Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Crankshaft to Camshaft Correlation	P0016	Detects a shift of the camshaft angle by monitoring the average offset angle.	average value of camshaft offset	<	-20.00	degrees	Engine backward rotation detected	=	FALSE	-	fail conditions exists for more than 2 events test performed continuously 0.01 s rate	B
			OR				and					
			average value of camshaft offset	>	20.00	degrees	NO pending or confirmed DTCs	=	see sheet inhibit tables	-		
							and					
							Ignition ON	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Turbocharger Boost Control Position Not Learned	P003A	Detects in range vane position errors during a vane sweep initiated to learn minimum and maximum vane position values.	**Path 1:**				injection quantity	>=	0.00	mm^3/rev	fail conditions exists for 0.01 s monitor runs once per trip with 0.01 s rate whenever enable conditions are met	B
			mean offset learned value at fully closed valve position	<	68.01	%	and					
			or				injection quantity	<=	100.00	mm^3/rev		
			mean offset learned value at fully closed valve position	>	95.61	%	and					
							accelerator pedal position	<=	0.10	%		
		The Open Position of the Turbocharger is learned prior to the Closed Position					and					
							Engine Speed	>=	500.00	rpm		
							and					
							Engine Speed	<=	760.00	rpm		
							and					
							Vehicle speed	>=	0.00	mph		
							and					
							Vehicle speed	<=	3.11	mph		
							and					
							Battery voltage	>=	10.00	V		
							and					
							engine coolant temperature	>=	71.96	°C		
							and					
							engine coolant temperature	<=	130.06	°C		
							and					
							Barometric pressure	>=	65.00	kPa		
							and					
							Barometric pressure	<=	110.00	kPa		
							and					
							time since start	>	10.08	sec		
							and					
							Engine is Idling	=	TRUE	-		
							and					
							Rich idle regeneration	=	inactive	-		
							and					
							Rich idle (see closed loop enable condition for details)	=	inactive	-		

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

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

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					turbocharger offset adaption timer	>= 0.60 sec		
					and			
					turbocharger offset adaption timer	>= 0.15 sec		
					and			
					No Pending or Confirmed DTCs	= see sheet inhibit tables -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
			Path 4: time taken to learn the mean offset learned value at fully open valve position	> 30.00 sec	injection quantity	>= 0.00 mm^3/rev	fail conditions exists for 0.01 s monitor runs once per trip with 0.01 s rate whenever enable conditions are met	
					and			
					injection quantity	<= 100.00 mm^3/rev		
					and			
					accelerator pedal position	<= 0.10 %		
					and			
					Engine Speed	>= 500.00 rpm		
					and			
					Engine Speed	<= 760.00 rpm		
					and			
					Vehicle speed	>= 0.00 mph		
					and			
					Vehicle speed	<= 3.11 mph		
					and			
					Battery voltage	>= 10.00 V		
					and			
					engine coolant temperature	>= 71.96 °C		
					and			
					engine coolant temperature	<= 130.06 °C		
					and			
					Barometric pressure	>= 65.00 kPa		
					and			
					Barometric pressure	<= 110.00 kPa		
					and			
					time since start	> 10.08 sec		
					and			
					Engine is Idling	= TRUE -		
					and			
					Rich idle regeneration	= inactive -		
					and			
					Rich idle (see closed loop enable condition for details)	= inactive -		
					and			
					Adaption is finished for this driving cycle	= FALSE -		
					and			
					valve open	= TRUE -		
					and			
					turbocharger offset adaption timer	>= 0.60 sec		
					and			
					turbocharger offset adaption timer	>= 0.15 sec		
					and			
					No Pending or Confirmed DTCs	= see sheet inhibit tables -		
					and			
					basic enable conditions met:	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Boost Control Circuit	P0045	Diagnoses the Turbocharger Boost Control low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit:≥ 200 K Ω impedance between ECU pin and load -	battery voltage for time and starter is active cranking No Pending or confirmed DTCs and basic enable conditions met:	> 11.00 V > 3.00 sec = FALSE - = see sheet inhibit tables = see sheet enable tables -	fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Diagnoses the Turbocharger Boost Control low side driver circuit for driver over temperature faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match and the IC maximum temperature has been exceeded IC Tempeature	> 150.00 °C	battery voltage for time and starter is active cranking No Pending or confirmed DTCs and basic enable conditions met:	> 11.00 V > 3.00 sec = FALSE - = see sheet inhibit tables = see sheet enable tables -	fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions are met	
Turbocharger Boost Control Circuit Low Voltage	P0047	Diagnoses the Turbocharger Boost Control low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	battery voltage for time and starter is active cranking No Pending or confirmed DTCs and basic enable conditions met:	> 11.00 V > 3.00 sec = FALSE - = see sheet inhibit tables = see sheet enable tables -	fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Turbocharger Boost Control Circuit High Voltage	P0048	Diagnoses the Turbocharger Boost Control low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	battery voltage for time and starter is active cranking No Pending or confirmed DTCs and basic enable conditions met:	> > = = =	11.00 3.00 FALSE see sheet inhibit tables 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
Turbocharger Boost High Control Circuit Low Voltage Turbocharger Boost Control Circuit High Voltage	P006E	Diagnoses the Turbo Charger Boost Circuit high side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	ignition on and basic enable conditions met:	= =	TRUE see sheet enable tables	- -	fail conditions exists for 1.5 s monitor runs with 0.1 s rate whenever enable conditions are met	B
Turbocharger Boost High Control Circuit High Voltage	P006F	Diagnoses the Turbo Charger Boost Circuit high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	battery voltage for time and starter is active cranking No Pending or confirmed DTCs and basic enable conditions met:	> > = = =	11.00 3.00 FALSE see sheet inhibit tables see sheet enable tables	V sec - -	fail conditions exists for 0.1 s monitor runs with 0.1 s rate whenever enable conditions are met	B
CAC Temperature Sensor Circuit Low Voltage	P007C	Detects a CAC temperature sensor circuit short to ground.	CAC downstream temperature sensor voltage same as	<	0.11	V	ignition on and	=	TRUE	-	fail conditions exists for 5 s test	A

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	>	150	°C	basic enable conditions met:	=	see sheet enable tables	-	performed continuously 0.1 s rate	
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
CAC Temperature Sensor Circuit High Voltage	P007D	Detects a CAC temperature sensor circuit short to high voltage or a sensor open circuit	CAC downstream temperature sensor voltage	>	4.93	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.1 s rate	A
			same as downstream CAC temperature	<	-53	°C	and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Fuel Rail Pressure [FRP] Too Low	P0087	Measured rail pressure is checked against desired rail pressure to detect low rail pressure conditions.	rail pressure deviation from set point calculated out of difference between desired and actual value (see Look-Up-Table #68)	>	11000 to 80000	kPa	state machine rail pressure control equal to metering unit control mode	=	TRUE	-	fail conditions exists for 8 s monitor runs with 0.02 s rate whenever enable conditions are met	B
							and basic enable conditions met:	=	see sheet enable tables	-		
							and metering unit actuator test active	=	FALSE	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			rail pressure deviation from set point calculated out of difference between desired and actual value (see Look-Up-Table #71)	>	11000 to 80000	kPa	(				fail conditions exists for 8 s monitor runs with 0.02 s rate whenever enable conditions are met	
							state machine rail pressure control equal to pressure control valve	=	TRUE	-		
							or state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-		
							) and basic enable conditions met:	=	see sheet enable tables	-		
							and metering unit actuator test active	=	FALSE	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Rail Pressure [FRP] Too High	P0088	Measured rail pressure is checked against desired rail pressure to detect high rail pressure conditions.	rail pressure deviation from set point calculated out of difference between desired and actual value (see Look-Up-Table #69)	< -80000 to -18000 kPa	current injection quantity and 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:	> 8.00 mm^3/rev = 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 set point calculated out of difference between desired and actual value	< -18000.00 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: and NO Pending or Confirmed DTCs:	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 8 s monitor runs with 0.02 s rate whenever enable conditions are met	
Engine Coolant Temperature (ECT)-Fuel Temperature Not Plausible	P008F	Detects a biased ECT or fuel temperature by comparing start-up temperatures between the two sensors.	**Path 1:** |(a) - (b)| (see Look-Up-Table #15) where ((a) captured engine coolant temperature at start and (b) captured fuel temperature at start) or **Path 2:** |(a) - (b)| (see Look-Up-Table #15)	> 100.00 °C = measured parameter - = measured parameter - <= 100.00 °C	minimum engine-off time and ambient temperature and Engine Running for time and engine post drive/ afterun and diagnostic performed in current drive cycle (once per trip monitor) and	>= 28800.00 sec > -60.04 °C = TRUE - > 0.00 sec = FALSE = FALSE	fail conditions exists for 0.2 s monitor runs once per trip with 0.2 s rate whenever enable conditions are met	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			with		basic enable conditions met:	= see sheet enable tables -		
			(a) captured engine coolant temperature at start	= measured parameter -	and			
			and		NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
			(b) captured fuel temperature at start	= measured parameter -				
			and					
			|(a) - (b)| (see Look-Up-Table #16)	> 20.00 °C				
			where					
			(a) captured engine coolant temperature at start	= measured parameter -				
			and					
			(b) captured fuel temperature at start	= measured parameter -				
			and					
			(					
			block heater detected (see parameter definition)	= FALSE -				
Fuel Pressure Regulator 1 Control Circuit/Open	P0090	Diagnoses the Fuel Pressure Regulator 1 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit:≥ 200 K Ω impedance between ECU pin and load -	battery voltage	> 11.00 V	fail conditions exists for 1 monitor runs with 0.01 s rate whenever enable conditions are met	A
					for time	> 3.00 sec		
					and			
					starter is active cranking	= FALSE -		
					for time	> 3.00 sec		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
					and			
					Basic enable conditions met	= see sheet enable tables -		
		Diagnoses the Fuel Pressure Regulator 1 low side driver circuit for circuit faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage	> 11.00 V	fail conditions exists for 1 monitor runs with 0.01 s rate whenever enable conditions are met	A
					for time	> 3.00 sec		
					and			
					starter is active cranking	= FALSE -		
					for time	> 3.00 sec		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Basic enable conditions met	=	see sheet enable tables	-		
Fuel Pressure Regulator 1 Control Circuit Low	P0091	Diagnoses the Fuel Pressure Regulator 1 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	battery voltage	>	11.00	V	fail conditions exists for 0.75s monitor runs with 0.01 s rate whenever enable conditions are met	A
							for time	>	3.00	sec		
							and starter is active cranking	=	FALSE	-		
							for time	>	3.00	sec		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and Basic enable conditions met	=	see sheet enable tables	-		
Fuel Pressure Regulator 1 Control Circuit High	P0092	Diagnoses the Fuel Pressure Regulator 1 low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	battery voltage	>	11.00	V	fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions are met	A
							for time	>	3.00	sec		
							and starter is active cranking	=	FALSE	-		
							for time	>	3.00	sec		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and Basic enable conditions met	=	see sheet enable tables	-		
Intake Air Temperature (IAT) Sensor 2 Circuit Low Voltage	P0097	Detects low voltage readings on the MAF IAT circuit, indicating an OOR low condition on the MAF IAT circuit (IAT #2)	MAF intake air temperature sensor voltage	<	0.08	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously with 0.1 s rate	A
			same as intake air temperature	>	150	°C	and basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Intake Air Temperature (IAT) Sensor 2 Circuit High Voltage	P0098	Detects high voltage readings on the MAF IAT circuit, indicating an OOR high condition on the MAF IAT circuit (IAT#2)	MAF intake air temperature sensor voltage	>	4.93	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously with 0.1 s rate	A
			same as intake air temperature	<	-52	°C	and basic enable conditions met:	=	see sheet enable tables	-		
Fuel Pressure Regulator 1 High Control Circuit Low Voltage	P00C9	Diagnoses the Fuel Pressure Regulator 1 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	ignition on	=	TRUE	-	fail conditions exists for 0.5s monitor runs with 0.01 s rate whenever enable conditions are met	A
							and Basic enable conditions met		See sheet enable tables			
Fuel Rail Pressure Regulator 1 High Control Circuit High Voltage	P00CA	Diagnoses the Fuel Pressure Regulator 1 high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	battery voltage	>	11.00	V	fail conditions exists for 0.1 s monitor runs with 0.1 s rate whenever enable conditions are met	A
							for time	>	3.00	sec		
							and starter is active cranking	=	FALSE	-		
							for time	>	3.00	sec		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Intake Air Temperature 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	<	0.03	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.1 s rate	B
			same as temperature of intake air temperature sensor 3	>	250	°C	and basic enable conditions met:	=	see sheet enable tables	-		
							and 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	>	4.93	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.1 s rate	B
			same as temperature of intake air temperature sensor 3	<	-53	°C	and 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	**Path1:**				Engine Running (please see the definition)	=	TRUE	-	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	B
			Humidity Sensor Duty Cycle	<	5.00	%	and following conditions for time:	>	1.00	sec		
			same as relative humidity	>	100.00	%	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.
		The internal ECM PWM circuit driver detects either a duty cycle which has not been received or the maximum period has been exceeded, indicating short low condition on the humidity sensor circuit.	**Path 2:**				Engine Running (please see the definition)	=	TRUE	-	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	
			Internal ECM PWM circuit low voltage	=	TRUE	-	and					
			and				following conditions for time:	>	1.00	sec		
			ECM PWM circuit maximum period detected	=	TRUE	-	battery voltage	>	11.00	V		
			or				battery voltage	<	655.34	V		
			Internal ECM PWM period not received	=	TRUE	-	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							no pending or confirmed DTCs	=	see sheet inhibit tables	-		
Humidity Sensor Circuit High	P00F5	Detects a high duty cycle signal from the humidity sensor, indicating an OOR high condition on the humidity sensor circuit	**Path 1:**				Engine Running (please see the definition)	=	TRUE	-	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	B
			Humidity Sensor Duty Cycle	>	95.00	%	and					
			same as				following conditions for time:	>	1.00	sec		
			relative humidity	<	0.00	%	battery voltage	>	11.00	V		
							battery voltage	<	655.34	V		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							no pending or confirmed DTCs	=	see sheet inhibit tables	-		
		The internal ECM PWM circuit driver detects either a duty cycle which has not been received or the maximum period has been exceeded, indicating short high condition on the humidity sensor circuit.	**Path 2:**				Engine Running (please see the definition)	=	TRUE	-	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	
			Internal ECM PWM circuit high voltage	=	TRUE	-	and					
			and				following conditions for time:	>	1.00	sec		
			ECM PWM circuit maximum period detected	=	TRUE	-	battery voltage	>	11.00	V		
			or				battery voltage	<	655.34	V		
			Internal ECM PWM period not received	=	TRUE	-	and					
							basic enable conditions met:	=	see sheet enable tables	-		

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	-		
Humidity Sensor Circuit Intermittent / Erratic	P00F6	The humidity signal performance monitor monitors the humidity signal delta in a defined time interval. The sum of these signal delta's over a number of time intervals is compared to a threshold.	Cumulative Humidity Sensor signal delta	>=	50.00	%	Engine Running (please see the definition)	=	TRUE	-	fail conditions exists for 4 out of 5 windows (x out of y), test is performed continuously with 0.1 s rate	B
			accumulated over a defined time interval	>	5.00	counts	and					
			same as				basic enable conditions met:	=	see sheet enable tables	-		
			accumulated over time	>	0.13	sec	and					
							no pending or confirmed DTCs	=	see sheet inhibit tables	-		
Mass Air Flow (MAF) Sensor Performance	P0101	Detects skewed MAF sensor by comparing measured MAF to calculated expected MAF based on volumetric efficiency of the engine	(				ambient pressure	>	74.80	kPa	fail conditions exists for 10 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			measured air mass flow signal	<	(a) - (b)	-	and					
			with									
			(a) engine load dependent MAP for calculating lower threshold (see Look-Up-Table #1)	=	0.75 to 0.8	ratio	engine coolant temperature	>=	-20.04	°C		
			and with				and					
			(b) air temperature dependent correction factor curve	=	0	factor	engine coolant temperature	<=	129.96	°C		
			or				and					
			measured air mass flow signal	>	(c) + (b)	-						
			with				gradient of the charge-air temperature	>=	-2.00	°C / sec		
			(c) Engine load dependent MAP for calculating higher threshold	=	1.2	ratio	and					
			and with				gradient of the charge-air temperature	<=	2.00	°C / sec		
			(b) air temperature dependent correction factor curve	=	0	factor	and					
			)				(					
							Engine Running	=	TRUE	-		
							for					
							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					
							(					
							set point valve position of exhaust-gas recirculation	>=	-400.00	%		
							and					
							set point valve position of exhaust-gas recirculation	<=	2.00	%		
							for					
							time	>	3.00	sec		
							)					
							and					
							injection quantity	<=	300.00	mm^3/rev		
							and					
							air pressure in the induction volume	<=	280.00	kPa		
							and					
							engine speed	>=	625.00	rpm		
							and					
							engine speed	<=	1500.00	rpm		
							and					
							intake air temperature	>=	-7.04	°C		
							and					
							intake air temperature	<=	51.96	°C		
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Mass Air Flow (MAF) Sensor Circuit High Voltage	P0102	Detects low frequency readings on the MAF circuit, indicating an OOR low condition on the MAF circuit	signal period of air mass flow sensor (MAF)	>	881.00	usec	ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs 0.01 s rate whenever enable conditions are met	A
			same as				and					
			air mass flow	<	14.04	g/sec	basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Mass Air Flow (MAF) Sensor Circuit Low Voltage	P0103	Detects high frequency readings on the MAF circuit, indicating an OOR high condition on the MAF circuit	PWM period too long	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs 0.01 s rate whenever enable conditions are met	A
			or				and					
			signal period of air mass flow sensor (MAF)	<	50.00	usec	basic enable conditions met:	=	see sheet enable tables	-		
			same as				and					
			air mass flow	>	7354.80	g/sec	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Manifold Absolute Pressure (MAP) Sensor Performance	P0106	Detects a skewed MAP or BARO sensor by comparing MAP readings to the BARO sensor	**Path 1:**				engine coolant temperature	>	-3549.94	°C	fail conditions exists for 5 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			(a) - (b)	<	-15.00	kPa	and					
							current injection quantity	<	1308.00	mm^3/rev		
			or				and					
			Path 2:				actuator position of throttle valve	<=	327.67	%		
			(a) - (b)	>	15.00	kPa	and					
			where				turbo charger (VNT) wiping is active (see parameter definition)	=	FALSE	-		
			(a) MAP sensor measured pressure	=	measured parameter	-	and					
			and				(					
			(b) BARO sensor measured pressure	=	measured parameter	-	engine speed	>=	0.00	rpm		
							and					
							engine speed	<=	100.00	rpm		
							)					
							and					
							vehicle speed	<	3.11	mph		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Manifold Absolute Pressure (MAP) Sensor Circuit Low Voltage	P0107	Detects low voltage readings on the MAP circuit, indicating an OOR low condition on the MAP circuit	**Path 1:**				engine synchronization completed	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.01 s rate	A
			(				which means					
			sensor voltage of manifold absolute pressure	<	0.91	V	number of crankshaft revolutions	>=	4.00	revs		
			same as				and					
			manifold absolute pressure	<	44.9	kPa	crankshaft reference mark detected	=	TRUE	-		
							(reference mark is the 2 missing teeth in the 50-2 tooth-wheel configuration)					
			and				and					
			actuator position of throttle valve	<=	20.00	%	basic enable conditions met:	=	see sheet enable tables	-		
			)									
			or									
			Path 2:									
			(									
			sensor voltage of manifold absolute pressure	<	0.38	V						
			same as									
			manifold absolute pressure	<	-0.3	kPa						
			and									
			actuator position of throttle valve	>	20.00	%						
			)									

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Manifold Absolute Pressure (MAP) Sensor Circuit High Voltage	P0108	Detects high voltage readings on the MAP circuit, indicating an OOR high condition on the MAP circuit	sensor voltage of manifold absolute pressure	>	4.75	V	engine synchronization completed	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.01 s rate	A
			same as				which means					
			manifold absolute pressure	>	371.3	kPa	number of crankshaft revolutions	>=	4.00	revs		
							and					
							crankshaft reference mark detected	=	TRUE	-		
							(reference mark is the 2 missing teeth in the 50-2 tooth-wheel configuration)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Intake Air Temperature Sensor 1 Circuit Low	P0112	Detects a low PWM period from the humidity temperature sensor, indicating an OOR low condition on the humidity temperature sensor circuit	**Path 1:**				Engine Running (please see the definition)	=	TRUE	-	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	B
			Humidity Temperature sensor period	<	0.26	centisecond	and					
			same as				following conditions for time:	>	1.00	sec		
			humidity temperature	>	145.96	°C	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.	**Path 2:**				Engine Running (please see the definition)	=	TRUE	-	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	
			Internal ECM PWM circuit low voltage	=	TRUE	-	and					
			and				following conditions for time:	>	1.00	sec		
			ECM PWM circuit maximum period detected	=	TRUE	-	battery voltage	>	11.00	V		
			or				battery voltage	<	655.34	V		
			Internal ECM PWM period not received	=	TRUE	-	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							no pending or confirmed DTCs	=	see sheet inhibit tables	-		

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 High	P0113	Detects a high PWM period from the humidity temperature sensor, indicating an OOR high condition on the humidity temperature sensor circuit	**Path 1:** Humidity Temperature sensor period same as humidity temperature	> 10.00 centisecond < -60.00 °C	Engine Running (please see the definition) and following conditions for time: battery voltage battery voltage and basic enable conditions met: and no pending or confirmed DTCs	= TRUE - > 1.00 sec > 11.00 V < 655.34 V = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	B
		The internal ECM PWM circuit driver detects either a duty cycle which has not been received or the maximum period has been exceeded, indicating short high condition on the humidity sensor circuit.	**Path 2:** Internal ECM PWM circuit high voltage and ECM PWM circuit maximum period detected or Internal ECM PWM period not received	= TRUE - = TRUE - = TRUE -	Engine Running (please see the definition) and following conditions for time: battery voltage battery voltage and basic enable conditions met: and no pending or confirmed DTCs	= TRUE - > 1.00 sec > 11.00 V < 655.34 V = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	
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 same as engine coolant temperature	< 0.51 V > 149 °C	ignition on and basic enable conditions met:	= TRUE - = see sheet enable tables -	fail conditions exists for 15 s test performed continuously 0.2 s rate	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Engine Coolant Temperature (ECT) Sensor Circuit High Voltage	P0118	Detects high voltage readings on the ECT circuit, indicating an OOR high condition on the ECT circuit	voltage of engine coolant temperature sensor	>	4.90	V	ignition on	=	TRUE	-	fail conditions exists for 60 s test performed continuously 0.2 s rate	A
			same as engine coolant temperature	<	-53	°C	and basic enable conditions met:	=	see sheet enable tables	-		
Engine Coolant Temperature (ECT) Below Thermostat Regulating Temperature	P0128	Detects a stuck open thermostat by comparing actual engine coolant heat up profile to an expected modeled heat up profile. The targets are dependent on start up conditions (high and low regions)	modeled coolant temperature (model derived from injection quantity, coolant temperature at start, and ambient temperature)	>=	59.96	°C	engine pre drive	=	FALSE	-	fail conditions exists for 0.2 s monitor runs once per trip with 0.2 s rate whenever enable conditions are met	B
			and measured engine coolant temperature	<	49.96	°C	and time since start	<	1440.00	sec		
		Low Region Engine Temperature at start < 31 degC AND ambient air temperature <= 10 degC.					and measured engine coolant temperature and	>=	-53.04	°C		
							captured value of coolant temperature during start and (	<=	30.96	°C		
							ambient temperature and	>	-7.04	°C		
							ambient temperature) and	<	59.96	°C		
							ambient temperature (used for low region determination) and	<=	9.96	°C		
							engine idle time ratio which is defined by (idle time divided by time since start) where idle time is incremented when: (	<	0.50	%		
							accelerator pedal value and	<=	10.01	%		
							vehicle speed and	<=	9.94	mph		
							engine speed)	<=	750.00	rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							diagnostic performed in current dc	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
		Detects a stuck open thermostat by comparing actual engine coolant heat up profile to an expected modeled heat up profile. The targets are dependant on start up conditions (high and low regions)	modeled coolant temperature (model derived from injection quantity, coolant temperature at start, and ambient temperature)	>=	81.96	°C	engine pre drive	=	FALSE	-		
			and				and					
			measured engine coolant temperature	<	70.96	°C	time since start	<	1440.00	sec		
							and					
							measured engine coolant temperature	>=	-53.04	°C		
		High region Engine Temperature at start < 52 degC AND ambient air temperature > 10 degC					and					
							captured value of coolant temperature during start	<=	51.96	°C		
							and					
							(					
							ambient temperature	>	-7.04	°C		
							and					
							ambient temperature	<	59.96	°C		
							)					
							and					
							ambient temperature (used for high region determination)	>	9.96	°C		
							and					
							engine idle time ratio	<	0.50	%		
							which is defined by					
							(					
							idle time					
							divided by					
							time since start					
							)					
							where idle time is incremented when:					
							(					
							accelerator pedal value	<=	10.01	%		
							and					
							vehicle speed	<=	9.94	mph		
							and					
							engine speed	<=	750.00	rpm		
							)					
							and					
							diagnostic performed in current dc	=	FALSE	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met: and NO Pending or Confirmed DTCs:	= see sheet enable tables - = see sheet inhibit tables -		
HO2S Bank 1 Sensor 1 Circuit Low	P0131	Detects an out of range low fault of the upstream NOx sensor lambda signal	Upstream NOx sensor lambda signal received via CAN	< -150.00 counts (-150 counts = 1100 Lambda = ~27 %O2)	Valid upstream NOx signal from CAN is received (no NOx sensor communication failures) Engine Running (see parameter definition) for time (required for the NOx sensor to give valid response) and basic enable conditions met:	= TRUE - = TRUE - > 20.00 sec = see sheet enable tables -	fault exists for more than 3 sec; monitor runs at 0.1 s when enable conditions are met	B
HO2S Bank 1 Sensor 1 Circuit High	P0132	Detects an out of range high fault of the upstream NOx sensor lambda signal	Upstream NOx sensor lambda signal received via CAN	> 1550.00 counts (1550 counts = 0.65 Lambda = -0.1178 %O2)	Valid upstream NOx signal from CAN is received (no NOx sensor communication failures) Engine Running (see parameter definition) for time (required for the NOx sensor to give valid response) and basic enable conditions met:	= TRUE - = TRUE - > 20.00 sec = see sheet enable tables -	fault exists for more than 3 sec; monitor runs at 0.1 s when enable conditions are met	B
HO2S Bank1 Sensor2 Circuit Low	P0137	Detects an out of range low fault of the downstream NOx sensor lambda signal	Downstream NOx sensor lambda signal received via CAN	< -150.00 counts (-150 counts = 1100 Lambda = ~27 %O2)	Valid downstream NOx signal from CAN is received (no NOx sensor communication failures) Engine Running (see parameter definition) for time (required for the NOx sensor to give valid response) and basic enable conditions met:	= TRUE - = TRUE - > 20.00 sec = see sheet enable tables -	fault exists for more than 3 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.
HO2S Bank1 Sensor2 Circuit High	P0138	Detects an out of range high fault of the downstream NOx sensor lambda signal	Downstream NOx sensor lambda signal received via CAN	>	1550.00	counts	Valid downstream NOx signal from CAN is received (no NOx sensor communication failures)	=	TRUE	-	fault exists for more than 3 sec; monitor runs at 0.1 s when enable conditions are met	B
					(1550 counts = 0.65 Lambda = - 0.1178 %O2)		Engine Running (see parameter definition)	=	TRUE	-		
							for time (required for the NOx sensor to give valid response)	>	20.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
NOx Sensor - O2 Sensor Slow Response - Rich to Lean Bank 1 Sensor 1	P014C	measure O2 response time of upstream NOx sensor until O2 concentration reaches the calibrated upper limit of the modeled O2 concentration in overrun state	measured O2 response time	<	2.00	sec	**global enable condition:**				fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	B
			with				Engine speed	>	600.00	rpm		
			O2 concentration of the sensor	<=	((0.2095 - (a)) * (b)) + (a)	factor	Engine speed	<	4000.00	rpm		
			where				Battery voltage	>	11.00	V		
			(a) modeled O2 in waiting-injection falling state	=	modeled O2 concentration	factor	Ambient Air Pressure	>=	74.80	kPa		
			(b) factor for the determination of the upper limit of modeled O2 concentration	=	0.60	factor	Ambient Air Pressure	<=	106.00	kPa		
							Ambient Air Temperature	>=	-7.04	°C		
							Ambient Air Temperature	<=	124.96	°C		
							Engine operation mode	=	normal	-		
							Post injection	=	inactive	-		
							Oxygen Concentration Signal	=	active	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							Communication with NOx Sensor	=	active	-		
							Exhaust Gas Temperature	>=	-0.04	°C		
							Exhaust Gas Temperature	<=	1299.96	°C		
							Additional enable conditions for transitioning state machine from inactive state to stable operation state:					
							following conditions for time:	>	1.80	sec		
							modeled O2 signal (based on injection quantity, air mass and fuel density)	<	0.12	-		
							Fuel Injection Quantity	>	120.00	mm^3/rev		
							Engine speed	>	600.00	rpm		
							Additional enable conditions for transitioning state machine from stable operation state to wait-Injection falling state:					
							Fuel Injection Quantity	<	a+b	-		
							with					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					a) Measured and stored Fuel Injection Quantity at start of diagnosis	=	measured parameter	-		
					b) Decline of Injection Quantity from stored fuel quantity at start of diagnosis	>=	18.00	mm^3/rev		
					and					
					Fuel Injection Quantity	>	a-b	-		
					with					
					a) Measured and stored Fuel Injection Quantity at start of diagnosis	=	measured parameter	-		
					b) Decline of Injection Quantity from stored fuel quantity at start of diagnosis	>=	18.00	mm^3/rev		
					and					
					Engine speed	>	600.00	rpm		
					Additional enable conditions for transitioning state machine from wait-Injection falling state to wait-overrun state:					
					Fuel Injection Quantity	<	120.00	mm^3/rev		
					Fuel Injection Quantity	<	a+b			
					with					
					a) Measured and stored Fuel Injection Quantity at start of diagnosis	=	measured parameter	-		
					b) Decline of Injection Quantity from stored fuel quantity at start of diagnosis	>=	18.00	mm^3/rev		
					Additional enable conditions for transitioning state machine from wait-overrun state to overrun state:					
					following for exhaust gas transfer time:	>	0.50	sec		
					actual valve position of exhaust-gas recirculation	>=	0.00	%		
					and					
					actual valve position of exhaust-gas recirculation	<=	80.00	%		
					and					
					within the time fuel injection falling below	<	1.05	sec		
					Fuel Injection Quantity	<	4.00	mm^3/rev		
					and					
					Fuel Injection Quantity	<	a+b			
					with					
					a) Measured Minimum Fuel Injection Quantity	=	measured parameter	-		
					b) Maximum fluctuation of Injection Quantity	=<	16.00	mm^3/rev		
					Additional enable conditions for transitioning state machine from overrun state to delay state:					
					actual valve position of exhaust-gas recirculation	>=	0.00	%		
					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	<=	80.00	%		
							Deviation from maximum O2 concentration during overrun	<	0.06	-		
							Additional enable conditions for transitioning from delay state to diagnostic completion state:					
							actual valve position of exhaust-gas recirculation	>=	0.00	%		
							and					
							actual valve position of exhaust-gas recirculation	<=	80.00	%		
							Deviation from maximum O2 concentration during overrun	<	0.06	-		
Fuel Trim System Lean	P0171	Monitors the fuel mass observer correction quantity. Detects if the correction quantity exceeds the feedback limit.	Fuel mass observer emission correction quantity (see Look-Up Table #41)	<=	-164.4 to -46.12	mm^3/rev	(Status of the Observer function's lambda-signal	=	TRUE	-	fail conditions exists for 12 s monitor runs with 0.02 s rate whenever enable conditions are met	B
							means					
							(					
							lambda signal from NOx sensor ready (see parameter definition)	=	TRUE	-		
							fuel system is in fuel cut off (see parameter definition)	=	FALSE	-		
							Particulate Filter Regeneration Mode	=	FALSE	-		
							((					
							fraction of total fuel injected that is involved in combustion (Fuel Mass for Combustion / Total fuel injected)	=	1	-		
							or					
							calculated EGR rate	>=	0	-		
							)					
							for time	>	1.00	sec		
							))					
							AND					
							Controller status of the observer	=	TRUE	-		
							means					
							(					
							Load dependent release state (see look up table #48)	=	0 to 1	-		
							AND					
							Component Protection release state (see look up table #43)	>	0 to 1	-		
							)					
							)					
							engine coolant temperature	<=	199.96	°C		
							engine coolant temperature	>=	64.96	°C		
							Normal Injection Mode	=	TRUE	-		
							Barometric pressure	>=	74.80	kPa		
							Ambient temperature	>=	-7.04	°C		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Fuel Trim System Rich	P0172	Monitors the fuel mass observer correction quantity. Detects if the correction quantity exceeds the feedback limit.	Fuel mass observer emission correction quantity (see Look-Up Table #46)	>=	46.12 to 164.64	mm^3/rev	(Status of the Observer function's lambda-signal	=	TRUE	-	fail conditions exists for 12 s monitor runs with 0.02 s rate whenever enable conditions are met	B
							means					
							(					
							lambda signal from NOx sensor ready (see parameter definition)	=	TRUE	-		
							fuel system is in fuel cut off (see parameter definition)	=	FALSE	-		
							Particulate Filter Regeneration Mode	=	FALSE	-		
							((					
							fraction of total fuel injected that is involved in combustion (Fuel Mass for Combustion / Total fuel injected)	=	1	-		
							or					
							calculated EGR rate	>=	0	-		
							)					
							for time	>	1.00	sec		
							))					
							AND					
							Controller status of the observer	=	TRUE	-		
							means					
							(					
							Load dependent release state (see look up table #48)	=	0 to 1	-		
							AND					
							Component Protection release state (see look up table #43)	>	0 to 1	-		
							)					
							)					
							engine coolant temperature	<=	199.96	°C		
							engine coolant temperature	>=	64.96	°C		
							Normal Injection Mode	=	TRUE	-		
							Barometric pressure	>=	74.80	kPa		
							Ambient temperature	>=	-7.04	°C		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
Fuel pump Temperature Sensor 1 Circuit Low	P0182	Detects low voltage readings in the fuel pump temperature sensor 1 circuit, indicating an OOR low condition on the fuel pump temperature sensor 1 circuit	voltage of fuel temperature sensor 1	<	0.60	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.2 s rate	B
			same as				and					
			fuel temperature	>	59	°C	basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Fuel pump Temperature Sensor 1 Circuit High	P0183	Detects high voltage readings in the fuel pump temperature sensor 1 circuit, indicating an OOR high condition on the fuel pump temperature sensor 1 circuit	voltage of fuel temperature sensor 1	>	4.71	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.2 s rate	B
			same as				and					
			fuel temperature	<	-50.04	°C	basic enable conditions met:	=	see sheet enable tables	-		
Fuel Temperature Sensor 2 Circuit Low	P0187	Detects low voltage condition of the fuel temperature sensor circuit, indicating an OOR low condition	fuel temperature sensor voltage	<	0.60	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.2 s rate	B
			same as				and					
			fuel temperature	>	150	°C	basic enable conditions met:	=	see sheet enable tables	-		
Fuel Temperature Sensor 2 Circuit High	P0188	Detects high voltage condition of the fuel temperature sensor circuit, indicating an OOR high condition	fuel temperature sensor voltage	>	4.75	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.2 s rate	B
			same as				and					
			fuel temperature	<	-50	°C	basic enable conditions met:	=	see sheet enable tables	-		
Fuel Rail Pressure [FRP] Sensor Performance	P0191	Detects a drifted fuel rail pressure sensor by determining the adaptation factor of the fuel rail pressure regulator 2.	fuel pressure regulator 2 adaptation factor	>=	1.25	factor	fuel pressure regulator 2 in closed loop control	=	TRUE	-	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever	A
			or				and					
			fuel pressure regulator 2 adaptation factor	<=	0.75	factor	adaptation for fuel pressure regulator 2 active	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							means				enable conditions are met	
							(					
							counter for successful adaption	>	0	counts		
							or					
							counter for the successful calculation of the adaptation	>	9.00	counts		
							and					
							(					
							engine speed	>	400.00	rpm		
							and					
							engine speed	<	1000.00	rpm		
							)					
							and					
							vehicle speed	<=	1.86	mph		
							and					
							(					
							state machine rail pressure control equal to pressure control valve	=	TRUE	-		
							or					
							state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
		Detects a biased sensor by determining the FRP sensor voltage to be in the correct range for atmospheric pressure at engine off and with sufficient pressure bleed-off time.	(				engine post drive/ afterun	=	TRUE	-	all conditions exists for more than 30 monitor runs once per driving cycle with 0.01 s rate whenever enable conditions are met	
			rail pressure sensor voltage	<	0.35	V	and					
			or				fuel temperature	>	-0.04	°C		
			rail pressure sensor voltage	>	0.65	V	and					
			)				engine has already run in this driving cycle	=	TRUE	-		
							and					
							rail pressure is reduced	=	TRUE	-		
							means					
							rail pressure	<	0.00	Kpa		
							and					
							fuel pressure regulator 2 current	<=	1.70	Amps		
							and					
							time since engine off	>	30.08	sec		
							and					
							number of fault measurements during engine postdrive/ afterun	>	10.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:		see sheet inhibit tables	-		

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 Low	P0192	Detects low voltage readings on the FRP circuit, indicating an OOR low condition on the FRP circuit	rail pressure sensor voltage	< 0.19 V	ignition on	= TRUE	fail conditions exists for 0.14 s monitor runs with 0.01 s rate whenever enable conditions are met	A
			same as rail pressure	< 0 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 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 -		
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. 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 1	> (a) - (b) -	and			
			(with (a) maximum injection energizing time	= 384.4 usec	(fuel temperature and	>= 0.06 °C		
			and with (b) offset of the maximum filtered energizing time))	= 12 usec	fuel temperature) and	<= 79.96 °C		
			for rail pressure point	= 70000.00 kPa	engine temperature and	> 49.96 °C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					battery voltage	>	10.00	V		
					and combustion chamber is not cold off means time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
					and intake manifold pressure	>	75.00	kPa		
					and intake manifold pressure	<	150.00	kPa		
					and accelerator pedal position	<	0.05	%		
					and Fuel system status	=	Fuel cut off	-		
					and (engine speed	>	(b) - (a)	-		
					and engine speed	<	(a) + (c)	-		
					with (a) value of engine speed	=	30.00	rpm		
					and with (b) gear specific minimum engine speed	=	950.00	rpm		
					and with (c) gear specific maximum engine speed)	=	1850.00	rpm		
					and current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
					and vehicle speed	>	0.00	mph		
					and rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
					for time	>	0.10	sec		
					and no gear change is occurred	=	TRUE	-		
					and 4 wheel mode	=	FALSE	-		
					and basic enable conditions met:	=	see sheet enable tables	-		
					and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 2 Injection Timing Retarded	P01CD	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point.	(		environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Detects a fault when the corrected energizing time exceeds the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 2	>	(a) - (b)	-	and				whenever enable conditions are met	
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time	=	384.4	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time	=	12	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 7 Injection Timing Retarded	P01D7	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point.	(				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 7	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time	=	384.4	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time	=	12	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 8 Injection Timing Retarded	P01D9	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 8	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time	=	384.4	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time	=	12	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off					
							means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					

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	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 4 Injection Timing Retarded	P01D1	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 4	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time	=	384.4	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time	=	12	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off					
							means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

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

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 6 Injection Timing Retarded	P01D5	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 6	>	(a) - (b)	-	and					
			(with				(fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time	=	384.4	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time	=	12	usec	)					
			))				and					
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 3 Injection Timing Retarded	P01CF	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 3	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time	=	384.4	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time	=	12	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off means					

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 #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 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					
			(				(					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time	=	47.2	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off					
							means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 2 Injection Timing Advanced	P01CE	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time falls below the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 2	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time	=	47.2	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off means					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							for time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 7 Injection Timing Advanced	P01D8	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time falls below the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 7	<	(a) + (b)	-	and					
			(with				(					
							fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time	=	47.2	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 8 Injection Timing Advanced	P01DA	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time falls below the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 8	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time	=	47.2	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 4 Injection Timing Advanced	P01D2	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time falls below the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 4	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	usec	and					
			and with				fuel temperature	<=	79.96	°C		

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 usec	)			
			)		and			
			)					
			for		engine temperature	> 49.96 °C		
			rail pressure point	= 70000.00 kPa	and			
					battery voltage	> 10.00 V		
					and			
					combustion chamber is not cold off			
					means			
					time since last combustion (see Look-Up-Table #94)	>= 5 to 30 sec		
					and			
					intake manifold pressure	> 75.00 kPa		
					and			
					intake manifold pressure	< 150.00 kPa		
					and			
					accelerator pedal position	< 0.05 %		
					and			
					Fuel system status	= Fuel cut off -		
					and			
					(			
					engine speed	> (b) - (a) -		
					and			
					engine speed	< (a) + (c) -		
					with			
					(a) value of engine speed	= 30.00 rpm		
					and with			
					(b) gear specific minimum engine speed	= 950.00 rpm		
					and with			
					(c) gear specific maximum engine speed	= 1850.00 rpm		
					)			
					and			
					current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	= 0 to 1 -		
					and			
					vehicle speed	> 0.00 mph		
					and			
					rail pressure deviation from set point calculated out of difference between desired and actual value	< 5000.00 kPa		
					for			
					time	> 0.10 sec		
					and			
					no gear change is occurred	= TRUE -		
					and			
					4 wheel mode	= FALSE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 5 Injection Timing Advanced	P01D4	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time falls below the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 5	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time	=	47.2	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off					
							means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					time	> 0.10 sec		
					and no gear change is occurred	= TRUE -		
					and 4 wheel mode	= FALSE -		
					and basic enable conditions met:	= see sheet enable tables -		
					and NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Cylinder 6 Injection Timing Advanced	P01D6	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point. Detects a fault when the corrected energizing time falls below the allowed limit.	(		environmental temperature	> -7.04 °C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			corrected energizing time for the rail pressure calibration points and cylinder 6	< (a) + (b) -	and			
			(		(			
			with		fuel temperature	>= 0.06 °C		
			(a) minimum injection energizing time	= 107.2 usec	and			
			and with		fuel temperature	<= 79.96 °C		
			(b) offset of the minimum filtered energizing time	= 47.2 usec	)			
			)		and			
			)					
			for		engine temperature	> 49.96 °C		
			rail pressure point	= 70000.00 kPa	and			
					battery voltage	> 10.00 V		
					and combustion chamber is not cold off means			
					time since last combustion (see Look-Up-Table #94)	>= 5 to 30 sec		
					and intake manifold pressure	> 75.00 kPa		
					and intake manifold pressure	< 150.00 kPa		
					and accelerator pedal position	< 0.05 %		
					and Fuel system status	= Fuel cut off -		
					and (			
					engine speed	> (b) - (a) -		
					and engine speed	< (a) + (c) -		
					with (a) value of engine speed	= 30.00 rpm		
					and with (b) gear specific minimum engine speed	= 950.00 rpm		

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) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 3 Injection Timing Advanced	P01D0	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time falls below the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 3	<	(a) + (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) minimum injection energizing time	=	107.2	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time	=	47.2	usec	)					
			)				and					
			)									
			for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and					
							battery voltage	>	10.00	V		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
							and					
							intake manifold pressure	>	75.00	kPa		
							and					
							intake manifold pressure	<	150.00	kPa		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Coolant Temperature Dropped Below Diagnostic Monitoring Temperature	P01F0	Detects a stuck open thermostat by monitoring for a decrease of the engine coolant temperature below the OBD monitoring threshold during normal operating conditions	engine coolant temperature	<	70.96	°C	engine pre drive	=	FALSE	-	fail conditions exists for 0.2 s monitor runs with 0.2 s rate whenever enable conditions are met	B
			for fault counter	>=	200.00	-	and					
			which is equivalent to fault time	>=	40.00	sec	ambient temperature	>=	-7.04	°C		
							and					
							engine coolant temperature at least once in driving cycle	>=	70.96	°C		
							and					
							instantaneous fuel consumption (low-pass filtered)	>=	6.00	liters / hr		
							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 -		
Injector 1 Control Circuit	P0201	Diagnoses the Fuel Injector Cylinder #1 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit:≥ 200 K Ω impedance between ECU pin and load -	Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 2 Control Circuit	P0202	Diagnoses the Fuel Injector Cylinder #2 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit:≥ 200 K Ω impedance between ECU pin and load -	Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 3 Control Circuit	P0203	Diagnoses the Fuel Injector Cylinder #3 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit:≥ 200 K Ω impedance between ECU pin and load -	Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Injector 4 Control Circuit	P0204	Diagnoses the Fuel Injector Cylinder #4 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 5 Control Circuit	P0205	Diagnoses the Fuel Injector Cylinder #5 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 6 Control Circuit	P0206	Diagnoses the Fuel Injector Cylinder #6 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Injector 7 Control Circuit	P0207	Diagnoses the Fuel Injector Cylinder #7 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 8 Control Circuit	P0208	Diagnoses the Fuel Injector Cylinder #8 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Turbocharger/Supercharger "A" Overboost Condition	P0234	Detects an permanent negative control deviation of the boost pressure indicating and overboost condition	control deviation of the boost pressure calculated out of difference between desired and actual value (see Look-Up-Table #4)	<	(d*e*f)	-	(				fail conditions exists for 10 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			with				VNT turbocharger offset adaptation active - in order to compensate sensor drift and valve aging, the valve is closed and opened fully once in a driving cycle during engine idling, the read positions for opening and closing are averaged and used for the calculation of offset drift of the valve	=	FALSE	-		
			(d) The lower threshold pressure (see Look-Up-Table #62)	=	-31.5 to -10	kPa						
			(e) correction factor (see Look-Up-Table #60)	=	0.699951 to 1	factor	and					
			(f) ECB valve based lower limit correction factor	=	1.00	factor	VNT turbocharger wiping is active	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					- in order to prevent soot accumulation e.g. in a long idle operation under cold engine condition on the turbine the desired value of the boost pressure actuator position governor is assigned from the set-point value			
					and			
					injection quantity is stable	= TRUE -		
					means			
					increase of injection quantity	< 40.00 (mm^3/rev)/s		
					and			
					engine speed is stable	= TRUE -		
					means			
					increase of engine speed	< 35.00 rpm/s		
					and			
					injection Quantity	>= 132.00 mm^3/rev		
					injection Quantity	<= 480.00 mm^3/rev		
					and			
					engine Speed	>= 1450.00 rpm		
					engine Speed	<= 2000.00 rpm		
					and			
					working range of boost pressure is in closed-loop	= TRUE -		
					means			
					(			
					engine speed	> 1200.00 rpm		
					and			
					injection quantity	> 20.00 mm^3/rev		
					)			
					NO Pending or Confirmed DTCs	= see sheet inhibit tables -		
					)			
					for time	> 2.00 sec		
					and			
					Basic enable conditions met	= see sheet enable tables -		
Turbocharger/Supercharger "A" Underboost Condition	P0299	Detects an permanent positive control deviation of the boost pressure indicating and underboost condition.	control deviation of the boost pressure calculated out of difference between desired and actual value (see Look-Up-Table #3)	> (a*b*c) -	(		fail conditions exists for 10 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			with		VNT turbocharger offset adaptation active	= FALSE -		
			(a) the upper limit (see Look-Up-Table #61)	= 19 to 40 kPa	- in order to compensate sensor drift and valve aging, the valve is closed and opened fully once in a driving cycle during engine idling, the read positions for opening and closing are averaged and used for the calculation of offset drift of the valve			
			(b) Correction factor (see Look-Up-Table #97)	= 1 to 1.099976 factor	and			
			(c) ECB valve based upper limit correction factor	= 1.00 factor	VNT turbocharger wiping is active	= FALSE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							- in order to prevent soot accumulation e.g. in a long idle operation under cold engine condition on the turbine the desired value of the boost pressure actuator position governor is assigned from the set-point value					
							and					
							injection quantity is stable	=	TRUE			
							means					
							increase of injection quantity	<	40.00	(mm^3/rev) /s		
							and					
							engine speed is stable	=	TRUE	-		
							means					
							increase of engine speed	<	35.00	rpm/s		
							and					
							injection Quantity	>=	132.00	mm^3/rev		
							injection Quantity	<=	480.00	mm^3/rev		
							and					
							engine Speed	>=	1450.00	rpm		
							engine Speed	<=	2000.00	rpm		
							and					
							working range of boost pressure is in closed-loop	=	TRUE	-		
							means					
							(					
							engine speed	>	1200.00	rpm		
							and					
							injection quantity	>	20.00	mm^3/rev		
							)					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					
							for time	>	2.00	sec		
							and					
							Basic enable conditions met:	=	see sheet enable tables	-		
Cylinder 1 Balance System	P0263	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current commanded injection quantity	>	52.00	mm^3/rev		
			with				current commanded injection quantity	<	380.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #38)	=	-68 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0.00	kpa		
			and with				engine speed	>	590.00	rpm		
			(b) factor for correction quantity	=	0.95	factor	engine speed	<	3000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #39)	=	0 to 68	mm^3/rev	and					

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 2 Balance System	P0266	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current commanded injection quantity	>	52.00	mm^3/rev		
			with				current commanded injection quantity	<	380.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #38)	=	-68 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0.00	kpa		
			and with				engine speed	>	590.00	rpm		
			(b) factor for correction quantity	=	0.95	factor	engine speed	<	3000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #39)	=	0 to 68	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 3 Balance System	P0269	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current commanded injection quantity	>	52.00	mm^3/rev		
			with				current commanded injection quantity	<	380.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #38)	=	-68 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0.00	kpa		
			and with				engine speed	>	590.00	rpm		
			(b) factor for correction quantity	=	0.95	factor	engine speed	<	3000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #39)	=	0 to 68	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 4 Balance System	P0272	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current commanded injection quantity	>	52.00	mm^3/rev		
			with				current commanded injection quantity	<	380.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #38)	=	-68 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0.00	kpa		
			and with				engine speed	>	590.00	rpm		
			(b) factor for correction quantity	=	0.95	factor	engine speed	<	3000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #39)	=	0 to 68	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 5 Balance System	P0275	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current commanded injection quantity	>	52.00	mm^3/rev		
			with				current commanded injection quantity	<	380.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #38)	=	-68 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0.00	kpa		
			and with				engine speed	>	590.00	rpm		
			(b) factor for correction quantity	=	0.95	factor	engine speed	<	3000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #39)	=	0 to 68	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 6 Balance System	P0278	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current commanded injection quantity	>	52.00	mm^3/rev		
			with				current commanded injection quantity	<	380.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #38)	=	-68 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0.00	kpa		
			and with				engine speed	>	590.00	rpm		
			(b) factor for correction quantity	=	0.95	factor	engine speed	<	3000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #39)	=	0 to 68	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 7 Balance System	P0281	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current commanded injection quantity	>	52.00	mm^3/rev		
			with				current commanded injection quantity	<	380.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #38)	=	-68 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0.00	kpa		
			and with				engine speed	>	590.00	rpm		
			(b) factor for correction quantity	=	0.95	factor	engine speed	<	3000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #39)	=	0 to 68	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 8 Balance System	P0284	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			or				and					
			fuel balance correction quantity	>	(c) * (b)	-	current commanded injection quantity	>	52.00	mm^3/rev		
			with				current commanded injection quantity	<	380.00	mm^3/rev		
			(a) lower limitation (see Look-Up-Table #38)	=	-68 to 0	mm^3/rev	engine coolant temperature	>=	39.96	°C		
							ambient pressure	>=	0.00	kpa		
			and with				engine speed	>	590.00	rpm		
			(b) factor for correction quantity	=	0.95	factor	engine speed	<	3000.00	rpm		
			and with				vehicle speed	<=	186.45	mph		
			(c) upper limitation (see Look-Up-Table #39)	=	0 to 68	mm^3/rev	and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
CAC Efficiency Below Threshold	P026A	Detects insufficient charge-air cooler efficiency. The efficiency is calculated out of temperature upstream of the charge air cooler, temperature downstream of the charge air cooler and ambient temperature.	filtered charge-air cooler efficiency	<	0.25	-	vehicle speed	>=	31.08	mph	fail conditions exists for 30 s monitor runs once per driving cycle with 100 ms rate whenever enable conditions are met	B
							air mass flow	>=	13.89	g/sec		
							air mass flow (see Look-Up-Table #98)	<=	55.5 to 277.78	g/sec		
							engine coolant temperature	>=	69.96	°C		
							engine coolant temperature	<=	129.96	°C		
							(maximum value of (a) and (b))	>=	1.22	-		
							the maximum value is then divided by (b)					
							with					
							(a) boost pressure downstream compressor	=	measured parameter	-		
							and with					
							(b) ambient pressure	=	measured parameter	-		
							and					
							control value of the throttle valve	>=	-400.00	%		
							control value of the throttle valve	<=	5.00	%		
							and					
							(a) - (b)	>=	50.00	°C		
							with					
							(a) charge air cooler upstream temperature	=	measured parameter	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and with					
							(b) modeled ambient air temperature	=	measured parameter	-		
							and					
							injection quantity	>=	80.00	mm^3/rev		
							injection quantity	<=	480.00	mm^3/rev		
							ambient pressure	>	74.80	kPa		
							modeled ambient air temperature	>	-7.04	°C		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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	<=	-32.00	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 NOx sensor ready (see parameter definition)	=	TRUE	-		
							fuel system is in fuel cut off (see parameter definition)	=	FALSE	-		
							Particulate Filter Regeneration Mode	=	FALSE	-		
							((					
							fraction of total fuel injected that is involved in combustion (Fuel Mass for Combustion / Total fuel injected)	=	1	-		
							or					
							calculated EGR rate	>=	0	-		
							)					
							for time	>	1.00	sec		
							))					
							AND					
							Controller status of the observer	=	TRUE	-		
							means					
							(					
							Load dependent release state (see look up table #48)	=	0 to 1	-		
							AND					
							Component Protection release state (see look up table #43)	>	0 to 1	-		
							)					
							)					
							engine coolant temperature	<=	199.96	°C		
							engine coolant temperature	>=	64.96	°C		
							Normal Injection Mode (not in DPF regeneration)	=	TRUE	-		
							Barometric pressure	>=	74.80	kPa		
							Ambient temperature	>=	-7.04	°C		
							Vehicle speed	<	1.86	mph		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables			
							)					
							AND					
							(					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Engine speed	<=	1040	rpm		
							AND					
							Engine speed	>=	448	rpm		
							)					
							AND					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					
							basic enable conditions met:	=	see sheet enable tables	-		
Injection Quantity Too High	P026D	Monitors the fuel mass observer correction quantity. Detects if the correction quantity exceeds the emissions limit.	Unlimited fuel mass observer correction quantity - emission control correction quantity (see look up table #44)	>=	8 to 30	mm^3/rev	((Status of the Observer function's lambda-signal	=	TRUE	-	fail conditions exists for 12 s monitor runs with 0.02 s rate whenever enable conditions are met	B
							means					
							(					
							lambda signal from NOx sensor ready (see parameter definition)	=	TRUE	-		
							fuel system is in fuel cut off (see parameter definition)	=	FALSE	-		
							Particulate Filter Regeneration Mode	=	FALSE	-		
							((					
							fraction of total fuel injected that is involved in combustion (Fuel Mass for Combustion / Total fuel injected)	=	1	-		
							or					
							calculated EGR rate	>=	0	-		
							)					
							for time	>	1.00	sec		
							))					
							AND					
							Controller status of the observer	=	TRUE	-		
							means					
							(					
							Load dependent release state (see look up table #48)	=	0 to 1	-		
							AND					
							Component Protection release state (see look up table #43)	>	0 to 1	-		
							)					
							)					
							engine coolant temperature	<=	199.96	°C		
							engine coolant temperature	>=	64.96	°C		
							Normal Injection Mode (not in DPF regeneration)	=	TRUE	-		
							Barometric pressure	>=	74.80	kPa		
							Ambient temperature	>=	-7.04	°C		
							Vehicle speed	<	1.86	mph		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables			
							)					
							AND					
							(					
							Engine speed	<=	1040	rpm		
							AND					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Engine speed	>=	448	rpm		
							)					
							AND					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					
							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. 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	>=	0.06	°C		
			(a) maximum injection energizing time (see Look-Up-Table #20)	=	353.2 to 670.8	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	)					
			)				and					
			)									
			OR				engine temperature	>	49.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 1	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(									
			with				and					
			(a) minimum injection energizing time	=	107.2	usec	combustion chamber is not cold off					
			and with				means					
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	=	10 to 16	usec	time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
			)				and					
			)				intake manifold pressure	>	75.00	kPa		
			for				and					
			rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 2 Injection Timing Reached Feedback Limit	P02CF	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point. 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 2	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time (see Look-Up-Table #20)	=	353.2 to 670.8	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	)					
			)				and					
			)									
			OR				engine temperature	>	49.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 2	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(									

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			with		and			
			(a) minimum injection energizing time	= 107.2 usec	combustion chamber is not cold off			
			and with		means			
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	= 10 to 16 usec	time since last combustion (see Look-Up-Table #94)	>= 5 to 30 sec		
			)		and			
			)		intake manifold pressure	> 75.00 kPa		
			for		and			
			rail pressure point (see Look-Up-Table #19)	= 30000 to 90000 kPa	intake manifold pressure	< 150.00 kPa		
					and			
					accelerator pedal position	< 0.05 %		
					and			
					Fuel system status	= Fuel cut off -		
					and			
					(			
					engine speed	> (b) - (a) -		
					and			
					engine speed	< (a) + (c) -		
					with			
					(a) value of engine speed	= 30.00 rpm		
					and with			
					(b) gear specific minimum engine speed	= 950.00 rpm		
					and with			
					(c) gear specific maximum engine speed	= 1850.00 rpm		
					)			
					and			
					current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	= 0 to 1 -		
					and			
					vehicle speed	> 0.00 mph		
					and			
					rail pressure deviation from set point calculated out of difference between desired and actual value	< 5000.00 kPa		
					for			
					time	> 0.10 sec		
					and			
					no gear change is occurred	= TRUE -		
					and			
					4 wheel mode	= FALSE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Cylinder 7 Injection Timing Reached Feedback Limit	P02D9	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point.	(		environmental temperature	> -7.04 °C	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Detects a fault when the corrected energizing time exceeds the feedback control limit.	corrected energizing time for the rail pressure calibration points and cylinder 7	>	(a) - (b)	-	and				whenever enable conditions are met	
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time (see Look-Up-Table #20)	=	353.2 to 670.8	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	)					
			)				and					
			)									
			OR				engine temperature	>	49.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 7	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(									
			with				and					
			(a) minimum injection energizing time	=	107.2	usec	combustion chamber is not cold off					
			and with				means					
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	=	10 to 16	usec	time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
			)				and					
			)				intake manifold pressure	>	75.00	kPa		
			for				and					
			rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							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.
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 8 Injection Timing Reached Feedback Limit	P02DB	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the feedback control limit.	corrected energizing time for the rail pressure calibration points and cylinder 8	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time (see Look-Up-Table #20)	=	353.2 to 670.8	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	)					
			)				and					
			)									
			OR				engine temperature	>	49.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 8	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(									
			with				and					
			(a) minimum injection energizing time	=	107.2	usec	combustion chamber is not cold off					
			and with				means					
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	=	10 to 16	usec	time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
			)				and					
			)				intake manifold pressure	>	75.00	kPa		
			for				and					
			rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 4 Injection Timing Reached Feedback Limit	P02D3	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point. 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 4	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time (see Look-Up-Table #20)	=	353.2 to 670.8	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	)					
			)				and					
			)									
			OR				engine temperature	>	49.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 4	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(									
			with				and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(a) minimum injection energizing time and with	=	107.2	usec	combustion chamber is not cold off means					
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	=	10 to 16	usec	time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
			)				and					
			)				intake manifold pressure	>	75.00	kPa		
			for				and					
			rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 5 Injection Timing Reached Feedback Limit	P02D5	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Detects a fault when the corrected energizing time exceeds the feedback control limit.	corrected energizing time for the rail pressure calibration points and cylinder 5	>	(a) - (b)	-	and				whenever enable conditions are met	
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time (see Look-Up-Table #20)	=	353.2 to 670.8	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	)					
			)				and					
			)									
			OR				engine temperature	>	49.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 5	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(									
			with				and					
			(a) minimum injection energizing time	=	107.2	usec	combustion chamber is not cold off					
			and with				means					
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	=	10 to 16	usec	time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
			)				and					
			)				intake manifold pressure	>	75.00	kPa		
			for				and					
			rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							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.
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 6 Injection Timing Reached Feedback Limit	P02D7	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	B
		Detects a fault when the corrected energizing time exceeds the feedback control limit.	corrected energizing time for the rail pressure calibration points and cylinder 6	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time (see Look-Up-Table #20)	=	353.2 to 670.8	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	)					
			)				and					
			)									
			OR				engine temperature	>	49.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 6	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(									
			with				and					
			(a) minimum injection energizing time	=	107.2	usec	combustion chamber is not cold off					
			and with				means					
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	=	10 to 16	usec	time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
			)				and					
			)				intake manifold pressure	>	75.00	kPa		
			for				and					
			rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 3 Injection Timing Reached Feedback Limit	P02D1	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point. 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 3	>	(a) - (b)	-	and					
			(				(					
			with				fuel temperature	>=	0.06	°C		
			(a) maximum injection energizing time (see Look-Up-Table #20)	=	353.2 to 670.8	usec	and					
			and with				fuel temperature	<=	79.96	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	)					
			)				and					
			)									
			OR				engine temperature	>	49.96	°C		
			(				and					
			corrected energizing time for the rail pressure calibration points and cylinder 3	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(									
			with				and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(a) minimum injection energizing time and with	=	107.2	usec	combustion chamber is not cold off means					
			(b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	=	10 to 16	usec	time since last combustion (see Look-Up-Table #94)	>=	5 to 30	sec		
			)				and					
			)				intake manifold pressure	>	75.00	kPa		
			for				and					
			rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	intake manifold pressure	<	150.00	kPa		
							and					
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status	=	Fuel cut off	-		
							and					
							(					
							engine speed	>	(b) - (a)	-		
							and					
							engine speed	<	(a) + (c)	-		
							with					
							(a) value of engine speed	=	30.00	rpm		
							and with					
							(b) gear specific minimum engine speed	=	950.00	rpm		
							and with					
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							)					
							and					
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and					
							vehicle speed	>	0.00	mph		
							and					
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for					
							time	>	0.10	sec		
							and					
							no gear change is occurred	=	TRUE	-		
							and					
							4 wheel mode	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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 7s monitor runs with 0.005 s rate whenever enable conditions	B
							for					
							time	>	3.00	sec		
							and					
							starter is active cranking	=	FALSE			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					for time	>	3.00	sec	are met	
					and Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
					and basic enable conditions met	=	see sheet enable tables	-		
					and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage	>	11.00	V	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	
					for time	>	3.00	sec		
					and starter is active cranking	=	FALSE			
					for time	>	3.00	sec		
					and Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
					and basic enable conditions met	=	see sheet enable tables	-		
					and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage	>	11.00	V	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	
					for time	>	3.00	sec		
					and starter is active cranking	=	FALSE			
					for time	>	3.00	sec		
					and Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
					and basic enable conditions met	=	see sheet enable tables	-		
					and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Flow Valve Control Circuit 1 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 for time and starter is active cranking for time and Throttle Valve Actuator Solenoid Control Circuit and basic enable conditions met and NO Pending or Confirmed DTCs:	> 11.00 V > 3.00 sec = FALSE > 3.00 sec = ACTIVE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
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 for time and starter is active cranking for time and Throttle Valve Actuator Solenoid Control Circuit and basic enable conditions met and NO Pending or Confirmed DTCs:	> 11.00 V > 3.00 sec = FALSE > 3.00 sec = ACTIVE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B

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 Active	=	TRUE	-		
							and Throttle Valve Permanent Control Deviation	=	FALSE	-		
							and Engine Coolant Temperature	<	198.96	°C		
							and Engine Running	=	TRUE	-		
							and basic enable conditions met	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Diesel Intake Air Flow Position Sensor Circuit Low Voltage	P02E8	Detects low voltage readings on the throttle valve position sensor circuit, indicating an OOR low condition on the throttle valve position sensor circuit	measured throttle valve position value via sensor	<	5.01	%	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.005 s rate	A
							and basic enable conditions met	=	see sheet enable tables	-		
							and analog digital converter error present	=	FALSE	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Diesel Intake Air Flow Position Sensor Circuit High Voltage	P02E9	Detects high voltage readings on the throttle valve position sensor circuit, indicating an OOR high condition on the throttle valve position sensor circuit	measured throttle valve position value via sensor	>	94.99	%	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.005 s rate	A
							and basic enable conditions met	=	see sheet enable tables	-		
							and no sensor supply error	=	TRUE	-		
							and SENT frame correctly received	=	FALSE	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

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 Motor Current Performance	P02EB	Electronic out-put driver circuitry determines circuit integrity on the intake air flow valve.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.				battery voltage	>	11.00	V	fail conditions exists for 2 s monitor runs with 0.005 s rate whenever enable conditions are met	B
							for					
							time	>	3.00	sec		
							and					
							starter is active cranking	=	FALSE			
							for					
							time	>	3.00	sec		
							and					
							Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
							and					
							basic enable conditions met	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Engine Misfire Detected	P0300	Indicates engine has experienced more than one cylinder misfiring	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 ms monitor runs with 0.02 s rate whenever enable conditions are met	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	and					
			and with				engine speed	<	1560.00	rpm		
			(b) number of test blocks	=	20.00	counts	)					
			and				and					
			misfires exist on more than one cylinder	=	TRUE	-	|(a) - (b)|	<	200.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	mm^3/rev		
							)					
							and					
							engine coolant temperature	>=	39.96	°C		
							and					
							vehicle speed	<=	1.86	mph		
							and					
							time since start	>=	10.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	=	TRUE	-		
							and					
							adaptation value for tooth wheel has been learned	=	TRUE	-		
							and					
							number of detected misfires	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 1 Misfire Detected	P0301	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all cly are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	and					
			and with				engine speed	<	1560.00	rpm		
			(b) number of test blocks	=	20.00	counts	)					
							and					
							|(a) - (b)|	<	200.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	mm^3/rev		
							)					
							and					
							engine coolant temperature	>=	39.96	°C		
							and					
							vehicle speed	<=	1.86	mph		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.					and					
							time since start	>=	10.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	=	TRUE	-		
							and					
							adaptation value for tooth wheel has been learned	=	TRUE	-		
							and					
							number of detected misfires	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 2 Misfire Detected	P0302	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all cly are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 ms monitor runs with 0.02 s rate whenever enable conditions are met	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	and					
			and with				engine speed	<	1560.00	rpm		
			(b) number of test blocks	=	20.00	counts	)					
							and					
							|(a) - (b)|	<	200.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	mm^3/rev		
							)					
							and					
							engine coolant temperature	>=	39.96	°C		
							and					
							vehicle speed	<=	1.86	mph		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.					and					
							time since start	>=	10.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	=	TRUE	-		
							and					
							adaptation value for tooth wheel has been learned	=	TRUE	-		
							and					
							number of detected misfires	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 3 Misfire Detected	P0303	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all cly are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 ms monitor runs with 0.02 s rate whenever enable conditions are met	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			evaluated crankshaft revolutions with	>=	(a) * (b)	-	and					
							engine speed	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	and					
			and with				engine speed	<	1560.00	rpm		
			(b) number of test blocks	=	20.00	counts	)					
							and					
							|(a) - (b)|	<	200.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	mm^3/rev		
							)					
							and					
							engine coolant temperature	>=	39.96	°C		
							and					
							vehicle speed	<=	1.86	mph		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.					and					
							time since start	>=	10.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	=	TRUE	-		
							and					
							adaptation value for tooth wheel has been learned	=	TRUE	-		
							and					
							number of detected misfires	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 4 Misfire Detected	P0304	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all cly are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 ms monitor runs with 0.02 s rate whenever enable conditions are met	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			evaluated crankshaft revolutions with	>=	(a) * (b)	-	and					
							engine speed	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	and					
			and with				engine speed	<	1560.00	rpm		
			(b) number of test blocks	=	20.00	counts	)					
							and					
							|(a) - (b)|	<	200.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	mm^3/rev		
							)					
							and					
							engine coolant temperature	>=	39.96	°C		
							and					
							vehicle speed	<=	1.86	mph		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.					and					
							time since start	>=	10.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	=	TRUE	-		
							and					
							adaptation value for tooth wheel has been learned	=	TRUE	-		
							and					
							number of detected misfires	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 5 Misfire Detected	P0305	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all cly are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 ms monitor runs with 0.02 s rate whenever enable conditions are met	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	and					
			and with				engine speed	<	1560.00	rpm		
			(b) number of test blocks	=	20.00	counts	)					
							and					
							|(a) - (b)|	<	200.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	mm^3/rev		
							)					
							and					
							engine coolant temperature	>=	39.96	°C		
							and					
							vehicle speed	<=	1.86	mph		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.					and					
							time since start	>=	10.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	=	TRUE	-		
							and					
							adaptation value for tooth wheel has been learned	=	TRUE	-		
							and					
							number of detected misfires	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 6 Misfire Detected	P0306	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all cly are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 ms monitor runs with 0.02 s rate whenever enable conditions are met	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	and					
			and with				engine speed	<	1560.00	rpm		
			(b) number of test blocks	=	20.00	counts	)					
							and					
							|(a) - (b)|	<	200.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	mm^3/rev		
							)					
							and					
							engine coolant temperature	>=	39.96	°C		
							and					
							vehicle speed	<=	1.86	mph		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.					and					
							time since start	>=	10.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	=	TRUE	-		
							and					
							adaptation value for tooth wheel has been learned	=	TRUE	-		
							and					
							number of detected misfires	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 7 Misfire Detected	P0307	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all cly are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 ms monitor runs with 0.02 s rate whenever enable conditions are met	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			evaluated crankshaft revolutions with	>=	(a) * (b)	-	and					
							engine speed	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	and					
			and with				engine speed	<	1560.00	rpm		
			(b) number of test blocks	=	20.00	counts	)					
							and					
							|(a) - (b)|	<	200.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	mm^3/rev		
							)					
							and					
							engine coolant temperature	>=	39.96	°C		
							and					
							vehicle speed	<=	1.86	mph		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.					and					
							time since start	>=	10.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	=	TRUE	-		
							and					
							adaptation value for tooth wheel has been learned	=	TRUE	-		
							and					
							number of detected misfires	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 8 Misfire Detected	P0308	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all cly are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 ms monitor runs with 0.02 s rate whenever enable conditions are met	B
			and				Engine Running (see parameter definition)	=	TRUE	-		
			evaluated crankshaft revolutions	>=	(a) * (b)	-	and					
			with				engine speed	>	448.00	rpm		
			(a) number of crankshaft revolutions per block (see general description document for details)	=	20.00	counts	and					
			and with				engine speed	<	1560.00	rpm		
			(b) number of test blocks	=	20.00	counts	)					
							and					
							|(a) - (b)|	<	200.00	rpm		
							with					
							(a) actual desired idle speed	=	calculated parameter	-		
							and with					
							(b) engine speed	=	measured parameter	-		
							and					
							(					
							current injection quantity	>	12.00	mm^3/rev		
							and					
							current injection quantity	<	400.00	mm^3/rev		
							)					
							and					
							engine coolant temperature	>=	39.96	°C		
							and					
							vehicle speed	<=	1.86	mph		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.					and					
							time since start	>=	10.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							deletion of error memory (Mode$4) not executed since last check of the monitoring conditions	=	TRUE	-		
							and					
							adaptation value for tooth wheel has been learned	=	TRUE	-		
							and					
							number of detected misfires	>	140.00	counts		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Crankshaft Position System Variation Not Learned	P0315	Wheel Learn - Fuel Balance System - Tooth Wheel Variation and Crankshaft Dynamics not learned quickly enough Wheel learn only occurs when the memory is cleared within the ECM. Once the wheel learn is completed once, the wheel learn values are stored within the EEPROM	fuel balance wheel learn 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
							engine speed	>	900	rpm		
							engine speed	<	2700	rpm		
							fuel balance wheel learn values stored in EEPROM	=	FALSE			
							Inhibit Status (no inhibiting faults) (No pending or stored DTC)	=	see sheet inhibit tables	-		
Crankshaft Position [CKP] Sensor Circuit	P0335	Detects crankshaft sensor circuit failure by monitoring for valid signals from CKP sensor while CMP sensor is also sending valid signals	ECM has detected reference mark on the crankshaft	=	FALSE	-	Ignition ON	=	TRUE	-	fail conditions exists for more than 6 events monitor runs with 0.1 s rate whenever enable conditions are met	A
			AND number of crankshaft rotations not detected	>=	6.00	counts	and Engine backward rotation detected	=	FALSE	-		
							and					
							(					
							engine speed	>=	400.00	rpm		
							and					
							synchronization completed	=	TRUE	-		
							which means					
							number of crankshaft revolutions	>=	4.00	revs		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							crankshaft reference mark detected	=	TRUE	-		
							(reference mark is the 2 missing teeth in the 50-2 tooth-wheel configuration)					
							) or starter is active cranking	=	TRUE	-		
							) and (vehicle speed	=	0	mph		
							or vehicle speed	>	16	mph		
							and engine speed	>	200.00	rpm		
							) and basic enable conditions met:	=	see sheet enable tables	-		
Crankshaft Position Sensor Performance	P0336	Detects implausible crankshaft sensor operation by detecting incorrect crank sensor signal patterns.	number of disturbances in crankshaft signal	>=	10.00	counts	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for 0.1 s monitor runs with 0.1 s rate whenever enable conditions are met	A
			crankshaft signal disturbance detected under the following conditions:				and					
			Current tooth time period	>	200000.00	us	ECM has detected reference mark on the crankshaft	=	FALSE	-		
			or Crankshaft tooth counts between detected gaps	>	68.00	counts	and basic enable conditions met:	=	see sheet enable tables	-		
			or If gap not expected, ratio of current tooth time to previous tooth time (see Look-Up-Table #18)	>	1.5 to 2	ratio						
			or If gap expected, ratio of current tooth time to previous tooth time (see Look-Up-Table #17)	>	3.38 to 8	ratio						
			with increment	=	1.00	counts						
Camshaft Position [CMP] Sensor Circuit	P0340	Detects camshaft sensor circuit failure by monitoring for valid signals from CMP sensor while CKP sensor is also sending valid signals	number of crankshaft revolutions during missed camshaft signal	>=	4.00	counts	ECM has detected reference mark on the crankshaft	=	TRUE	-	fail conditions exists for 0.01 s test performed continuously 0.01 s rate	A
							and basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Camshaft Position [CMP] Sensor Performance	P0341	Detects implausible camshaft sensor operation by detecting incorrect cam sensor patterns	number of camshaft edges	>	4	counts	ECM has detected reference mark on the crankshaft	=	TRUE	-	fail conditions exists for more than 6 events test performed continuously 0.01 s rate	B
							and basic enable conditions met:	=	see sheet enable tables	-		
Glow Plug/Heater Indicator Control Circuit/Open	P0381	Diagnoses the Glow Lamp Circuit high side driver circuit for circuit faults.	Voltage high during driver off state (open circuit)	=	Open Circuit: ≥ 200 K Ω impedance between ECU pin and load signal and controller ground	-	circuit active at low current	=	TRUE	-	fail conditions exists for 0.2 s monitor runs with 0.01 s rate whenever enable conditions are met	B
							and battery voltage	>	11.00	V		
							for time	>	3.00	sec		
							and Basic enable conditions met:	=	see sheet enable tables	-		
		Diagnoses the Glow Lamp Circuit high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short-to-ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	lamp is commanded on	=	TRUE	-	fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	
							and battery voltage	>	11.00	V		
							for time	>	3.00	sec		
							and Basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Diagnoses the Glow Lamp Circuit high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	lamp is commanded off	=	TRUE	-	fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions are met	
							and					
							battery voltage	>	11.00	V		
							for time	>	3.00	sec		
							and					
							Basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation(EGR) Flow Excessive	P0400	Detects excessive EGR flow. Actual MAF readings are compared to desired MAF values as an indication of how much EGR is flowing.	controller deviation of the air mass = actual minus desired value (see Look-Up-Table #11)	>	1.6 to 2	g/rev	EGR controller is active	=	TRUE	-	fail conditions exists for 15 s monitor runs 0.02 s rate whenever enable conditions are met	A
							and					
							VGT offset learning is active	=	FALSE	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation(EGR) Flow Insufficient	P0401	Detects insufficient EGR flow. Actual MAF readings are compared to desired MAF values as an indication of how much EGR is flowing.	controller deviation of the exhaust gas recirculation (EGR) - calculated out of desired and actual value	>	(a) * (b)	-	(				fail conditions exists for 10 s monitor runs 0.02 s rate whenever enable conditions are met	B
			with				EGR controller is active	=	TRUE			
			(a) Minimum Controller Deviation	=	-0.63	g/rev	and					
			(b) Environmental Pressure correction factor (see Look-Up-Table #8)	=	0.48 to 1	factor	change of injection quantity between actual and last received value	<	80.00	(mm^3/rev)/sec		
							for time	=	0.25	sec		
							and					
							change of engine speed between actual and last received value	<	35.00	rpm/sec		
							for time	=	0.99	sec		
							and					
							VGT offset learning is active	=	FALSE	-		
							maximum set point for air-mass flow (see Look-Up-Table #9)	>	0.8 to 1.2	g/rev		
							and					
							Engine speed	<=	1900.00	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	>=	480.00	rpm		
							and					
							Torque generating commanded engine fuel injection quantity	<=	120.00	mm^3/rev		
							Torque generating commanded engine fuel injection quantity	>=	20.00	mm^3/rev		
							and					
							set point valve position of exhaust-gas recirculation	>	5.00	%		
							and					
							throttle position	<	5.00	%		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					
							for time	>=	3.00	sec		
Exhaust Gas Recirculation(EGR) Flow Excessive	P0402	Detects excessive EGR flow. Actual MAF readings are compared to desired MAF values as an indication of how much EGR is flowing.	controller deviation of the exhaust gas recirculation (EGR) - calculated out of desired and actual value	>	(a) * (b)	-	(				fail conditions exists for 8 s monitor runs 0.02 s rate whenever enable conditions are met	B
			with				EGR controller is active	=	TRUE	-		
			(a) Maximum Controller Deviation (see Look-Up-Table #10)	=	0.32 to 1.12	g/rev	and					
			(b) Environmental Pressure correction factor (see Look-Up-Table #12)	=	1 to 2	factor	change of injection quantity between actual and last received value	<	80.00	(mm^3/rev) /sec		
							for time	=	0.25	sec		
							and					
							change of engine speed between actual and last received value	<	35.00	rpm/sec		
							for time	=	1.00	sec		
							and					
							VGT offset learning is active	=	FALSE	-		
							maximum set point for EGR mass flow	<	0.79	g/rev		
							and					
							Engine speed	<=	1600.00	rpm		
							Engine speed	>=	1100.00	rpm		
							and					
							Torque generating engine fuel injection quantity	<=	480.00	mm^3/rev		
							Torque generating engine fuel injection quantity	>=	160.00	mm^3/rev		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					
							for time	>=	1.50	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	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Gas Recirculation(EGR) Position Sensor Circuit Low Voltage	P0405	Detects low voltage readings on the EGR position circuit, indicating an OOR low condition on the EGR position circuit	raw voltage of EGR actuator position sensor	<	0.25	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.005 s rate	A
			same as 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 circuit, indicating an OOR high condition on the EGR position circuit	raw voltage of EGR actuator position sensor	>	4.80	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.005 s rate	A
			same as EGR actuator position	>	127	%	and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Gas Recirculation(EGR) Temperature Sensor A Circuit Low Voltage	P040C	Detects low voltage readings on the EGR cooler temperature circuit, indicating an OOR low condition on the EGR cooler temperature 2 circuit	EGR temperature sensor 2 voltage	<	0.46	V	(				fail conditions exists for 5 s monitor runs 0.05 s rate whenever enable conditions are met	B
			same as EGR sensor 2 temperature	>	220	°C	time since engine start	>	0.00	sec		
							and engine coolant temperature	<	199.96	°C		
							and ambient temperature	>	-60.04	°C		
							and ambient pressure	>	20.00	kPa		
							and (set point valve position of exhaust-gas recirculation	>	-100.00	%		
							and set point valve position of exhaust-gas recirculation	<	200.00	%		
							) and Engine Running (see parameter definition)	=	TRUE	-		
							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	>	-100.00	%		
							and					
							valve position of EGR cooler bypass	<	200.00	%		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Gas Recirculation(EGR) Temperature Sensor A Circuit High Voltage	P040D	Detects high voltage readings on the EGR temperature cooler circuit, indicating an OOR high condition on the EGR cooler temperature 2 circuit	EGR temperature sensor 2 voltage	>	4.84	V	(				fail conditions exists for 5 s monitor runs 0.05 s rate whenever enable conditions are met	B
			same as				time since engine start	>	0.00	sec		
			EGR sensor 2 temperature	<	-50	°C	and					
							engine coolant temperature	>	-60.04	°C		
							and					
							ambient temperature	>	-60.04	°C		
							and					
							ambient pressure	>	20.00	kPa		
							and					
							(					
							set point valve position of exhaust-gas recirculation	>	-100.00	%		
							and					
							set point valve position of exhaust-gas recirculation	<	200.00	%		
							)					
							and					
							Engine Running (see parameter definition)	=	TRUE	-		
							and					
							current injection quantity	>	0.00	mm^3/rev		
							and					
							(					
							valve position of EGR cooler bypass	>	-100.00	%		
							and					
							valve position of EGR cooler bypass	<	200.00	%		
							)					
							)					
							for					
							time	>	0.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Gas Recirculation(EGR) Temperature Sensor Correlation (EGR 1/ EGR 2)	P040F	Detects biased EGR temperature sensors by comparing the two EGR cooler temp sensor after an engine off soak time	**Path 1:**				minimum engine-off time	>=	28800.00	sec	fail conditions exists for 0.1 s monitor runs with 0.1 s	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			|(a) - (b)| (see Look-Up-Table #4)	>	100.00	°C	and				rate	
			with				ambient temperature	>	-60.04	°C	whenever	
			(a) captured EGR sensor 2	=	measured	-	and				enable	
			temperature at start		parameter						conditions	
			and with				Engine Running (see parameter	=	TRUE	-	are met	
							definition)					
			(b) captured EGR sensor 1	=	measured	-	for					
			temperature at start		parameter							
			or				time	>	0.00	sec		
							and					
			Path 2:				engine post drive/ afterun	=	FALSE			
			(				and					
			|(a) - (b)| (see Look-Up-Table #4)	<=	100.00	°C	diagnostic performed in current dc	=	FALSE			
			with				and					
			(a) captured EGR sensor 2	=	measured	-	basic enable conditions met:	=	see sheet enable	-		
			temperature at start		parameter				tables			
			and with				and					
			(b) captured EGR sensor 1	=	measured	-	NO Pending or Confirmed DTCs:	=	see sheet inhibit	-		
			temperature at start		parameter				tables			
			and									
			|(a) - (b)| (see Look-Up-Table #7)	>	20.00	°C						
			with									
			(a) captured EGR sensor 2	=	measured	-						
			temperature at start		parameter							
			and with									
			(b) captured EGR sensor 1	=	measured	-						
			temperature at start		parameter							
			and									
			(									
			status of block heater (see parameter	=	FALSE	-						
			definition)									
			or									
			status of sun-load detection (see	=	FALSE	-						
			parameter definition)									
			)									
			)									
Exhaust Gas	P041C	Detects low voltage	voltage of EGR temperature sensor 1	<	0.46	V	(				fail	B
Recirculation(EGR		readings on the EGR cooler									conditions	
) Temperature		temperature circuit,									exists for 5 s	
Sensor B Circuit		indicating an OOR low									monitor runs	
Low Voltage		condition on the EGR cooler									0.05 s rate	
		temperature 1 circuit									whenever	
											enable	
			same as				time since engine start	>	0.00	sec	conditions	
			EGR sensor 1 temperature	>	220	°C	and				are met	
							engine coolant temperature	<	199.96	°C		
							and					
							ambient temperature	>	-60.04	°C		
							and					
							ambient pressure	>	20.00	kPa		
							and					
							(					
							set point valve position of exhaust-gas	>	-100.00	%		
							recirculation					
							and					
							set point valve position of exhaust-gas	<	200.00	%		
							recirculation					
							)					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							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	>	4.84	V	(				fail conditions exists for 5 s monitor runs 0.05 s rate whenever enable conditions are met	B
			same as EGR sensor 1 temperature	<	-50	°C	time since engine start	>	0.00	sec		
							and					
							engine coolant temperature	>	-60.04	°C		
							and					
							ambient temperature	>	-60.04	°C		
							and					
							ambient pressure	>	20.00	kPa		
							and					
							(					
							set point valve position of exhaust-gas recirculation	>	-100.00	%		
							and					
							set point valve position of exhaust-gas recirculation	<	200.00	%		
							)					
							and					
							Engine Running (see parameter definition)	=	TRUE	-		
							and					
							current injection quantity	>	0.00	mm^3/rev		
							and					
							(					
							valve position of EGR cooler bypass	>	-100.00	%		
							and					
							valve position of EGR cooler bypass	<	200.00	%		
							)					
							)					
							for					
							time	>	0.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
NMHC Catalyst Efficiency Below Threshold Bank 1	P0420	Detects insufficient conversion rate in oxidation catalyst. Actual conversion rate is compared to a conversion rate threshold as an indication of how much HC is converted in the oxidation catalyst.	Calculated HC conversion rate	<	0.55	-					fail conditions exists for more than 0.1 seconds monitor runs once per driving cycle with 0.1 s rate whenever enable conditions are met	B
							(					
							Modeled HC mass converted in the oxidation catalyst since monitor start means Converted HC mass model uses commanded fuel quantity, DOC temperature, and exhaust gas mass flow as inputs	>	140.00	g		
							and					
							average HC mass flow calculated by Average HC mass flow is determined by dividing the integrated HC mass by the integrated time step	>	0.00	g/sec		
							and					
							simulated heat quantity in oxidation catalyst	>	0.00	kJ		
							and					
							particulate filter regeneration	=	TRUE	-		
							and					
							no reset condition for evaluation is active					
							therefore					
							(					
							regeneration was not aborted to assure that HC conversion was not disturbed	=	TRUE	-		
							and					
							evaluation took place one time step before (to ensure P0420 has not already completed)	=	FALSE	-		
							)					
							and					
							there has been sufficient HC integrated in order to evaluate the monitor conversion efficiency. means	=	TRUE	-		
							(					
							particulate filter regeneration	=	TRUE	-		
							)					
							and					
							measured temperature upstream of the oxidation catalyst	>	249.96	°C		
							and					
							(					
							engine speed	>	700.00	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	<	3400.00	rpm		
							)					
							and					
							diagnostic performed in current dc	=	FALSE	-		
							and					
							reset condition	=	FALSE	-		
							which becomes False under following conditions					
							(					
							converted HC mass in the oxidation catalyst during monitoring calculated by integrating the amount of fuel injected by the HCI (Hydro-Carbon Injector)	<	140.00	g		
							or					
							particulate filter regeneration	=	FALSE	-		
							or					
							regeneration was not aborted to assure that HC conversion was disturbed	=	TRUE	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Primary Fuel Sensor Performance	P0461	Detects an error in the primary fuel tank sensor performance by comparing the decrease of the fuel level for a certain driven mileage to a threshold.	(a) - (b)	>=	100.00	miles	Engine Running	=	TRUE	-	fail conditions exists for 0.02 s monitor runs 0.02 s rate whenever enable conditions are met	B
			with				for					
			(a) total vehicle distance	=	measured parameter	-	time	>=	60.00	sec		
			and with				and					
			(b) change in mileage	=	calculated parameter	-	fuel transfer pump active	=	FALSE	-		
							means					
			and				(					
			(c) - (d)	<	4.00	l	filtered fuel volume in primary tank (fuel volume is calculated by converting the measured fuel level (%) to volume based on the calibratable fuel tank maximum capacity)	>	1638.35	l		
			with									
			(c) maximum volume of fuel reached in primary tank during driving cycle	=	measured parameter	-	and					
			and with				filtered fuel volume in secondary tank	<	0.00	l		
			(d) minimum volume of fuel reached in primary tank during driving cycle	=	measured parameter	-	for					
							time	>=	0.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and cumulative transfer pump on time in current ignition cycle	>	0.00	sec		
							) and fuel level zone 3	=	TRUE	-		
							means (filtered fuel volume in primary tank	<	137.40	l		
							and filtered fuel volume in secondary tank	>	0.00	l		
							) or fuel level zone 4	=	TRUE	-		
							means (filtered fuel volume in primary tank	<	137.40	l		
							and filtered fuel volume in secondary tank	<=	0.00	l		
							) and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	-	see sheet inhibit tables	-		
SRC low for fuel level sensor of primary tank	P0462	Detects low voltage readings in the fuel level primary tank sensor circuit, indicating an OOR low condition on the fuel level sensor circuit	voltage of fuel level sensor 1	<	0.20	V	ignition on	=	TRUE	-	fail conditions exists for 24 s test performed continuously 0.1 s rate	B
							and basic enable conditions met:	=	see sheet enable tables	-		
SRC high for fuel level sensor of primary tank	P0463	Detects high voltage readings in the fuel level primary tank sensor circuit, indicating an OOR high condition on the fuel level sensor circuit	voltage of fuel level sensor 1	>	4.80	V	ignition on	=	TRUE	-	fail conditions exists for 24 s test performed continuously 0.1 s rate	B
							and basic enable conditions met:	=	see sheet enable tables	-		

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 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 controller deviation of EGR valve calculated out of difference between desired and actual value	<= -5.00 %	and offset learning in the previous driving cycle was complete	= TRUE -		
					and Engine Running	= TRUE -		
					and duty cycle of the Intake Air Heater output	< 5.00 %		
					and battery voltage	>= 11.00 V		
					and EGR Valve	= ACTIVE -		
					EGR Valve Jammed	= FALSE -		
					and NO Pending or Confirmed DTCs:	see sheet inhibit tables -		
					and basic enable conditions met:	see sheet enable tables -		
Cooling Fan Speed Output Circuit	P0480	This diagnostic checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage	> 11.00 V	fail conditions exists for 3 s test performed continuously 0.02 s rate	B
					for time	> 3.00 sec		
					and starter is active cranking	= FALSE -		
					for time	> 3.00 sec		
					and ignition on	= TRUE -		
					and			

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	-		
		This diagnostic checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.				battery voltage	>	11.00	V	fail conditions exists for 1 s test performed continuously 0.02 s rate	
							for time	>	3.00	sec		
							and starter is active cranking	=	FALSE	-		
							for time	>	3.00	sec		
							and ignition on	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
Cooling Fan System Performance	P0483	Detects inability to control fan speed to desired RPM	fan speed difference between actual and commanded value	<=	-500.00	rpm	PWM of fan driver output	>=	28.00	%	fail conditions exists for 120 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			or fan speed difference between actual and commanded value	>=	500.00	rpm	and Commanded fan speed	>=	999.00	rpm		
			or fan speed difference between actual and commanded value, unfiltered	<=	-500.00	rpm	and (					
			or fan speed difference between actual and commanded value, unfiltered	>=	500.00	rpm	fan input speed means Fan input speed is calculated by the engine speed * the pulley ratio	<	5320.00	rpm		
							and fan input speed means Fan input speed is calculated by the engine speed * the pulley ratio	>	400.00	rpm		
							) and engine coolant temperature	>	69.96	°C		
							and fan drive speed rate of change	<	2000.00	rpm		
							and fan speed weight factor calculated out of ((a) * (b) * (c) * (d)	>	0.59	factor		
							with (a) factor based on input shaft stability (see Look-Up-Table #32)	=	0 to 1	factor		
							and with (b) factor based on intake air temperature (see Look-Up-Table #35)	=	0 to 1	factor		

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) factor based on engine coolant temperature (see Look-Up-Table #34) and with (d) factor based on fan drive speed (see Look-Up-Table #33)) and basic enable conditions met:	= 0 to 1 factor = 0 to 1 factor = see sheet enable 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 and battery voltage for time and starter is active cranking for time and basic enable conditions met:	= ACTIVE - > 11.00 V > 3.00 sec = FALSE - > 3.00 sec = see sheet enable tables -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
Exhaust Gas Recirculation (EGR) Motor Control Circuit 1 High Voltage	P0490	Diagnoses the EGR Valve low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	EGR Solenoid Control Circuit and battery voltage for time and starter is active cranking for time and basic enable conditions met:	= ACTIVE - > 11.00 V > 3.00 sec = FALSE - > 3.00 sec = see sheet enable tables -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cooling Fan Speed High	P0495	Detects a locked fan. When fan speed control solenoid is off, the fan speed should follow accessory drive input speed plus some slip.	fan speed (see Look-Up-Table #36)	>	400 to 1500	rpm	fluid volume in Clutch (see Look-Up-Table #37)	<	0.005 to 0.0115	l	fail conditions exists for 0.02 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			for				calculated by					
			Error counter	>=	800.00	counts	a model where fluid flow in and fluid flow out are calculated. The fluid flow in model is based on fan output speed. The fluid out model is based on fluid temperature and the difference between fan input and output speed.					
							or					
			equivalent to 80 sec				Maximum allowed clutch pump out time	>=	600 to 65534	sec		
							when					
							{					
							input fan speed	>	1500.00	rpm		
							means					
							Fan input speed is calculated by the engine speed * the pulley ratio					
							and					
							(					
							PWM of fan driver output	<=	45.00	%		
							and					
							Commanded fan speed	<	600.00	rpm		
							)					
							and					
							ambient pressure	>	55.00	kPa		
							and					
							intake air temperature	>	-40.04	°C		
							and					
							time since engine off	>	0.00	sec		
							and					
							(					
							Engine Running	=	TRUE	-		
							for					
							time	>	0.00	sec		
							)					
							}					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Control Position Not Learned	P049D	Detects adaptation values of EGR bypass that are not plausible. Compares the difference between the maximum and minimum adaptation values to a threshold.	**Path 1:**				offset learning is active	=	TRUE	-	fail conditions exists for 0.005 s monitor runs with 0.005 s rate whenever enable conditions are met	B
			(a) - (b)	>	30.00	%	active under following conditions					
			with				(					
			(a) maximum learned offset value for EGR valve	=	measured parameter	-	engine coolant temperature	>=	5.06	°C		
			and with				and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Only the closed position is learned.	(b) minimum learned offset value for EGR valve	=	measured parameter	-	engine coolant temperature	<=	130.06	°C		
			or				)					
							and					
		The learn procedure includes 3 actual learns. i.e. the valve is commanded open then closed, then the closed position is read for learn. Then position is commanded open, then closed a 2nd time, and the closed position is read for learn. Then position is commanded open and closed a 3rd time, and closed position is read for learn.										
		The maximum and minimum learned offset refers to the maximum and minimum learned values of the 3 learns performed within total learn procedure.					(					
							battery voltage	>=	10.00	V		
							and					
			Path 2:				battery voltage	<=	655.34	V		
			(				)					
			learned offset value for EGR valve in the present driving cycle	>	23.33	%	and					
			or				EGR sweep has ended - no movement in EGR valve	=	TRUE	-		
			learned offset value for EGR valve in the present driving cycle	<	-23.33	%	means					
			)				the EGR valve cleaning procedure (cycle the valve fully open, fully close 10 times) is performed before the learn starts (in after-run). This signal (EGR sweep has ended) indicates that this cleaning procedure is complete.					
							and					
							engine post drive/ afterun	=	TRUE	-		
							and					
							engine was running during last driving cycle	=	TRUE	-		
							means					
							engine running during last driving cycle	=	TRUE	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Detects a jammed EGR valve during opening or closing the valve.	**Path 1:**				**Path 1:**				fail conditions exists for 0.005 s monitor runs with 0.005 s rate whenever enable conditions are met	
			EGR valve stuck during opening	=	TRUE	-	EGR valve is opening	=	TRUE	-		
			means				or					
			(				**Path 2:**					
			(a) + (b)	>=	20.01	%	EGR valve is closing	=	TRUE	-		
			with				and					
			(a) position of EGR valve	=	measured parameter	-	engine post drive/ afterun	=	TRUE	-		
			and with				and					
			(b) learned offset value of EGR valve in the previous driving cycle	=	measured parameter	-	offset learning active	=	TRUE	-		
			or				and					
			(a) - (c)	<=	0.01	%	basic enable conditions met:		see sheet enable tables	-		
			with									
			(a) position of EGR valve	=	measured parameter	-						
			and with									
			(c) position of EGR valve of previous process cycle (refers to last measured valve position in the previous raster calculation)	=	measured parameter	-						
			)									
			for									
			time	>	5.00	sec						
			or									
			Path 2:									
			EGR valve stuck during closing	=	TRUE	-						
			means									
			(									
			position of EGR valve	<=	(a) * (b)	-						
			with									
			(a) reference position of the EGR valve in open position	=	measured parameter	-						
			and with									
			(b) factor for EGR valve close position	=	0.50	factor						
			or									
			|(c) - (d)|	>	0.02	%						
			with									
			(c) position of EGR valve	=	measured parameter	-						
			and with									
			(d) position of EGR valve of previous process cycle (refers to last measured valve position in the previous raster calculation)	=	measured parameter	-						
			)									
			for									
			time	>	5.00	sec						
Idle Speed Too Low	P0506	Detects an idle speed governor that is unable to achieve the desired idle speed and the idle speed is too low	engine speed	<	maximum value of (a) **OR** (b - (b * c))		Engine Running	=	TRUE	-	fail conditions exists for 20 s monitor runs	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			with				and				with 0.1 s rate whenever enable conditions are met	
			(a) minimum engine speed	=	300.00	rpm	(					
			and with				engine coolant temperature	>	-7.04	°C		
			(b) minimum idle speed set point (see table #91 for commanded) minimum idle speed	=	calculated parameter	-	and					
			and with				engine coolant temperature	<	129.96	°C		
			(c) factor for calculation of engine speed interval	=	24.00	%	)					
							and					
							idle speed controller active active when TCC not in lock up and when the commanded pedal torque is less than idle governor torque	=	TRUE	-		
							and					
							vehicle speed	<	1.86	mph		
							and					
							no other torque demanding function active means no torque demand based on accelerator pedal input	=	TRUE	-		
							and					
							set point torque of the speed controller	>	0	NM		
							and					
							measured engine speed	>	300.00	rpm		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Idle Speed Too High	P0507	Detects an idle speed governor that is unable to achieve the desired idle speed and the idle speed is too high.	engine speed	>	minimum value of (a) **OR** (b + (b * c))		Engine Running	=	TRUE	-	fail conditions exists for 20 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			with				and					
			(a) maximum engine speed	=	2500.00	rpm	(					
			and with				engine coolant temperature	>	-7.04	°C		
			(b) minimum idle speed set point (see table #91 for commanded) minimum idle speed	=	calculated parameter	-	and					
			and with				engine coolant temperature	<	129.96	°C		
			(c) factor for calculation of engine speed interval	=	24.00	%	)					
							and					
							idle speed controller active active when TCC not in lock up and when the commanded pedal torque is less than idle governor torque	=	TRUE	-		
							and					
							vehicle speed	<	1.86	mph		
							and					
							no other torque demanding function active	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					means no torque demand based on accelerator pedal input			
					and			
					set point torque of the speed controller	> 0 NM		
					and			
					measured engine speed	> 300.00 rpm		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Cooling Fan Speed Sensor Circuit	P0526	This diagnostic checks the circuit for electrical integrity during operation.	**Path 1:**		engine speed	> 550.00 rpm	fail conditions exists for 3 s monitor runs with 0.020 s rate whenever enable conditions are met	B
			period is too long to measure	> 0.21 sec	and			
			and		{			
			(		(			
			current state of the signal received from fan is low	= TRUE -	PWM of fan driver output	>= 45.00 %		
			)		and			
					Commanded fan speed	>= 0.00 rpm		
			or		)			
					for			
			Path 2:		time	> 30.00 sec		
			period is too long to measure	> 0.21 sec	or			
			and		vehicle speed	< 203.65 mph		
			(		for			
			current state of the signal received from fan is high	= TRUE -	time	> 327.67 sec		
			)		}			
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Exhaust Gas Temperature (EGT) Sensor 1 Circuit Low Voltage	P0545	Detects low voltage readings on the EGT 1 circuit, indicating an OOR low condition on the EGT circuit	voltage of the temperature sensor upstream of oxidation catalyst	< 0.65 V	NO Pending or Confirmed DTCs:	= see sheet inhibit tables -	fail conditions exists for 3 s monitor runs 0.050 s rate whenever enable conditions are met	B
			same as		for			
			temperature upstream of oxidation catalyst	< -50 °C	time	> 0.00 sec		
					and			
					ignition on	= TRUE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Gas Temperature (EGT) Sensor 1 Circuit Low Voltage	P0545	Detects low voltage readings on the EGT 1 circuit, indicating an OOR low condition on the EGT circuit	voltage of the temperature sensor upstream of oxidation catalyst	<	0.65	V	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	fail conditions exists for 3 s monitor runs 0.050 s rate whenever enable conditions are met	B
			same as temperature upstream of oxidation catalyst	<	-50	°C	for time	>	0.00	sec		
							and ignition on	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Temperature (EGT) Sensor 1 Circuit High Voltage	P0546	Detects high voltage readings on the EGT 1 circuit, indicating an OOR high condition on the EGT 1 circuit	voltage of the temperature sensor upstream of oxidation catalyst	>	2.21	V	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	fail conditions exists for 3 s monitor runs 0.050 s rate whenever enable conditions are met	B
			same as temperature upstream of oxidation catalyst	>	1000	°C	for time	>	0.00	sec		
							and ignition on	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
Idle Control System	P054E	Quantity Threshold - Fuel Quantity Lower Than Expected	(				(				fail conditions exists for 15 s monitor runs 0.2 s rate whenever enable conditions are met	B
			Current injection quantity	<	minimum expected injection quantity (map) * factor for calculating the minimum threshold out of the reference map	mm^3/rev	Current gear	=	unchanged	-		
			with Current gear	≠	Neutral		AND Vehicle speed	<=	1.86	mph		
			and minimum expected injection quantity (see Look-Up Table #96)	=	46.0 to 161.6	mm^3/rev	AND Particulate filter regeneration	=	not active			
			and factor for calculating the minimum threshold out of the reference map	=	0.50	factor	AND Engine speed	<=	1040.00	rpm		
			)				AND Engine speed	>=	448.00	rpm		
							AND Engine coolant temperature	>	-20.04	°C		
							AND					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Idle speed controller	=	active	-		
							all for time	>	5.00	sec		
							)					
							AND					
							Fluctuation range of engine speed	<	16383.50	rpm		
							AND					
							Basic enable conditions met	=	see sheet enable tables	-		
	P054F	Quantity Threshold - Fuel Quantity Higher Than Expected	Current injection quantity	<	maximum expected injection quantity (map) * factor for calculating the maximum threshold out of the reference map	mm^3/rev	(				fail conditions exists for 15 s monitor runs 0.2 s rate whenever enable conditions are met	B
			with				Current gear	=	unchanged	-		
			Current gear	≠	Neutral		AND					
			and				Vehicle speed	<=	1.86	mph		
			maximum expected injection quantity (see Look-Up-Table #50)	=	122.8 to 244.4	mm^3/rev	AND					
			and				Particulate filter regeneration	=	not active			
			factor for calculating the maximum threshold out of the reference map	=	1.50	factor	AND					
			)				Engine speed	<=	1040.00	rpm		
							AND					
							Engine speed	>=	448.00	rpm		
							AND					
							Engine coolant temperature	>	-20.04	°C		
							AND					
							Idle speed controller	=	active	-		
							all for time	>	5.00	sec		
							)					
							AND					
							Fluctuation range of engine speed	<	16383.50	rpm		
							AND					
							Basic enable conditions met	=	see sheet enable tables	-		
Cruise Control Multi-Function Input "A" Circuit	P0564	Cruise switch status indicated not in "between range" for calibrated period of time.	Set Switch CAN message value "Between Ranges"	=	9	-	ignition on	=	TRUE	-	fail conditions exists for 5 sec monitor runs with 0.005 s rate whenever enable conditions are met	Special C
							and					
							input circuit active	=	TRUE	-		
							and					
							basic enable conditions met	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control "On" Signal	P0565	If the Cruise ON switch is continuously applied for greater than a calibratable time	Set Switch CAN message value "Cruise On"	= 5 -	ignition on and input circuit active and basic enable conditions met and NO Pending or Confirmed DTCs:	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 20s monitor runs with 0.005 s rate whenever enable conditions are met	Special C
Cruise Control "Resume" Signal	P0567	Resume switch state indicates problem with the circuit, by remaining in the high / active state for a calibrated period of time	Resume Switch CAN message in high / active state	= TRUE -	ignition on and input circuit active and basic enable conditions met and NO Pending or Confirmed DTCs:	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 90 s monitor runs with 0.005 s rate whenever enable conditions are met	Special C
Cruise Control "Set" Signal	P0568	Set switch state indicates problem with the circuit, by remaining in the high / active state for a calibrated period of time	Set Switch CAN message in high / active state	= TRUE -	ignition on and input circuit active and basic enable conditions met and NO Pending or Confirmed DTCs:	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 90 s monitor runs with 0.005 s rate whenever enable conditions are met	Special C

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cruise Control "Cancel" Signal	P056C	Cruise Control CANCEL switch state indicates problem with the circuit, by remaining in the high / active state for a calibrated period of time	Set Switch CAN message value "CANCEL"	=	6	-	ignition on	=	TRUE	-	fail conditions exists for 20s monitor runs with 0.005 s rate whenever enable conditions are met	Special C
							and					
							input circuit active	=	TRUE	-		
							and					
							basic enable conditions met	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cruise Control Input Circuit	P0575	Cruise control CAN communication monitoring	amount of errors in consecutive frames	>=	3.00	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/Performanc e	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 for	=	FALSE	-		
			difference of the brake sensor voltage corresponds to a corrected value of (see Look-Up-Table #14)	=	0 to 1	factor						
							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	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					full test has not been completed this driving cycle gear selector currently not in Park vehicle speed accelerator pedal position 1 and No Pending or Confirmed DTCs: and basic enable conditions met:	= TRUE - = TRUE - >= 4.35 mph < 5.00 % = see sheet inhibit tables - = 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 and No Pending or Confirmed DTCs: and basic enable conditions met:	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	fail conditions exists for 0.5 s monitor runs 0.01 s rate whenever enable conditions are met	A
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 and No Pending or Confirmed DTCs: and basic enable conditions met:	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	fail conditions exists for 0.5 s monitor runs 0.01 s rate whenever enable conditions are met	A
Cruise Control Multi-Function Input "A" Circuit Low	P0580	Cruise switch status in Open/short circuit to ground for a calibrated period of time	Set Switch CAN message value "Open/Short to Ground"	= 7 -	ignition on and input circuit active and basic enable conditions met and NO Pending or Confirmed DTCs:	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 20s monitor runs with 0.005 s rate whenever enable conditions are met	Special C

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-Function Input "A" Circuit High	P0581	Cruise switch status in"short circuit to Power" for a calibrated period of time	Set Switch CAN message value "Short to Power"	= 8 -	ignition on and input circuit active and basic enable conditions met and NO Pending or Confirmed DTCs:	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 2.5s monitor runs with 0.005 s rate whenever enable conditions are met	Special C
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 and engine pre drive	= TRUE - = TRUE -	fail conditions exists for 0.01 s test performed test performed once per driving cycle during ECU initialization	A
Control Module Internal Performance	P0606	Monitors and detects the improper operation of the ECM. This is accomplished by monitoring the output of various hardware modules within the ECM and by creating parallel redundant	SPI communication, data transfer lost	= TRUE	ignition on and basic enable conditions met:	= TRUE - = see sheet enable tables -	fail conditions exists for 0.5 s test performed continuously	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		calculations of critical engine management system parameters. These redundant calculations are compared to the respective values of the primary function or to fixed limits to evaluate the monitoring path. A failure of these monitoring paths would for example be caused by a corrupt RAM cell leading to an implausible value for a parameter.	faults detected in the SPI communication IC internal	>	523.00	counts	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 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 5.25	V V	ignition on and counter of reactivation attempt of power output stage and NO Pending or Confirmed DTCs:	= >= =	TRUE 2.00 see sheet inhibit tables	- counts -	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	> = =	50.00 calculated parameter calculated parameter	usec - -	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 measured energizing time for fuel injection and engine speed and	= >= = >= >	TRUE 0 TRUE 0 1200.00	- - - - rpm	fail conditions exists for at least 0.05 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.
							rail pressure and	>	20000.00	kPa		
							engine test active via diagnosis tester and	=	FALSE	-		
			Path 1: (				engine speed and	>	1200.00	rpm	fail conditions exists for at least 0.05 s monitor runs with 0.01 s rate whenever enable conditions are met	
			parallel redundant calculation of angle for pilot injection 1 quantity or	<	-32.98	degrees	engine test active via diagnosis tester	=	FALSE	-		
			parallel redundant calculation of angle for pilot injection 1 quantity) or	>	102.99	degrees						
			Path 2: (									
			parallel redundant calculation of angle for main injection quantity or	<	-32.98	degrees						
			parallel redundant calculation of angle for main injection quantity) or	>	43.53	degrees						
			Path 3: (									
			parallel redundant calculation of angle for post injection quantity 1 or	<	-360.00	degrees						
			parallel redundant calculation of angle for post injection quantity 1) or	>	-67.00	degrees						
			Path 4: (									
			parallel redundant calculation of angle for post injection quantity 2 or	<	-83.00	degrees						
			parallel redundant calculation of angle for post injection quantity 2) or	>	43.53	degrees						
			Path 5: (									
			parallel redundant calculation of angle for post injection quantity 3 or	<	-83.00	degrees						
			parallel redundant calculation of angle for post injection quantity 3)	>	0.00	degrees						
			(				redundant engine speed calculation	>=	1200.00	rpm	fail conditions exists for at least 0.2 s monitor runs with 0.04 s	
			parallel redundant calculation of energizing times of the correction value for pilot injection quantity (see Look-Up-Table #56)	<	-500 to -50	usec	and					
			or				engine test active via diagnosis tester	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			parallel redundant calculation of energizing times of the correction value for pilot injection quantity (see Look-Up-Table #55))	>	50 to 500	usec					rate whenever enable conditions are met	
			parallel redundant calculation of post injection 2 quantity	>	130.00	mm^3	engine test active via diagnosis tester	=	FALSE	-	fail conditions exists for at least 0.4 s monitor runs with 0.04 s rate whenever enable conditions are met	
							and					
							change in injection operation mode requested	=	TRUE	-		
			parallel redundant calculation of averaged torque creating energizing time per cylinder (see Look-Up-Table #58)	>	200 to 6000	us	fuel system is in fuel cut off (see parameter definition line #189)	=	TRUE	-	fail conditions exists for at least 0.8 s monitor runs with 0.04 s rate whenever enable conditions are met	
			and				for					
			activation counter (intervention) of the surge damper	>=	74.00	counts	time	>	0.65	sec		
							and					
							redundant engine speed calculation	>	1440.00	rpm		
							and					
							general engine speed demand (see parameter definition line #213)	=	FALSE	-		
							and					
							external torque demand from stability ECU via CAN	=	FALSE	-		
							and					
							external torque demand from transmission ECU via CAN	=	FALSE	-		
							and					
							((					
							cruise control active	=	FALSE	-		
							or					
							(					
							brake pedal status	=	TRUE	-		
							or					
							redundant brake pedal status	=	TRUE	-		
							)					
							for					
							time	>	0.28	sec		
							)					
							and					
							(					
							pedal position	=	0	%		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							or					
							redundant calculation of pedal position	=	0	%		
							for time	>	0.02	sec		
							)					
							and					
							(					
							redundant engine speed calculation after start detected	>	120.00	rpm		
							and					
							redundant engine speed calculation at start (see Look-Up-Table #57)	>	840 to 1120	rpm		
							)					
							and					
							engine test active via diagnosis tester	=	FALSE	-		
			parallel redundant calculation of averaged wave correction quantity for pilot injection	>=	7.50	mm^3	redundant engine speed calculation	>=	1200.00	rpm	fail conditions exists for at least 0.2 s monitor runs with 0.04 s rate whenever enable conditions are met	
			or				and					
			parallel redundant calculation of averaged wave correction quantity for main injection	>=	7.50	mm^3	engine test is active via diagnosis tester	=	FALSE	-		
			or									
			parallel redundant calculation of averaged wave correction quantity for post injection 2	>=	7.50	mm^3						
			or									
			parallel redundant calculation of averaged wave correction quantity for post injection 3	>=	7.50	mm^3						
			(				(				fail conditions exists for 0.120 s monitor runs with 0.01 s rate whenever enable conditions are met	
			rail pressure	<=	16000.00	kPa	parallel redundant calculation of voltage of rail pressure sensor	<	0.19	V		
			or				or					
			rail pressure	>=	204000.00	kPa	parallel redundant calculation of voltage of rail pressure sensor	>	4.81	V		
							)					
							and					
							delay time	>	0.21	sec		
							and					
							parallel redundant calculation of injections active	=	TRUE	-		
							and					
							redundant engine speed calculation	>	1000.00	rpm		
							and					
							engine test active via diagnosis tester	=	FALSE	-		
							and					
							conditions for level one signal range check fault detection are met	=	TRUE	-		
			internal supply voltage	<	4.2	V	ignition on	=	TRUE	-	fail conditions exists for 0.05 s test	
			or									
			internal supply voltage	>	5.25	V						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							performed continuously with 0.01 s rate	
			WDA (watch dog) shut off due to undervoltage means internal supply voltage	= TRUE - < 4.2 V	shut off path test active and battery voltage for time and WDA (watch daog) line active	= FALSE > 8.00 V > 0.10 sec = TRUE	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	
			WDA (watch dog) shut off due to overvoltage means internal supply voltage	= TRUE - > 5.25 V	shut off path test active and WDA (watch dog) line active	= FALSE - = TRUE -	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	
			WDA (watch dog) shut off due to internal security error	= TRUE -	shut off path test active and WDA (watch dog) line active	= FALSE - = TRUE -	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	
			WDA (watch dog) shut off because of corrupt question-and-answer communication	= TRUE -	ignition on	= TRUE -	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.
					and WDA (watch dog) line active and shut off path test active	 = TRUE - = FALSE -	0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	
			the actual response time from processor is not equal to the requested response-time	= TRUE -	ignition on and NO Pending or Confirmed DTCs:	= TRUE - = see sheet inhibit tables -	fail conditions exists for more than 0.08 s monitor runs at least twice every 0.08 s rate whenever enable conditions are met	
			redundant, independent algorithm for plausibility fault of accelerator pedal signal for safety reasons:				fail conditions exists for 0.28 s monitor runs with 0.04 s rate whenever enable conditions are met	
			Path 1:		ignition on	= TRUE -		
			|(maximum (a) (b)) - 2 * (maximum (c) (b))|	> 0.29 V	and			
			with		engine test active via diagnosis tester	= FALSE -		
			(a) voltage accelerator pedal 1		and			
			and with		Input signal fault present	= FALSE -		
			(b) lower limit for accelerator pedal voltage	0.95 V	and			
			and with		ADC fault present	= FALSE -		
			(c) voltage accelerator pedal 2					
			and					
			(					
			voltage accelerator pedal 1	> 1.45 V				
			or					
			voltage accelerator pedal 2	> 1.45 V				
			)					
			or					
			Path 2:					
			|(maximum (a) (b)) - 2 * (maximum (c) (b))|	> 0.41 V				
			with					
			(a) voltage accelerator pedal 1					
			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) lower limit for accelerator pedal voltage and with (c) voltage accelerator pedal 2 and (voltage accelerator pedal 1 or voltage accelerator pedal 2)	 <= <=	0.95 1.45 1.45	V V V						
			no response to an injection request 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	
			no response to shut-off path test processor internal	=	TRUE	-	ignition on and NO Pending or Confirmed DTCs:	= =	TRUE see sheet inhibit tables	- -	fail conditions exists for more than 0.523 monitor runs at the 0.01 s rate whenever enable	
			no response to hardware activation request processor internal	=	TRUE	-	ignition on and NO Pending or Confirmed DTCs:	= =	TRUE see sheet inhibit tables	- -	fail conditions exists for more than 0.437 monitor runs at least twice every 0.08 s rate whenever enable	
			no response from processor operative system processor internal	=	TRUE	-	ignition on and NO Pending or Confirmed DTCs:	= =	TRUE see sheet inhibit tables	- -	fail conditions exists for more than 0.08 s monitor runs at least twice every 0.08 s	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
											every 0.08 s rate whenever enable conditions are met	
			Path 1: repetitions of injection shut-off path test or Path 2: (number of a powerstage test too few and number of cylinders)	 >= < >=	 523.00 2.00 8.00	 counts counts counts	ignition on and injection shut-off path test	= =	TRUE ACTIVE	- -	fail conditions exists for more than 0.64 s monitor runs at least twice every 0.08 s rate whenever enable conditions	
			too few bytes received by monitoring module from CPU means bytes received by monitoring module from CPU as response	= <	TRUE 4	- Bytes	ignition on	=	TRUE	-	fail conditions exists for more than 0.4 s monitor runs at least twice every 0.08 s rate whenever enable conditions are met	
			ECM detects interruption in the SPI communication processor internal	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for more than 0.08 s monitor runs at least twice every 0.08 s rate whenever enable conditions are met	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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	
			redundant filtered supply voltage to injector chip 1 or redundant filtered supply voltage to injector chip 1	< 3.10 V > 3.50 V	ignition on and battery voltage and basic enable conditions met:	= TRUE - > 8.00 V see sheet enable tables -	fail conditions exists for 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	
			redundant filtered supply voltage to injector chip 2 or redundant filtered supply voltage to injector chip 2	< 3.10 V > 3.50 V	ignition on and battery voltage and basic enable conditions met:	= TRUE - > 8.00 V see sheet enable tables -	fail conditions exists for 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	
			internal injector driver chip 1 error IC internal	= TRUE -	Engine Running and basic enable conditions met:	= TRUE - see sheet enable tables -	fail conditions exists for more than 0.1 s monitor runs with 0.01 s	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
											rate whenever enable conditions are met	
			internal injector driver chip 2 error IC internal	=	TRUE	-	Engine Running and basic enable conditions met:	= =	TRUE see sheet enable tables	- -	fail conditions exists for more than 0.1 s monitor runs with 0.01 s rate whenever enable conditions 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	
			security torque limitation request due to implausible air system control requests	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for more than 533 events test	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
											performed continuously with 0.01 s	
			security torque limitation request due to implausible rail pressure request	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for more than 533 events test performed continuously with 0.01 s	
			security torque limitation request due to implausible quantity set point control requests	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for more than 533 events test performed continuously with 0.01 s	
			indicated torque	>	(a) + (b) + (c) + (d)	-	Engine Running	=	TRUE	-	fail conditions exists for more than 0.28 s monitor runs with 0.04 s rate whenever enable conditions are met	
			with (a) modeled inner engine torque	=	calculated parameter	-	and basic enable conditions met:	=	see sheet enable tables	-		
			and with (b) torque tolerance offset (see Look-Up-Table #54)		11.72 to 99.61	%						
			and with (c) torque of engine speed controller	=	calculated parameter	-						
			and with (d) torque of surge damper control	=	calculated parameter	-						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			voltage of charging switch or voltage of charging switch if buffer of a bank is not charged completely, or not at all	> >	210.00 100.00	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 ms monitor runs with 0.01 s rate whenever enable conditions are met	
			DC/DC converter cannot be switched off.	=	TRUE	-	ignition on	=	TRUE	-		
ROM Memory Fault	P0601	Detects a fault in the ROM memory	ECM detects multiple errors in the ROM-memory by comparing a calculated checksum with a check word	=	TRUE	-	engine post drive/ afterun	=	TRUE	-	fail conditions exists for 0.01 s test performed once per drive cycle during afterrun	A
Control Module Analog to Digital Performance	P060B	Redundant electronic ECM circuitry determines if ADC is correctly converting signals within the correct time periods.	voltage at ADC test voltage input or	<	4.73	V	ignition on	=	TRUE	-	fail conditions	A

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 test voltage input	>	4.83	V					exists for at least 0.15 s test performed continuously 0.01 s	
			|(a) - (b)|	>	0.16	V	ignition on	=	TRUE	-	fail conditions exists for at least 0.12 s monitor runs with 0.01 s rate whenever enable conditions are met	
			with				and					
			(a) voltage accelerator pedal signal 2 at internal ADC	=	measured parameter	V	(					
			and with				counter for steady state detection of the internal AD converter	>=	4.00	events		
			(b) voltage accelerator pedal signal 2 at external ADC	=	measured parameter	V	means					
							|(a) - (b)|	<=	0.06	V		
							with					
							(a) voltage accelerator pedal signal 2 at internal ADC	=	measured parameter	V		
							and with					
							(b) voltage of the accelerator pedal signal 2 at the external ADC	=	measured parameter	V		
							or					
							counter for steady state detection of the external AD converter	>=	4.00	events		
							means					
							(c) - (d)	<=	0.06	V		
							with					
							(c) voltage accelerator pedal signal 2 at external ADC	=	measured parameter	V		
							and with					
							(d) voltage of the accelerator pedal signal 2 at the internal ADC	=	measured parameter	V		
							)					
			(				ignition on	=	TRUE	-	fail conditions exists for at least 0.15 s test performed continuously 0.01 s	
			ratio metric correction factor	<	0.62	factor						
			or									
			ratio metric correction factor	>	0.74	factor						
			)									

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Internal Control Module Engine Speed (RPM) Performance	P061C	Monitors main and redundant engine speed calculations for agreement. Detects failure in engine speed calculation through redundant calculation algorithm.	|(a) - (b)|	>=	400.00	rpm	redundant calculated engine speed	>=	600.00	rpm	fail conditions exists for more than 0.32 s monitor runs with 0.04 s rate whenever enable conditions are met	A
			with				and					
			(a) redundant calculated engine speed	=	calculated parameter	-	engine synchronization	=	TRUE	-		
			and with				engine synchronization completed	=	TRUE	-		
			(b) engine speed	=	measured parameter	-	which means					
							number of crankshaft revolutions	>=	4.00	revs		
							and					
							crankshaft reference mark detected	=	TRUE	-		
							(reference mark is the 2 missing teeth in the 50-2 tooth-wheel configuration)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Fuel Pre-supply Pump Control Circuit Open	P0627	Diagnoses the Fuel Pre-Supply Pump low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	engine post drive/ afterrun	=	FALSE	-	fail conditions exists for 1.99s monitor runs with 0.2 s rate whenever enable conditions are met	B
							for					
							time	>	1.00	sec		
							and					
							battery voltage	>	11.00	V		
							for					
							time	>	3.00	sec		
							and					
							(					
							ignition on	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							)					
Fuel Pre-supply Pump Control Circuit Low Voltage	P0628	Diagnoses the Fuel Pre-Supply Pump low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	engine post drive/ afterrun	=	FALSE	-	fail conditions exists for 1s monitor runs with 0.2 s rate whenever enable conditions are met	B
							for					
							time	>	1.00	sec		
							and					
							battery voltage	>	11.00	V		

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 -		
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 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 2 s monitor runs with 0.2 s rate whenever enable conditions are met	B
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
5 Volt Reference 1 Circuit	P0641	Sensor supply voltage circuitry determines if faults related to maintaining the voltage level exist.	sensor supply voltage 1	<= 4.6 V	ignition on and basic enable conditions met:	= TRUE - = see sheet enable tables -	fail conditions exists for 0.1 s test performed continuously 0.01s rate	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
5 Volt Reference 2 Circuit	P0651	Sensor supply voltage circuitry determines if faults related to maintaining the voltage level exist.	sensor supply voltage 2	<= 4.6 V	ignition on and basic enable conditions met:	= TRUE - = see sheet enable tables -	fail conditions exists for 0.1 s test performed continuously 0.01s rate	A
5 Volt Reference 3 Circuit	P0697	Sensor supply voltage circuitry determines if faults related to the voltage level present at the sensor supply voltage exist.	sensor supply voltage 3	<= 4.6 V	ignition on and basic enable conditions met:	= TRUE - = see sheet enable tables -	fail conditions exists for 0.1 s test performed continuously 0.01s rate	A
5 Volt Reference 4 Circuit	P06A3	Sensor supply voltage circuitry determines if faults related to the voltage level present at the sensor supply voltage exist.	sensor supply voltage 4	<= 4.6 V	ignition on and basic enable conditions met:	= TRUE - = see sheet enable tables -	fail conditions exists for 1.0 s test performed continuously 0.01s rate	B
5 Volt Reference 5 Circuit	P06D2	Sensor supply voltage circuitry determines if faults related to the voltage level present at the sensor supply voltage exist.	sensor supply voltage 5	<= 4.6 V	ignition on and	= TRUE -	fail conditions exists for 0.1 s test performed continuously	B

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 -	0.01s rate	
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	= TRUE -	fail conditions exists for 2 s monitor runs with 0.01 s rate whenever enable conditions are met	B (No MIL)
					and ignition on	= TRUE -		
					and ECU Initialization tasks in progress	= FALSE -		
					for time	> 1.00 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 -		
		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	= TRUE -	fail conditions exists for 2 s monitor runs with 0.01 s rate whenever enable conditions are met	B (No MIL)
					and ignition on	= TRUE -		
					and ECU Initialization tasks in progress	= FALSE -		
					for time	> 1.00 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.
		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	B (No MIL)
							and					
							ignition on	=	TRUE	-		
							and					
							ECU Initialization tasks in progress	=	FALSE	-		
							for					
							time	>	1.00	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	-		
Transmission Control Module (TCM) Requested MIL Illumination	P0700	Monitors Serial Data Communication for request from TCM to illuminate the MIL	Serial data communication from the TCM indicates the TCM has requested the MIL	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 1 s test performed continuously 0.5 s rate	A (No MIL)
							for time	>	0.25	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	-		
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					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(selected gear position is park or selected gear position is neutral) and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -		
Traction Control Input Signal	P0856	Detects a failure when a certain number of Traction Control System torque request messages within a defined message group checksum or rolling count values are incorrect	Error counter for Traction Control torque request message group	>= 8.00 counts	Traction Control Torque Request CAN Message Received and no rolling count or protection errors on CAN Frame $1C7 and ignition on and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	fault exists for 1 message group ; monitor runs whenever enable conditions are met.	Special C
Reductant Pump High Control Circuit Low Voltage	P1043	Diagnoses the Ruductant Pump Motor high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	ECU initialization tasks in progress for time and battery voltage for time and battery voltage for time and (battery voltage correction factor (please see the parameter definition (please see the parameter definition and	= FALSE - > 1.00 sec > 11.00 V > 3.00 sec < 655.34 V > 3.00 sec > 0.00 factor	fail conditions exists for 3 s monitor runs with 10 msec rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							battery voltage correction factor (please see the parameter definition (please see the parameter definition)	<	4.00	factor		
							for time	>	3.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Pump High Control Circuit High Voltage	P1044	Diagnoses the Ruductant Pump Motor high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	ECU initialization tasks in progress	=	FALSE	-	fail conditions exists for 3 s monitor runs with 10 msec rate whenever enable conditions are met	A
							for time	>	1.00	sec		
							and					
							battery voltage	>	11.00	V		
							for time	>	3.00	sec		
							and					
							battery voltage	<	655.34	V		
							for time	>	3.00	sec		
							and					
							(					
							battery voltage correction factor (please see the parameter definition	>	0.00	factor		
							and					
							battery voltage correction factor (please see the parameter definition)	<	4.00	factor		
							for time	>	3.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Purge Valve High Control Circuit High Voltage	P1046	Diagnoses the Reductant Purge Valve high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	ECU initialization tasks in progress	=	FALSE	-	fail conditions exists for 3 s monitor runs with 10 msec rate whenever enable conditions are met	B
							for time	>	1.00	sec		
							and					
							battery voltage	>	11.00	V		
							for					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					time	> 3.00 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3.00 sec		
					and			
					(			
					battery voltage correction factor (please see the parameter definition	> 0.00 factor		
					and			
					battery voltage correction factor (please see the parameter definition	< 4.00 factor		
					)			
					for			
					time	> 3.00 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Reductant Injector High Control Circuit Low Voltage	P1048	Diagnoses the Reductant Injector high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	ECU initialization tasks in progress	= FALSE -	fail conditions exists for 3 s monitor runs with 10 msec rate whenever enable conditions are met	A
			OR		for			
			Output current to dosing valve	> 1.60 Amps	time	> 1.00 sec		
					and			
					battery voltage	> 11.00 V		
					for			
					time	> 3.00 sec		
					and			
					battery voltage	< 655.34 V		
					for			
					time	> 3.00 sec		
					and			
					(			
					battery voltage correction factor (please see the parameter definition	> 0.00 factor		
					and			
					battery voltage correction factor (please see the parameter definition	< 4.00 factor		
					)			
					for			
					time	> 3.00 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		

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 High Voltage	P1049	Diagnoses the Reductant Injector high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	ECU initialization tasks in progress	=	FALSE	-	fail conditions exists for 3 s monitor runs with 10 msec rate whenever enable conditions are met	A
			OR				for					
			Output current to dosing valve	<	0.10	Amps	time	>	1.00	sec		
							and					
							battery voltage	>	11.00	V		
							for					
							time	>	3.00	sec		
							and					
							battery voltage	<	655.34	V		
							for					
							time	>	3.00	sec		
							and					
							(					
							battery voltage correction factor (please see the parameter definition	>	0.00	factor		
							and					
							battery voltage correction factor (please see the parameter definition	<	4.00	factor		
							)					
							for					
							time	>	3.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Fuel Rail Pressure Performance	P1089	Measured rail pressure is checked against desired rail pressure to detect high rail pressure deviations in fuel cut-off	rail pressure deviation from set point calculated as the absolute value of difference between desired and actual value as an enable condition for injection timing correction learning	>	5000.00	kPa	rail pressure control commanded during injection timing correction learning phase	=	TRUE	-	fail conditions exists for 720 crank revolutions monitor runs with 0.02 s rate whenever enable conditions are met	B
							and					
							NO Pending or Confirmed DTCs limiting rail pressure set point	=	see sheet inhibit tables	-		
							for time	>	2.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Aftertreatment Fuel Injector Control Circuit Shorted	P10CC	Diagnoses the Exhaust Aftertreatment Fuel Injector low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power	engine pre drive	=	FALSE	-	fail conditions exists for more than 5 events monitor runs with 0.1 s rate whenever enable conditions are met	B
					for time	>	1.00	sec		
					and					
					battery voltage	>	11.00	V		
					for time	>	3.00	sec		
					and					
					starter is active cranking	=	FALSE	-		
					for time	>	3.00	sec		
					and					
					Diesel dosing valve: fuel injection	=	ACTIVE	-		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Aftertreatment Fuel Injector High Control Circuit Low Voltage	P10CD	Electronic out-put driver circuitry determines circuit integrity on the diesel dosing valve control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		engine pre drive	=	FALSE	-	fail conditions exists for more than 30 events monitor runs with 0.1 s rate whenever enable conditions are met	B
					for time	>	1.00	sec		
					and					
					battery voltage	>	11.00	V		
					for time	>	3.00	sec		
					and					
					starter is active cranking	=	FALSE	-		
					for time	>	3.00	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Aftertreatment Fuel Injector High Control Circuit High Voltage	P10CE	Diagnoses the Exhaust Aftertreatment Fuel Injector high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	engine pre drive	=	FALSE	-	fail conditions exists for more than 30 events monitor runs with 0.1 s rate whenever enable conditions are met	B
					for time	>	1.00	sec		
					and					
					battery voltage	>	11.00	V		
					for time	>	3.00	sec		
					and					
					starter is active cranking	=	FALSE	-		

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 basic enable conditions met:	 > =	 3.00 see sheet enable tables	 sec -		
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
			|(a) - (b)| (see Look-Up-Table #3) with	>	100.00	°C	and ambient temperature	 >	 -60.04	 °C		
			(a) captured charge air cooler downstream temperature at start and with	=	measured parameter	-	and					
			(b) captured charge air cooler upstream temperature at start	=	measured parameter	-	engine speed (see Look-Up-Table #3) for time and	> >	530 to 870 0.00	rpm sec		
			or **Path 2:** (				engine post drive/ afterun and diagnostic performed in current dc	= =	FALSE FALSE	- -		
			|(a) - (b)| (see Look-Up-Table #3) with	<=	100.00	°C	and basic enable conditions met:	 =	 see sheet enable tables	 -		
			(a) captured charge air cooler downstream temperature at start and with	=	measured parameter	-	and NO Pending or Confirmed DTCs:	 =	 see sheet inhibit tables	 -		
			(b) captured charge air cooler upstream temperature at start and	=	measured parameter	-						
			|(a) - (b)| (see Look-Up-Table #6) with	>	27.00	°C						
			(a) captured charge air cooler downstream temperature at start and with	=	measured parameter	-						
			(b) captured charge air cooler upstream temperature at start and (	=	measured parameter	-						
			status of block heater (see parameter definition)	=	FALSE	-						
			status of sun-load detection (see parameter definition))	=	FALSE	-						
Reductant Injector Temperature - Exhaust Gas Temperature 2 Correlation	P10D0	Detects an implausible SCR dosing valve coil temperature by comparing the temperature with a reference temperature	|(a) - (b)| (see Look-Up-Table #90) with	>	30 to 3276.7	°C	ignition on and	=	TRUE	-	fail conditions exists for 0.1 s monitor 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.
			(a) dosing valve coil temperature [Calculated coil temperature = 20degC + (((measured Coil resistance/coil temp @ 20degC)-1) / temp coefficient of copper)]	=	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	<	10.00	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	<=	3276.70	°C		
							(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	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Fuel Temperature Sensor 1 Circuit High	P111F	Detects an error in the fuel pump temperature sensor performance by comparing start-up temperatures between fuel pump temperature and fuel rail temperature	**Path 1:**				minimum engine-off time	>=	28800.00	sec	fail conditions exists for 0.2 s monitor runs once per trip with 0.2 s rate whenever enable conditions are met	B
			|(a) - (b)| (see Look-Up-Table #41) where	>	100.00	°C	and					
			(				ambient temperature	>	-60.04	°C		
			(a) captured fuel temperature 1 at start	=	measured parameter	-	and					
			and with				engine speed (see Look-Up-Table #91) for	>	600 to 850	rpm		
			(b) captured fuel temperature 2 at start	=	measured parameter	-						
			)				time and	>	0.00	sec		
			or **Path 2:**				engine post drive/ afterun and	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			|(a) - (b)| (see Look-Up-Table #41)	<=	100.00	°C	diagnostic performed in current dc	=	FALSE	-		
			with				and					
			(a) captured fuel temperature 1 at start	=	measured parameter	-	basic enable conditions met:	=	see sheet enable tables	-		
			and with				and					
			(b) captured fuel temperature 2 at start	=	measured parameter	-	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			and									
			|(a) - (b)| (see Look-Up-Table #42)	>	20.00	°C						
			where									
			(a) captured fuel temperature 1 at start	=	measured parameter	-						
			and with									
			(b) captured fuel temperature 2 at start	=	measured parameter	-						
			and									
			(									
			status of block heater (see parameter definition)	=	FALSE	-						
Exhaust Gas Temperature Sensors 3-4 Not Plausible	P113A	Detects biased urea catalyst temperature sensor by comparing the urea catalyst temperature sensor to the particulate filter temperature sensor after an engine off soak time	|(a) - (b)| (see Look-Up-Table #95)	>	30.00	°C	minimum engine-off time	>=	28800.00	sec	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			with				and					
			(				Engine Running	=	TRUE	-		
			(a) captured temperature downstream of the urea catalyst at start	=	measured parameter	°C	for					
			and with				time	>	0.00	sec		
			(b) captured temperature downstream of the particulate filter at start	=	measured parameter	°C	and					
			)				engine post drive/ afterun	=	FALSE	-		
							and					
							diagnostic performed in current dc	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

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 Cold Start Range/performance	P118B	Plausibility check of PM sensor temperature value upon start-up after a calibrated soaking time: stuck high check (temperature cross check of PM temperature with 3 reference sensors after cold start)	difference of the measured PM sensor temperature at start and the average value of the reference exhaust gas temperature sensors	>	24.96	°C	PM sensor start temperature available	=	TRUE	-	fault exists for more than 0.1 sec; monitor runs at 0.1 s once per trip	B
			where reference temperatures				means					
			(a) DOC downstream temperature	=	measured parameter	-	Raw value of start temperature of particulate sensor	>=	-40.00	°C		
			(b) SCR downstream temperature	=	measured parameter	-	Particulate sensor can be reached via CAN	=	TRUE	-		
			(c) DPF downstream temperature	=	measured parameter	-	Barometric pressure	>	75	kPa		
							Cold start detection	=	TRUE	-		
							means					
							(					
							Engine ECU shut-off time is reported as valid (see P262B) 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 after Oxi-Catalyst	>=	-40.04	°C		
							and					
							Temperature after Oxi-Catalyst	<=	79.96	°C		
							Temperature after SCR-Catalyst	>=	-40.04	°C		
							and					
							Temperature after SCR-Catalyst	<=	79.96	°C		
							Temperature after particulate filter	>=	-40.04	°C		
							and					
							Temperature after particulate filter	<=	79.96	°C		
							)					
HO2S Performance - Signal High During Moderate Load Bank 1 Sensor 1	P11A6	Compare the pressure compensated O2 concentration sensor signal with a threshold	Pressure compensated O2 concentration	>	(a) + (b)	factor	engine speed	<	1800	rpm	fail conditions exists for more than 2 event monitor runs with 0.1 s rate whenever enable conditions are met	B
			where				engine speed	>	550	rpm		
			(a) Filtered calculated O2 concentration based on injection quantity, air mass and fuel density	=	Please see the general description for details of this calculated O2 concentration	factor	commanded fuel injection quantity	<	240.00	mm^3/rev		
			(b) Positive O2 concentration margin	=	0.04	factor	Inner combusted quantity	>	88.00	mm^3/rev		
							Air mass per cylinder	<	3.96	g/rev		
							Air mass per cylinder	>	1.98	g/rev		
							Status of binary lambda signal valid	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							for time	>	0.50	sec		
							oxidation catalyst upstream temperature	<	999.96	°C		
							oxidation catalyst upstream temperature	>	99.96	°C		
							integrated air mass since all other release conditions are fulfilled for O2 plausibility	>	2.5	g		
							battery voltage	>	11.00	V		
							Fuel volume in fuel tank	>	-1638.40	l		
							Deceleration fuel cut-off	=	FALSE	-		
							Injection active	=	TRUE	-		
							calculated oxygen concentration	<=	(a) + (b)	factor		
							calculated oxygen concentration	>=	(a) - (b)	factor		
							where					
							(a) Oxygen concentration is captured at the moment when the above steady state conditions are met	=	measure variable	factor		
							(b) tolerance range of calculated Oxygen concentration	=	0.02	factor		
							for time	>	0.10	sec		
							Engine operation mode (Please see the definition)	=	normal operation	-		
							engine speed	<	4500.00	rpm		
							engine speed	>	600.00	rpm		
							ambient temperature	<	122.96	°C		
							ambient temperature	>	-45.04	°C		
							ambient pressure	<	110.00	kPa		
							ambient pressure	>	74.80	kPa		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit table	-		
							basic enable conditions met:	=	see sheet enable tables	-		
HO2S Performance - Signal Low During Moderate Load Bank 1 Sensor 1	P11A9	Compare the pressure compensated O2 concentration sensor signal with a threshold	Pressure compensated O2 concentration	<	(a) - (b)	factor	engine speed	<	1800	rpm	fail conditions exists for more than 2 event monitor runs with 0.1 s rate whenever enable conditions are met	B
			where				engine speed	>	550	rpm		
			(a) Filtered calculated O2 concentration based on injection quantity, air mass and fuel density	=	Please see the general description for details of this calculated O2 concentration	factor	commanded fuel injection quantity	<	240.00	mm^3/rev		
			(b) Positive O2 concentration margin	=	0.04	factor	Inner combusted quantity	>	88.00	mm^3/rev		
							Air mass per cylinder	<	3.96	g/rev		
							Air mass per cylinder	>	1.98	g/rev		
							Status of binary lambda signal valid	=	TRUE	-		
							for time	>	0.50	sec		
							oxidation catalyst upstream temperature	<	999.96	°C		
							oxidation catalyst upstream temperature	>	99.96	°C		
							integrated air mass since all other release conditions are fulfilled for O2 plausibility	>	2.5	g		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							battery voltage	>	11.00	V		
							Fuel volume in fuel tank	>	-1638.40	l		
							Deceleration fuel cut-off	=	FALSE	-		
							Injection active	=	TRUE	-		
							calculated oxygen concentration	<=	(a) + (b)	factor		
							calculated oxygen concentration	>=	(a) - (b)	factor		
							where					
							(a) Oxygen concentration is captured at the moment when the above steady state conditions are met	=	measure variable	factor		
							(b) tolerance range of calculated Oxygen concentration	=	0.02	factor		
							for time	>	0.10	sec		
							Engine operation mode (Please see the definition)	=	normal operation	-		
							engine speed	<	4500.00	rpm		
							engine speed	>	600.00	rpm		
							ambient temperature	<	122.96	°C		
							ambient temperature	>	-45.04	°C		
							ambient pressure	<	110.00	kPa		
							ambient pressure	>	74.80	kPa		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit table	-		
							basic enable conditions met:	=	see sheet enable tables	-		
HO2S Performance - Signal High During Moderate Load Bank 1 Sensor 2	P11AF	Compare the pressure compensated O2 concentration sensor signal with a threshold	Pressure compensated O2 concentration	>	(a) + (b)	factor	engine speed	<	1800	rpm	fail conditions exists for more than 2 event monitor runs with 0.1 s rate whenever enable conditions are met	B
			where				engine speed	>	550	rpm		
			(a) Filtered calculated O2 concentration based on injection quantity, air mass and fuel density	=	Please see the general description for details of this calculated O2 concentration	factor	commanded fuel injection quantity	<	240.00	mm^3/rev		
			(b) Positive O2 concentration margin	=	0.05	factor	Inner combusted quantity	>	88.00	mm^3/rev		
							Air mass per cylinder	<	3.96	g/rev		
							Air mass per cylinder	>	1.98	g/rev		
							Status of binary lambda signal valid	=	TRUE	-		
							for time	>	0.50	sec		
							SCR downstream temperature	<	999.96	°C		
							SCR downstream temperature	>	99.96	°C		
							integrated air mass since all other release conditions are fulfilled for O2 plausibility	>	2.5	g		
							battery voltage	>	11.00	V		
							Fuel volume in fuel tank	>	-1638.40	l		
							Deceleration fuel cut-off	=	FALSE	-		
							Injection active	=	TRUE	-		
							calculated oxygen concentration	<=	(a) + (b)	factor		
							calculated oxygen concentration	>=	(a) - (b)	factor		
							where					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							(a) Oxygen concentration is captured at the moment when the above steady state conditions are met	=	measure variable	factor		
							(b) tolerance range of calculated Oxygen concentration	=	0.02	factor		
							for time	>	0.10	sec		
							Engine operation mode (Please see the definition)	=	normal operation	-		
							engine speed	<	4500.00	rpm		
							engine speed	>	600.00	rpm		
							ambient temperature	<	122.96	°C		
							ambient temperature	>	-45.04	°C		
							ambient pressure	<	110.00	kPa		
							ambient pressure	>	74.80	kPa		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit table	-		
							basic enable conditions met:	=	see sheet enable tables	-		
HO2S Performance - Signal Low During Moderate Load Bank 1 Sensor 2	P11B2	Compare the pressure compensated O2 concentration sensor signal with a threshold	Pressure compensated O2 concentration	<	(a) - (b)	factor	engine speed	<	1800	rpm	fail conditions exists for more than 2 event monitor runs with 0.1 s rate whenever enable conditions are met	B
			where				engine speed	>	550	rpm		
			(a) Filtered calculated O2 concentration based on injection quantity, air mass and fuel density	=	Please see the general description for details of this calculated O2 concentration	factor	commanded fuel injection quantity	<	240.00	mm^3/rev		
			(b) Positive O2 concentration margin	=	0.05	factor	Inner combusted quantity	>	88.00	mm^3/rev		
							Air mass per cylinder	<	3.96	g/rev		
							Air mass per cylinder	>	1.98	g/rev		
							Status of binary lambda signal valid	=	TRUE	-		
							for time	>	0.50	sec		
							SCR downstream temperature	<	999.96	°C		
							SCR downstream temperature	>	99.96	°C		
							integrated air mass since all other release conditions are fulfilled for O2 plausibility	>	2.5	g		
							battery voltage	>	11.00	V		
							Fuel volume in fuel tank	>	-1638.40	l		
							Deceleration fuel cut-off	=	FALSE	-		
							Injection active	=	TRUE	-		
							calculated oxygen concentration	<=	(a) + (b)	factor		
							calculated oxygen concentration	>=	(a) - (b)	factor		
							where					
							(a) Oxygen concentration is captured at the moment when the above steady state conditions are met	=	measure variable	factor		
							(b) tolerance range of calculated Oxygen concentration	=	0.02	factor		
							for time	>	0.10	sec		
							Engine operation mode (Please see the definition)	=	normal operation	-		
							engine speed	<	4500.00	rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							engine speed	>	600.00	rpm		
							ambient temperature	<	122.96	°C		
							ambient temperature	>	-45.04	°C		
							ambient pressure	<	110.00	kPa		
							ambient pressure	>	74.80	kPa		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit table	-		
							basic enable conditions met:	=	see sheet enable tables	-		
HO2S Current Performance Bank 1 Sensor 1	P11B4	Compares the ratio of valid lambda signal time to total time with a threshold	ratio of valid lambda signal time to total time: (a) / (b)	<	0.50	ratio	NOx sensor's heater temperature has reached the set point	=	TRUE	-	fail conditions exists for more than 36 sec monitor runs with 0.02 s rate whenever enable conditions are met	B
			where				for time	>	2.00	sec		
			(a) time for which valid lambda signal received over CAN	=	measured parameter	-	Enabling Upstream NOx sensor heater diagnosis (please see the definition)	=	TRUE	-		
			(b) total time for which diagnosis is enabled	=	calculated parameter	-	Reciprocal lambda change : | (a) - (b) | (see Look-Up-Table #49)	<=	0.1 to 10	factor		
							where					
							(a) Reciprocal lambda	=	measured parameter	-		
							(b) Filtered reciprocal lambda	=	calculated parameter	-		
							for time	>	5.00	sec		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
HO2S Current Performance Bank 1 Sensor 2	P11B5	Compares the ratio of valid lambda signal time to total time with a threshold	ratio of valid lambda signal time to total time: (a) / (b)	<	0.50	ratio	NOx sensor's heater temperature has reached the set point	=	TRUE	-	fail conditions exists for more than 36 sec monitor runs with 0.02 s rate whenever enable conditions are met	B
			where				for time	>	2.00	sec		
			(a) time for which valid lambda signal received over CAN	=	measured parameter	-	Enabling Upstream NOx sensor heater diagnosis (please see the definition)	=	TRUE	-		
			(b) total time for which diagnosis is enabled	=	calculated parameter	-	Reciprocal lambda change : | (a) - (b) | (see Look-Up-Table #49)	<=	0.1 to 10	factor		
							where					
							(a) Reciprocal lambda	=	measured parameter	-		
							(b) Filtered reciprocal lambda	=	calculated parameter	-		
							for time	>	5.00	sec		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CB	Compares the averaged relative deviation of the measured NOx sensor concentration from the modeled NOx concentration against the averaged threshold	Averaged relative NOx concentration deviation	>	0.699951	-	for averaging time with the following secondary parameters fulfilled	>=	5.00	sec	fault exists for more than 1 event; monitor runs at 0.1 s once per trip	B
							(					
							Status of NOx signal of upstream NOx sensor (please see the definition)	=	TRUE	-		
							Normal Mode (Particulate Filter Regeneration not active)	=	TRUE	-		
							for time	>=	15.00	sec		
							ambient pressure	>=	75.00	kPa		
							ambient pressure	<=	106.00	kPa		
							ambient temperature	>=	-7.04	°C		
							ambient temperature	<=	37.96	°C		
							((					
							filtered modeled NOx concentration percent positive deviation	<=	0.05	-		
							filtered modeled NOx concentration percent negative deviation	>=	0.05	-		
							for time	>	2.00	sec		
							)					
							))					
							for time	>	2.00	sec		
							time since start	>	30.00	sec		
							Engine Coolant Temperature	>=	68.96	°C		
							Engine Coolant Temperature	<=	129.96	°C		
							Exhaust gas temperature range at Upstream NOx sensor (see Look-Up-Table #81)	>0	0 to 1	factor		
							Fuel Injection pattern (see Look-Up-Table #82)	=	0 to 58	pattern		
									24 = pilot 1 main 56 = pilot 2, pilot 1, main 58 = pilot 2, pilot 1, main, post 2 26 = pilot 1 main, post 2 0 = all off (overrun)			
							Vehicle speed	>=	37.29	mph		
							for time	>	1.00	sec		
							Enable range for the plausibility check of Upstream NOx sensor (see Look-Up-Table #74)	≠0	0 to 1	factor		
							for time	>	0.00	sec		
							Air mass per cylinder	>=	0.00	g/rev		
							Air mass per cylinder	<=	5.40	g/rev		
							for time	>	5.00	sec		
							actual valve position of exhaust-gas recirculation	>=	0.00	%		
							actual valve position of exhaust-gas recirculation	<=	100.00	%		
							for time	>	0.50	sec		
							filtered modeled NOx-concentration upstream of the SCR	>=	0.00	ppm		

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 upstream of the SCR	<=	1650.00	ppm		
							for time	>	0.50	sec		
							Diagnostic has not completed this driving cycle	=	FALSE	-		
							NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
							)					
NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P11CC	Compares the averaged relative deviation of the measured NOx sensor concentration from the modeled NOx concentration against the averaged threshold	Averaged relative NOx concentration deviation	<	(a) * (b)	-	for averaging time with the following secondary parameters fulfilled	>=	5.00	sec	fault exists for more than 1 event; monitor runs at 0.1 s once per trip	B
			(a) Table for the base value of the lower plausibility limit (see Look-Up-Table #80)	=	-1 to -0.486328	-	(					
			(b) Factor correction based on Environmental Pressure	=	1	-	Status of NOx signal of upstream NOx sensor (please see the definition)	=	TRUE	-		
							Normal Mode (Particulate Filter Regeneration not active)	=	TRUE	-		
							for time	>=	15.00	sec		
							ambient pressure	>=	75.00	kPa		
							ambient pressure	<=	106.00	kPa		
							ambient temperature	>=	-7.04	°C		
							ambient temperature	<=	37.96	°C		
							((					
							filtered modeled NOx concentration percent positive deviation	<=	0.05	-		
							filtered modeled NOx concentration percent negative deviation	>=	0.05	-		
							for time	>	2.00	sec		
							)					
							))					
							for time	>	2.00	sec		
							time since start	>	30.00	sec		
							Engine Coolant Temperature	>=	68.96	°C		
							Engine Coolant Temperature	<=	129.96	°C		
							Exhaust gas temperature range at Upstream NOx sensor (see Look-Up-Table #81)	>0	0 to 1	factor		
							Fuel Injection pattern (see Look-Up-Table #82)	=	0 to 58	pattern		
									24 = pilot 1 main 56 = pilot 2, pilot 1, main 58 = pilot 2, pilot 1, main, post 2 26 = pilot 1 main, post 2 0 = all off (overrun)			
							Vehicle speed	>=	37.29	mph		
							for time	>	1.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Enable range for the plausibility check of Upstream NOx sensor (see Look-Up-Table #75)	≠0	0 to 1	factor		
							for time	>	0.00	sec		
							Air mass per cylinder	>=	0.00	g/rev		
							Air mass per cylinder	<=	5.40	g/rev		
							for time	>	5.00	sec		
							actual valve position of exhaust-gas recirculation	>=	0.00	%		
							actual valve position of exhaust-gas recirculation	<=	100.00	%		
							for time	>	0.50	sec		
							filtered modeled NOx-concentration upstream of the SCR	>=	0.00	ppm		
							filtered modeled NOx-concentration upstream of the SCR	<=	1650.00	ppm		
							for time	>	0.50	sec		
							Diagnostic has not completed this driving cycle	=	FALSE	-		
							NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
							)					
NOx Sensor Current Performance Bank 1 Sensor 1	P11DB	Detects a failure of the feedback performance of upstream NOx sensor	Ratio of invalid upstream NOx sensor status time count (invalid time / total time)	>	0.50	ratio	Sufficient number of valid and invalid NOx status time (sum of valid and invalid NOx status for diagnostic determination)	>=	18.00	sec	fail conditions exists for more than 36 sec monitor runs with 0.02 s rate whenever enable conditions are met	B
							and					
							Engine Running (see parameter definition)	=	TRUE	-		
							for time (required for the NOx sensor to give valid response)	>	20.00	sec		
							and					
							Upstream NOx sensor detects a lean A/F mixture	=	TRUE	-		
							and					
							Valid NOx signal from CAN is received (no NOx sensor communication failures)	=	TRUE	-		
							or					
							following conditions for time:	>	45.00	sec		
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR upstream temperature	>=	94.96	°C		
							SCR upstream temperature	<=	3003.56	°C		
							Engine Running (see parameter definition)	=	TRUE	-		
							for time (required for the NOx sensor to give valid response)	>	20.00	sec		
							and					
							Lambda signal is in steady state condition (see Look-Up-Table #28)	<=	0.1 to 10	-		
							for time	>=	5.00	sec		
							Inhibit Status (no inhibiting faults) (No pending or stored DTC)	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
NOx Sensor Current Performance Bank1 Sensor 2	P11DC	Detects a failure of the feedback performance of downstream NOx sensor	Ratio of valid to invalid downstream NOx sensor status time count	>	0.50	ratio	Sufficient number of valid and invalid downstream NOx sensor status time (sum of valid and invalid NOx status for diagnostic determination)	>=	18.00	sec	fail conditions exists for more than 36 sec monitor runs with 0.02 s rate whenever enable conditions are met	B
							and					
							Engine Running (see parameter definition)	=	TRUE	-		
							for time (required for the NOx sensor to give valid response)	>	20.00	sec		
							and					
							Downstream NOx sensor detects a lean A/F mixture	=	TRUE	-		
							and					
							Valid NOx signal from CAN is received (no NOx sensor communication failures)	=	TRUE	-		
							or					
							following conditions for time:	>	120.00	sec		
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR downstream temperature	>=	94.96	°C		
							SCR downstream temperature	<=	3003.56	°C		
							Engine Running (see parameter definition)	=	TRUE	-		
							for time (required for the NOx sensor to give valid response)	>	20.00	sec		
							and					
							Downstream Lambda signal is in steady state condition (| measured lambda signal - filtered lambda signal |) (see Look-Up-Table #27)	<=	0.2 to 3.2	-		
							for time	>=	5.00	sec		
							Inhibit Status (no inhibiting faults) (No pending or stored DTC)	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
Injector 1 Control Circuit Shorted	P1224	Diagnoses the Injector Cylinder #1 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions 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 2 Control Circuit Shorted	P1227	Diagnoses the Injector Cylinder #2 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 3 Control Circuit Shorted	P122A	Diagnoses the Injector Cylinder #3 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Intake Air Flow Valve Control Circuit Shorted	P122C	Electronic out-put driver circuitry determines circuit integrity on the intake air flow valve.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.				battery voltage	>	11.00	V	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
							for time	>	3.00	sec		
							and					
							and Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
							and Open Load Diagnosis active	=	FALSE	-		
							and basic enable conditions met	=	see sheet enable tables	-		

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 Exceeded Learning Limit	P122D	Detects adaptation values of throttle valve that are not plausible. Compares the difference between the maximum and minimum adaption values to a threshold.	throttle valve control deviation calculated out of difference between desired and actual value	<	-10.00	%	throttle valve controller bypass is active	=	FALSE	-	fail conditions exists for 10.05 s monitor runs once per driving cycle with 0.005 s rate whenever enable conditions are met	B
			or				and					
			throttle valve control deviation calculated out of difference between desired and actual value	>	10.00	%	throttle valve is driven to a mechanical stop	=	FALSE	-		
							and					
							Engine Coolant Temperature	<	199.96	°C		
							and					
							offset learning for the throttle valve was successful in the previous driving cycle	=	TRUE	-		
							and					
							basic enable conditions met		see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
		Detects implausible learned offset values.	**Path 1:**				(				fail conditions exists for 0.005 s monitor runs once per driving cycle with 0.005 s rate whenever enable conditions are met	
			learned throttle valve offset position at open or closed position	<	-20.00	%	engine temperature	>=	4.96	°C		
			or				and					
			learned throttle valve offset position at open or closed position	>	20.00	%	engine temperature	<=	130.06	°C		
			or				)					
			Path 2:				and					
			difference between the maximum and minimum positions learned at closed position	>	30.00	%	(					
			or				battery voltage	>=	8.00	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:					
							(					
							Engine Coolant Temperature	>=	5.06	°C		
							or					
							if					
							Engine Coolant Temperature	<	5.06	°C		
							then					
							Engine Coolant Temperature	>	6.06	°C		
							for					
							time		10.00	sec		
							)					
							and					
							engine speed	=	0	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 post drive/ afterun	=	TRUE	-		
					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	>	11.00	V	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					for time	>	3.00	sec		
					and					
					and					
					Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
					and					
					Open Load Diagnosis active	=	FALSE	-		
					and					
					basic enable conditions met	=	see sheet enable tables	-		
Intake Air Flow Valve Control Circuit 2 High Voltage	P122F	Diagnoses the Throttle Valve high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	battery voltage	>	11.00	V	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					for time	>	3.00	sec		
					and					
					and					
					Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
					and					
					Open Load Diagnosis active	=	FALSE	-		
					and					
					basic enable conditions met	=	see sheet enable tables	-		

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	P1233	Diagnoses the Injector Cylinder #4 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 5 Control Circuit Shorted	P1236	Diagnoses the Injector Cylinder #5 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 6 Control Circuit Shorted	P1239	Diagnoses the Injector Cylinder #6 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Injector 7 Control Circuit Shorted	P1242	Diagnoses the Injector Cylinder #7 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 8 Control Circuit Shorted	P1247	Diagnoses the Injector Cylinder #8 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Fuel Pressure Regulator 2 High Control Circuit Low Voltage	P125A	Diagnoses the Fuel Rail Pressure Regulator #2 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	battery voltage	>	11.00	V	fail conditions exists for 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	A
							for time	>	3.00	sec		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and					

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 basic enable conditions met:	= TRUE - = see sheet enable tables -		
Fuel Pressure Regulator 2 High Control Circuit High Voltage	P125B	Diagnoses the Fuel Rail Pressure Regulator #2 high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	(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 - > 2.00 sec = see sheet enable tables -	fail conditions exists for 0.1 s monitor runs with 0.1s rate whenever enable conditions are met	B
Fuel Rail Pressure Performance	P128E	Actual rail pressure is compared to fixed absolute value to detect low or high rail pressure conditions.	rail pressure (see Look-Up-Table #67)	< 0 to 15000 kPa	state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve) and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 2 s monitor runs with 0.02 s rate whenever enable conditions are met	A
			rail pressure (see Look-Up-Table #72)	< 0 to 15000 kPa	state machine rail pressure control equal to pressure control valve and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = see sheet enable tables - = see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			rail pressure (see Look-Up-Table #70)	<	0 to 15000	kPa	state machine rail pressure control equal to metering unit control mode	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			rail pressure	>	215000.00	kPa	state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-	fail conditions exists for 1.01 s. monitor runs with 0.02 s rate whenever enable conditions are met	
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			rail pressure	>	215000.00	kPa	state machine rail pressure control equal to pressure control valve	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			rail pressure	>	215000.00	kPa	state machine rail pressure control equal to metering unit control mode	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cold Start Emission Reduction Control System	P1400	Detects problems resulting in improper delivery of fuel for catalyst light off and aftertreatment system preparation	**Path 1:**									B
			Pilot Injection 1 is prohibited due to exceeding the allowed number of injections (see general description for details)	=	TRUE	-	engine operating mode	=	exhaust warm-up	state bit mask	fail conditions exists for 20 revs test performed continuously 0.01 s rate	
							which means:					
			or				Cold Start Injection Monitoring	=	ENABLED	-		
							and					
							engine operating mode state transition	=	FALSE	-		
			Path 2:				and					
			Pilot Injection 1 is prohibited due to	=	TRUE	-	engine coolant temperature	>	16.00	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			collision (overlap) with Main Injection and Pilot Injection 2 (see general description or				and engine coolant temperature	<	71.00	°C		
			Path 3: Injector circuit or activation errors (set point 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 (set point deviation) occurred when the injector was being energized for Pilot or	=	TRUE	-						
			Path 7: Injector circuit or activation errors (set point deviation) occurred when the injector was being energized for Main or	=	TRUE	-						
			Path 8: Post Injection 2 is prohibited due to exceeding the allowed number of injections (see general description for details) or	=	TRUE	-						
			Path 9: Post Injection 2 is prohibited due to collision (overlap) with Main Injection and Post Injection 1 (see general description	=	TRUE	-						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			or					
			Path 10: Injector circuit or activation errors (set point deviation) occurred when the injector was being energized for Post or	= TRUE -				
Exhaust Gas Recirculation (EGR) Motor Control Circuit Shorted	P1407	Electronic out-put driver circuitry determines circuit integrity on the EGR solenoid.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		EGR Solenoid Control Circuit	= ACTIVE -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					and battery voltage	> 11.00 V		
					for time	> 3.00 sec		
					and starter is active cranking	= FALSE -		
					for time	> 3.00 sec		
					and basic enable conditions met:	= see sheet enable tables -		
Exhaust Gas Recirculation 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	> 0.25 g/rev	(		fail conditions exists for 15 s monitor runs with 0.1s rate whenever enable conditions are met	B
					ambient pressure	> 74.80 kPa		
					and engine coolant temperature	> 69.96 °C		
					and EGR control is in closed loop	= TRUE -		
					for time	> 2.00 sec		
					and EGR control is active	= TRUE -		
					for time	> 0.00 sec		
					and exhaust gas system regeneration mode	= FALSE -		
					for time	> 5.00 sec		
					and Engine speed	>= 1300.00 rpm		
					Engine speed	<= 2000.00 rpm		
					and injection quantity	>= 100.00 mm^3/rev		
					injection quantity	<= 260.00 mm^3/rev		
					and desired delta air mass flow	> -0.10 g/sec		
					desired delta air mass flow	< -0.01 g/sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					difference of the air mass	< 0 g/rev		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
					)			
					for time	> 0.20 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	>= 0.25 g/rev	(		fail conditions exists for 15 s monitor runs with 0.1s rate whenever enable conditions are met	B
					ambient pressure	> 74.80 kPa		
					and			
					engine coolant temperature	> 69.96 °C		
					and			
					EGR control is in closed loop	= TRUE -		
					for time	> 2.00 sec		
					and			
					EGR control is active	= TRUE -		
					for time	> 0.00 sec		
					and			
					exhaust gas system regeneration mode	= FALSE -		
					for time	> 5.00 sec		
					and			
					Engine speed	>= 1300.00 rpm		
					Engine speed	<= 2000.00 rpm		
					and			
					injection quantity	>= 100.00 mm^3/rev		
					injection quantity	<= 260.00 mm^3/rev		
					and			
					desired delta air mass flow	> 0.01 g/sec		
					desired delta air mass flow	< 0.10 g/sec		
					and			
					difference of the air mass	> 0 g/rev		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
					)			
					for time	> 0.20 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
Exhaust Gas Recirculation (EGR) Motor Control Circuit 2 Low Voltage	P140D	Diagnoses the EGR Valve high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	EGR Solenoid Control Circuit	= ACTIVE -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable	B
					and			
					battery voltage	> 11.00 V		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for time	> 3.00 sec	conditions are met	
					and starter is active cranking	= FALSE -		
					for time	> 3.00 sec		
					and basic enable conditions met:	= see sheet enable tables -		
Exhaust Gas Recirculation (EGR) Motor Control Circuit 2 High Voltage	P140E	Diagnoses the EGR Valve high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	EGR Solenoid Control Circuit	= ACTIVE -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					and battery voltage	> 11.00 V		
					for time	> 3.00 sec		
					and starter is active cranking	= FALSE -		
					for time	> 3.00 sec		
					and basic enable conditions met:	= see sheet enable tables -		
Exhaust Gas Recirculation (EGR) Motor 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	= ACTIVE -	fail conditions exists for 2 s monitor runs with 0.005 s rate whenever enable conditions are met	B
					and battery voltage	> 11.00 V		
					for time	> 3.00 sec		
					and starter is active cranking	= FALSE -		
					for time	> 3.00 sec		
					and basic enable conditions met:	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Gas Recirculation (EGR) Motor Control Circuit 2 Low Voltage	P1411	Diagnoses the EGR Cooler Bypass high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	EGR Cooling Bypass Solenoid Control Circuit	=	ACTIVE	-	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
							and					
							battery voltage	>	11.00	V		
							for					
							time	>	3.00	sec		
							and					
							starter is active cranking	=	FALSE	-		
							for					
							time	>	3.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Motor Control Circuit 2 High Voltage	P1412	Diagnoses the EGR Cooler Bypass high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	EGR Cooling Bypass Solenoid Control Circuit	=	ACTIVE	-	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
							and					
							battery voltage	>	11.00	V		
							for					
							time	>	3.00	sec		
							and					
							starter is active cranking	=	FALSE	-		
							for					
							time	>	3.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Motor Control Circuit Shorted	P1413	Electronic output driver circuitry determines circuit integrity on the EGR cooler bypass solenoid. This failure detects a short between the two output circuits	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.				EGR Cooling Bypass Solenoid Control Circuit	=	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					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Current Performance	P1414	Electronic output driver circuitry determines circuit integrity on the EGR cooler bypass solenoid.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	=		-	EGR Cooling Bypass Solenoid Control Circuit	=	ACTIVE	-	fail conditions exists for 2 s monitor runs with 0.005 s rate whenever enable conditions are met	B
							and battery voltage for time	> >	11.00 3.00	V sec		
							and starter is active cranking for time	= >	FALSE 3.00	- sec		
							and basic enable conditions met:	=	see sheet enable tables	-		
Closed Loop Diesel Particulate Filter (DPF) Regeneration Control At Limit - Stage 1 Temperature Too Low	P144B	Detects insufficient exhaust temperature. Actual inner controller ratio and temperature readings are compared to desired controller ratio and temperature values as an indication of an insufficient exhaust gas temperature.	commanded control value of the inner control loop of the temperature controller	>=	0.99	-	current engine operating point is suitable for monitoring deviation of exhaust gas temperature control - depending on engine speed and injection quantity (see Look-Up-Table #23)	=	0 to 1	-	fail conditions exists for 200 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			and deviation from the temperature set point for inner control loop (with	>	maximum of (a) and (b)	-	and release of the exhaust gas temperature outer loop control monitoring means	=	TRUE	-		
			(a) limitation of the temperature threshold and with	=	100.00	°C	(active operation mode of the inner control loop means	=	TRUE	-		
			(b) temperature threshold value for maximum deviation	=	100	°C	(					
							particulate filter regeneration and	=	TRUE	-		
							temperature before oxidation catalyst and temperature after particulate filter and (	>	99.96	°C		
							temperature before oxidation catalyst and temperature after particulate filter or	<	649.96	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					temperature before oxidation catalyst and temperature after particulate filter for activated post injection	< 649.96 °C		
					)			
					)			
					and			
					status maximum governor deviation	= TRUE -		
					means			
					vehicle speed	<= 124.30 mph		
					and			
					Relative accelerator pedal position	> 3.00 %		
					for			
					time	> 1.00 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Closed Loop Diesel Particulate Filter (DPF) Regeneration Control At Limit - Stage 1 Temperature Too High	P144C	Detects excessive exhaust temperature. Actual inner controller ratio and temperature readings are compared to desired controller ratio and temperature values as an indication of an excessive exhaust gas temperature.	commanded control value of the inner control loop of the temperature controller	<= 0.00 -	current engine operating point is suitable for monitoring deviation of exhaust gas temperature control - depending on engine speed and injection quantity (see Look-Up-Table #24)	= 0 to 1 -	fail conditions exists for 200 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			and		and			
			deviation from the temperature set point for inner control loop	< minimum of (a) and (b) -	release of the exhaust gas temperature outer loop control monitoring	= TRUE -		
			(		means			
			with		(			
			(a) limitation of the temperature threshold	= -100.00 °C	active operation mode of the inner control loop	= TRUE -		
			and with		means			
			(b) temperature threshold value for minimum deviation	= 100 °C	(			
					particulate filter regeneration	= TRUE -		
					and			
					temperature before oxidation catalyst and temperature after particulate filter	> 99.96 °C		
					and			
					(			
					temperature before oxidation catalyst and temperature after particulate filter	< 649.96 °C		
					or			
					temperature before oxidation catalyst and temperature after particulate filter for activated post injection	< 649.96 °C		
					)			
					)			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							status maximum governor deviation	=	TRUE	-		
							means					
							vehicle speed	<=	124.30	mph		
							and					
							Relative accelerator pedal position	>	3.00	%		
							for					
							time	>	1.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Particulate Matter Sensor Signal Message Counter Incorrect	P1472	PM Sensor Sensor Control Unit (SCU) diagnostic data length CAN error or PM Sensor SCU received invalid data from ECM	SCU diagnostic signal data length CAN error (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
							Ignition on	=	TRUE	-		
							for time	>	1.20	sec		
							Ignition on	=	TRUE	-		
Particulate Matter Sensor Electrode Supply Circuit Low Input	P1475	Range check high when IDE-supply voltage is on during PM-measurement. Note that a successive sensor regeneration is needed to check whether the current has been caused by soot on the IDE.	measured 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	B
			for time	>=	2.00	sec	Particulate sensor plausibility check is terminated	=	TRUE	-		
							means					
							One successful 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 Electrode Supply Circuit High Input	P1476	Negative IDE electrode electric fault when supply voltage is off (Range check high)	measured 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	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	>=	2.00	sec	means				when enable conditions are met	
							Particulate sensor is not in the "measure" or "regeneration" state	=	TRUE	-		
							Battery voltage (ECM)	>=	11.00	V		
							Supply voltage is off	=	TRUE	-		
							Ignition on	=	TRUE	-		
							for time	>	3.00	sec		
Particulate Matter Sensor Compensation Value Missing/Not Received	P1479	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		means					
			OR				Battery voltage (ECM)	>=	11.00	V		
			Sensor sensitivity calibration factor	>	1.25							
			OR									
			Path 2:									
			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						
Particulate Matter Sensor Circuit Range/Performanc e	P147B	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		

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 Heater Control Circuit Range/Performance	P1488	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	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	>	0.8	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	=	0.4	V	for time	>	0.9	sec		
							Diagnosis by the local unit is released	=	TRUE	-		
							means					
							(					
							PM sensor temperature	>	190.00	°C		
							and					
							PM sensor temperature	<	210.00	°C		
							)					
							Time has elapsed since diagnosis by the local unit is released	>=	15	sec		
							Protection heating is active	=	TRUE	-		
							means					
							PM sensor heater target temperature	=	200	°C		
							PM sensor dewpoint achieved	=	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	<	99.960	°C		
							Battery voltage (ECM)	>=	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.
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	-	basic enable conditions met:	=	see sheet enable tables	-		
			with				and					
			number of consecutive frames	=	12.00	-	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			)									
			or									
			Path 2:									
			(									
			internal calculated checksum value for transmission is not equal the received value	=	TRUE	-						
			and									
			number of fault results	>	15.00	-						
			)									
			or									
			Path 3:									
			time since last frame with valid protection value was received from transmission	>	0.08	sec						
Cruise Control Switch Data Integrity	P155A	Cruise switch status indicates "indeterminate" switch state for calibrated period of time.	Set Switch CAN message value "Indeterminate"	=	0	-	ignition on	=	TRUE	-	fail conditions exists for 15.5s monitor runs with 0.005 s rate whenever enable conditions are met	Special C
							and					
							input circuit active	=	TRUE	-		
							and					
							basic enable conditions met	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Validation Error in messages received in Power Take Off frame	P1591	Rolling counter and protection value evaluation of the power take off frame	number of messages with validation errors	>=	4.00	counts	ignition on	=	TRUE	-	Once the fault is reported there will be no debouncing of the DFC until ignition key state changes from 0 to 1. monitor runs with 0.005 s rate	Special C
			in the last number of messages (sliding window) received PTO frames	=	10.00	counts	for time	>=	3.00	sec		
							and					
							Bus off or error passive on CAN	=	FALSE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Throttle Sensor Communication Circuit Low Voltage	P16A0	Detects low voltage readings on the throttle valve sensor communication circuit, indicating an OOR low condition on the throttle valve sensor communication circuit	sensor communication circuit voltage	<=	SENT_INFO_LINE_LOW	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.005 s rate	B
							and basic enable conditions met	=	see sheet enable tables	-		
							and no sensor supply error	=	TRUE	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Throttle Sensor Communication Circuit High Voltage	P16A1	Detects high voltage readings on the throttle valve sensor communication circuit, indicating an OOR high condition on the throttle sensor communication circuit	sensor communication circuit voltage	>=	SENT_INFO_LINE_HIGH	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.005 s rate	B
							and basic enable conditions met	=	see sheet enable tables	-		
							and no sensor supply error	=	TRUE	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Throttle Sensor Communication Circuit Performance	P16A2	Detects an error in the throttle sensor communication.	throttle valve position sensor communication circuit disturbed due to noise or wrong CRC (cyclic redundancy check)	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 8 s test performed continuously 0.005 s rate	B
							and basic enable conditions met	=	see sheet enable tables	-		
							and no sensor supply error	=	TRUE	-		
							and NO Pending or Confirmed DTCs:	=	see sheet enable tables	-		
Cruise Control Switch Status	P1797	Driver Selected Mode Switch 1 State stuck switch	Driver Selected Mode switch status 1	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 20 s monitor runs	Special C
							and Frame timeout	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and		with 0.005 s rate whenever	
					Bus off or error passive on CAN	= FALSE -		
					and			
					)			
					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 uA	which means			
			measured and filtered interdigital electrode(IDE) current	< 41 uA	Sensor regeneration complete	= TRUE -		
			when	<	and			
			integrated reciprocal of the predicted trigger time	= 1	PM sensor dewpoint reached (please see the definition)	= FALSE -		
					DPF regeneration not active	TRUE -		
			or		Calculated soot particles mass based on sensor flow resistance	>= 0 g		
					Calculated soot particles mass based on sensor flow resistance	<= 300 g		
			Path2:		(			
			measured interdigital electrode(IDE) current	>= 41 uA	Exhaust gas velocity at particulate sensor position	>= 0 m/sec		
					Exhaust gas velocity at particulate sensor position	<= 50 m/sec		
			then		for			
			Integrated reciprocal of the predicted trigger time	<= 1	Duration for exhaust gas velocity	>= 5 sec		
			when		)			
			waiting time for particulate sensor regeneration has elapsed	= 60 sec	(			
					Exhaust gas pressure	>= 75.0 kPa		
					Exhaust gas pressure	<= 135 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			
					Duration for exhaust gas pressure	>= 10 sec		
					)			
					(			
					Exhaust gas temperature	>= 89.960 °C		
					Exhaust gas temperature	<= 399.960 °C		
					for			
					Duration for exhaust gas temperature	>= 5 sec		
					)			
					(			
					Engine running	= TRUE -		
					(			
					NOx concentration in exhaust gas	< 200 ppm		
					Meander temperature of particulate sensor	< 249.960 °C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							) NOx concentration in exhaust gas	 <	 1500	 ppm		
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 same as temperature downstream of oxidation catalyst	< <	0.65 - 50	V °C	ignition on and basic enable conditions met:	= =	TRUE see sheet enable tables	- -	fail conditions exists for 3 s monitor runs 0.050 s rate whenever enable conditions are met	A
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 same as temperature downstream of oxidation catalyst	> >	2.21 1000	V °C	ignition on and basic enable conditions met:	= =	TRUE see sheet enable tables	- -	fail conditions exists for 3 s monitor runs 0.050 s rate whenever enable conditions are met	A
Reductant Level Sensor "A" Circuit Range/Performance	P203B	Reductant level plausibility check error from CAN	CAN message "Reductant Level Plausibility Check Error" from reductant tank level evaluation module which means ((measured tank level sensor 2 voltage after 1.5 ms since a test impulse was applied) (measured tank level sensor 1 voltage after 1.5 ms since a test impulse was applied)) or (	= = =	TRUE (0.0 to 1.7) (1.71 to 3.56)	- V 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 5 s test performed continuously 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.
			(measured tank level sensor 3 voltage after 1.5 ms since a test impulse was applied)	=	(0.0 to 1.7)	V						
			(measured tank level sensor 1 voltage after 1.5 ms since a test impulse was applied)	=	(1.71 to 3.56)	V						
			)									
			or									
			(									
			(measured tank level sensor 3 voltage after 1.5 ms since a test impulse was applied)	=	(0.0 to 1.7)	V						
			(measured tank level sensor 2 voltage after 1.5 ms since a test impulse was applied)	=	1.71 to 3.56)	V						
			)									
Reductant Level Sensor 1 Circuit Low	P203C	CAN message: Discrete level sensor level 1 short to ground error	Reductant Tank Level 1 Error Status	=	1	-	ignition on	=	TRUE	-	fail conditions exists for more than 3 sec. monitor runs with 1 s rate whenever enable conditions are met	A
			(tank level sensor 1 voltage directly measured after a test impulse was applied)	<	(0.17)	V	battery voltage	>	8	V		
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Level Sensor 1 Circuit High	P203D	Path 1:									fail conditions exists for more than 3 sec. monitor runs with 1 s rate whenever enable conditions are met	A
		CAN message: Discrete level sensor 1 open load error	Reductant Tank Level 1 Error Status	=	3	-	ignition on	=	TRUE	-		
			(measured tank level sensor 1 voltage after 1.5 ms since a test impulse was applied)	>	(3.56)	V	battery voltage	>	8	V		
			(measured tank level sensor 1 voltage after 1.5 ms since a test impulse was applied)	<	(4.74)	V	basic enable conditions met:	=	see sheet enable tables	-		
		Path 2:										
		CAN message: Discrete level sensor 1 short to battery error	Reductant Tank Level 1 Error Status	=	2	-	ignition on	=	TRUE	-		
			(measured tank level sensor 1 voltage after 1.5 ms since a test impulse was applied)	>	(4.74)	V	battery voltage	>	8	V		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Injector Control Circuit	P2047	Diagnoses the Reductant Injector low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	ECU initialization task in progress	=	FALSE	-	fail conditions exists for 3 s monitor runs with 10 msec rate whenever enable conditions are met	A
							for					
							time	>	1.00	sec		
							and					
							battery voltage	>	11.00	V		
							for					
							time	>	3.00	sec		
							and					
							battery voltage	<	655.34	V		
							for					
							time	>	3.00	sec		
							and					
							(					
							battery voltage correction factor (please see the parameter definition	>	0.00	factor		
							and					
							battery voltage correction factor (please see the parameter definition	<	4.00	factor		
							)					
							for					
							time	>	3.00	sec		
							and					
							No Pending or confirmed DTCs	=	See sheet inhibit tables	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Injector Control Circuit Low Voltage	P2048	Diagnoses the Reductant Injector low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	ECU initialization task in progress	=	FALSE	-	fail conditions exists for 2 s monitor runs with 10 msec rate whenever enable conditions are met	A
							for					
							time	>	1.00	sec		
							and					
							battery voltage	>	11.00	V		
							for					
							time	>	3.00	sec		
							and					
							battery voltage	<	655.34	V		
							for					
							time	>	3.00	sec		
							and					
							(					

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

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	Pressure difference between baro pressure and unfiltered Reductant pressure is compared to a threshold while the SCR system is in No Pressure Control state	Pressure sensor signal change during No Pressure Control state	>	50.00	kPa	Reductant filling state in the pressure line	<=	0.00	%	fail conditions exists for more than 0.6 sec monitor runs with 0.01 s rate whenever enable conditions are met	A
							and status of SCR control state (please see the definition)	=	No Pressure Control	-		
							and State of the defrosting check of pressure line (please see the definition)	=	TRUE	-		
							and ambient pressure	>	0.00	kPa		
							and ambient temperature	>	-30.04	°C		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
Reductant Pump Pressure Sensor Circuit Low	P204C	Measured reductant pump pressure sensor signal low voltage	Reductant pump pressure sensor signal	<	0.41	V	ignition on	=	TRUE	-	fail conditions exists for more than 0.4 sec. monitor runs with 0.01 s rate whenever enable	A
			same as:				NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			reductant pump pressure	<	0	kPa	basic enable conditions met:	=	see sheet enable tables	-		
Reductant Pump Pressure Sensor Circuit High	P204D	Measured reductant pump pressure sensor signal high voltage	Reductant pump pressure sensor signal	>	4.80	V	ignition on	=	TRUE	-	fail conditions exists for more than 0.4 sec. monitor runs with 0.01 s rate whenever enable conditions are met	A
			same as:				NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			reductant pump pressure	>	800.00	kPa	basic enable conditions met:	=	see sheet enable tables	-		
Reductant System Performance Bank 1	P204F	Unsuccessful reductant pressure build up	Reductant Pump Module Pressure	<=	350.00	kPa	status of SCR control sub state (please see the definition)	=	PRESSURE BUILDUP	-	fail conditions exists for 1 event monitor runs with 0.1 s	A
							AND status byte in substate PRESSUREBUILDUP	=	RUNNING			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Reductant Defrost check (please see the definition)	=	TRUE	-	rate whenever enable conditions are met	
							ambient pressure	>	0.00	kPa		
							ambient temperature	>	-30.04	°C		
							number of pressure build-up attempts in pressure buildup and ventilation states	>=	20	counts		
							Dwell time in Pressure Build up substate	>=	10.00	sec		
							Dwell time in ventilation substate	>=	0.23	sec		
							Urea heater release reason	≠	COMPONENT PROTECTION	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Tank Temperature Sensor Performance	P205B	**Path 1:**									fail conditions exists for more than 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)	>	34.96	°C	ignition on	=	TRUE	-		
			where				status of SCR control state (please see the definition)	=	No Pressure control	-		
			(a) Reductant tank temperature	=	measured parameter	-	Engine off Time	>	28800.00	sec		
			(b) fuel temperature	=	measured parameter	-	time since start	>	6.00	sec		
							Max [(a), (b), (c)] - Min [(a), (b), (c)] where	<=	6.96	°C		
							(a) Oxidation Catalyst upstream temperature	=	measured parameter	-		
							(b) fuel temperature	=	measured parameter	-		
							(c) Particulate filter downstream temperature	=	measured parameter	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
										\		
		Path 2: OR					ignition on	=	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.
		The temperature difference between reductant tank temperature and diesel fuel temperature are compared to a lower threshold after sufficient engine-off duration	(a) - (b)	<	-35.04	°C	status of SCR control state (please see the definition)	=	No Pressure control	-	exists for more than 0.5 sec monitor runs with 0.01 s rate whenever enable conditions are met	
			where				Engine off Time	>	28800.00	sec		
			(a) Reductant tank temperature	=	measured parameter	-	time since start	>	6.00	sec		
			(b) fuel temperature	=	measured parameter	-	Max [(a), (b), (c)] - Min [(a), (b), (c)]	<=	6.96	°C		
							where					
							(a) Oxidation Catalyst upstream temperature	=	measured parameter	-		
							(b) fuel temperature	=	measured parameter	-		
							(c) Particulate filter downstream temperature	=	measured parameter	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Tank Temperature Sensor Circuit Low	P205C	Detects an out of range low reading of the Reductant Tank Temperature Sensor via CAN Message	Raw value of the CAN message for the Reductant Tank Temperature	<	0x001	hex	basic enable conditions met:	=	see sheet enable tables	-	fault exists for more than 3 sec; monitor runs at 1 s whenever enable conditions are met	A
			Corresponds to a temperature of	<=	-55.0	°C	and					
			Corresponds to a resistance of	>=	1200	kOhm	No rolling count or protection value errors. (sliding window errors) in the CAN frame	=	TRUE	-		
			Corresponds to a voltage of	>=	5.0	V						
Reductant Tank Temperature Sensor Circuit High	P205D	Detects an out of range high reading of the Reductant Tank Temperature Sensor via CAN Message or an invalid (initialization) value of the Reductant Tank Temperature CAN message	Raw value of the CAN message for the Reductant Tank Temperature	>	0x3FE 1022	hex dec	basic enable conditions met:	=	see sheet enable tables	-	fault exists for more than 6 sec; monitor runs at 1 s whenever enable conditions are met	B
			Corresponds to a temperature of	>=	160.0	°C	and					
			Corresponds to a resistance of	<=	0.153	kOhm	No rolling count or protection value errors. (sliding window errors) in the CAN frame	=	TRUE	-		
			Corresponds to a voltage of	<=	0.270	V						
			Raw value of the CAN message for the Reductant Tank Temperature	=	0x3FF 1023	hex dec						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Secondary Fuel Sensor Performance	P2066	Detects an error in the secondary fuel tank sensor performance by comparing the decrease of the fuel level for a certain driven mileage to a threshold.	(a) - (b)	<	100.00	miles	Engine Running	=	TRUE	-	fail conditions exists for 0.02 s monitor runs 0.02 s rate whenever enable conditions are met	B
			with				for					
			(a) total vehicle distance	=	measured parameter	-	time	>=	60.00	sec		
			and with				and					
			(b) change in mileage	=	measured parameter	-	diagnosis tester	=	FALSE	-		
			and				and					
			(c) - (d)	<	4.00	l	fuel transfer pump active	=	FALSE	-		
			with				means					
			(c) maximum volume of fuel reached in secondary tank during driving cycle	=	measured parameter	-	(					
			and with				filtered fuel volume in primary tank	>	1638.35	l		
			(d) minimum volume of fuel reached in secondary tank during driving cycle	=	measured parameter	-	or					
			and				filtered fuel volume in secondary tank	<	0.00	l		
			filtered fuel volume in secondary tank	>	0.00	l	for					
							time	>	0.00	sec		
							and					
							cumulative transfer pump on time in current ignition cycle	>	0.00	sec		
							)					
							and					
							fuel level zone 1					
							means					
							(					
							filtered fuel volume in primary tank	>=	137.40	l		
							and					
							filtered fuel volume in secondary tank	>=	0.00	l		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:		see sheet inhibit tables			
SRC low for fuel level sensor of secondary tank	P2067	Detects low voltage readings in the fuel level secondary tank sensor circuit, indicating an OOR low condition on the fuel level sensor circuit	voltage of fuel level sensor 2	<	0.20	V	ignition on	=	TRUE	-	fail conditions exists for 24 s test performed continuously 0.2 s rate	B
							and					
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
SRC high for fuel level sensor of secondary tank	P2068	Detects high voltage readings in the fuel level secondary tank sensor circuit, indicating an OOR high condition on the fuel level sensor circuit	voltage of fuel level sensor 2	>	4.80	V	ignition on	=	TRUE	-	fail conditions exists for 24 s test performed continuously 0.2 ms rate	B
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Temperature Sensor 1 Performance	P2080	Detects a fault in the exhaust temperature sensor 1 performance by comparing the heat quantity on the sensor position to a threshold.	integrated heat quantity of exhaust gas temperature sensor 1	<	(a) / (b) * (c) / (d) * (e) * (f)	-	exhaust gas system regeneration mode	=	FALSE	-	fail conditions exists for 5 times monitor runs with 0.1 s rate whenever enable conditions are met	B
			or				for					
			integrated heat quantity of exhaust gas temperature sensor 1	>	(a) / (b) * (c) / (d) * (e) * (g)	-	time	>	1500.00	sec		
			with				and					
			(a) exhaust gas mass flow	=	calculated parameter	-	time since start	>	327.00	sec		
			and with				and					
			(b) factor		3.60	g/sec	(					
			and with				exhaust-gas temperature sensor 1	>	-60.04	°C		
			(c) heat capacity	=	1050.00	J/Kg/°C	and					
			and with				exhaust-gas temperature sensor 1	<	1999.96	°C		
			(d) factor	=	1000	kW/°C	)					
			and with				and					
			(e) correction factor for heat flow quantity depending on exhaust gas mass flow for temperature sensor 1	=	1.00	factor	change in exhaust-gas temperature sensor 1	<	7.00	°C		
							for					
			and with				time	=	5.00	sec		
			(f) minimum permissible temperature deviation for exhaust gas temperature sensor 1	=	-100.00	°C	and					
			and with				engine operation point suitable for diagnostic (see Look-Up-Table #29)	=255	0 to 255	-		
			(g) maximum permissible temperature deviation for exhaust gas temperature sensor 1	=	100.00	°C	for					
							time	>=	50.00	sec		
							and					
							change in modeled exhaust-gas temperature sensor 1	>	4.00	°C		
							and					
							(					
							heat quantity for exhaust gas temperature sensor 1	>	10.00	kJ		
							and					
							heat quantity for exhaust gas temperature sensor 1	<	12.00	kJ		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							)					
							and					
							engine has been in normal mode for time	>=	1.00	sec		
							or					
							engine has been in exhaust warm-up mode for time	>=	1.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Temperature Sensor 2 Performance	P2084	Detects a fault in the exhaust temperature sensor 2 performance by comparing the heat quantity on the sensor position to a threshold.	integrated heat quantity of exhaust gas temperature sensor 2	<	(a) / (b) * (c) / (d) * (e) * (f)	-	exhaust gas system regeneration mode	=	FALSE	-	fail conditions exists for 5 times monitor runs with 0.1 s rate whenever enable conditions are met	B
			or				for					
			integrated heat quantity of exhaust gas temperature sensor 2	>	(a) / (b) * (c) / (d) * (e) * (g)	-	time	>	1500.00	sec		
			with				and					
			(a) exhaust gas mass flow	=	calculated parameter	-	time since start	>	327.00	sec		
			and with				and					
			(b) factor	=	3.60	g/sec	(					
			and with				exhaust-gas temperature sensor 2	>	-60.04	°C		
			(c) heat capacity	=	1050.00	J/Kg/°C	and					
			and with				exhaust-gas temperature sensor 2	<	1999.96	°C		
			(d) factor	=	1000	kW/°C	)					
			and with				and					
			(e) correction factor for heat flow quantity depending on exhaust gas mass flow for temperature sensor 2	=	1.00	factor	change in exhaust-gas temperature sensor 2	<	7.00	°C		
							for					
			and with				time	=	5.00	sec		
			(f) minimum permissible temperature deviation for exhaust gas temperature sensor 2	=	-100.00	°C	and					
			and with				engine operation point suitable for diagnostic (see Look-Up-Table #29)	=	0 to 255	-		
			(g) maximum permissible temperature deviation for exhaust gas temperature sensor 2	=	100.00	°C	for					
							time	>=	0.05	sec		
							and					
							change in modeled exhaust-gas temperature sensor 2	>	4.00	°C		
							and					
							(					
							heat quantity for exhaust gas temperature sensor 2	>	10.00	kJ		
							and					
							heat quantity for exhaust gas temperature sensor 2	<	12.00	kJ		
							)					
							and					

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 normal mode for time	>=	1.00	sec		
							or					
							engine has been in exhaust warm-up mode for time	>=	1.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Temperature Sensor 3 Performance	P242B	Detects a fault in the exhaust temperature sensor 3 performance by comparing the heat quantity on the sensor position to a threshold.	integrated heat quantity of exhaust gas temperature sensor 3	<	(a) / (b) * (c) / (d) * (e) * (f)	-	exhaust gas system regeneration mode	=	FALSE	-	fail conditions exists for 5 times monitor runs with 0.1 s rate whenever enable conditions are met	B
			or				for					
			integrated heat quantity of exhaust gas temperature sensor 3	>	(a) / (b) * (c) / (d) * (e) * (g)	-	time	>	1500.00	sec		
			with				and					
			(a) exhaust gas mass flow	=	calculated parameter	-	time since start	>	327.00	sec		
			and with				and					
			(b) factor	=	3.60	g/sec	(					
			and with				exhaust-gas temperature sensor 3	>	-60.04	°C		
			(c) heat capacity	=	1050.00	J/Kg/°C	and					
			and with				exhaust-gas temperature sensor 3	<	1999.96	°C		
			(d) factor	=	1000	kW/°C	)					
			and with				and					
			(e) correction factor for heat flow quantity depending on exhaust gas mass flow for temperature sensor 3	=	1.00	factor	change in exhaust-gas temperature sensor 3	<	7.00	°C		
							for					
			and with				time	=	5.00	sec		
			(f) minimum permissible temperature deviation for exhaust gas temperature sensor 3	=	-100.00	°C	and					
			and with				engine operation point suitable for diagnostic (see Look-Up-Table #29)	=	0 to 255	-		
			(g) maximum permissible temperature deviation for exhaust gas temperature sensor 3	=	100.00	°C	for					
							time	>=	0.05	sec		
							and					
							change in modeled exhaust-gas temperature sensor 3	>	4.00	°C		
							and					
							(					
							heat quantity for exhaust gas temperature sensor 3	>	10.00	kJ		
							and					
							heat quantity for exhaust gas temperature sensor 3	<	12.00	kJ		
							)					
							and					
							engine has been in normal mode for time	>=	1.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							or					
							engine has been in exhaust warm-up mode for time	>=	1.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Temperature Sensor 4 Performance	P246F	Detects a fault in the exhaust temperature sensor 4 performance by comparing the heat quantity on the sensor position to a threshold.	integrated heat quantity of exhaust gas temperature sensor 4	<	(a) / (b) * (c) / (d) * (e) * (f)	-	exhaust gas system regeneration mode	=	FALSE	-	fail conditions exists for 5 times monitor runs with 0.1 s rate whenever enable conditions are met	B
			or				for					
			integrated heat quantity of exhaust gas temperature sensor 3	>	(a) / (b) * (c) / (d) * (e) * (g)	-	time	>	1500.00	sec		
			with				and					
			(a) exhaust gas mass flow	=	calculated parameter	-	time since start	>	327.00	sec		
			and with				and					
			(b) factor	=	3.60	g/sec	(					
			and with				exhaust-gas temperature sensor 4	>	-60.04	°C		
			(c) heat capacity	=	1050.00	J/Kg/°C	and					
			and with				exhaust-gas temperature sensor 4	<	1999.96	°C		
			(d) factor	=	1000	kW/°C	)					
			and with				and					
			(e) correction factor for heat flow quantity depending on exhaust gas mass flow for temperature sensor 3	=	1.00	factor	change in exhaust-gas temperature sensor 4	<	7.00	°C		
							for					
			and with				time	=	5.00	sec		
			(f) minimum permissible temperature deviation for exhaust gas temperature sensor 3	=	-100.00	°C	and					
			and with				engine operation point suitable for diagnostic (see Look-Up-Table #29)	=	0 to 255	-		
			(g) maximum permissible temperature deviation for exhaust gas temperature sensor 3	=	100.00	°C	for					
							time	>=	0.05	sec		
							and					
							change in modeled exhaust-gas temperature sensor 4	>	4.00	°C		
							and					
							(					
							heat quantity for exhaust gas temperature sensor 4	>	10.00	kJ		
							and					
							heat quantity for exhaust gas temperature sensor 4	<	12.00	kJ		
							)					
							and					
							engine has been in normal mode for time	>=	1.00	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	>=	1.00	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Pump Control Circuit	P208A	Diagnoses the Reductant Pump Motor low side driver circuit for circuit faults.	Voltage low during driver off state (indicates Open circuit)	= Open Circuit:≥ 200 K Ω impedance between signal and controller ground -	ECU Initialization task in progress	=	FALSE	-	fail conditions exists for 6.2 s monitor runs with 10 msec rate whenever enable conditions are met	A
					for time	>	1.00	sec		
					and					
					battery voltage	>	11.00	V		
					for time	>	3.00	sec		
					and					
					battery voltage	<	655.34	V		
					for time	>	3.00	sec		
					and					
					(					
					battery voltage correction factor (please see the parameter definition	>	0.00	factor		
					and					
					battery voltage correction factor (please see the parameter definition	<	4.00	factor		
					)					
					for time	>	3.00	sec		
					and					
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		ECU Initialization task in progress	=	FALSE	-	fail conditions exists for 0.01 s monitor runs with 0.01 sec rate whenever enable conditions are met	
					for time	>	1.00	sec		
					and					
					battery voltage	>	11.00	V		
					for time	>	3.00	sec		
					and					
					battery voltage	<	655.34	V		
					for					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							time	>	3.00	sec		
							and					
							(					
							battery voltage correction factor (please see the parameter definition	>	0.00	factor		
							and					
							battery voltage correction factor (please see the parameter definition	<	4.00	factor		
							)					
							for					
							time	>	3.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Pump Performance	P208B	The ECM detects that the commanded state of the Reductant Pump driver and the actual state of the control circuit do not match.	timer for functional acknowledgement of the reductant pump motor	>	4.00	sec	(				fault exists for more than 0.3 s; monitor runs at 0.1 s whenever enable conditions are met	A
			timer for functional acknowledgement of the reductant pump motor	<=	6.00	sec	Reductant Pump Warm-up status	=	FALSE	-		
							where the Warm-up state is defined as:					
							(					
							No Pressure control state (please see the definition)	=	TRUE	-		
							SCR Engine State (please see the definition)	=	ON	-		
							((					
							Remaining defrosting time of the tank	>	0	sec		
							Remaining defrosting time of the tank	<=	120.00	sec		
							)					
							OR					
							Reductant Defrost check (please see the definition)	=	TRUE	-		
							))					
							)					
							(					
							ambient temperature	>	-30.04	°C		
							)					
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Pump Control Circuit High Voltage	P208D	Diagnoses the Reductant Pump Motor low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	ECU Initialization task in progress	=	FALSE	-	fail conditions exists for 3 s monitor runs with 10 msec rate whenever	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	> 1.00 sec	enable conditions are met	
					and battery voltage	> 11.00 V		
					for time	> 3.00 sec		
					and battery voltage	< 655.34 V		
					for time	> 3.00 sec		
					and (battery voltage correction factor (please see the parameter definition	> 0.00 factor		
					and battery voltage correction factor (please see the parameter definition	< 4.00 factor		
					) for time	> 3.00 sec		
					and basic enable conditions met:	= see sheet enable tables -		
					and NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Reductant Purge Valve Control Circuit	P20A0	Diagnoses the Reductant Purge Valve low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit:≥ 200 K Ω impedance between ECU pin and load -	ECU Initialization task in progress	= FALSE -	fail conditions exists for 3 s monitor runs with 10 msec rate whenever enable conditions are met	A
					for time	> 1.00 sec		
					and battery voltage	> 11.00 V		
					for time	> 3.00 sec		
					and battery voltage	< 655.34 V		
					for time	> 3.00 sec		
					and (battery voltage correction factor (please see the parameter definition	> 0.00 factor		
					and battery voltage correction factor (please see the parameter definition	< 4.00 factor		
					) for time	> 3.00 sec		
					and basic enable conditions met:	= see sheet enable tables -		
					and NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		

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 Performance	P20A1	This diagnostic checks the Reductant Purge valve performance during operation by detecting a lack of reduction of the reductant pressure	Difference between reductant pump pressure at beginning and end of pressure reduction state	<	50.00	kPa	(				fault exists for more than 1 event monitor runs with 100 ms rate whenever enable conditions are met	A
							Reductant Dosing System state pressure reduction	=	TRUE	-		
							Reductant Dosing System pump relative pressure to initiate test	>=	350.00	kPa		
							)					
							AND					
							((					
							Time attempting to reduce dosing pressure	>=	5.00	sec		
							AND					
							Reductant Dosing System pump relative pressure after attempting to reduce pressure	>	50.00	kPa		
							)					
							OR					
							Reductant Dosing System pump relative pressure after attempting to reduce pressure	<=	50.00	kPa		
							)					
							(					
							ambient pressure	>	0.00	kPa		
							ambient temperature	>	-100.04	°C		
							)					
							NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Purge Valve Control Circuit Low Voltage	P20A2	Diagnoses the Reductant Purge Valve low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	ECU Initialization task in progress	=	FALSE	-	fail conditions exists for 2 s monitor runs with 10 msec rate whenever enable conditions are met	A
							for time	>	1.00	sec		
							and					
							battery voltage	>	11.00	V		
							for time	>	3.00	sec		
							and					
							battery voltage	<	655.34	V		
							for time	>	3.00	sec		
							and					
							(					
							battery voltage correction factor (please see the parameter definition	>	0.00	factor		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							battery voltage correction factor (please see the parameter definition)	<	4.00	factor		
							for time	>	3.00	sec		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Purge Valve Control Circuit High Voltage	P20A3	Diagnoses the Reductant Purge Valve low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	ECU Initialization task in progress	=	FALSE	-	fail conditions exists for 3 s monitor runs with 10 msec rate whenever enable conditions are met	A
							for time	>	1.00	sec		
							and battery voltage	>	11.00	V		
							for time	>	3.00	sec		
							and battery voltage	<	655.34	V		
							for time	>	3.00	sec		
							and (battery voltage correction factor (please see the parameter definition	>	0.00	factor		
							and battery voltage correction factor (please see the parameter definition)	<	4.00	factor		
							for time	>	3.00	sec		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Aftertreatment Fuel Injector Control Circuit	P20CB	Electronic output driver circuitry determines circuit integrity on the exhaust aftertreatment fuel injector control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.				engine pre drive	=	FALSE	-	fail conditions exists for more than 30 events monitor runs with 0.1 s rate whenever enable conditions	B
							for time	>	1.00	sec		
							battery voltage	>	11.00	V		
							for time	>	3.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and				are met	
							starter is active cranking	=	FALSE	-		
							for					
							time	>	3.00	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Aftertreatment Fuel Injector Performance	P20CC	Detects high exhaust temperatures in order to protect the engine	oxidation catalyst downstream temperature - oxidation catalyst upstream temperature	>	300	°C	(				fail conditions exists for 180 s test performed continuously 0.1 s rate	A
			OR				oxidation catalyst upstream temperature change	<	50.00	°C		
			particulate filter downstream temperature - SCR downstream temperature	>	300	°C	for time	>	10.00	sec		
							)					
							AND					
							(					
							time since last successful regeneration	>	900.00	sec		
							)					
							AND					
							((					
							Normal Mode (Particulate Filter Regeneration not active)	=	TRUE	-		
							OR					
							Exhaust Gas Temperature (Active) Management Mode	=	TRUE	-		
							)					
							for time	>	300.00	sec		
							)					
							AND					
							(					
							time since the end of the last tip cleaning request of the Exhaust Aftertreatment Fuel Injector HCI tip cleaning is performed to prevent the nozzle of the HCI from sticking shut or building deposits that may effect its flow. During tip cleaning, the injector is operating at a higher injection frequency (100 Hz) with 30% duty cycle for a duration less than two seconds. HCI tip cleaning is requested at 30%, 50% and 75% of soot loading level on the DPF when the following conditions are also met:	>	300.00	sec		
							HCI Injector is not currently activated	=	TRUE	-		
							SCR Catalyst downstream temperature	<	499.96	°C		
							SCR Catalyst downstream temperature	>	179.96	°C		
							DOC Upstream Temperature	>	219.96	°C		
							Engine Speed	>	500	rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Vehicle Speed	> 3.10 mph		
					Exhaust Mass Flow	> 72.00 g/sec		
					)			
					AND			
					basic enable conditions met:	= see sheet enable tables -		
					AND			
					NO Pending or Confirmed DTCs:	see sheet inhibit tables -		
Exhaust Aftertreatment Fuel Injector Control Circuit Low Voltage	P20CD	Electronic out-put driver circuitry determines circuit integrity on the exhaust aftertreatment fuel injector control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		engine pre drive	= FALSE -	fail conditions exists for more than 30 events monitor runs with 0.1 s rate whenever enable conditions are met	B
					for time	> 1.00 sec		
					battery voltage	> 11.00 V		
					for time	> 3.00 sec		
					and			
					starter is active cranking	= FALSE -		
					for time	> 3.00 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			
					Diesel dosing valve: fuel injection	= INACTIVE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		
Exhaust Aftertreatment Fuel Injector Control Circuit High Voltage	P20CE	Diagnoses the Exhaust Aftertreatment Fuel Injector low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	engine pre drive	= FALSE -	fail conditions exists for more than 30 events monitor runs with 0.1 s rate whenever enable conditions are met	B
					for time	> 1.00 sec		
					battery voltage	> 11.00 V		
					for time	> 3.00 sec		
					and			
					starter is active cranking	= FALSE -		
					for time	> 3.00 sec		
					and			
					basic enable conditions met:	= see sheet enable tables -		
					and			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P20E2	Detects biased exhaust temperature sensors by comparing the upstream and downstream oxidation catalyst temperature sensors after a calibrated engine off soak time	**Path 1:**				minimum engine-off time	>=	28800.00	sec	fail conditions exists for 0.050 s monitor runs with 0.050 s rate whenever enable conditions are met	B
			|(a) - (b)| (see Look-Up-Table #30)	>	100.00	°C	and					
			with				ambient temperature	>	-60.04	°C		
			(a) captured oxidation catalyst downstream temperature at start	=	measured parameter	-	and					
			and with				Engine Running (see parameter definition)	=	TRUE	-		
			(b) captured oxidation catalyst upstream temperature at start as reference temperature	=	measured parameter	-	for					
			or				time	>	0.00	sec		
			Path 2:				and					
			(				engine post drive/ afterun	=	FALSE	-		
			|(a) - (b)| (see Look-Up-Table #30)	<=	100.00	°C	and					
			with				diagnostic performed in current dc	=	FALSE	-		
			(a) captured oxidation catalyst downstream temperature at start	=	measured parameter	-	and					
			and with				basic enable conditions met:	=	see sheet enable tables	-		
			(b) captured oxidation catalyst upstream temperature at start as reference temperature	=	measured parameter	-	and					
			and				NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			|(a) - (b)| (see Look-Up-Table #31)	>	30.00	°C						
			with									
			(a) captured oxidation catalyst downstream temperature at start	=	measured parameter	-						
			and with									
			(b) captured oxidation catalyst upstream temperature at start as reference temperature	=	measured parameter	-						
			and									
			status of block heater	=	FALSE	-						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Reductant Pressure Too Low	P20E8	Compare Reductant tank pressure with lower thresholds under metering control	Reductant Pump Module Pressure	<	400.00	kPa					fail conditions exists for more than 60.0 s monitor runs with 0.1 s rate whenever enable conditions are met	A
							status of SCR control sub state (please see the definition)	=	Metering control	-		
							status byte in substate METERING CONTROL	=	Running			
							Dwell time in Metering control substate	>	1.00	sec		
							ambient pressure	>	0.00	kPa		
							ambient temperature	>	-30.04	°C		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant System Performance Bank 1	P20E9	**Path 1:**									fail conditions exists for more than 10 s monitor runs with 0.1 s rate whenever enable conditions are met	A
		Compare Reductant tank pressure with upper threshold under metering control	Reductant Pump Module Pressure	>	650.00	kPa	status of SCR control sub state (please see the definition)	=	Metering control	-		
							status byte in substate METERING CONTROL	=	Running	-		
							Dwell time in Metering control substate	>	1.00	sec		
							ambient pressure	>=	0.00	kPa		
							ambient temperature	>=	-30.04	°C		
							NO Pending or Confirmed DTCs:	=	see inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
		Path 2: Or Reductant tank pressure high	Unfiltered Reductant Pump Module Pressure	>=	795.00	kPa	ambient pressure	>	0.00	kPa	fail conditions exists for more than 1 s monitor runs with 0.1 s rate whenever enable conditions	
							ambient temperature	>	-30.04	°C		
							basic enable conditions met:	=	see sheet enable tables	-		
SCR NOx Catalyst Efficiency Below Threshold Bank 1	P20EE	Compare EWMA filtered NOx conversion efficiency of SCR catalyst with a threshold value	EWMA filtered delta SCR catalyst efficiency of (a) - (b)	<	0.00	factor	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	fail conditions exists for more than 1 event monitor runs with 0.01 s	A
			where				for time	>	300.00	sec		
			(a) measured SCR catalyst efficiency	=	calculated parameter	factor						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(b) offset-corrected modeled SCR catalyst efficiency: (b) = ((c) * (d) * (e)) + (f) where	=	calculated parameter	factor	Status of NOx signal of upstream NOx sensor (please see the definition)	=	TRUE	-	rate whenever enable conditions are met	
							for time	>	60.00	sec		
			(c) SCR modeled NOx conversion efficiency		calculated parameter	factor	Status of NOx signal of downstream NOx sensor (please see the definition)	=	TRUE	-		
							for time	>	60.00	sec		
			(d) correction map dependent on SCR catalyst temperature and upstream NOx mass flow		1.00	factor						
			(e) correction map dependent on SCR catalyst temperature and exhaust mass flow		1.00	factor						
			(f) Offset threshold (see Look-Up-Table #100)		-0.3 to -0.1	factor	(					
							Release of dosing strategy (please see the definition)	=	TRUE	-		
							for time	>=	(a) + (b)	sec		
							(a) Turn on delay time 1 of status metering strategy		330.00	sec		
							(b) Turn on delay time 2 of status metering strategy		20.00	sec		
							)					
							(					
							Status for disabling SCR Efficiency monitoring following an SCR Adaptation completion (please see the definition)	=	FALSE	-		
							for time	>	(a) + (b)	sec		
							(a) Debounce time after pre controlled dosing over	>	0.50	sec		
							(b) delay time the status of disabling SCR Efficiency monitoring	>	80.00	sec		
							or					
							integrated upstream NOx	>=	3276.70	g		
							)					
							(					
							Status of pre controlled dosing (please see the definition)	=	FALSE	-		
							for time	>	(a) + (b)			
							(a) Debounce time after pre controlled dosing off	=	0.50	sec		
							(b) Delay time after pre controlled dosing off	=	300.00	sec		
							or					
							integrated upstream NOx	>=	3276.70	g		
							)					
							(					
							Decrease of Reductant load level (please see the definition)	=	FALSE	-		
							for time	>	300.00	sec		
							)					
							(					
							Average slow filtered NOx mass flow upstream SCR	<=	0.20	g/sec		
							for time	>	0.50	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Monitor disable time based on average NOx mass flow and the time (see Look-Up-Table #88)	>	0 to 120	sec		
					)					
					for time with	>	5.00	sec		
					((					
					Delta SCR temperature (see Look-Up-Table #85)	<	59.96 to 64.96	°C		
					Delta SCR temperature (see Look-Up-Table #101)	>	-50.04 to -0.04	°C		
					Delta SCR temperature	<=	524.96	°C		
					Delta SCR temperature	>=	199.96	°C		
					Initialization time of temperature gradient calculation	>=	2.50	sec		
					)					
					or					
					Delta SCR temperature	<	229.96	°C		
					or					
					Delta SCR temperature	>	499.96	°C		
					for time	>	10.00	sec		
					)					
					(					
					normalized HC load in SCR catalyst	>	21.00	-		
					)					
					(					
					ambient pressure	>=	74.80	kPa		
					ambient temperature	>=	-7.04	°C		
					)					
					(					
					Stuck reductant dosing valve fault was healed	=	FALSE	-		
					last particulate filter regeneration successful	=	TRUE	-		
					)					
					(					
					State of the NH3 slip detection	=	FALSE	-		
					integrated upstream NOx during SCR adaptation plausibility check active	>=	20.00	g		
					Status of the SCR adaptation plausibility check active (please see the definition)	=	FALSE	-		
					for time	>	600.00	sec		
					)					
					SCR NOx Catalyst Efficiency Below Threshold Bank 1 was performed this drive cycle	=	FALSE	-		
					(					
					engine speed	>=	1000.00	rpm		
					engine speed	<=	3000.00	rpm		
					for time	>	0.00	sec		
					)					
					SCR estimated current Reductant load (see Look-Up-Table #77)	>=	0.05 to 0.75	g		
					SCR estimated current Reductant load (see Look-Up-Table #76)	<=	2 to 2.2	g		
					Difference between nominal and estimated Reductant (see Look-Up-Table #79)	>=	-0.5 to -0.1	g		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Difference between nominal and estimated Reductant (see Look-Up-Table #78)	<=	0.15 to 0.25	g		
					SCR in Pre-Control State (please see the definition)	=	FALSE	-		
					(					
					Disable after SCR adaptation	=	FALSE	-		
					for time	>	600.00	sec		
					)					
					((					
					(a) - (b)	<=	74.96	°C		
					for time	>	0.00	sec		
					)					
					or					
					(					
					(a) - (b)	>=	14.96	°C		
					for time	>	0.00	sec		
					(a) upstream SCR catalyst temperature					
					(b) downstream SCR catalyst temperature					
					))					
					Integrated NOx mass upstream SCR	>	1.00	g		
					for time	>	0.00	sec		
					Average SCR Temperature	<=	399.96	°C		
					Average SCR Temperature	>=	-3549.94	°C		
					Downstream SCR catalyst temperature	>=	3003.56	°C		
					Downstream SCR catalyst temperature	<=	-3549.94	°C		
					Filtered and delayed upstream NOx raw emission	>=	750.00	ppm		
					Filtered and delayed upstream NOx raw emission	<=	175.00	ppm		
					Filtered and delayed NOx raw emission mass flow upstream of SCR	<=	0.17	g/sec		
					Filtered and delayed NOx raw emission mass flow upstream of SCR	>=	0.01	g/sec		
					Filtered exhaust gas mass flow	<=	236.13	g/sec		
					Filtered exhaust gas mass flow	>=	-910.30	g/sec		
					MAP for valid engine operation points for SCR efficiency monitoring (see Look-Up-Table #83)	=	0 to 1	-		
					for time	>	0.00	sec		
					Inverse calculated accelerator pedal value	>	5.00	%		
					for time	>	0.00	sec		
					EWMA fast initialization mode:					
					filter coefficient for fast initialization	=	0.35	factor		
					number of SCR efficiency measurements for fast initialization mode	>=	3.00	count		
					EWMA Rapid Response mode:					
					EWMA filtered delta SCR catalyst efficiency	>	0.12	factor		
					(a) - (b)	<	-0.01	factor		
					(a) measured SCR catalyst efficiency					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							(b) offset-corrected modeled SCR catalyst efficiency (please see the general description for details)					
							offset-corrected modeled SCR catalyst efficiency (please see the general description for details)	>	0.00	factor		
							filter coefficient for Rapid Respond mode	=	0.16	factor		
							number of SCR efficiency measurements for Rapid Response mode	>=	6.00	count		
							EWMA filtered value too small in Fast Init. And Rapid Response modes: EWMA filtered delta SCR catalyst efficiency of (a) - (b) (a) measured SCR catalyst efficiency (b) offset-corrected modeled SCR catalyst efficiency (please see the general description for details)	<	0.00	factor		
							EWMA stabilized mode: filter coefficient for stabilized mode	=	0.04	factor		
							number of SCR efficiency measurements for stabilized mode	=	1	count		
							not disabled during following conditions	=	see sheet enable tables	-		
Accelerator Pedal Position (APP) Sensor 1 Circuit Low Voltage	P2122	Detects low voltage readings on the APP circuit, indicating an OOR low condition on the APP 1 circuit	voltage of acceleration pedal sensor 1	<=	0.79	V	ignition on	=	TRUE	-	fail conditions exists for 0.19 s monitor runs with 0.01 s rate whenever enable conditions are met	A
			same as acceleration pedal position	<=	-6.6	%	and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Accelerator Pedal Position (APP) Sensor 1 Circuit High Voltage	P2123	Detects high voltage readings on the APP circuit, indicating an OOR high condition on the APP 1 circuit	voltage of acceleration pedal sensor 1	>=	4.75	V	ignition on	=	TRUE	-	fail conditions exists for 0.19 s monitor runs with 0.01 s rate whenever enable conditions are met	A
			same as acceleration pedal position	>=	125.6	%	and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

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 Low Voltage	P2127	Detects low voltage readings on the APP circuit, indicating an OOR low condition on the APP 2 circuit	voltage of acceleration pedal sensor 2	<=	0.31	V	ignition on	=	TRUE	-	fail conditions exists for 0.19 s monitor runs with 0.01 s rate whenever enable conditions are met	A
			same as acceleration pedal position	<=	-13.9	%	and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Accelerator Pedal Position (APP) Sensor 2 Circuit High Voltage	P2128	Detects high voltage readings on the APP circuit, indicating an OOR high condition on the APP 2 circuit	voltage of acceleration pedal sensor 2	>=	2.32	V	ignition on	=	TRUE	-	fail conditions exists for 0.19 s monitor runs with 0.01 s rate whenever enable conditions are met	A
			same as acceleration pedal position	>=	115.1	%	and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detects in range pedal positions errors by comparing the voltages on each of the pedal position sensors.	|maximum value ((a/b) or (c)) - maximum value ((c) or (d))| (see Look-Up-Table #13)	>	0.12 to 0.18	V	ignition on	=	TRUE	-	fail conditions exists for 0.2 s monitor runs with 0.01 rate whenever enable conditions are met	A
			with (a) voltage of acceleration pedal position sensor 1	=	measured parameter	V	and basic enable conditions met:	=	see sheet enable tables	-		
			and with (b) factor between sensor raw values	=	2.00	factor	and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			and with (c) minimum voltage	=	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	-		
Injector Positive Voltage Control Circuit Group 2	P2149	ECM Electronic out-put driver circuitry determines if faults (open/short/no load) exist on injector charging bank #2.	Voltage high during driver off state (indicates short to power, short to ground, or open circuit)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power Open Circuit: ≥ 200 K Ω impedance between ECU pin and load signal and controller ground Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
							and fuel system status	=	no fuel cut off	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Injector Positive Voltage Control Circuit Group 3	P2152	ECM Electronic out-put driver circuitry determines if faults (open/short/no load) exist on injector charging bank #3.	Voltage high during driver off state (indicates short to power, short to ground, or open circuit)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power Open Circuit: ≥ 200 K Ω impedance between ECU pin and load signal and controller ground Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
							and fuel system status	=	no fuel cut off	-		
Injector Positive Voltage Control Circuit Group 4	P2155	ECM Electronic out-put driver circuitry determines if faults (open/short/no load) exist on injector charging bank #4.	Voltage high during driver off state (indicates short to power, short to ground, or open circuit)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power Open Circuit: ≥ 200 K Ω impedance between ECU pin and load signal and controller ground Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
							and fuel system status	=	no fuel cut off	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Reductant tank heater short circuit	P214F	Compare the maximum measured conductance of a tank heater against the threshold	maximum conductance of tank heater	>=	(a) * (b)	1/Ohm	ignition switch on	=	TRUE	-	fail conditions exists for 0.001 s monitor runs once per trip with 0.001 s rate whenever enable conditions	B
					with		urea tank heater powerstage on	=	TRUE	-		
			(a) upper threshold	=	0.98	1/Ohm	battery voltage	>=	11.00	V		
			(b) factor for tolerances	=	1.00	factor	battery voltage	<=	655.34	V		
							engine off time	>=	5400.00	sec		
							urea tank temperature	<=	41.96	°C		
							(					
							conductance of the urea tank heater is steady or falling	=	TRUE	-		
							maximum counter	>	1000.00	count		
							or					
							heater activation time	>=	600.00	sec		
							)					
							basic enable conditions met:	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Intake Air Temp Sensor 1 / 2 Correlation	P2199	Detects biased Humidity Temperature Sensor (IAT #1) or MAF Intake Air Temperature Sensor (IAT #2) 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
			|(a) - (b)| (see Look-Up-Table #2)	>	100 to 999	°C	and					
			where				ambient air temperature	>	-60.04	°C		
			(a) captured intake air temperature at start	=	measured parameter	-	and					
			and				Engine Running (see parameter definition)	=	TRUE	-		
			(b) captured humidity temperature at start	=	measured parameter	-	for					
							time	>	0.00	sec		
			or				and					
			Path 2:				engine post drive/ afterun	=	FALSE	-		
			(				and					
			|(a) - (b)| (see Look-Up-Table #2)	<=	100 to 999	°C	diagnostic performed in current dc	=	FALSE	-		
			where				and					
			(a) captured intake air temperature at start	=	measured parameter	-	basic enable conditions met:	=	see sheet enable tables	-		
			and				and					
			(b) captured humidity temperature at start	=	measured parameter	-	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			and									
			|(a) - (b)| (see Look-Up-Table #5)	>	20 to 999	°C						
			where									
			(a) captured intake air temperature at start	=	measured parameter	-						
			and									
			(b) captured humidity temperature at start	=	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.
			status of block heater (see parameter definition)	=	FALSE	-						
			or									
			status of sun-load detection (see parameter definition)	=	FALSE	-						
			)									
			)									
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 with 1 s rate whenever enable conditions are met	A
			(tank level sensor 2 voltage directly measured after a test impulse was applied)	<	(0.17)	V	battery voltage	>	8	V		
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Level Sensor 2 Circuit High	P21AB	**Path 1:**										
		CAN message: Discrete level sensor 2 open load error	Reductant Tank Level 2 Error Status	=	3	-	ignition on	=	TRUE	-		
			(measured tank level sensor 2 voltage after 1.5 ms since a test impulse was applied)	>	(3.56)	V	battery voltage	>	8	V		
			(measured tank level sensor 2 voltage after 1.5 ms since a test impulse was applied)	<	(4.74)	V	basic enable conditions met:	=	see sheet enable tables	-		
		Path 2: CAN message: Discrete level sensor 2 short to battery error	Reductant Tank Level 2 Error Status	=	2	-	ignition on	=	TRUE	-		
			(measured tank level sensor 2 voltage after 1.5 ms since a test impulse was applied)	>	(4.74)	V	battery voltage	>	8	V		
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant Level Sensor 3 Circuit Low	P21AF	CAN message: Discrete level sensor level 3 short to ground error	Reductant Tank Level 3 Error Status	=	1	-	ignition on	=	TRUE	-	fail conditions exists for more than 3 sec monitor runs with 1 s rate whenever enable conditions are met	A
			(tank level sensor 3 voltage directly measured after a test impulse was applied)	<	(0.17)	V	battery voltage	>	8	V		
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Reductant Level Sensor 3 Circuit High	P21B0	**Path 1:**										
		CAN message: Discrete level sensor 3 open load error	Reductant Tank Level 3 Error Status	=	3	-	ignition on	=	TRUE	-		
			(measured tank level sensor 3 voltage after 1.5 ms since a test impulse was applied)	>	(3.56)	V	battery voltage	>	8	V		
			(measured tank level sensor 3 voltage after 1.5 ms since a test impulse was applied)	<	(4.74)	V	basic enable conditions met:	=	see sheet enable tables	-		
		Path 2:										
		CAN message: Discrete level sensor 3 short to battery error	Reductant Tank Level 3 Error Status	=	2	-	ignition on	=	TRUE	-		
			(measured tank level sensor 3 voltage after 1.5 ms since a test impulse was applied)	>	(4.74)	V	battery voltage	>	8	V		
							basic enable conditions met:	=	see sheet enable tables	-		
Reductant tank heater open circuit	P21DD	Compare the maximum measured conductance of a tank heater against the threshold	maximum conductance of tank heater	<=	(a) * (b)	1/Ohm	ignition switch on	=	TRUE	-	fail conditions exists for 0.001 s monitor runs once per trip with 0.001 s rate whenever enable conditions are met	B
				with			urea tank heater powerstage on	=	TRUE	-		
			(a) lower threshold	=	0.28	1/Ohm	battery voltage	>=	11.00	V		
			(b) factor for tolerances	=	1.00	factor	battery voltage	<=	655.40	V		
							engine off time	>=	5400.00	sec		
							urea tank temperature	<=	41.96	°C		
							(					
							conductance of the urea tank heater is steady or falling	=	TRUE	-		
							maximum counter	>	1000.00	count		
							or					
							heater activation time	>=	600.00	sec		
							)					
							basic enable conditions met:	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
NOx Sensor Circuit Bank 1 Sensor 1	P2200	Detects a failure when open circuit status message from NOx sensor is received continuously for a time period	Open circuit NOx signal error	=	TRUE	-	following conditions for time	>	0.50	sec	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever enable conditions are met	A
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR upstream temperature	>=	94.96	°C		
							SCR upstream temperature	<=	3003.56	°C		
							Engine Running	=	TRUE	-		
							for time	>=	20.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Can Bus Initialized (CAN Bus is Active)	= TRUE -		
					consisting of:			
					ignition on	= TRUE -		
					for time	>= 3 sec		
					battery voltage	> 9.8 V		
					battery voltage	< 655.34 V		
					Upstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					no pending or confirmed faults	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		
		Detects a failure when open circuit status message from binary lambda signal from the NOx sensor is received continuously for a time period	Open circuit binary lambda signal error	= TRUE -	following conditions for time	> 0.50 sec	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever enable conditions are met	
					battery voltage	>= 11.00 V		
					battery voltage	<= 655.34 V		
					SCR upstream temperature	>= 94.96 °C		
					SCR upstream temperature	<= 3003.56 °C		
					Engine Running	= TRUE -		
					for time	>= 20.00 sec		
					Can Bus Initialized (CAN Bus is Active)	= TRUE -		
					consisting of:			
					ignition on	= TRUE -		
					for time	>= 3 sec		
					battery voltage	> 9.8 V		
					battery voltage	< 655.34 V		
					Upstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					no pending or confirmed faults	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		
		Detects a failure when open circuit status message from linear lambda signal from the NOx sensor is received continuously for a time period	Open circuit linear lambda signal error	= TRUE -	following conditions for time	> 0.50 sec	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever enable conditions are met	
					battery voltage	>= 11.00 V		
					battery voltage	<= 655.34 V		
					SCR upstream temperature	>= 94.96 °C		
					SCR upstream temperature	<= 3003.56 °C		
					Engine Running	= TRUE -		
					for time	>= 20.00 sec		
					Can Bus Initialized (CAN Bus is Active)	= TRUE -		
					consisting of:			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					ignition on	= TRUE -		
					for time	>= 3 sec		
					battery voltage	> 9.8 V		
					battery voltage	< 655.34 V		
					Upstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					no pending or confirmed faults	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		
		Detects a failure when short circuit status message from NOx sensor is received continuously for a time period	Short Circuit NOx signal error	= TRUE -	following conditions for time	> 0.50 sec	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever enable conditions are met	
					battery voltage	>= 11.00 V		
					battery voltage	<= 655.34 V		
					SCR upstream temperature	>= 94.96 °C		
					SCR upstream temperature	<= 3003.56 °C		
					Engine Running	= TRUE -		
					for time	>= 20.00 sec		
					Can Bus Initialized (CAN Bus is Active)	= TRUE -		
					consisting of:			
					ignition on	= TRUE -		
					for time	>= 3 sec		
					battery voltage	> 9.8 V		
					battery voltage	< 655.34 V		
					Upstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					no pending or confirmed faults	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		
		Detects a failure when short circuit status message from binary lambda signal form the NOx sensor is received continuously for a time period	Short Circuit binary lambda signal error	= TRUE -	following conditions for time	> 0.50 sec	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever enable conditions are met	
					battery voltage	>= 11.00 V		
					battery voltage	<= 655.34 V		
					SCR upstream temperature	>= 94.96 °C		
					SCR upstream temperature	<= 3003.56 °C		
					Engine Running	= TRUE -		
					for time	>= 20.00 sec		
					Can Bus Initialized (CAN Bus is Active)	= TRUE -		
					consisting of:			
					ignition on	= TRUE -		
					for time	>= 3 sec		
					battery voltage	> 9.8 V		

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		
					Upstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					no pending or confirmed faults	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		
		Detects a failure when short circuit status message from linear lambda signal from the NOx sensor is received continuously for a time period	Short Circuit linear lambda signal error	= TRUE -	following conditions for time	> 0.50 sec	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever enable conditions are met	
					battery voltage	>= 11.00 V		
					battery voltage	<= 655.34 V		
					SCR upstream temperature	>= 94.96 °C		
					SCR upstream temperature	<= 3003.56 °C		
					Engine Running	= TRUE -		
					for time	>= 20.00 sec		
					Can Bus Initialized (CAN Bus is Active)	= TRUE -		
					consisting of:			
					ignition on	= TRUE -		
					for time	>= 3 sec		
					battery voltage	> 9.8 V		
					battery voltage	< 655.34 V		
					Upstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					no pending or confirmed faults	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		
N0x Sensor Circuit High Bank 1 Sensor 1	P2203	Detects an out of range high fault of the upstream NOx Sensor	NOx sensor signal (raw information received via CAN from NOx sensor)	> 2500.00 ppm	NOx sensor 1 ready status (see parameter definition)	= TRUE -	fault exists for more than 10 sec; monitor runs at 0.1 s when enable conditions are met	B
					Valid NOx signal from CAN is received (no NOx sensor communication failures)	= TRUE -		
					Engine Running (see parameter definition)	= TRUE -		
					for time	> 20.00 sec		
N0x Sensor Circuit Low Bank 1 Sensor 1	P2202	Detects an out of range low fault of the upstream NOx Sensor	NOx sensor signal (raw information received via CAN from NOx sensor)	< -90.00 ppm	and			
					Injection Quantity	> 8.00 mm^3/rev		
					or			
					Upstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					for time	> 600.00 sec		

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	> 0.50 sec	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever enable conditions are met	A
					battery voltage	>= 11.00 V		
					battery voltage	<= 655.34 V		
					SCR upstream temperature	>= 94.96 °C		
					SCR upstream temperature	<= 3003.56 °C		
					Engine Running	= TRUE -		
					for time	>= 20.00 sec		
					Can Bus Initialized (CAN Bus is Active)	= TRUE -		
					consisting of:			
					ignition on	= TRUE -		
					for time	>= 3 sec		
					battery voltage	> 9.8 V		
					battery voltage	< 655.34 V		
					Upstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					no pending or confirmed faults	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		
		Detects a failure when short circuit status message from NOx sensor heater is received continuously for a time period	Short Circuit NOx heater signal error	= TRUE -	following conditions for time	> 0.50 sec	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever enable conditions are met	
					battery voltage	>= 11.00 V		
					battery voltage	<= 655.34 V		
					SCR upstream temperature	>= 94.96 °C		
					SCR upstream temperature	<= 3003.56 °C		
					Engine Running	= TRUE -		
					for time	>= 20.00 sec		
					Can Bus Initialized (CAN Bus is Active)	= TRUE -		
					consisting of:			
					ignition on	= TRUE -		
					for time	>= 3 sec		
					battery voltage	> 9.8 V		
					battery voltage	< 655.34 V		
					Upstream NOx sensor dewpoint achieved (please see the definition)	= TRUE -		
					no pending or confirmed faults	= see sheet inhibit tables -		
					basic enable conditions met:	= see sheet enable tables -		

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 1	P2209	Monitoring of the upstream NOx sensor signal readiness	Upstream NOx sensor heater temperature has reached set point	=	FALSE	-	(				fault exists for more than 1 event when dewpoint end is reached; monitor runs at 0.02 s when enable conditions are met	B
							battery voltage	>=	11.00	V		
							and					
							battery voltage	<=	655.34	V		
							and					
							Oxidation Catalyst upstream temperature	>=	94.96	°C		
							and					
							Oxidation Catalyst upstream temperature	<=	3003.56	°C		
							and					
							Engine running	=	TRUE	-		
							for time	>	20.00	sec		
							and					
							Upstream NOx sensor dewpoint end is reached (please see parameter definition)	=	TRUE	-		
							)					
							for time	>	150.5	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							No Pending or Confirmed DTC	=	see sheet inhibit tables	-		
Reductant pressure line heater open circuit	P221C	Compare the measured conductance of a pressure line heater against the threshold	conductance of pressure line heater	>=	(a) * (b)	1/Ohm	ignition switch on	=	TRUE	-	fail conditions exists for 5 s monitor runs with 3 s rate whenever enable conditions are met	B
				with			and					
			(a) upper threshold	=	0.26	1/Ohm	urea pressure line heater powerstage on	=	TRUE	-		
			(b) factor for tolerances	=	1.00	factor	battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							engine off time	>=	0.00	sec		
							heater activation time	>=	81.00	sec		
							basic enable conditions met:	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant pressure line heater short circuit	P221D	Compare the measured conductance of a pressure line heater against the threshold	conductance of pressure line heater	<=	(a) * (b)	1/Ohm	ignition switch on	=	TRUE	-	fail conditions exists for 5 s monitor runs with 3 s rate whenever enable conditions are met	B
				with			and					
			(a) lower threshold	=	0.05	1/Ohm	urea pressure line heater powerstage on	=	TRUE	-		
			(b) factor for tolerances	=	1.00	factor	battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							engine off time	>=	0.00	sec		
							heater activation time	>=	81.00	sec		
							basic enable conditions met:	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Urea supply module heater open circuit	P221E	Detects a supply module heater open circuit by detecting low conductance in the heater	a <= b	=	TRUE	-	ignition switch on	=	TRUE	-	fail conditions exists for 0.1 s monitor runs once per trip with 0.1 s rate whenever enable conditions are met	B
			with				and					
			(a) maximum conductance of the supply module heater	=	calculated parameter	1/Ohm	supply module heater powerstage on	=	TRUE	-		
			and with				and					
			(b) minimum tolerance threshold of the conductance for the supply module heater	=	0.14	1/Ohm	battery voltage	>=	11.00	V		
							and					
							battery voltage	<=	655.34	V		
							and					
							engine off time	>=	7600.00	sec		
							and					
							and					
							(					
							conductance of the urea tank heater is steady or falling					
							for					
							time	>	100.00	sec		
							or					
							heater activation time	>=	10.00	sec		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Urea supply module heater short circuit	P221F	Detects a supply module heater short circuit by detecting high conductance in the heater	a >= b	=	TRUE	-	ignition switch on	=	TRUE	-	fail conditions exists for 0.1 s monitor runs once per trip with 0.1 s rate whenever enable conditions are met	B
			with				and					
			(a) maximum conductance of the supply module heater	=	calculated parameter	1/Ohm	supply module heater powerstage on	=	TRUE	-		
			and with				and					
			(b) maximum tolerance threshold of the conductance for the supply module heater	=	0.35	1/Ohm	battery voltage	>=	11.00	V		
							and					
							battery voltage	<=	655.34	V		
							and					
							engine off time	>=	7600.00	sec		
							and					
							and					
							(					
							conductance of the urea tank heater is steady or falling					
							for					
							time	>	100.00	sec		
							or					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							heater activation time	>=	10.00	sec		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Barometric Pressure Sensor "A" Circuit Low	P2228	Detects low voltage readings on the ECM internal BARO circuit, indicating an OOR low condition on the BARO circuit.	voltage of barometric pressure sensor	<=	1.97	V	ignition on	=	TRUE	-	fail conditions exists for 0.8 s monitor runs 0.1 s rate whenever enable conditions are met	A
			same as				and					
			ambient pressure	<=	50.00	kPa	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Barometric Pressure Sensor "A" Circuit High	P2229	Detects high voltage readings on the ECM internal BARO circuit, indicating an OOR high condition on the BARO circuit.	voltage of barometric pressure sensor	>	4.54	V	ignition on	=	TRUE	-	fail conditions exists for 0.8 s monitor runs 0.1 s rate whenever enable conditions are met	A
			same as				and					
			ambient pressure	>=	115.00	kPa	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Turbo Boost System Performance	P2263	Detects if the Turbocharger is severely over or under boosting based on control deviation	**Path 1**				(				fail conditions exists for 15 s monitor runs with 0.01 s rate whenever enable conditions are met	A
			control deviation of the boost pressure calculated out of difference between desired and actual value with	>	(g*h)		VNT turbocharger offset adaptation active	=	FALSE	-		
							- in order to compensate sensor drift and valve aging, the valve is closed and opened fully once in a driving cycle during engine idling, the read positions for opening and closing are averaged and used for the calculation of offset drift of the valve					
			(g) the upper limit (see Look-Up-Table #64)	=	42.5 to 45.0	kPa	and					
			(h) correction factor (see Look-Up-Table #59)	=	0.900024 to 1	factor	VNT turbocharger wiping is active	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					- in order to prevent soot accumulation e.g. in a long idle operation under cold engine condition on the turbine the desired value of the boost pressure actuator position governor is assigned from the set-point value			
					and			
					injection quantity is stable	= TRUE -		
					means			
					increase of injection quantity	< 80.00 (mm^3/rev)/sec		
					and			
					engine speed is stable	= TRUE -		
					means			
					increase of engine speed	< 100.00 rpm/sec		
					and			
					injection Quantity	>= 80.00 mm^3/rev		
					injection Quantity	<= 480.00 mm^3/rev		
					and			
					engine Speed	>= 1200.00 rpm		
					engine Speed	<= 3400.00 rpm		
					and			
					working range of boost pressure is in closed-loop	= TRUE -		
					means			
					(			
					engine speed	> 1200.00 rpm		
					and			
					injection quantity	> 20.00 mm^3/rev		
					)			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables		
					for time	> 2.00 sec		
					and			
					basic enable conditions met:	= see sheet enable tables		
			Path 2		(		fail conditions exists for 15 s monitor runs with 0.01 s rate whenever enable conditions are met	
			control deviation of the boost pressure calculated out of difference between desired and actual value with	< (i*j) -	VNT turbocharger offset adaptation active	= FALSE -		
					- in order to compensate sensor drift and valve aging, the valve is closed and opened fully once in a driving cycle during engine idling, the read positions for opening and closing are averaged and used for the calculation of offset drift of the valve			
			(i) the upper limit (see Look-Up-Table #63)	= -80 to -40 kPa	and			
			(j) correction factor	= 1.00 factor	VNT turbocharger wiping is active	= FALSE -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					- in order to prevent soot accumulation e.g. in a long idle operation under cold engine condition on the turbine the desired value of the boost pressure actuator position governor is assigned from the set-point value			
					and			
					injection quantity is stable	= TRUE -		
					means			
					increase of injection quantity	< 80.00 (mm^3/rev)/sec		
					and			
					engine speed is stable	= TRUE -		
					means			
					increase of engine speed	< 100.00 rpm/sec		
					and			
					injection Quantity	>= 80.00 mm^3/rev		
					injection Quantity	<= 480.00 mm^3/rev		
					and			
					engine Speed	>= 1200.00 rpm		
					engine Speed	<= 3400.00 rpm		
					and			
					working range of boost pressure is in closed-loop	= TRUE -		
					means			
					(			
					engine speed	> 1200.00 rpm		
					and			
					injection quantity	> 20.00 mm^3/rev		
					)			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
					for time	> 2.00 sec		
					and			
					Basic enable conditions met:	= see sheet enable tables -		
Fuel Pressure Regulator 2 Control Circuit	P2294	Diagnoses the Fuel Pressure Regulator 2 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	= Open Circuit: ≥ 200 K Ω impedance between ECU pin and load signal and controller ground -	battery voltage	> 11.00 V	fail conditions exists for 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	A
					for time	> 3.00 sec		
					and			
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
					and			
					ignition on	= TRUE -		
					and			
					basic enable conditions met:	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Diagnoses the Fuel Pressure Regulator 2 low side driver circuit for driver over temperature faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match and the IC maximum temperature has been exceeded IC Tempeature	> 150.00 °C	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 1 s monitor runs with 0.01 s rate whenever enable conditions are met	
Fuel Pressure Regulator 2 Control Circuit Low Voltage	P2295	Diagnoses the Fuel Pressure Regulator 2 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	battery voltage 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 0.75 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Fuel Pressure Regulator 2 Control Circuit High Voltage	P2296	Diagnoses the Fuel Pressure Regulator 2 low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: ≤ 0.5 Ω impedance between signal and controller power -	battery voltage for time and NO Pending or Confirmed DTCs: and	> 11.00 V > 3.00 sec = see sheet inhibit tables -	fail conditions exists for 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							ignition on	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
NOx Sensor Circuit Bank 1 Sensor 2	P229E	Detects a failure when open circuit status message from downstream NOx sensor is received continuously for a time period	Open circuit downstream NOx signal error	=	TRUE	-	following conditions for time	>	0.50	sec	fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	A
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR downstream temperature	>=	94.96	°C		
							SCR downstream temperature	<=	3003.56	°C		
							Engine Running	=	TRUE	-		
							for time	>=	20.00	sec		
							Can Bus Initialized (CAN Bus is Active)	=	TRUE	-		
							consisting of:					
							ignition on	=	TRUE	-		
							for time	>=	3	sec		
							battery voltage	>	9.8	V		
							battery voltage	<	655.34	V		
							Downstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							no pending or confirmed faults	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
		Open circuit error of the binary lambda signal of Downstream NOx sensor via the CAN message	Open circuit lambda binary error of downstream NOx sensor via CAN message	=	TRUE	-	following conditions for time	>	0.50	sec	fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR downstream temperature	>=	94.96	°C		
							SCR downstream temperature	<=	3003.56	°C		
							Engine Running	=	TRUE	-		
							for time	>=	20.00	sec		
							Can Bus Initialized (CAN Bus is Active)	=	TRUE	-		
							consisting of:					
							ignition on	=	TRUE	-		
							for time	>=	3	sec		
							battery voltage	>	9.8	V		
							battery voltage	<	655.34	V		
							Downstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							no pending or confirmed faults	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Open circuit error of linear lambda signal of Downstream NOx sensor via the CAN message	Open circuit lambda linear error of downstream NOx sensor via CAN message	=	TRUE	-	following conditions for time	>	0.50	sec	fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR downstream temperature	>=	94.96	°C		
							SCR downstream temperature	<=	3003.56	°C		
							Engine Running	=	TRUE	-		
							for time	>=	20.00	sec		
							Can Bus Initialized (CAN Bus is Active)	=	TRUE	-		
							consisting of:					
							ignition on	=	TRUE	-		
							for time	>=	3	sec		
							battery voltage	>	9.8	V		
							battery voltage	<	655.34	V		
							Downstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							no pending or confirmed faults	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
		Downstream NOx sensor short circuit error via the CAN message	Short circuit NOx signal error of downstream NOx sensor via CAN message	=	TRUE	-	following conditions for time	>	0.50	sec	fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR downstream temperature	>=	94.96	°C		
							SCR downstream temperature	<=	3003.56	°C		
							Engine Running	=	TRUE	-		
							for time	>=	20.00	sec		
							Can Bus Initialized (CAN Bus is Active)	=	TRUE	-		
							consisting of:					
							ignition on	=	TRUE	-		
							for time	>=	3	sec		
							battery voltage	>	9.8	V		
							battery voltage	<	655.34	V		
							Downstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							no pending or confirmed faults	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
		Short circuit error of binary lambda signal of Downstream NOx sensor via the CAN message	Short circuit lambda binary error of downstream NOx sensor via CAN message	=	TRUE	-	following conditions for time	>	0.50	sec	fail conditions exists for more than 13 s monitor runs with 0.1 s	
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR downstream temperature	>=	94.96	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							SCR downstream temperature	<=	3003.56	°C	rate whenever enable conditions are met	
							Engine Running	=	TRUE	-		
							for time	>=	20.00	sec		
							Can Bus Initialized (CAN Bus is Active)	=	TRUE	-		
							consisting of:					
							ignition on	=	TRUE	-		
							for time	>=	3	sec		
							battery voltage	>	9.8	V		
							battery voltage	<	655.34	V		
							Downstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							no pending or confirmed faults	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
		Short circuit error of linear lambda signal of Downstream NOx sensor via the CAN message	Short circuit lambda linear error of downstream NOx sensor via CAN message	=	TRUE	-	following conditions for time	>	0.50	sec	fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	
							battery voltage	>=	11.00	V		
							battery voltage	<=	655.34	V		
							SCR downstream temperature	>=	94.96	°C		
							SCR downstream temperature	<=	3003.56	°C		
							Engine Running	=	TRUE	-		
							for time	>=	20.00	sec		
							Can Bus Initialized (CAN Bus is Active)	=	TRUE	-		
							consisting of:					
							ignition on	=	TRUE	-		
							for time	>=	3	sec		
							battery voltage	>	9.8	V		
							battery voltage	<	655.34	V		
							Downstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
							no pending or confirmed faults	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
NOx Sensor Circuit High Bank 1 Sensor 2	P22A1	Detects an out of range high fault of the downstream NOx Sensor	Downstream NOx sensor signal (raw information received via CAN from NOx sensor)	>	2500.00	ppm	Downstream NOx sensor ready status (see parameter definition)	=	TRUE	-	fault exists for more than 10 sec; monitor runs at 0.1 s when enable conditions are met	B
							Valid NOx signal from CAN is received (no NOx sensor communication failures)	=	TRUE	-		
NOx Sensor Circuit Low Bank 1 Sensor 2	P22A0	Detects an out of range low fault of the downstream NOx Sensor	Downstream NOx sensor signal (raw information received via CAN from NOx sensor)	<	-90.00	ppm	Engine Running (see parameter definition)	=	TRUE	-		
							for time	>	20.00	sec		
							and					
							Injection Quantity	>	8.00	mm^3/rev		
							or					
							Downstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for time	> 600.00 sec		
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 battery voltage battery voltage SCR downstream temperature SCR downstream temperature Engine Running for time Can Bus Initialized (CAN Bus is Active) consisting of: ignition on for time battery voltage battery voltage Downstream NOx sensor dewpoint achieved (please see the definition) no pending or confirmed faults basic enable conditions met:	> 0.50 sec >= 11.00 V <= 655.34 V >= 94.96 °C <= 3003.56 °C = TRUE - >= 20.00 sec = TRUE - = TRUE - >= 3 sec > 9.8 V < 655.34 V = TRUE - = see sheet inhibit tables - = see sheet enable tables -	fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	A
		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 battery voltage battery voltage SCR downstream temperature SCR downstream temperature Engine Running for time Can Bus Initialized (CAN Bus is Active) consisting of: ignition on for time battery voltage battery voltage Downstream NOx sensor dewpoint achieved (please see the definition) no pending or confirmed faults basic enable conditions met:	> 0.50 sec >= 11.00 V <= 655.34 V >= 94.96 °C <= 3003.56 °C = TRUE - >= 20.00 sec = TRUE - = TRUE - >= 3 sec > 9.8 V < 655.34 V = TRUE - = see sheet inhibit tables - = see sheet enable tables -	fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	
NOx Heater Performance Bank 1 Sensor 2	P22A7	Compare the time difference between the time ECU requested to enable sensor and the time sensor responding for the request against the threshold	the time difference between the time ECU requested to enable sensor and the time sensor responding for the request	> 150.00 sec	(		fault exists for more than 1 event when dewpoint end is reached;	B

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	monitor runs at 0.02 s when enable conditions are met	
							and					
							battery voltage	<=	655.34	V		
							and					
							SCR downstream temperature	>=	94.96	°C		
							and					
							SCR downstream temperature	<=	3003.56	°C		
							and					
							Engine running	=	TRUE	-		
							for time	>	20.00	sec		
							and					
							Downstream NOx Sensor Dewpoint end is reached (please see the parameter definition)	=	TRUE	-		
							)					
							for time	>	0.50	sec		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							No Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
N0x Sensor Performance Bank 1 Sensor 1	P22FA	Compare the measured NOx signal response time with the threshold when injection quantity changes from fueling to overrun	measured upstream NOx response time from 70% of the initial NOx value to 40% of the initial NOx value	>	2.30	sec	**global enable conditions:**				fail conditions exist for 1 event, test is performed in the 0.01 ms rate when enable conditions are met	B
			Or				upstream NOx readiness	=	TRUE	-		
			measured upstream NOx response time from the initial NOx value to 40% of the initial value.	>	5.00	sec	Engine operation mode ≠ DPF Regeneration	=	TRUE	-		
							no post injection	=	TRUE	-		
							No Pending or Confirmed DTC	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
							state machine: inactive the following conditions moves the state machine from inactive state to steady-state operating point state:					
							(					
							engine speed	>=	1200.00	rpm		
							injection quantity for combustion	>=	120.00	mm^3/rev		
							upstream NOx concentration	>=	100.00	ppm		
							)					
							state-machine: Check-Operating point the following conditions moves the state machine from steady-state operating point state to wait-for-overrun:					
							(					
							engine speed	>=	1200.00	rpm		
							upstream NOx concentration	>=	100.00	ppm		
							injection quantity for combustion	<=	(a) + (b)	mm^3/rev		
							injection quantity for combustion	>=	(a) - (b)	mm^3/rev		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							with			mm^3/rev		
							(a) Reference injection quantity picked in Check-operating point state	=	measured parameter	mm^3/rev		
							(b) Maximum deviation of injection quantity	=	40.00	mm^3/rev		
							for time	>=	2.00	sec		
							)					
							state-machine: Wait-for-Overrun the following conditions moves the state machine from wait-for-overrun to evaluate-edge state:					
							(					
							injection quantity for combustion	<	(a) - (b)	mm^3/rev		
							with					
							(a) Reference injection quantity picked in Check-operating point state	=	measured parameter	mm^3/rev		
							(b) Maximum deviation of injection quantity	=	40.00	mm^3/rev		
							)					
							state-machine: evaluate-edge the following conditions moves the state machine from evaluate-edge state to overrun state:					
							(					
							injection quantity for combustion	<	2.00	mm^3/rev		
							time since the last state	<	1.05	sec		
							)					
Downstream NOx sensor Self diagnostic Bank 1 Sensor 2	P22FE	NOx sensor self-diagnosis, which occurs within the NOx sensor and reported to the ECM , which runs in the ECM afterrun, and measures the sensor drift by comparing to a reference point.	average stored NOx sensor self-diagnostic result	>	143.99	%	**Global Release conditions:**				fault exists for more than 3 events; monitor runs at 0.1 s once per trip during the afterrun	B
			Or				time interval between the runs of the diagnostic tests	>	10.00	sec		
			average stored NOx sensor self-diagnostic result	<	62.00	%	status of downstream NOx sensor validity	=	TRUE	-		
							SCR downstream temperature	>=	-7.04	°C		
							SCR downstream temperature	<=	399.96	°C		
							status of current engine operation system ≠ Post Drive	=	TRUE	-		
							Engine operation mode = normal mode	=	TRUE	-		
							engine speed	<=	1500.00	rpm		
							engine speed	>=	0.00	rpm		
							for time		5.00	sec		
							Modeled downstream NOx concentration	<	160.00	ppm		

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		
					Battery voltage	>=	10.00	V		
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					status of heater temperature validity for downstream NOx sensor	=	TRUE	-		
					(					
					engine speed	<	1200.00	rpm		
					virtual pedal angle	<	10.00	%		
					for time	<=	14400.00	sec		
					With					
					(((					
					SCR downstream temperature	<=	129.96	°C		
					for time	>=	40.00	sec		
					)					
					for time	>=	600.00	sec		
					)					
					((					
					vehicle speed	<=	31.08	mph		
					for time	>=	40.00	sec		
					)					
					for time	>=	600.00	sec		
					))					
					(					
					Status: DFP Regeneration active	=	FALSE	-		
					Or					
					Status: DPF Regeneration not completed	=	FALSE	-		
					)					
					Rising edge of the following conditions:	=	TRUE	-		
					(					
					Ignition key on	=	TRUE	-		
					Engine operation status	=	Running	-		
					)					
					with					
					(					
					Status: DPF Regeneration not completed	=	TRUE	-		
					Status: DFP Regeneration active	=	TRUE	-		
					Engine coolant temperature	<=	59.96	°C		
					))					
					(					
					Ignition key on	=	TRUE	-		
					Or					
					status of over run condition	=	TRUE	-		
					for time	<=	12.00	sec		
					status of over run condition	=	FALSE	-		
					for time	>	20.00	sec		
					)					
					(					
					Estimated HC Load in SCR catalyst	<=	2.00	g		
					Or					
					(					
					change of estimated HC Load in SCR catalyst	>=	(a) * (b)	g		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					within time	<	0.20	sec		
					(a) Estimated HC Load limit in SCR catalyst	=	-0.01	g/sec		
					(b) time factor	=	0.20	sec		
					))					
					And					
					(					
					Estimated HC Load in SCR catalyst	>=	32.00	g		
					engine speed	<=	4000.00	rpm		
					engine speed	>=	500.00	rpm		
					SCR downstream temperature	<=	199.96	°C		
					SCR downstream temperature	>=	-40.04	°C		
					((					
					SCR downstream temperature	<=	199.96	°C		
					for time	>=	1.00	sec		
					)					
					for time (see Look-Up-Table #99)	>=	100 to 900	sec		
					)					
					((					
					vehicle speed	<=	44.75	mph		
					for time	>=	1.00	sec		
					)					
					for time (see Look-Up-Table #99)	>=	100 to 900	sec		
					))					
					Additional release conditions:					
					vehicle speed	=	0	mph		
					number of possible test runs in after-run	<	20.00	counts		
					Engine operation status = Post Drive	=	True	-		
					for time	>=	100.00	sec		
					for time in ECM afterrun	>=	30.00	sec		
					for time in ECM afterrun	<=	300.00	sec		
					status of heater temperature validity for downstream NOx sensor	=	True	-		
					number of tests for averaging test result	<=	1.00	count		
					Status of downstream NOx sensor self diagnosis (Bit2)	=	4	decimal		
					for time	>=	1	sec		
					and					
					aggressive driving conditions not encountered	=	TRUE	-		
					which means					
					time at idle	<	10.00	sec		
					where idle is defined as:					
					following conditions for time:	>	30.00	sec		
					vehicle speed	<	0.60	mph		
					engine running	=	TRUE	-		
					vehicle speed deceleration rate (calculated based on vehicle speed)	>	2.00	m/sec^2		
					and					
					vehicle speed deceleration rate (calculated based on vehicle speed)	>	2.00	m/sec^2		
					Afterrun Conditions:					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					Engine operation status = Post Drive	=	True	-		
					vehicle speed	=	0			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							measured downstream NOx concentration	<=	160.00	ppm		
							DPF regeneration active	=	FALSE	-		
							engine speed	>=	0.00	rpm		
							engine speed	<=	1500.00	rpm		
							NOx sensor signal is valid (e.g. No CAN error of NOx CAN messages)	=	TRUE	-		
							maximum duration in afterrun	<=	300.00	sec		
							minimum duration to start self-diagnostic	<=	100.00	sec		
							number of self-diagnostic attempts	<	20.00	count		
							basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas High Temperature	P2428	Detects implausible temperatures in order to protect the engine	Any two of the following four conditions: ((a) and (b)) or ((a) and (c)) or ((a) and (d)) or ((b) and (c)) or ((b) and (d)) or ((c) and (d)) with				basic enable conditions met:	=	see sheet enable tables	-	fail conditions exists for 6 s test performed continuously 0.1 s rate	A
							and					
			(a) oxidation catalyst upstream temperature	>	799.96	°C	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			and with									
			(b) oxidation catalyst downstream temperature	>	799.96	°C						
			and with									
			(c) SCR downstream temperature	>	799.96	°C						
			and with									
			(d) particulate filter downstream temperature	>	799.96	°C						
Exhaust Gas Temperature (EGT) Sensor 3 Circuit Low Voltage	P242C	Detects low voltage condition of the downstream SCR catalyst temperature sensor circuit, indicating an OOR low condition	voltage of SCR downstream catalyst temperature sensor	<	0.65	V	((				fail conditions exists for more than 5.0 sec. monitor runs with 0.1 s rate whenever enable conditions are met	A
			same as				engine speed	<=	6000.00	rpm		
			Downstream SCR Catalyst temperature	<	-50	°C	engine speed	>=	0.00	rpm		
							current injection quantity	<=	800.00	mm^3/rev		
							current injection quantity	>=	0.00	mm^3/rev		
							engine coolant temperature	>	-50.04	°C		
							time since engine start	>	0.00	sec		
							exhaust-gas mass flow downstream of the exhaust manifold	>	0.00	g/sec		
							)					
							or					
							SCR catalyst temperature	>	-45.04	°C		
							)					
							for time	>	0.00	sec		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Gas Temperature (EGT) Sensor 3 Circuit High Voltage	P242D	Detects high voltage condition of the downstream SCR catalyst temperature sensor circuit, indicating an OOR high condition	voltage of SCR downstream catalyst temperature sensor same as Downstream SCR Catalyst temperature	> 2.21 V > 1000 °C	((engine speed engine speed current injection quantity current injection quantity engine coolant temperature time since engine start exhaust-gas mass flow downstream of the exhaust manifold) or SCR catalyst temperature) for time NO Pending or Confirmed DTCs: basic enable conditions met:	 <= 6000.00 rpm >= 0.00 rpm <= 800.00 mm^3/rev >= 0.00 mm^3/rev > -50.04 °C > 0.00 sec > 0.00 g/sec > -45.04 °C > 0.00 sec = see sheet inhibit tables - = see sheet enable tables -	fail conditions exists for more than 5.0 sec. monitor runs with 0.1 s rate whenever enable conditions are met	A
Diesel Particulate Filter Differential Pressure Sensor Performance	P2453	Detects in range faults on the DPF differential pressures sensor.	**Path 1:** change in differential pressure or change in differential pressure	 < -1.00 kPa/s > 1.00 kPa/s	(change in exhaust gas volume flow or change in exhaust gas volume flow) and current exhaust gas volume flow and basic enable conditions met: and NO Pending or Confirmed DTCs:	 > 375.00 m^3/h/s < -375.00 m^3/h/s > 375.00 m^3/h = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 3 s test performed continuously 0.1 s rate	B
			Path 2: differential pressure sensor	 > 3.20 kPa	Engine State for time and basic enable conditions met: and NO Pending or Confirmed DTCs:	= After Run > 35.00 sec = see sheet enable tables - = see sheet inhibit tables -	fail conditions exists for 0.5 s monitor runs with 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.
Diesel Particulate Filter Differential Pressure Sensor Circuit Low Voltage	P2454	Detects low voltage readings on the DPF differential pressure sensor circuit, indicating an OOR low condition on the circuit	voltage of differential pressure sensor	<	0.83	V	ignition on	=	TRUE	-	fail conditions exists for 3 s test performed continuously 0.020 s rate	B
			same as differential pressure	<	-4.20	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	>	4.67	V	ignition on	=	TRUE	-	fail conditions exists for 3 s test performed continuously 0.020 s rate	
			same as differential pressure	>	91.70	kPa	and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Gas Recirculation (EGR) Cooler Performance	P2457	Performs a check of the EGR cooler performance by monitoring the EGR efficiency and comparing it to a threshold value	EGR cooler efficiency	<	0.65	-	following conditions for time	>=	120.00	sec	fail conditions exists for 120 s monitor runs with 0.1 s rate whenever enable conditions are met	B
							(engine speed	>=	1100.00	rpm		
							and engine speed	<=	2000.00	rpm		
							) and (injection quantity	>=	20.00	mm^3/rev		
							and injection quantity	<=	240.00	mm^3/rev		
							) and (recirculated exhaust-gas mass flow downstream of the EGR cooler	>=	16.68	g/sec		
							and recirculated exhaust-gas mass flow downstream of the EGR cooler	<=	40.28	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.
					EGR controller is active	=	TRUE	-		
					and					
					(					
					(a) - (b)	>=	210.00	°C		
					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					
					and with					
					(b) engine temperature					
					)					
					and					
					engine coolant temperature	>=	69.96	°C		
					and					
					engine coolant temperature	<=	129.96	°C		
					and					
					(					
					actual valve position of exhaust-gas recirculation	>=	9.9976	%		
					and					
					actual valve position of exhaust-gas recirculation	<=	399.99	%		
					)					
					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	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Diesel Particulate Filter 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 (a) engine out soot mass flow in the exhaust-gas (function of vehicle speed only)	=	measured parameter	-	and last particulate filter regeneration successful	=	TRUE	-		
			and with (b) soot mass at the end of previous DPF regeneration	=	calculated parameter	-	or particulate filter regeneration must have been completed	=	TRUE	-		
			and with (c) factor for calculation of a soot mass value offset depending on the simulated maximal base soot mass (see Look-Up-Table #1)	=	0 to 121.8	g	and basic enable conditions met:	=	see sheet enable tables	-		
			and with (d) factor for determination of correction factor for ash in the particulate filter	=	1.00	factor	and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit	P245A	Diagnoses the EGR Cooler Bypass 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 7s (in engine postdrive/ afterun duration limited to 5s) monitor runs with 0.01s rate whenever enable conditions are met	B
		The faults of the output circuit, that are detected with this diagnosis, are an open circuit or an overtemperature of the integrated circuit within the ECM.					for time	>	3.00	sec		
							and starter is active cranking	=	FALSE	-		
							for time	>	3.00	sec		
							and EGR Cooling Bypass Solenoid Control Circuit	=	ACTIVE	-		
							for time	>	3.00	sec		
							and (open load diagnostics is triggered after offset learning of valve is completed or NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		

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 -		
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage for time and starter is active cranking for time and EGR Cooling Bypass Solenoid Control Circuit and (NO Pending or Confirmed DTCs) and basic enable conditions met:	> 11.00 V > 3.00 sec = FALSE - > 3.00 sec = ACTIVE - = see sheet inhibit tables - = see sheet enable tables -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	
Exhaust Gas Recirculation (EGR) Motor Control Circuit 1 Low Voltage	P245C	Diagnoses the EGR Cooler Bypass low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	battery voltage for time and starter is active cranking for time and EGR Cooling Bypass Solenoid Control Circuit and (NO Pending or Confirmed DTCs) and basic enable conditions met:	> 11.00 V > 3.00 sec = FALSE - > 3.00 sec = ACTIVE - = see sheet inhibit tables - = see sheet enable tables -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Gas Recirculation (EGR) Motor Control Circuit 1 High Voltage	P245D	Diagnoses the EGR Cooler Bypass low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	battery voltage	>	11.00	V	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	B
							for time	>	3.00	sec		
							and starter is active cranking	=	FALSE	-		
							for time	>	3.00	sec		
							and EGR Cooling Bypass Solenoid Control Circuit	=	ACTIVE	-		
							and (NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
							) and basic enable conditions met:	=	see sheet enable tables	-		
Diesel Particulate Filter - Soot Accumulation	P2463	Detects high levels of soot in the DPF as indicated by the soot model.	soot mass in the particulate filter	>	69.60	g	ignition on	=	TRUE	-	fail conditions exists for 30 s test performed continuously 0.1 s rate	A
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Gas Temperature (EGT) Sensor 4 Sensor Circuit Low Voltage	P2470	Detects low voltage readings on the EGT 4 circuit, indicating an OOR low condition on the EGT 4	particulate filter downstream temperature sensor voltage	<	0.65	V	ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs 0.05 s rate whenever enable conditions are met	B
			same as particulate filter downstream temperature	<	-60	°C	and basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Exhaust Gas Temperature (EGT) Sensor 4 Circuit High Voltage	P2471	Detects high voltage readings on the EGT 4 circuit, indicating an OOR high condition on the EGT 4	particulate filter downstream temperature sensor voltage	>	2.21	V	ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs 0.05 s rate whenever enable conditions are met	B
			same as particulate filter downstream temperature	>	999.6	°C	and basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Current Performance	P2493	Detects a controller deviation in EGR cooling bypass valve. Actual deviation readings are compared to a threshold.	controller deviation of EGR cooling bypass valve actuator calculated out of difference between desired and actual value	>	10.00	%	engine coolant temperature	>	-7.04	°C	fail conditions exists for 8 s monitor runs with 0.02 s rate whenever enable conditions are met	B
			or controller deviation of EGR cooling bypass valve actuator calculated out of difference between desired and actual value	<	-10.00	%	and offset learning of EGR cooling bypass valve actuator active	=	FALSE	-		
							and offset learning in the previous driving cycle was complete	=	TRUE	-		
							and engine speed	>	100.00	rpm		
							and EGR Cooler Bypass Valve Actuator	=	ACTIVE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
EGR Cooling Bypass Position Sensor Circuit Low Voltage	P2494	Detects low voltage readings on the EGR cooling bypass position circuit, indicating an OOR low condition on the EGR cooling bypass position circuit	raw voltage of EGR cooling bypass actuator position sensor	<	0.25	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.01 s rate when enable conditions are met	A
			same as EGR cooling bypass actuator position	<	-22.5	%	and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
EGR Cooling Bypass Position Sensor Circuit High Voltage	P2495	Detects high voltage readings on the EGR cooling bypass position circuit, indicating an OOR high condition on the EGR cooling bypass position circuit	raw voltage of EGR cooling bypass actuator position sensor	>	4.80	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.01 s rate when enable conditions are met	A
			same as EGR cooling bypass actuator position	>	114	%	and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Closed loop Reductant Injection Control at Limit-Flow too high	P249D	Detects an out of range high of the long term Reductant quantity adaption factor	long term adaptation factor of Reductant quantity	>	1.40	factor	long term adaption triggered	=	TRUE	-	fault exists for more than 0.1 s; monitor runs at 0.1 s whenever enable conditions are met	B
							NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		

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	<	0.41	factor	long term adaption triggered	=	TRUE	-	fail conditions exists for more than 5 sec. monitor runs with 0.01 s rate whenever enable conditions are met	B
							NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
Closed Loop Particulate Filter Regeneration Control At Limit - Temperature Too Low	P24A0	Detects insufficient HCI temperature. Temperature readings are compared to desired temperature values as an indication of an insufficient exhaust gas temperature.	commanded control value of the HCI temperature controller	>=	0.00	-	current engine operating point is suitable for monitoring deviation of exhaust gas temperature control - depending on engine speed and injection quantity (see Look-Up-Table #25)	=	0 to 1	-	fail conditions exists for 300 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			and				for					
			deviation from the temperature set point for HCI control loop	>	maximum of (a) and (b+c)		time	>	30.00	sec		
			with				and					
			(a) temperature threshold value	=	100.00	°C	(					
			and with				exhaust gas temperature control is active	=	TRUE	-		
			(b) temperature value for threshold of monitoring	=	0.00	°C	means					
			and with				(					
			(c) basic temperature threshold value for monitoring	=	100.00	°C	temperature upstream of the oxidation catalyst	>	224.96	°C		
							and					
							(					
							particulate filter temperature	>	229.96	°C		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							(					
							particulate filter temperature	<	719.96	°C		
							or					
							particulate filter temperature for activated post injection	<	749.96	°C		
							)					
							)					
							and					
							release status	=	TRUE	-		
							means					
							(					
							vehicle speed	>=	14.92	mph		
							and					
							vehicle speed	<=	124.30	mph		
							and					
							Actual time spent in coastdown mode	<	60.00	sec		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Closed Loop Particulate Filter Regeneration Control At Limit - Temperature Too High	P24A1	Detects excessive HCI temperature. Actual HCI controller ratio and temperature readings are compared to desired HCI controller ratio and temperature values as an indication of an excessive exhaust gas temperature.	commanded control value of the HCI temperature controller	<=	0.99	-	current engine operating point is suitable for monitoring deviation of exhaust gas temperature control - depending on engine speed and injection quantity (see Look-Up-Table #26)	=	0 to 1	-	fail conditions exists for 300 s monitor runs with 0.1 s rate whenever enable conditions are met	B
			and				for					
			deviation from the temperature set point for HCI control loop	<	minimum of (a) and (b+c-(d-e))		time	>	30.00	sec		
			with				and					
			(a)	=	-75.00	°C	(					
			and with									
			(b) temperature value for threshold of monitoring	=	0.00	°C	exhaust gas temperature control is active	=	TRUE	-		
			with				means					
			(c) basic temperature threshold value for monitoring	=	100.00	°C	(					
			and with				temperature upstream of the oxidation catalyst	>	224.96	°C		
			(d) temperature set point for exhaust gas system control loop	=	calculated parameter	-	and					
			and with				(					
			(e) actual temperature for exhaust gas system control loop	=	measured parameter	-	particulate filter temperature	>	229.96	°C		
							and					
							(					
							particulate filter temperature	<	719.96	°C		
							or					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							particulate filter temperature for activated post injection	<	749.96	°C		
							)					
							and					
							release status	=	TRUE	-		
							means					
							(					
							vehicle speed	>=	14.92	mph		
							and					
							vehicle speed	<=	124.30	mph		
							)					
							and					
							Actual time spent in coastdown mode	<	60.00	sec		
							)					
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Particulate Matter Sensor Circuit Low Voltage	P24B0	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	<	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	B
			OR				means					
			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		

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 High Voltage	P24B1	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	-	Battery voltage (ECM)	>=	11.00	V		
			IDE supply voltage	>=	49.72	V						
			OR									
			IDE supply voltage	<=	41.55	V						
			OR									
			Path 2:									
			(									
			IDE supply voltage is on	=	FALSE	-						
			IDE supply voltage	>=	2.00	V						
			)									
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		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
EGR Cooling Bypass Performance	P24C4	Detects adaptation values of EGR cooling bypass valve that are not plausible. Compares the difference between the maximum and minimum adaptation values to a threshold.	**Path 1:**				(				fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	B
			difference between the max and min EGR cooler bypass valve offset values	>	50.00	%	(					
			or									
			Path 2:									
			learned offset value for EGR cooler bypass valve in the present driving cycle	>	16.00	%	active cleaning mode of EGR cooler bypass valve - no movement in EGR cooling bypass valve	=	FALSE	-		
			or				and					
			learned offset value for EGR cooler bypass valve in the present driving cycle	<	-16.00	%	engine post drive/ afterun	=	TRUE	-		
			or				and					
			Path 3:				(					
			mean value for EGR cooling bypass valve offset learned at the open end during the current driving cycle over multiple open-close cycles	>	13.00	%	battery voltage	>=	10.00	V		
			or				and					
			mean value for EGR cooling bypass valve offset learned at the open end during the current driving cycle over multiple open-close cycles	<	-16.00	%	battery voltage	<=	655.34	V		
							)					
							and					
							(					
							engine coolant temperature	>=	5.06	°C		
							and					
							engine coolant temperature	<=	130.06	°C		
							)					
							)					
							or					
							offset learning active	=	TRUE	-		
							or					
							diagnosis tester present	=	FALSE	-		
							)					
							and					
							completion of offset learning	=	TRUE	-		
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
		Detects a jammed EGR cooling bypass valve during opening or closing the valve.	**Path 1:**				EGR cooler bypass valve is opening	=	TRUE	-	fail conditions exists for 5 s monitor runs	

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 valve stuck during opening	=	TRUE	-	or				with 0.01 s rate whenever enable conditions are met	
			which means				EGR cooler bypass valve is closing	=	TRUE	-		
			(				and					
			(a) + (b)	>=	75.01	%	(					
			with				(					
			(a) position of the EGR cooling bypass valve				active cleaning mode of EGR cooler bypass valve - no movement in EGR cooling bypass valve	=	FALSE	-		
			and with				and					
			(b) learned offset value of EGR cooler bypass valve in the previous driving cycle	=	calculated parameter	-	engine post drive/ afterun	=	TRUE	-		
			and				and					
			(a) - (b)	>=	0.99	%	(					
			with				battery voltage	>=	10.00	V		
			(a) position of the EGR cooling bypass valve			-	and					
			and with				battery voltage	<=	655.34	V		
			(b) position of the EGR cooling bypass valve of the previous process cycle	=	calculated parameter	-	)					
			)				and					
			for time	>	5.00	sec	(					
							engine coolant temperature	>=	5.06	°C		
			or				and					
			Path 2:				engine coolant temperature	<=	130.06	°C		
			EGR cooler bypass valve stuck during closing	=	TRUE	-	)					
			which means				)					
			(				or					
			position of the EGR cooling bypass valve	<	(a) * (b)	-	offset learning active	=	TRUE	-		
			with				or					
			(a) reference position of the EGR cooling bypass valve in open position	=	calculated parameter	-	diagnosis tester present	=	FALSE	-		
			and with				)					
			(b) calibrateable factor of the EGR cooling bypass valve close position	=	0.15	factor	and					
			and				completion of offset learning	=	TRUE	-		
			(a) - (b)	<=	0.02	%	and					
			with				basic enable conditions met:	=	see sheet enable tables	-		
			(a) position of the EGR cooling bypass valve				and					
			and with				NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			(b) position of the EGR cooling bypass valve of the previous process cycle	=	calculated parameter	-						
			)									
			for time	>	5.00	sec						

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	P24C6	Range check of meander temperature raw signal: comparison voltage of meander temperature signal with maximum and minimum threshold	Voltage of meander 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 meander temperature signal	<	0.30	V	Battery voltage (ECM)	>=	11.00	V		
			OR				Exhaust gas temperature	>=	-40.04	°C		
			Temperature as measured by meander	>	920.00	°C	and					
							Exhaust gas temperature	<=	799.96	°C		
Particulate Matter Sensor Temperature Circuit Range/performance	P24C7	The PM Sensor temperature sensor is monitored for temperature deviations compared to a modeled exhaust temperature.	difference of the measured PM sensor temperature and the modeled exhaust gas temperature (see Look-Up-Table #102)	>	34.96 to 74.96	°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 #103)	<	-70.04 to -110	°C	Time after the end of sensor regeneration	>	180.00	sec		
							Vehicle velocity	>=	15.53	mph		
							and					
							Vehicle velocity	<=	155.34	mph		
							Barometric pressure	>	75	kPa		
							Engine running (please see the definition)	=	TRUE	-		
							exhaust model temperature at PM sensor	>	49.96	°C		
							and					
							exhaust model temperature at PM sensor	<	249.96	°C		
							(					
							|A - B| (Absolute value of the temperature difference)	<=	29.96	°C		
							for					
							time since stationary modeled temperature in the driving mode is detected	>=	90.00	sec		
							with					
							(a) Model temperature	=	measured parameter	-		
							and with					
							(b) frozen model temperature value at beginning of enable condition release	=	calculated parameter	-		
							)					

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 Supply Voltage Circuit Low	P24D0	PM 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		
			difference of ECM measured voltage and SCU voltage	>	3.00	V	Initialization values have been transferred (i.e. CAN communication with ECM established)	=	TRUE	-		
							Sensor is in the state "ready"	=	TRUE	-		
							means Battery voltage (ECM)	>=	11.00	V		
			or									
			Path 2:									
			Battery voltage (ECM)	<	11.7	V						
			difference of ECM measured voltage and SCU voltage	>	1.90	V						
			or									
			Path 3:									
			Battery voltage (ECM)	>=	11.7	V						
			and									
			Battery voltage (ECM)	<=	15.00	V						
			difference of ECM measured voltage and SCU voltage	>	2.60	V						
		Plausibility check of the PM 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	B
			Battery voltage (ECM)	>	15.00	V	for time	=	3.00	sec		
			difference of ECM measured voltage and SCU voltage	>	3.00	V	Initialization values have been transferred (i.e. CAN communication with ECM established)	=	TRUE	-		
			or				Sensor is in the state "ready"	=	TRUE	-		
							means Battery voltage (ECM)	=	11.00	V		
							Heater duty cycle of PM Sensor	>	23	%		
			Path 2:									
			Battery voltage (ECM)	<	11.7	V						
			difference of ECM measured voltage and SCU voltage	>	1.90	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 3:									
			Battery voltage (ECM)	>=	11.7	V						
			and									
			Battery voltage (ECM)	<=	15.00	V						
			difference of ECM measured voltage and SCU voltage	>	2.60	V						
Particulate Matter Sensor Regeneration Success Monitor	P24D1	PM sensor operational check from "regeneration" phase to "measurement" phase	PM sensor transition state from regeneration phase to protection heating phase has occurred	=	TRUE	-	regeneration phase is active	=	TRUE	-	fault event exists for one time; monitor runs at 0.1 s when enable conditions are met	B
			and				measurement request to particulate matter sensor is active	=	TRUE	-		
			Monitor is released	=	TRUE	-	PM sensor dewpoint achieved	=	TRUE	-		
							the time the particle sensor spent under unacceptable working conditions during the regeneration,	<	10	sec		
							means					
							(					
							exhaust gas acceleration	>	5	m/s^2		
							or					
							ratio between demanded and max available heater power	>	1	-		
							)					
							Battery voltage (ECM)	>	11.00	V		
ECM Power Relay Circuit Performance	P2510	Detection of Main Relay that has opened without a request from ECU	Number of detected occurrences of main relay opening without ECM request (stored in EEPROM)	>	1.00	counts	ignition on	=	TRUE	-	fail conditions exists for 0.02 s monitor runs once per driving cycle during predrive with 0.02 s rate whenever enable	B
							and					
							engine pre drive	=	TRUE	-		
							and					
							Basic enable conditions met:	=	see sheet enable conditions	-		
		Detection of main relay that is stuck and not opened when commanded by ECM	Time after request to open the main relay	>	1.40	sec	ignition on	=	FALSE	-	fail conditions exists for 0.02 s monitor runs once per driving cycle	B
							and					
							engine pre drive	=	FALSE	-		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Basic enable conditions met: and NO Pending or Confirmed DTCs:	= see sheet enable conditions - = see sheet inhibit tables -	during predrive with 0.02 s rate whenever enable	
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 - = 15.00 - = 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 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 same as boost pressure position	> 4.75 V > 93,5 %	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 0.01 s rate	A
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	< 0.15 V < 4.60 %	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 0.01 s rate	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Turbocharger Boost Control Position Sensor "A" Circuit Range/Performance - Stuck Low	P2598	Detects in range Turbo vane position errors by comparing desired vane position to actual vane position	turbo charger control deviation calculated out of difference between desired and actual value	>	15.00	%	engine speed	>=	300.00	rpm	fail conditions exists for 10 s monitor runs with 0.02 s rate whenever enable conditions are met	B
							and adaption not active	=	FALSE	-		
Turbocharger Boost Control Position Sensor "A" Circuit Range/Performance - Stuck High	P2599	Detects in range Turbo vane position errors by comparing desired vane position to actual vane position	turbo charger control deviation calculated out of difference between desired and actual value	<	-15.00	%	and offset learned since last clearing of fault code memory	=	TRUE	-		
							and engine running	=	TRUE	-		
							for time (see Look-Up-Table #92)	>	30 to 327.67	sec		
							and (engine coolant temperature	>=	69.96	°C		
							and engine coolant temperature)	<	129.96	°C		
							and (environmental temperature	>=	-15.04	°C		
							and environmental temperature)	<	199.86	°C		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and no pending or confirmed DTCs	=	see sheet inhibit tables	-		
							and no pending or confirmed DTCs	=	see sheet inhibit tables	-		
Unmetered Fuel - Forced Engine Shutdown	P25BD	Detects engine overspeed in the event that there is an error in the ECM or engine damage has occurred which is resulting in the engine speed increasing beyond desired control limits. Upon failure detection, the engine will be shutdown by closing the diesel intake air valve and disabling the fuel injectors	current engine speed	>	4900.00	rpm	ignition on	=	TRUE	-	fail conditions exists for .01 s test performed continuously	A
							and basic enable conditions met:	=	see sheet enable tables	-		

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 -		
Control Module Power Off Timer Performance	P262B	Detects a failure in the engine off timer if during the after run the internal SW timer and the EOT do not correlate. A failure is detected when the respective timers are started after a calibration time then both are stopped, if the difference between the calculated times exceeds a calibrated threshold a fault is set.	**Path 1:**		time since engine post drive/ afterun	< 20.00 sec	fail conditions exists for 0.01 s monitor runs once per driving cycle with 0.01 s rate whenever enable conditions are met	B
			acquired engine off time	< (100% - ((a) - 7.5%)) -	and			
			or **Path 2:**		engine post drive/ afterun and	= TRUE -		
			acquired engine off time	> (100% + ((a) - 7.5%)) -	basic enable conditions met:	= see sheet enable tables -		
			(where (a) Tolerance threshold for diagnosis of stop counter	= 17.19 %				
		Detects Communication failure with on-board control unit (PCA8565) after the HW reset of PCA8565 was performed	Communication failure with on-board control unit (PCA8565)	= TRUE -	ignition on	= TRUE -	fail conditions exists for1 event monitor runs once per driving cycle with 0.01 s rate whenever enable conditions are met	
					and basic enable conditions met:	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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	
Fuel Transfer Pump Relay Control Circuit	P2632	Electronic out-put driver circuitry determines that the tank transfer pump circuit is open.	Voltage low during driver off state (indicates open circuit)	= Open Circuit:≥ 200 K Ω impedance between ECU pin and load -	ignition on and basic enable conditions met:	= TRUE - = see sheet enable tables -	fail conditions exists for 3 s monitor runs 0.02 s rate whenever enable conditions are met	B
Fuel Transfer Pump Relay Control Circuit Low	P2633	Electronic out-put driver circuitry determines that the tank transfer pump circuit is shorted to ground.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: ≤ 0.5 Ω impedance between signal and controller ground -	ignition on and basic enable conditions met:	= TRUE - = see sheet enable tables -	fail conditions exists for 3 s monitor runs 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.
Fuel Transfer Pump Relay Control Circuit High	P2634	Electronic out-put driver circuitry determines that the tank transfer pump circuit is shorted to battery.	Voltage high during driver on state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs 0.02 s rate whenever enable conditions are met	B
							and					
							basic enable conditions met:	=	see sheet enable tables	-		
Fuel Transfer Pump Performance	P2636	Detects an error in the fuel tank transfer pump performance by comparing the decrease of the fuel level in both tanks.	**Path 1:**				(				fail conditions exists for 327 s monitor runs 0.02 s rate whenever enable conditions are met	B
			change in fuel volume in primary tank	<	0.80	l	Engine Running	=	TRUE	-		
			and				and					
			change in fuel volume in secondary tank	<	0.00	l	fuel transfer pump active	=	TRUE			
			or				means					
			Path 2:				(					
			change in fuel volume in primary tank	<	0.80	l	(					
			and				filtered fuel volume in primary tank	<	1638.30	l		
			change in fuel volume in secondary tank	>=	0.00	l	or					
			or				filtered fuel volume in secondary tank	>	0.00	l		
			Path 3:				and					
			change in fuel volume in primary tank	>=	0.80	l	time between activations of transfer pump	>	32767.00	sec		
			and				and					
			change in fuel volume in secondary tank	<	0.00	l	fuel level zone 5					
							means					
							(					
							filtered fuel volume in primary tank	<	137.40	l		
							and					
							filtered fuel volume in secondary tank	>	0.00	l		
							)					
							)					
							vehicle speed	<=	0.00	mph		
							and					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							)					
							for					
							time	>	327.67	sec		
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	= see sheet enable tables -		
Fuel Injector Calibration Not Programmed	P268A	Detects un-programmed Injector Calibration Data (IQA) in ECM	**Path 1:** the checksum of the injector adjustment code words is correct	= FALSE -	engine pre drive and basic enable conditions met:	= TRUE - = see sheet enable tables -	fail conditions exist for 1 s monitor runs once per driving cycle during predrive with 1 s rate	A
Cylinder 1 Injector Data Incorrect (IQA)	P268C	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 1 transmitted via CAN from GPCM (glow plug module) match with the stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 1 are valid and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exist for 1 s test performed continuously with 1 s rate	A
Cylinder 2 Injector Data Incorrect (IQA)	P268D	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 2 transmitted via CAN from GPCM (glow plug module) match with the stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 2 are valid and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exist for 1 s test performed continuously with 1 s rate	A
Cylinder 3 Injector Data Incorrect (IQA)	P268E	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 3 transmitted via CAN from GPCM (glow plug module) match with the stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 3 are valid and basic enable conditions met: and	= TRUE - = see sheet enable tables -	fail conditions exist for 1 s test performed continuously with 1 s rate	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NO Pending or Confirmed DTCs:	= see sheet inhibit tables -		
Cylinder 4 Injector Data Incorrect (IQA)	P268F	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 4 transmitted via CAN from GPCM (glow plug module) match with the stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 4 are valid and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE see sheet enable tables see sheet inhibit tables	fail conditions exist for 1 s test performed continuously with 1 s rate	A
Cylinder 5 Injector Data Incorrect (IQA)	P2690	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 5 transmitted via CAN from GPCM (glow plug module) match with the stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 5 are valid and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exist for 1 s test performed continuously with 1 s rate	A
Cylinder 6 Injector Data Incorrect (IQA)	P2691	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 6 transmitted via CAN from GPCM (glow plug module) match with the stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 6 are valid and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exist for 1 s test performed continuously with 1 s rate	A
Cylinder 7 Injector Data Incorrect (IQA)	P2692	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 7 transmitted via CAN from GPCM (glow plug module) match with the stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 7 are valid and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE - = see sheet enable tables - = see sheet inhibit tables -	fail conditions exist for 1 s test performed continuously with 1 s rate	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Cylinder 8 Injector Data Incorrect (IQA)	P2693	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 8 transmitted via CAN from GPCM (glow plug module) match with the stored ECM value	=	FALSE	-	transmitted IQA data from GPCM (glow plug module) for cylinder 8 are valid	=	TRUE	-	fail conditions exist for 1 s test performed continuously with 1 s rate	A
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
4WD Switch Circuit	P2771	Checks plausibility of the 4WD-Low switch with 4WD state based on 4WD state from transmission turbine speed, transmission output shaft speed, and transmission gear ratio.	Debounced value of 4WD-Lo switch	=	FALSE	-	Current Transmission Gear	≠	Park/Neutral	-	fail conditions exists for 0.05 s test performed continuously 0.02 s rate	B
			and 4WD-Lo active based on transmission turbine speed, output shaft speed, and gear ratio	=	TRUE	-	and Current Transmission Gear	≠	Reverse	-		
							and Torque converter clutch open	=	FALSE	-		
							and Engine is Running	=	TRUE	-		
							and vehicle speed	>	12.43	mph		
							and accelerator pedal position	<	100.00	%		
							and accelerator pedal position	>	10.00	%		
							and engine speed	<	6000.00	rpm		
							and engine speed	>	1000.00	rpm		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Delivery Performance monitor	P2BAA	Compared EWMA filtered pressure drop with the threshold	EWMA filtered pressure drop	<	24.80	kPa	Modeled SCR catalyst temperature	>=	199.96	°C	fault exists for more than 1 event; monitor runs at 0.1 s once per trip	A
							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	>	0.50	g/sec		
							Exhaust mass flow	<=	44.40	g/sec		
							(a) - (b)	>	-0.30	g		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(a) Desired NH3 load level	=	calculated parameter	-		
					(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)	=	Metering Control	-		
					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		
					State of Reductant injection valve Component Protection (please see definition)	=	0	-		
					Vehicle speed	<	4.35	mph		
					for time	>	4.00	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	count		
					Total number of pressure drop for Fast Initialization mode	=	4.00	count		
					EWMA Rapid Response mode:					
					Pressure difference: (a) - (b)	>	-12.0	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		
					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	count		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
CAN A BUS OFF	U0073	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 0.01 s rate	B
							and basic enable conditions met:	=	see sheet enable tables	-		
CAN B BUS OFF	U0074	BUS B off monitoring	CAN B Bus-Off reported by CAN hardware	=	TRUE	-	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.01 s rate	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	>	0.18	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	-		
Glow Plug Diagnostic Status Frame	U0106	Monitoring of the reception of glow plug control frame	Frame timeout error is detected when frame is not received within the timeout count	>	5.00	counts	ignition on	=	TRUE	-	test performed continuously at 0.02 s rate whenever enable conditions are met	B
							and Bus off or error passive on CAN	=	FALSE	-		
							and Frame enabled. The EMC is authorized to read the frame	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Lost Communication with Reductant Control Module	U010E	CAN frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	40.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than 5 sec monitor runs with 0.1 s rate	A
							Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	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.
Lost Communications with Auxiliary Heater Control Module	U0166	Detects loss of communication between ECM (on-board control unit) and Auxiliary Heater Control Module	time since last message from auxiliary heater control module was received	>	2.50	sec	ignition on	=	TRUE	-	fail conditions exists for 12 s test performed continuously 0.01 s rate	Special C
							for time	>=	3.00	sec		
							and battery voltage	>=	9.00	V		
							and battery voltage	<=	16.00	V		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of engine out NOx co	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	Sliding window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of engine out NOx se	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.
					No pending or confirmed DTCs	= see sheet inhibit tables -		
Engine Out NOx Sensor CAN Message #2		Engine out NOx sensor CAN message #2 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	> 5.00 counts	CAN Bus is Active	= TRUE -	fail conditions exists for more than 20 sec monitor runs with 0.005 s rate	
					Can Bus Initialized (CAN Bus is Active)			
					consisting of:			
					ignition	= TRUE -		
					for			
					time	> 5.00 sec		
					battery voltage	< 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 ser	within a number of message frames	= 9.00 counts	Can Bus Initialized (CAN Bus is Active)			
					consisting of:			
					ignition	= TRUE -		
					for			
					time	> 5.00 sec		
					battery voltage	< 655.34 V		
					battery voltage	> 9.00 V		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
Engine Out NOx Sensor CAN Message #3		Engine out NOx sensor CAN message #3 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	> 5.00 counts	CAN Bus is Active	= TRUE -	fail conditions exists for more than 20 sec monitor runs with 0.005 s rate	
					Can Bus Initialized (CAN Bus is Active)			
					consisting of:			
					ignition	= TRUE -		
					for			
					time	> 5.00 sec		
					battery voltage	< 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 ser	within a number of message frames	= 9.00 counts	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		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
Engine Out NOx Sensor CAN Message #4		Engine out NOx sensor CAN message #4 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	25.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than 20 sec monitor runs with 0.02 s rate	
							Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	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 ser	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	655.34	V		
							battery voltage	>	9.00	V		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
Engine Out NOx Sensor CAN Message #5		Engine out NOx sensor CAN message #5 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	25.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than 20 sec monitor runs with 0.1 s rate	
							Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	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 21 sec monitor runs	A
							Can Bus Initialized (CAN Bus is Active)					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							consisting of:				with 0.005 s rate	
							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 c	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	655.34	V		
							battery voltage	>	9.00	V		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of post catalyst NOx s	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	655.34	V		
							battery voltage	>	9.00	V		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
Post Catalyst NOx Sensor CAN Message #2		Post catalyst NOx sensor CAN message #2 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	5.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than 21 sec monitor runs with 0.005 s rate	
							Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	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.
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of post catalyst NOx s	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	655.34	V		
							battery voltage	>	9.00	V		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
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 s	within a number of message frames	=	10.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	655.34	V		
							battery voltage	>	9.00	V		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
Post Catalyst NOx Sensor CAN Message #4		Post catalyst NOx sensor CAN message #4 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	25.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than 21 sec monitor runs with 0.02 s rate	
							Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	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.
		CAN frame rolling counter and protection value verification using a sliding window evaluation	Sliding window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever enable conditions are met	
		Check of post catalyst NOx s	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of:					
							ignition	=	TRUE	-		
							for					
							time	>	5.00	sec		
							battery voltage	<	655.34	V		
							battery voltage	>	9.00	V		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
Post Catalyst NOx Sensor CAN Message #5		Post catalyst NOx sensor CAN message #5 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	25.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than 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		
Lost Communication With PM Sensor	U02A3	PM Sensor Sensor Control Unit (SCU) signal timeout CAN error	SCU signal timeout CAN error (no message received)	=	TRUE	-	Battery voltage (ECM)	>=	11.00	V	fault exists for more than 1.5 sec; monitor runs at 0.1 s	B
							Ignition on	=	TRUE	-		
							for time	>	1.20	sec		
							Ignition on	=	TRUE	-		

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
Battery Voltage		Battery Voltage Correction Factor	battery voltage correction factor = Nominal Declared Battery Voltage divided by measured battery voltage	=	13.6	V
Engine Cooling System States		Status of the Block Heater	active under following conditions			
			(			
			engine speed	>	500	rpm
			for			
			time	>	60	sec
			and			
			(a) - (b)	>	1.8	°C
			with			
			(a) reference temperature (engine coolant temperature) captured during start	=	measured parameter	-
			and with			
			(b) engine coolant temperature	=	measured parameter	-
			)			
		status of Block Heater monitor time	active under following conditions			
			(			
			engine speed	>	500	rpm
			for			
			time	>	60	sec
		Status of Sun Load Detection	active under following condition			
			(			
		(high thermal input from the sun which influences system behavior)	Vehicle speed	>	14.92	mph
			for			
			time	>	300	sec
			and			
			engine speed (see Look-Up-Table #14)	>	600 to 850	rpm
			for			
			time	>	600	sec
			and			
			(a) - (b)	>	4.5	°C
			with			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			(a) intake at temperature at start	=	measured parameter	-
			and with			
			(b) minimum intake air temperature value for the comparison with the reference temperature during driving cycle	=	measured parameter	-
			)			
		Status of Sun Load Detection time	active under following condition			
			(			
			Vehicle speed	>	14.92	mph
			for			
			time	>	300	sec
			and			
			engine speed (see Look-Up-Table #14)	>	600 to 850	rpm
			for			
			time	>	600	sec
			)			
ECM Operating States		Engine Pre-Drive	processor operating normally	=	TRUE	-
			ignition	=	OFF	-
			processor powerup boot initialization	=	complete	-
			or			
			key off bookkeeping cleanup	=	complete	-
			(accessory, post-wake-up, pre-sleep)			
		Engine Running (see Look-Up table #70)	ignition	=	ON	-
			engine speed	>=	100	rpm
			engine speed was at start	>	850	rpm
		Engine Post-Drive/ Afterun also includes "engine stopping" during engine spin down	processor operating normally	=	TRUE	-
			ignition	=	OFF	-
			key off bookkeeping cleanup	=	in process	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
Engine Operating Modes	Exhaust Operating Mode focus	Normal Mode				
		Particulate Filter Regeneration Mode				
		Particulate Filter Regen Service Mode				
		Exhaust Gas Temperature (Active) Management Mode also known as Engine Operating Mode		= =	Warm Up or Maintain Temperature Exhaust Warm-up	-
Exhaust Gas Recirculation (EGR)		Exhaust Gas Recirculation (EGR) Control is enabled	see Closed Loop Enable Conditions for EGR Closed Loop conditions			
Engine Position Management		Engine Position Sync Complete	synchronization completed consisting of: crankshaft sensor pulses received camshaft sensor pulse received and aligned properly or sync via crank only invoked then crankshaft rotations	>=	4	counts
Fuel System		Fuel System is in Fuel Shut Off also known as Decel Fuel Shut Off or Over-Run	engine running required actual engine torque -	= < -	TRUE 1 -	- Nm -
		Status of Diesel Fuel Refill Detection	((Filtered total fuel volume available	 >	 (a) + (b)	 -

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			(a) Amount of fuel volume change that indicates a refueling event occurred	=	25.26	%
			(b) captured remaining diesel fuel volume under the following conditions	=	measured parameter	-
			(			
			Vehicle speed	<=	1.24	mph
			time	>	4	sec
			)			
			and			
			(			
			Vehicle speed	<=	1.24	mph
			time	>	30	sec
			))			
			or			
			at initialization of Diesel fuel level	=	TRUE	-
			which means			
			ECM Code-Clear of ECM Replacement occurred	=	TRUE	-
Idle Speed Control		Idle Speed Controller Active "normal" low idle speed governor	no overrides for: Gear-Shift Harmonization Intrusive Diagnosis Action Power Take Off or other working load handling			
		Engine Idling Time Ratio	= (time accumulated at idle divided by time since engine start)			
NOx Sensor		Status of NOx signal of upstream NOx sensor				
			(			
			following condition met for time:	>	30	sec
			(			
			Integrated heat quantity (see Look-Up-Table #1)	>=	375 to 500	kJ
			NOx status signal received via CAN message (Please see the definition)	=	TRUE	-
			for time	>	0.5	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			calculated lambda value based on air mass flow and injection quantity	>	0.9	-
			for time	>	0.5	sec
			engine speed	>	100	rpm
			for time	>	20	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
			))			
		Upstream Nox Sensor Signal Ready	following condition met for time:	>	30	sec
		or				
		Upstream Nox SensorDewpoint Reached	(			
		or				
		Lambda signal from NOx sensor ready	Integrated heat quantity (see Look-Up-Table #1)	>=	375 to 500	kJ
			)			
		Status of NOx signal of downstream NOx sensor				
			(			
			following condition met for time:	>	30	sec
			(			
			Integrated heat quantity (see Look-Up-Table #2)	>=	0 to 350	kJ
			NOx status signal received via CAN message (Please see the definition)	=	TRUE	-
			for time	>	0.5	sec
			calculated lambda value based on air mass flow and injection quantity	>	0.9	-
			for time	>	0.5	sec
			engine speed	>	100	rpm
			for time	>	20	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
			))			
		Downstream Nox Sensor Signal Ready	following condition met for time:	>	30	sec
		or	(			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
		Downstream NOx Sensor Dewpoint Reached or Lambda signal from NOx sensor ready	Integrated heat quantity (see Look-Up-Table #2)	>=	0 to 350	kJ
		Enabling Upstream NOx sensor heater diagnosis	(			
			SCR Catalyst downstream temperature	>=	94.96	°C
			SCR Catalyst downstream temperature	<=	3003.56	°C
			battery voltage	>=	11	V
			battery voltage	<=	655.34	V
			and			
			Integrated heat quantity (see Look-Up-Table #2)	>=	0 to 350	kJ
			for time	>	30	sec
			)			
			and			
			for time	>	1	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		Enabling Downstream NOx sensor heater diagnosis	(			
			SCR Catalyst upstream temperature	>=	94.96	°C
			SCR Catalyst upstream temperature	<=	3003.56	°C
			battery voltage	>=	11	V
			battery voltage	<=	655.34	V
			and			
			Integrated heat quantity (see Look-Up-Table #1)	>=	375 to 500	kJ
			for time	>	30	sec
			)			
			and			
			for time	>	1	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
Rail Pressure Control System Operating States		Rail Control at ECM Start	reset condition	=	TRUE	-
			or			
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		Rail Pre-Control (Just after start)	Rail Control at ECU Start	=	TRUE	-
			and			
			engine speed	<=	300	rpm
			and			
			(			
			rail pressure	>=	15000	kPa
			or			
			(a) - (b)	<	5000	kPa
			(a)Fuel Rail Pressure Setpoint	=	measured paramter	-
			(b)Maximum Rail Pressure for last 10ms	=	measured paramter	-
			)			
		Rail Control - PCV Closed Loop Control Only PCV = Pressure Control Valve	(			
			Rail Pressure Precontrol (Just after start)	=	TRUE	-
			and			
			Number of Crankshaft revolutions since entering Rail Pressure Precontrol	>=	10	revs
			)			
			or			
			(			
			state machine rail pressure control transitioning pressure control valve mode	=	TRUE	-
			and			
			setpoint volume flow of the metering unit out of rail pressure control (see Look-Up-Table #6)	>	60000 to 224000	mm^3/rev
			or			
			(			
			Fuel system pressure and high pressure pump outlet	<	0	kPa

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			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			
			(a) + (b) (see Look-Up-Table #7)	<	12 to 400	mm^3/rev
			(a)Torque Generating fuel injection quantity	=	calculated parametet	-
			(b)Non-Torque generating fuel injection quantity	=	calculated parametet	-
		Switchover Between Metering Unit + PCV Closed Loop Control to Metering Unit Closed Loop Control only	(			
			state machine rail pressure control equal to pressure control valve			
			or			
			state machine rail pressure control transitioning pressure control valve mode			
			)			
			and			
			(a) + (b)	<	(c) + (d)	-
			(a)Torque Generating fuel injection quantity	=	calculated parametet	-
			(b)Non-Torque generating fuel injection quantity	=	calculated parametet	-
			(c) (see Look-Up-Table #7)	=	12 to 400	mm^3/rev

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			(d)	=	12	mm^3/rev
			and			
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
			or			
			(			
			state machine rail pressure control equal to metering unit control mode			
			or			
			state machine rail pressure control equal transitioning to metering unit pressure control mode			
			)			
			and			
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
			(			
			Fuel system pressure and high pressure pump outlet	<	0	kPa
			and			
			engine status	=	RUNNING	-
			)			
			)			
			and			
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
			)			
		Switchover between PCV or Metering Unit closed loop control to Metering Unit + PCV Closed Loop Control	(			
			state machine rail pressure control equal to pressure control valve	=	TRUE	-
			or			
			state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-
			or			
			state machine rail pressure control transitioning pressure control valve mode	=	TRUE	-
			or			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			state machine rail pressure control equal transitioning to metering unit pressure control mode	=	TRUE	-
			)			
			and			
			(			
			(			
			exhaust gas system regeneration mode	!=	REGEN	-
			)			
			and			
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		Switchover Between Metering Unit + PCV Closed Loop Control to PCV Closed Loop Control only	(			
			state machine rail pressure control equals coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-
			or			
			state machine rail pressure control transitioning to coupled pressure control mode (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-
			)			
			and			
			(a) + (b) (see Look-Up-Table #7)	<	12 to 400	mm^3/rev
			where			
			(a)Torque Generating fuel injection quantity	=	calculated parametet	-
			(b)Non-Torque generating fuel injection quantity	=	calculated parametet	-
Regeneration of the Diesel Particulate Filter		Status thermal regeneration active				
			Reduced particle mass flow in simulation by thermal regeneration			
			(a) * (b) * (c)	>	0	-
			(a) Correction factor for thermal soot burn-out dependent on lambda and oxygen mass flow (see Look-Up-Table #4)	=	0 to 4.0	factor

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			(b) Effect of temperature on regenerated particle mass (see Look-Up-Table #5)	=	0 to 2.97	-
			(c) Basis value of produced soot mass flow dependent on actual soot mass (see Look-Up-Table #3)	=	0.02 to 0.29	g/sec
SCR System	NOx Control System Reductant Dosing Strategy Active State	Release of dosing of the dosing strategy				
			status of SCR control state (please see the definition)	=	Metering Control	-
			Reductant dosing is released	=	TRUE	-
			Deactivation of dosing to execute the NOx Offset test (Please see the definition)	=	FALSE	-
			since start for time	>=	0.02	sec
			gradient of exhaust gas temperature	<=	300	°C/sec
			since start for time	>=	0.01	sec
			Average temperature inside the SCR catalyst:	>	179.96	°C
			SCR catalyst wall temperature	>	89.96	°C
			Vehicle speed	>=	-0.62	mph
			engine speed	>	400	rpm
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
	NOx Control System Reductant Dosing Pressure Control System States		ignition	=	on	-
		State of Reductant Pressure Control System: Standby	Dwell time in the state of standby	<	5	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		State of Reductant Pressure Control System: No Pressure control	Old SCR control state (please see the definition)	=	Stand by	-
			ignition	=	on	-
			Dwell time in the state of standby	>=	5	sec
			Dwell time in the state of no pressure control	<	2	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
		State of Reductant Pressure Control System: Pressure control	Old SCR control state (please see the definition)	=	NO Pressure Control	-
			ignition	=	on	
			engine speed	>	550	rpm
			Dwell time in the state of no pressure control	>=	2	sec
			exhaust gas temperature Upstream SCR	>=	169.96	°C
			(			
			Reductant Defrost check (please see the definition)	=	TRUE	-
			or			
			The component protection release of the heater control (please see the definition)	=	TRUE	-
			or			
			Preliminary release of the heater control for the main state machine (please see the definition)	=	TRUE	-
			)			
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		State of Reductant Pressure Control System: Refilling Reductant in pressure line (substate of Pressure control)	SCR control state (please see the definition)	=	Pressure Control	-
			(			
			Reductant filling state in the pressure line	<	50	%
			and			
			Reductant Pump Module Pressure	<	200	kPa
			)			
			Set-point duty cycle for Reductant dosing valve	=	100	%
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	40.00	%
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		State of Reductant Pressure Control System: Pressure build up (substate of Pressure control)	SCR control state (please see the definition)	=	Pressure Control	-
			(			
			Reductant filling state in the pressure line	>=	50	%
			or			
			Reductant Pump Module Pressure	>=	200	kPa
			for time	>	0.5	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			)			
			Reductant Pump Module Pressure	<	350	kPa
			Set-point duty cycle for Reductant dosing valve	=	0%	%
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	80.00	%
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		State of Reductant Pressure Control System: Ventilation (substate of Pressure control)	SCR control state (please see the definition)	=	Pressure Control	-
			Reductant Pump Module Pressure	<	350	kPa
			Dwell time in Pressure Build up substate	>	10	sec
			system pressurizes in pressure buildup and ventilation states	<	10	counts
			Set-point duty cycle for Reductant dosing valve	=	100	%
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	80.00	%
			Dwell time in the sub state ventilation	<	0.23	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		State of Reductant Pressure Control System: Metering control (substate of Pressure control)	SCR control state (please see the definition)	=	Pressure Control	-
			Reductant Pump Module Pressure	>=	350	kPa
			Set-point duty cycle for Reductant dosing valve	=	0	%
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		State of Reductant Pressure Control System: Pressure reduction	ignition	=	off	-
			dwell time in the state of pressure reduction	<	5	sec
			Activation state of Reductant reverting valve power stage	=	On	-
			Set-point duty cycle for Reductant dosing valve	=	0	%
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	15.00	%
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
	SCR Engine State required for operation	SCR Engine State	Ignition on	=	TRUE	-
			engine speed	>	550	rpm
	Reductant Dosing Strategy based on DPF Fload	Status fill level decrease (please see the definition)	Particulate Filter Regeneration demand on	=	TRUE	-
			or			
			Reductant fill level of the SCR catalyst lowed to the target value under Particle filter Regeneration request			
			(a) - (b)	>=	0	-
			(a) Nominal value of Reductant fill level in the catalyst			
			(b) Estimated current Reductant load			
			(c) Reductant Dosing quantity limitation	=	100	factor
			or			
			SCR catalyst temperature too high to convert Reductant under Particle filter Regeneration request			
			Average temperature inside the SCR catalyst:	>	999.96	°C
	Reductant Heater and Defrost System Control States and Status					
		Reductant Defrost check	status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			State of the defrosting check of pressure line (please see the definition)	=	TRUE	-
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-
			(			
			duration, for which the conditions for a hydraulic release reset of pressure line heater circuit are satisfied	<=	1200	sec
			ambient temperature	>	-4.04	°C
			Release heater pressure line	=	FALSE	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			and			
			duration, for which the conditions for a hydraulic release reset of supply module heater circuit are satisfied	<=	1200	sec
			ambient temperature	>	-4.04	°C
			Release heater supply module	=	FALSE	-
			)			
		Status of reductant tank heater temperature	**status of reductant tank heater temperature (please see the definition)**			
			Reductant tank heat temperature at Standby state	>	-0.04	°C
			or			
			Engine off Time	<	2147483647	sec
			Reductant tank heat temperature at Standby state	>	-9.04	°C
		State of the defrosting check of pressure line	**State of the defrosting check of pressure line (please see the definition)**			
			time since pressure line heating on under pressure line defrost mode	>=	0 to 3276.7	sec
			or			
			status of SCR control state (please see the definition)	=	No Pressure Control	-
			Pressure line defrost timer	=	0	sec
			or			
			ignition	=	on	sec
			engine speed	>	550	rpm
			(			
			Pressure line defrost check in last driving cycle	=	TRUE	-
			status of SCR control state (please see the definition)	=	No Pressure Control	-
			Engine off Time	>	0	sec
			NO Pending or Confirmed DTCs:	=	TRUE	-
		State of the defrosting check of supply module	**State of the defrosting check of supply module (please see the definition)**			
			time since supply module heating on under supply module defrost mode	>=	0 to 3276.7	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			or			
			status of SCR control state (please see the definition)	=	No Pressure Control	-
			Supply module defrost timer	=	0	sec
			or			
			ignition	=	on	sec
			engine speed	>	550	rpm
			(			
			Pressure line defrost check in last driving cycle	=	TRUE	-
			status of SCR control state (please see the definition)	=	No Pressure Control	-
			Engine off Time	<	0	sec
			NO Pending or Confirmed DTCs:	=	TRUE	-
		The component protection release of the heater control	Current time for heating / not heating of heater circuit 1 (tank)	>=	0 to 299	sec
			Reductant Defrost check (please see the definition)	=	FALSE	-
		Preliminary release of the heater control for the main state machine	Preliminary release of the heater control for the main state machine (please see the definition)			
			(			
			Current time for heating / not heating of heater circuit 1 (tank)	>=	0 to 3276	sec
			status of reductant tank heater defrost	=	FALSE	-
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-
			State of the defrosting check of pressure line (please see the definition)	=	TRUE	-
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-
			)			
			or			
			(			
			ignition	=	on	sec
			engine speed	>	550	rpm
			Engine off Time	<=	0	sec
			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			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			if the following conditions were met in previous driving cycle	=	TRUE	-
			(			
			ignition	=	on	sec
			engine speed	>	550	rpm
			Engine off Time	<=	0	sec
			State of the defrosting check of pressure line (please see the definition)	=	TRUE	-
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-
			))			
		Release of tank heater circuit	(			
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec
			or			
			Requested heating time for Reductant tank heater (see Look-Up-Table #17)	>=	0 to 3277	sec
			)			
			or			
			((			
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec
			or			
			Requested heating time for Reductant tank heater (see Look-Up-Table #17)	>=	0 to 3277	sec
			)			
			and			
			(			
			Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 3276.7	sec
			or			
			Requested heating time for pressure line heater (see Look-Up-Table #20)	>=	0 to 3276.7	sec
			))			
			or			
			((			
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec
			or			
			Requested heating time for Reductant tank heater (see Look-Up-Table #17)	>=	0 to 3277	sec

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

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

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

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		Status of the battery voltage being in the valid working range for Reductant tank heater				
			battery voltage	<	100	V
			battery voltage	>	11	V
			for time	>	2	sec
		Status of the battery voltage being in the valid working range for pressure line heater				
			battery voltage	<	100	V
			battery voltage	>	11	V
			for time	>	2	sec
		Status of Reductant Tank Heater Release				
			(			
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired	>	0	sec
			)			
			or			
			((			
			Waiting time before tank heater released started with	<	32767	sec
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-
			)			
			and			
			(			
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired	>	0	sec
			))			
			or			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			((			
			Waiting time before tank heater released	>	32767	sec
			started with			
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-
			)			
			and			
			(			
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired	>	0	sec
			))			
	Reductant Tank Level System States and Status	status of Reductant tank level	Tank level > full (100%)	=	Full	-
			Warning (66.67%) < tank level < full (100%)	=	OK	-
			Restriction (33.33%) < tank level < Warning (66.67%)	=	Warning	-
			Empty < tank level < Restriction (33.33%)	=	Restriction	-
			Tank level < = 0.1%	=	Empty	-
		Status of Reductant tank level reset when refilling is detected (please see the definition)	(			
			time since potential Reductant refill detection is set	>=	12	sec
			and with			
			(			
			Derivation of the PT1 filtered level signal (DT1)	>=	1.00	%/sec
			ignition on	=	TRUE	-
			engine speed	>	550	rpm
			Vehicle speed	>=	6.22	mph
			time since engine started	<=	(a) * (b)	
			(a) Time period for a positive slope to detect refueling	=	12	sec
			(b) Factor for the extension of the detection time for refueling	=	20	factor
			since the following conditions met:	=	TRUE	-
			(			
			Falling edge of ignition	=	TRUE	-
			or			
			Reductant Refill enabling conditions reset timers	=	TRUE	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			)))			
			or			
			(			
			time since potential Reductant refill detection is set	>=	8	sec
			and with			
			(			
			Derivation of the PT1 filtered level signal (DT1)	>=	1.00	%/sec
			filter release for Reductant tank level calculation at ignition on on (Please see the definition)	=	TRUE	-
			and with			
			(			
			Frozen state is active during a certain warning level (please see the definition)	=	TRUE	-
			and with			
			(			
			Reductant tank Temperature	>=	-100.04	°C
			or			
			Reductant low warning level (Please see the definition)	>=	0	level
			)))			
		Status of Reductant Tank Level Release	status of reductant tank level release (please see the definition)			
			Status of Filter release for reductant tank level calculation (please see the definition)	=	TRUE	-
			and			
			((			
			ambient temperature	>=	-100.04	°C
			((			
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-
			Waiting time before tank heater released	<	32767	sec
			and			
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired	>	0	sec
			)			
			or			
			(			
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-
			Waiting time before tank heater released	>=	32767	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			and			
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired	>=	0	sec
			))			
			or			
			Frozen state is active during a certain warning level (please see the definition)	=	TRUE	-
			)			
			Vehicle speed	>=	6.22	mph
			)			
			or			
			filter release for Reductant tank level calculation at ignition on on (Please see the definition)	=	TRUE	-
		Status of Filter release for reductant tank level calculation				
			Reductant tank Temperature	>=	-100.04	°C
			or			
			Reductant low warning level (Please see the definition)	>=	0	-
			NO Pending or Confirmed DTCs:	=	TRUE	-
			or			
			Frozen state is active during a certain warning level (please see the definition)	=	TRUE	-
		Filter release for Reductant tank level calculation at Ignition on	ignition	=	on	-
			Engine on timer is expired (please see the definition)	=	FALSE	-
			Vehicle speed	>=	0.62	mph
			Reductant low warning level (Please see the definition)	>=	49	level
			and with			
			((			
			Raw Reductant tank level	>=	33.3	%
			and with			
			(			
			Remaining Reductant quantity (a) - (b):	<	(a) - (b)	
			(a) Tank level for reserve mode (Restriction level) in [g]	=	2614	g

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			(b) Tank level threshold range below Restriction threshold for ignition on refill detection release)	=	1015	g
			or			
			Raw Reductant tank level	>=	66.7	%
			and with (			
			Remaining Reductant quantity (a) - (b):	<	(a) - (b)	
			(a) Tank level for reserve mode (Warning level) in [g]	=	5279	g
			(b) Tank level threshold range below WARNING threshold for ignition on refill detection release)	=	1617	g
			or			
			Raw Reductant tank level	>=	100	%
			and with (			
			Remaining Reductant quantity (a) - (b):	>=	(a) - (b)	
			(a) Tank level for reserve mode (Warning level) in [g]	=	5279	g
			(b) Tank level threshold range below WARNING threshold for ignition on refill detection release))	=	1617	g
		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			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			status of Reductant tank level (please see the definition)	=	OK	-
			or			
			status of Reductant tank level (please see the definition)	=	Full	-
			))			
			or			
			((			
			Captured Reductant tank level at last tank level change	=	Warning	-
			or			
			Captured Reductant tank level at last tank level change	=	OK	-
			)			
			and			
			(			
			status of Reductant tank level (please see the definition)	=	Full	-
			)			
			or			
			(			
			Captured Reductant tank level at last tank level change	=	OK	-
			status of Reductant tank level (please see the definition)	=	Full	-
			))			
		Engine on timer is expired	time since engine started	>=	(a) * (b)	sec
					12	sec
					20	-
			and with			
			((			
			ignition	=	on	sec
			engine speed	>	550	rpm
			Vehicle speed	>=	6.22	mph
			)			
			or			
			(			
			Vehicle speed	>=	6.22	mph
			NO Pending or Confirmed DTCs:	=	TRUE	
			for time	>	1	sec
			))			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			and with timer reset conditions			
			(			
			Falling edge of ignition	=	TRUE	-
			or			
			Reductant Refill enabling conditions reset timers	=	TRUE	-
			)			
	Reducant Tank Level Low Warning States	Normal_Operation_OK: 0 decimal, normal operation	Reductant tank level	=	Full	-
			and with			
			(			
			Warning level	<=	49	-
			or			
			(			
			Previous warning level	>	49	-
			vehicle speed	<=	98.75	mph
			))			
			or			
			Reductant Quality state	>	0	-
		Warning_Leve1: 1 decimal, Warning level 1	Reductant tank level	<	Full	-
			Remaining mileage	>	1558.75	miles
			and with			
			(			
			Warning level	<=	49	Warning level
			or			
			(			
			Previous warning level	>	49	Warning level
			vehicle speed	<=	98.75	mph
			))			
			and with			
			Reductant Quality state	=	0	-
		Warning_Level2: 2 decimal, Warning level 2	Reductant tank level	<	Full	-
			Remaining mileage	<=	1558.75	miles

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

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			and with			
			Reductant Quality state	=	0	-
		Warning_Level5: 48 decimal, Warning level 5	((			
			Reductant tank level	<	Full	-
			Remaining mileage	<=	628.75	miles
			and with			
			(			
			Warning level	<=	49	Warning level
			or			
			(			
			Previous warning level	>	49	Warning level
			vehicle speed	<=	98.75	mph
			)))			
			or			
			(			
			Warning level	=	48	Warning level
			initialization phase after Reductant refill event is active	=	TRUE	-
			))			
			and with			
			Reductant Quality state	=	0	-
		Warning_Level6: 49 decimal, Warning level 6	((			
			Warning level	=	49	Warning level
			initialization phase after Reductant refill event is active	=	TRUE	-
			)			
			or			
			(			
			Warning level	<	49	Warning level
			Failed Reductant system pressure build up	=	1	-
			))			
			and with			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			Reductant Quality state	=	0	-
		Warning_Level8: 80 decimal,Vehicle speed restriction mild	Warning level	=	80	Warning level
			initialization phase after Reductant refill event is active	=	TRUE	
			and with			
			Reductant Quality state	=	0	
		Warning_Level10: 112 decimal,Vehicle speed restriction aggressive	Warning level	=	112	Warning level
			initialization phase after Reductant refill event is active	=	TRUE	-
			and with			
			Reductant Quality state	=	0	-
		Warning_Level12: 144 decimal, Vehicle speed restriction severe	Warning level	=	144	Warning level
			initialization phase after Reductant refill event is active	=	TRUE	-
			and with			
			Reductant Quality state	=	0	-
		Warning_Level14: 176 decimal, Vehicle speed restriction final	Warning level	=	176	Warning level
			initialization phase after Reductant refill event is active	=	TRUE	-
			and with			
			Reductant Quality state	=	0	-
	Reductant frozen System States	Frozen state is active during a certain warning level	ignition	=	On	-
			for time	>	5	sec
			Reductant tank Temperature	<=	-9.04	°C

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			Reductant low warning level (Please see the definition)	>=	2	level
		Status of Reductant tank as frozen				
			(			
			Engine off Time	>	14400	sec
			Reductant tank Temperature	<	-11.04	°C
			)			
			or			
			(			
			Engine off Time	<=	7200	sec
			time since the following conditions are met	<=	7200	sec
			(			
			status of reductant tank heater defrost	=	On or Defrost	-
			Vehicle speed	>	6.22	mph
			Status of urea tank as frozen (please see the definition)	=	TRUE	-
			))			
	SCR System Pressure State	Status of Low Reductant Pump Pressure - Under Reductant warning level 3 - Main state 0x30				
			Reductant low warning level (Please see the definition)	>=	64	-
			number of pressure build-up attempts	>=	2	counts
			and			
			(			
			status of SCR control sub state (please see the definition)	=	Pressure Build up	-
			Reductant Pump Module Pressure	<	350	kPa
			Dwell time in Pressure Build up substate	>	10	sec
			system pressurizes in pressure buildup and ventilation states	>=	10	counts
			Reductant Defrost check (please see the definition)	=	TRUE	-
			)			
SCR System Diagnosis	SCR System Long Term Adaptation Release States	Long-term Adaption Triggered				
			underdosing detected (please see the definition)	=	TRUE	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			OR			
			overdosing detected (please see the definition)	=	TRUE	-
		Underdosing detected				
			Difference between the NOx mass of the sensor and of the model during first functional evaluation	>=	10	g
			OR			
			Difference between the NOx mass of the sensor and of the model during second functional evaluation	>=	10	g
			OR			
			Difference between the NOx mass of the sensor and of the model during third functional evaluation	>=	-0.25	g
		Overdosing detected				
			Difference between the NOx mass of the sensor and of the model during first functional evaluation	<=	-6	g
			OR			
			Difference between the NOx mass of the sensor and of the model during second functional evaluation	<=	-6	g
			OR			
			Difference between the NOx mass of the sensor and of the model during third functional evaluation (see Look-Up-Table #9)	<=	-0.8 to -0.6	g
		Status of the SCR adaptation plausibility check active	(			
			Status of NOx signal of downstream NOx sensor (please see the definition)	=	TRUE	-
			NOx concentration downstream SCR catalyst	>	15	ppm
			for time	>	3	sec
			Estimated SCR catalyst efficiency	>	0.3	factor
			for time	>	3	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			NOx concentration deviation between sensor reading and modeled NOx concentration downstream SCR catalyst	>	measured parameter	-
			for time	>	10	sec
			(			
			Time since when the Reductant load level adaptation and the plausibility have been locked	>=	600	sec
			or			
			Time since when the Reductant load level adaptation and the plausibility have been locked	>=	50	sec
			Integrated NOx mass since Reductant load level adaptation and plausibility have been locked	>=	2	g
			)			
			Difference between nominal and estimated Reductant	<	0.125	g
			Difference between nominal and estimated Reductant	>=	-0.5	g
			Filtered Upstream NOx mass flow	>=	10	mg/sec
			Filtered Upstream NOx mass flow	<=	500	mg/sec
			(			
			Upstream Nox mass flow difference : (a) - (b)	>=	0	mg/sec
			Upstream Nox mass flow difference : (a) - (b)	<=	500	mg/sec
			and with			
			(a) Filtered Upstream NOx mass flow			
			(b) Filtered actual upstream NOx mass flow			
			)			
			Status of pre controlled dosing (please see the definition)	=	FALSE	-
			Difference between nominal and estimated Reductant	<	0.125	g
			Difference between nominal and estimated Reductant	>=	-0.5	g
			for time	>	5	sec
			HC load in SCR catalyst	<=	10	factor
			overall aging factor of the SCR catalyst	>=	0	factor
			for time	>	1	sec
			Temperature gradient of SCR	>=	-1	°C/sec
			Temperature gradient of SCR	<=	1	°C/sec
			for time	>	18	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			Integrated NOx mass flow after engine start	>=	5	g
			Release of Reductant dosing	=	active	-
			engine operating condition based on engine speed and injection quantity (see Look-Up-Table #10)	>	0 to 1	factor
			(			
			Difference between nominal and estimated Reductant	>	-0.05	g
			Reductant mass flow (see Look-Up-Table #8)	>	0 to 0.04	g
			Elapsed time of the fill level timer	>	20	sec
			)			
		State of the NH3 (Ammonia) slip detection				
			Reductant concentration downstream SCR	<	32767	ppm
			and			
			(a) - (b)	<	0	g/sec
			(a) Filtered NOx mass flow downstream SCR measured by the sensor	=	measured parameter	-
			(b) Filtered and delayed NOx raw emission mass flow upstream of SCR	=	measured parameter	-
		Deactivation of dosing to execute the NOx Offset test				
			SCR catalyst temperature	>	400.06	°C
			SCR catalyst temperature	<	999.96	°C
			time	>	60	sec
			and			
			Currently dosed Reductant mass flow	<=	0.005	g/sec
			time	>	30	sec
			and			
			Feed ratio			
			(a) / ((b) * (c))	<=	0.1	ratio
			(a) Currently dosed Reductant mass flow	=	measured parameter	-
			(b) NOx raw emission mass flow	=	measured parameter	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			(c) Stoichiometric conversion factor NOx to Reductant	=	calculated parameter	-
			time	>	10	sec
			and			
			Estimated current Reductant load	<=	0.3	g
			time	>	10	sec
		Release plausibility of Reductant Load				
			Release plausibility timer active	>=	600	sec
			or			
			(			
			Release plausibility timer active	>=	50	sec
			Integrated NOx raw emission since fill level adaptation and plausibility have been locked	>=	2	g
			)			
		Status for disabling the SCR Efficiency monitor following an SCR Adaptation cycle completion				
			Maximum dosing quantity	<	0.6	g/sec
			or			
			(a) - (b)	>	0	-
			(a) Reductant Dosing quantity	=	measured parameter	-
			(b) Maximum Reductant Dosing quantity	=	calculated parameter	-
			or			
			(a) - (b)	>	0	
			(a) Reductant Desired value	=	calculated parameter	-
			(b) Reductant Dosing quantity limitation due to frozen tank	=	calculated parameter	-
		Request for pre controlled dosing				
			Filtered exhaust gas mass flow	>	(a) * (b)	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			(a) Correction factor for the upper hysteresis threshold for filtered exhaust-gas mass flow, dependent on HC- contamination	=	1	factor
			(b) Upper hysteresis threshold for filtered exhaust-gas mass flow, dependent on thermal ageing	=	5040.00	g/sec
			and			
			Filtered NOx mass flow upstream SCR	>	(a) * (b)	-
			(a) Correction factor for the upper hysteresis threshold for filtered exhaust-gas mass flow, dependent on HC- contamination SCR	=	1	factor
			(b) Upper hysteresis threshold for filtered exhaust-gas mass flow, dependent on thermal ageing SCR	=	0.25	g/s
			and			
			Engine coolant temperature	<	(a) + (b)	-
			(a) Lower hysteresis threshold for engine temperature	=	105.06	°C
			(b) Offset for lower hysteresis switch on threshold for engine temperature	=	50	K
			Engine coolant temperature	>	108.06	°C
			and			
			ambient pressure	>	(a) + (b)	-
			(a) Upper hysteresis threshold for environment pressure	=	74.5	kPa
			(b) Offset for upper hysteresis switch on threshold for environment pressure	=	65.0	kPa
			or			
			ambient pressure	<	74.0	kPa
			and			
			Intake air temperature	>	(a) + (b)	-
			(a) Lower hysteresis switch on threshold for inlet air temperature	=	-6.54	°C
			(b) Offset for upper hysteresis switch on threshold for inlet air temperature	=	49.5	°C
			or			
			Intake air temperature	<	-8.04	°C
			)			
			and			
			(			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			ambient temperature	>=	-7.04	°C
			ambient pressure	>=	74.8	kPa
			Selected temperature used for locking pre controlled mode	>=	209.96	°C
			Selected temperature used for locking pre controlled mode	<=	309.96	°C
			engine operation in normal mode	=	TRUE	-
			SCR Nox Catalyst Efficiency check was performed this drive cycle	=	FALSE	-
			Incorrect Reductant Composition check was performed this drive cycle	=	FALSE	-
			NO Pending or Confirmed DTCs:	=	TRUE	-
			)			
			((			
			(k) + (l) + (m)	>	75	
			(k) = (a) * (b)			
			(a) entry condition for pre controlled dosing at sea level (see Look-Up-Table #13)	=	0 to 100	-
			(b) Altitude multiplier factor for sea level	=	measured paramter	-
			(l) = (c) * (d) * (e)			
			(c) entry condition for online dosing at Mid level (see Look-Up-Table #12)	=	0 to 100	-
			(d) Multiplier to Mid Level enable speed load map	=	1	factor
			(e) Altitude multiplier factor for medium altitude	=	measured paramter	-
			(m) = (f) * (g) * (h)			
			(f) Entry condition for online dosing at Hi level (see Look-Up-Table #11)	=	0 to 100	-
			(g) Multiplier to Hi Level enable speed load map	=	1	factor
			(h) Altitude multiplier factor for high altitude	=	measured paramter	-
			)			
			and			
			Low pass filtered rNOxNSCDs signal	>	2000	-
			)			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
	Reductant Tank Heater Performance Diagnosis Status	start temperature is captured in EERPOM if monitoring is active over several driving cycles	continuation of previously started tank temperature performance monitoring cycle (see definition)	=	1.56	°C
		or				
			(			
		start temperature is captured in EERPOM if monitoring is not active over several driving cycles	continuation of previously started tank temperature performance monitoring cycle (see definition)	=	FALSE	-
			(			
			ignition on for time	>	60	sec
			or	=	TRUE	
			ice detection by tank temperature difference:			
			(a) - (b)	<=	-0.14	°C
			(a) filtered current tank temperature	=	measured paramter	-
			(b) tank temperature captured at the beginning of current monitoring cycle	=	measured paramter	-
			))			
			or			
			(a) - (b)	<=	-0.14	°C
			(a) filtered current tank temperature	=	measured paramter	-
			(b) tank temperature captured at the beginning of current monitoring cycle	=	measured paramter	-
			or			
			monitoring was performed in previous driving cycle			
		continuation of previously started tank temperature performance monitoring cycle	temperature difference: (a) - (b)	<=	1.56	°C
			(a) filtered current tank temperature	=	measured paramter	-
			(b) tank temperature of the previous driving cycle	=	measured paramter	-
			temperature difference: (a) - (b)	<=	0	°C
			(a) tank temperature of the previous driving cycle	=	measured paramter	-
			(b) filtered current tank temperature	=	measured paramter	-
			temperature difference: (a) - (b)	>=	0	°C

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			(a) tank temperature of the previous driving cycle	=	measured paramter	-
			start tank temperature of current monitoring cycle from EEPROM (see definition)	=	measured paramter	-
			Engine off Time	<=	2000	sec
			This monitor was complete in the last driving cycle	=	FALSE	
			ice detection by tank temperature difference:			
			(a) - (b)	>	-0.14	°C
			(a) filtered current tank temperature	=	measured paramter	-
			(b) tank temperature captured at the beginning of current monitoring cycle	=	measured paramter	-
		State of Reductant injection valve Component Protection	((			
			status of SCR control sub state (please see the definition)	=	Metering control	-
			and with			
			(			
			PM Filter Regeneration	=	not active	-
			Modeled Reductant injection valve tip temperature based on its coil temperature (see Look-Up-Table #15)	>	100.96 to 114.96	°C
			)			
			or			
			(			
			PM Filter Regeneration	=	active	
			Reluctant dosing valve modeled temperature	>	19.96	°C
			))			
			or			
			(			
			status of SCR control sub state (please see the definition)	≠	Metering control	-
			and with			
			(			
			PM Filter Regeneration	=	not active	

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			Modeled Reductant injection valve tip temperature based on its coil temperature (see Look-Up-Table #15)	>	100.96 to 114.96	°C
			)			
			or			
			(			
			PM Filter Regeneration	=	active	
			Modeled Reductant injection valve tip temperature based on its coil temperature	>	19.96	°C
			)))			
Turbo Charger		Turbocharger (VNT) wiping active	The Variable Nozzle Turbocharger Control has an intrusive mode where: VNT wiping is a sweep of the vane position control throughout its range of motion which is used to: avoid a binding of the VNT vanes due to soot accumulation during long idle operation with a cold engine.			

16 OBDG09 Closed Loop Enable Condition Table - ECM

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
Exhaust Gas Recirculation (EGR)	Exhaust Gas Recirculation (EGR) Closed Loop Control is enabled	EGR controller is active continuously with exceptions for failures detected EGR controller is active Overrun Long Idle Transmission Gear Shift Cold Start extreme temperature or pressure Critical Regeneration Modes						
		Overrun	Engine Speed	>	1000	rpm	Crank Position	P0335,P0336, P0016
			Commanded Fuel	<	4	mm3/rev	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
		Overlong Idle	Engine Speed	<	1500	rpm	Crank Position	P0335,P0336, P0016
			Vehicle Speed	=	0	mph	Transmission output speed sensor	P0722, P0721
			Accelerator Pedal	=	0	%	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
			Above conditions true for Time Function of EGR Temperature (see Look-Up-Table #22)	=	0 to 150	sec	EGR Gas Temperature 1	P040C, P040D, P040F
							Engine off timer	P02610
		System error	DTC Pending or Confirmed	=	P0101, P0102, P0103, P0400, P1118, P1117, P2205, P2263, P0403, P140F, P0490, P140E, P0489, P140D, P1407, P0406, P0405, P2229, P2228, P2453, P2263, P0106, P0108, P0107, P0098, P0097, P007D, P007C, P02E0, P02EB, P02E3, P122F, P02E2, P122E, P122C, P02E9, P02E8, P006F,P006E, P0045, P0048, P0047,	-		
		Error exhaust gas recirculation valve	DTC Pending or Confirmed	=	P0406, P0405	-		
		Engine Brake Status	DFCO Active	=	TRUE	-		
			Vehicle Speed	>	12.42	mph	Transmission output speed sensor	P0722, P0721
		Atmospheric pressure too low	Barometric Pressure	<	72	kPa	Barometric Pressure	P2228, P2229, P0106
		Battery voltage too low	Battery Voltage	<	8	V		
		Switch-off coordinator	Not Used on our application will remove for future					
		Environmental temperature too low	Intake Air Temperature	<	-8	°C	Intake Air Temperature 2	P0097, P0098, P111C
		Environmental temperature too high	Intake Air Temperature	>	80	°C	Intake Air Temperature 2	P0097, P0098, P111C
		Engine temperature too low	Engine Coolant	<	44.5	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
		Engine temperature too high	Engine Coolant	>	108	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
		Cold start	Engine Cranking	=	Active	-	Crank Position	P0335,P0336, P0016
			or Engine Running	<	30	sec	Engine off timer	P02610
		Injection quantity too large	Commanded Fueling (see table 23) Function of Engine Speed & Charge Air Cooler Temp	<	220 to 400	mm^3/rev	Pedal Position 1 & 2 Crank Sensor Charge Air Cooler Temperature Out	P2122, P2123, P2138, P2127, P2128 P0335,P0336, P0016 P007D, P007C, P111C
		Environmental Temperature too low in Regeneration	Calibrated out on our application					
			Intake Air Temperature	<	-60	°C	Intake Air Temperature 2	P0097, P0098, P111C
		EGR Stroking	DFCO Active	=	TRUE	-	Engine off timer	P02610
			Exhaust Brake	=	Not Active			
		EGR controller is active in Overrun (warm exhaust system)	DFCO Active	=	TRUE	-		
			Regeneration Mode	=	Active			
		EGR controller is active in Overrun (Cold exhaust system)	DFCO Active	=	TRUE	-		

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			Regeneration Mode	=	Active			
		Atmospheric Pressure too low in Regeneration	Calibrated out on our application					
			Barometric Pressure	<	52	kPa	Barometric Pressure	P2228, P2229, P0106
		Engine Temperature too low in Regeneration	Engine Coolant	<	50	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
		Engine Temperature too high in Regeneration	Engine Coolant	>	118	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
		Rich Idle	Engine Speed	>	550	rpm	Crank Position	P0335,P0336, P0016
			Engine Speed	<	875	rpm	Crank Position	P0335,P0336, P0016
			Engine Coolant Temperature	>	60	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
			Engine Coolant Temperature	<	108	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
			Ambient Air Temperature	>	-5	°C	Intake Air Temperature 2	P0097, P0098, P111C
			Vehicle Speed	<	4	mph	Transmission output speed sensor	P0722, P0721
			Accelerator Pedal	<	2	%	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
			Upstream DOC Temperature	>	200	°C		
			Transmission not in Reverse	=	TRUE	-		
			DPF Regeneration	=	FALSE	-		
Fuel Balance Control States	Closed Loop	Command Fuel Quantity	injection quantity	≥	8	mm^3/rev	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
			injection quantity (see Look-Up-Table #31)	≤	200 to 380	mm^3/rev	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
		Engine Speed	engine speed	≥	(Look-Up-Table #91) - 150	rpm	Crank Position	P0335,P0336, P0016
			engine speed	≤	2750	rpm	Crank Position	P0335,P0336, P0016
		No Active System Errors	No DTC Pending OR Active	=	P0335, P0336, P0340, P0341, P2146, P2149, P2152, P2155, P0207, P0208, P1224, P1227, P1242, P1247, P1233, P1236, P1239	-		
	Open Loop	Command Fuel Quantity	injection quantity	=	6	mm^3/rev	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
			or					
			injection quantity	=	(Look-Up-Table #31) to (Look-Up-Table #31 + 20)	mm^3/rev	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
		Engine Speed	engine speed range 1	=	(Look-Up-Table #91)-250 to (Look-Up-Table #91) - 150	rpm	Crank Position	P0335,P0336, P0016
			engine speed range 2	=	2750 to 2850	rpm	Crank Position	P0335,P0336, P0016
		No Active System Errors	No DTC Pending OR Active	=	P0341, P0340, P0336, P0335, P2146, P2149, P2152, P2155, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P1224, P1227, P1242, P1247, P1233, P1236, P1239, P122A	-		
	InActive	Command Fuel Quantity	injection quantity Range 1	<	6	mm^3/rev	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
			or					
			injection quantity Range 2	>	(Look-Up-Table #31) + 20	mm^3/rev	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
		Engine Speed	Engine Speed Range 1	<	(Look-Up-Table #91)-250	rpm	Crank Position	P0335,P0336, P0016
			or					
			Engine Speed Range 2	>	2850	rpm	Crank Position	P0335,P0336, P0016

16 OBDG09 Closed Loop Enable Condition Table - ECM

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		Active Errors	No DTC Pending OR Active	=	P0341, P0340, P0336, P0335, P2146, P2149, P2152, P2155, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P1224, P1227, P1242, P1247, P1233, P1236, P1239, P122A	-		
HCI Loop	Closed Loop	Regen demand	time	≥	70,200	sec		P2610
			distance	≥	802	miles		P0722, P0721
			fuel	≥	325	liters		P2122, P2123, P2138, P2127, P2128
			soot	≥	44	grams	Delta Pressure Sensor	P2453, P2454, P2455
		DOC inlet temperature	upstream DOC temperature	≤	620	C	EGT 1	P0545, P0546, P20E2, P2080, P2428
			upstream DOC temperature	≥	230	C	EGT 1	P0545, P0546, P20E2, P2080
			for time	≥	0.5	s		
		DPF inlet temperature	DPF upstream temperature	≤	750	C	EGT 3	P242D, P242C, P242D, P113A, P242B, P2428
			DPF upstream temperature	≥	230	C	EGT 3	P242D, P242C, P242D, P113A, P242B
			for time	≥	0.5	s		
	Open Loop	Regen demand	time	≥	70,200	s		P2459, P2463
			distance	≥	802	miles		P2459, P2463
			fuel	≥	325	liters		P2459, P2463
			soot	≥	44	grams	Delta Pressure Sensor	P2453, P2454, P2455
		DOC inlet temperature	upstream DOC temperature	<=	230	C	EGT 1	P0545, P0546, P20E2, P2080
			for time	\	0.5	s		
		DPF inlet temperature	DPF upstream temperature	>=	750	C	EGT 3	P242D, P242C, P242D, P113A, P242B, P2428
			or					
			DPF upstream temperature	<=	230	C	EGT 3	P242D, P242C, P242D, P113A, P242B
			for time	≥	0.5	s		
		No Active System Errors	No DTC Pending OR Active	=	P2084, P10CE, P10CD P20CE, P20CB, P20CD P10CC, P0420, P2463, P2033, P2032	-		
		Exhaust flow rate	exhaust flow rate	≥	13.89	g/sec	Mass Air Flow Sensor	P0101, P0102, P0103
Intake Manifold Pressure	Intake Manifold Pressure Control is enabled	Manifold Pressure controller is active continuously with exceptions for Pending & Confirmed DTCs & under following conditions						
		Manifold Pressure Closed Loop	Manifold pressure dependent on Engine Speed, Commanded Fueling, EGR, and BARO pressure (see Look-Up-Table 25 - 30)				Crank Position	P0335,P0336, P0016
							Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
		Working Range (Manifold Pressure Open Loop)		≠	Manifold Pressure Closed Loop			

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		Cold Start	Engine Run time a function of Engine Coolant (see Look-Up-Table #24)	<	5 to 300	sec	Engine off timer	P02610
		System Error	No DTC Pending OR Active	=	P0102, P0103, P0118, P0117, P2263, P2229, P2228, P0107, P0108, P0C7D, P007C, P02E9, P02E8, P2565, P2564, P006F	-		
		Gear Shifting	Not Used in our Application Will Remove for Furture					
		Compressor Surge Detection	EGR Control	=	Not Active	-		
			Transmission Gear	=	R, 1, 2	-	Transmission Range Switch	P0706, P0708
			Engine Coolant	>	-20	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
				<	130	°C		
			Pressure Ratio (Manifold Pressure / Barometric Pressure)	>	1.85	ratio	Barometric Pressure	P2228, P2229, P0106
			Modelled Exhaust Gas Pressure / Manifold Pressure	>	0.65	ratio	Manifold Absolute Pressure Sensor	P0107, P0108, P0106
			Air Mass	<	333.33	g/sec	Mass Air Flow Sensor	P0102, P0103, P0101
			Engine Speed Gradient	<	500	rpm / sec	Crank Position	P0335,P0336, P0016
			Engine Torque Demand Gradient	<	-720	Nm / sec	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
		Exhaust Brake	DFCO Active	=	TRUE	-		
			Vehicle Speed	>	12.42	mph	Transmission output speed sensor	P0722, P0721
		Exhaust Pressure Control	Start Up Engine Coolant Temperature	<	80	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
			Intake Air Temperature	<	4	°C	Intake Air Temperature 2	P0097, P0098, P111C
			Engine Coolant	<	66	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
			PTO	=	Not Active			
			Transmission Gear State	=	P, N		Park Neutral Switch	P0851, P0852
			Brake Pressed	=	Not Active		Brake Pedal Position Sensor	P057D, P057C,
			Engine Speed	<	1300	rpm	Crank Position	P0335,P0336, P0016
			Vehicle Speed	<	15.53	mph	Transmission output speed sensor	P0722, P0721
			No DTC Pending OR Active	=	P0571, P0118, P0117, P0336, P0335, P2123, P2128, P2122, P2127, P007D, P007C			
Inner Loop - Reneration Temperature Control	Closed Loop	DPF Regeneration demand Active	time	≥	70,200	s		P2459, P2463
			distance	≥	802	miles		P2459, P2463
			fuel	≥	325	liters		P2459, P2463
			soot	≥	44	grams	Delta Pressure Sensor	P2453, P2454, P2455
		DOC inlet temperature	upstream DOC temperature	≤	650	C	EGT 1	P0545, P0546, P20E2, P2080, P2428
			upstream DOC temperature	≥	100	C	EGT 1	P0545, P0546, P20E2, P2080
			for time	≥	0.5	s		
		No Active System Errors	No DTC Pending OR Active	=	P0420, P2463	-		
	Open Loop	DPF Regeneration demand Active	time	≥	70,200	s		P2459, P2463
			distance	≥	802	miles		P2459, P2463
			fuel	≥	325	liters		P2459, P2463
			soot	≥	44	grams	Delta Pressure Sensor	P2453, P2454, P2455

16 OBDG09 Closed Loop Enable Condition Table - ECM

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		DOC inlet temperature	upstream DOC temperature	>=	650	C	EGT 1	P0545, P0546, P20E2, P2080, P2428
			upstream DOC temperature	<=	100	C	EGT 1	P0545, P0546, P20E2, P2080
			for time	≥	0.5	s		
SCR System	NOx Control System Reductant Dosing Strategy Active State	Release of dosing of the dosing strategy						
			status of SCR control state (please see the definition)	=	Metering Control	-		
			Reductant dosing is released	=	TRUE	-		
			Average temperature inside the SCR catalyst:	>	179.96	°C	Exh Temp Sensor 2 & 3	P2032, P2033, P20E2, P2084, P242C, P242D, P113A, P242B
			engine speed	>	400	rpm	Crank Position	P0335,P0336, P0016
			Status of request for Service Quality Test	=	0			
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
	NOx Control System Reductant Dosing Pressure Control System States		ignition	=	on	-		
		State of Reductant Pressure Control System: Standby	Dwell time in the state of standby	<	5	sec		
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
		State of Reductant Pressure Control System: No Pressure control	Old SCR control state (please see the definition)	=	Stand by	-		
			ignition	=	on	-		
			Dwell time in the state of standby	>=	5	sec		
			Dwell time in the state of no pressure control	<	2	sec		
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
		State of Reductant Pressure Control System: Pressure control	Old SCR control state (please see the definition)	=	NO Pressure Control	-		
			ignition	=	on			
			engine speed	>	550	rpm	Crank Position	P0335,P0336, P0016
			Dwell time in the state of no pressure control	>=	2	sec		
			exhaust gas temperature Upstream SCR	>=	169.96	°C	Exh Temp Sensor 2	P2032, P2033, P20E2, P2084
			(					
			Reductant Defrost check (please see the definition)	=	TRUE	-		
			or					
			The component protection release of the heater control (please see the definition)	=	TRUE	-		
			or					
			Preliminary release of the heater control for the main state machine (please see the definition)	=	TRUE	-		
			)					
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
		State of Reductant Pressure Control System: Refilling Reductant in pressure line (substate of Pressure control)	SCR control state (please see the definition)	=	Pressure Control	-		
			(					
			Reductant filling state in the pressure line	<	50	%		
			and					
			Reductant Pump Module Pressure	<	200	kPa	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			)					
			Set-point duty cycle for Reductant dosing valve	=	100	%	Reductant Injector	P1048, P2048, P1049, P2049, P2047, P202E
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	40.00	%	Reductant Pump	P1043, P1044, P208B, P208A, P208D
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

16 OBDG09 Closed Loop Enable Condition Table - ECM

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		State of Reductant Pressure Control System: Pressure build up (substate of Pressure control)	SCR control state (please see the definition)	=	Pressure Control	-		
			(					
			Reductant filling state in the pressure line	>=	50	%		
			or					
			Reductant Pump Module Pressure	>=	200	kPa	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			for time	>	0.5	sec		
			)					
			Reductant Pump Module Pressure	<	350	kPa	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			Set-point duty cycle for Reductant dosing valve	=	0%	%	Reductant Injector	P1048, P2048, P1049, P2049, P2047, P202E
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	80.00	%	Reductant Pump	P1043, P1044, P208B, P208A, P208D
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
		State of Reductant Pressure Control System: Ventilation (substate of Pressure control)	SCR control state (please see the definition)	=	Pressure Control	-		
			Reductant Pump Module Pressure	<	350	kPa	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			Dwell time in Pressure Build up substate	>	10	sec		
			system pressurizes in pressure buildup and ventilation states	<	10	counts		
			Set-point duty cycle for Reductant dosing valve	=	100	%	Reductant Injector	P1048, P2048, P1049, P2049, P2047, P202E
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	80.00	%	Reductant Pump	P1043, P1044, P208B, P208A, P208D
			Dwell time in the sub state ventilation	<	0.23	sec		
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
		State of Reductant Pressure Control System: Metering control (substate of Pressure control)	SCR control state (please see the definition)	=	Pressure Control	-		
			Reductant Pump Module Pressure	>=	350	kPa	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			Set-point duty cycle for Reductant dosing valve	=	0	%	Reductant Injector	P1048, P2048, P1049, P2049, P2047, P202E
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
		State of Reductant Pressure Control System: Pressure reduction	ignition	=	off	-		
			dwell time in the state of pressure reduction	<	5	sec		
			Activation state of Reductant reverting valve power stage	=	On	-	Reductant Pump Reverting Valve	P20A2, P1046, P20A3, P20A0, P20A1
			Set-point duty cycle for Reductant dosing valve	=	0	%	Reductant Injector	P1048, P2048, P1049, P2049, P2047, P202E
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	15.00	%	Reductant Pump	P1043, P1044, P208B, P208A, P208D
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
	SCR Engine State required for operation	SCR Engine State	Ignition on	=	TRUE	-		
			engine speed	>	550	rpm	Crank Position	P0335,P0336, P0016
	Reductant Heater and Defrost System Control States and Status							
		Reductant Defrost check	status of reductant tank heater temperature (please see the definition)	=	TRUE	-		
			State of the defrosting check of pressure line (please see the definition)	=	TRUE	-		
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-		
			(					

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			duration, for which the conditions for a hydraulic release reset of pressure line heater circuit are satisfied	<=	1200	sec		
			ambient temperature	>	-4.04	°C	Intake Air Temperature 2	P0097, P0098, P111C
			Release heater pressure line	=	FALSE	-		
			and					
			duration, for which the conditions for a hydraulic release reset of supply module heater circuit are satisfied	<=	1200	sec		
			ambient temperature	>	-4.04	°C	Intake Air Temperature 2	P0097, P0098, P111C
			Release heater supply module	=	FALSE	-		
			)					
		Status of reductant tank heater temperature	**status of reductant tank heater temperature (please see the definition)**					
			Reductant tank heat temperature at Standby state	>	-0.04	°C	Reductant Tank Temperature Sensor	P205D, P205C, P205B
			or					
			Engine off Time	<	2147483647	sec		
			Reductant tank heat temperature at Standby state	>	-9.04	°C	Reductant Tank Temperature Sensor	P205D, P205C, P205B
		State of the defrosting check of pressure line	**State of the defrosting check of pressure line (please see the definition)**					
			time since pressure line heating on under pressure line defrost mode	>=	0 to 3276.7	sec		
			or					
			status of SCR control state (please see the definition)	=	No Pressure Control	-		
			Pressure line defrost timer	=	0	sec		
			or					
			ignition	=	on	sec		
			engine speed	>	550	rpm	Crank Position	P0335,P0336, P0016
			(					
			Pressure line defrost check in last driving cycle	=	TRUE	-		
			status of SCR control state (please see the definition)	=	No Pressure Control	-		
			Engine off Time	>	0	sec		
			NO Pending or Confirmed DTCs:	=	TRUE	-		
		State of the defrosting check of supply module	**State of the defrosting check of supply module (please see the definition)**					
			time since supply module heating on under supply module defrost mode	>=	0 to 3276.7	sec		
			or					
			status of SCR control state (please see the definition)	=	No Pressure Control	-		
			Supply module defrost timer	=	0	sec		
			or					
			ignition	=	on	sec		
			engine speed	>	550	rpm	Crank Position	P0335,P0336, P0016
			(					
			Pressure line defrost check in last driving cycle	=	TRUE	-		
			status of SCR control state (please see the definition)	=	No Pressure Control	-		
			Engine off Time	<	0	sec		
			NO Pending or Confirmed DTCs:	=	TRUE	-		
		The component protection release of the heater control	Current time for heating / not heating of heater circuit 1 (tank)	>=	0 to 299	sec		
			Reductant Defrost check (please see the definition)	=	FALSE	-		
		Preliminary release of the heater control for the main state machine	Preliminary release of the heater control for the main state machine (please see the definition)					
			(					
			Current time for heating / not heating of heater circuit 1 (tank)	>=	0 to 3276	sec		
			status of reductant tank heater defrost	=	FALSE	-		
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-		

16 OBDG09 Closed Loop Enable Condition Table - ECM

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			State of the defrosting check of pressure line (please see the definition)	=	TRUE	-		
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-		
			)					
			or					
			(					
			ignition	=	on	sec		
			engine speed	>	550	rpm	Crank Position	P0335,P0336, P0016
			Engine off Time	<=	0	sec		
			State of the defrosting check of pressure line (please see the definition)	=	TRUE	-		
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-		
			and					
			if the following conditions were met in previous driving cycle	=	TRUE	-		
			(					
			ignition	=	on	sec		
			engine speed	>	550	rpm	Crank Position	P0335,P0336, P0016
			Engine off Time	<=	0	sec		
			State of the defrosting check of pressure line (please see the definition)	=	TRUE	-		
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-		
			))					
		Release of tank heater circuit	(					
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec		
			or					
			Requested heating time for Reductant tank heater (see Look-Up-Table #17)	>=	0 to 3277	sec		
			)					
			or					
			((					
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec		
			or					
			Requested heating time for Reductant tank heater (see Look-Up-Table #17)	>=	0 to 3277	sec		
			)					
			and					
			(					
			Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 3276.7	sec		
			or					
			Requested heating time for pressure line heater (see Look Up-Table #20)	>=	0 to 3276.7	sec		
			))					
			or					
			((					
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec		
			or					
			Requested heating time for Reductant tank heater (see Look-Up-Table #17)	>=	0 to 3277	sec		
			)					
			and					
			(					
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 3276.7	sec		
			or					
			Requested heating time for supply module heater (see Look-Up-Table #21)	>=	0 to 3276.7	sec		
			))					
			or					
			((					
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec		

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

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 3276.7	sec		
			or					
			Requested heating time for supply module heater (see Look-Up-Table #21)	>=	0 to 3276.7	sec		
			))					
			or					
			((					
			Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 3276.7	sec		
			or					
			Requested heating time for pressure line heater (see Look Up-Table #20)	>=	0 to 3276.7	sec		
			)					
			and					
			(					
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 3276.7	sec		
			or					
			Requested heating time for supply module heater (see Look-Up-Table #21)	>=	0 to 3276.7	sec		
			))					
			or					
			((					
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec		
			or					
			Requested heating time for Reductant tank heater (see Look-Up-Table #17)	>=	0 to 3277	sec		
			)					
			and					
			(					
			Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 3276.7	sec		
			or					
			Requested heating time for pressure line heater (see Look Up-Table #20)	>=	0 to 3276.7	sec		
			)					
			and					
			(					
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 3276.7	sec		
			or					
			Requested heating time for supply module heater (see Look-Up-Table #21)	>=	0 to 3276.7	sec		
			))					
			and					
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
		Status of the battery voltage being in the valid working range for Reductant tank heater						
			battery voltage	<	100	V		
			battery voltage	>	11	V		
			for time	>	2	sec		
		Status of the battery voltage being in the valid working range for pressure line heater						
			battery voltage	<	100	V		
			battery voltage	>	11	V		
			for time	>	2	sec		
		Status of Reductant Tank Heater Release						
			(					

16 OBDG09 Closed Loop Enable Condition Table - ECM

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-		
			Waiting time after tank heater release expired	>	0	sec		
			)					
			or					
			((					
			Waiting time before tank heater released started with	<	32767	sec		
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-		
			)					
			and					
			(					
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-		
			Waiting time after tank heater release expired	>	0	sec		
			))					
			or					
			((					
			Waiting time before tank heater released started with	>	32767	sec		
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-		
			)					
			and					
			(					
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-		
			Waiting time after tank heater release expired	>	0	sec		
			))					
	Reductant Tank Level System States and Status	status of Reductant tank level	Tank level > full (100%)	=	Full	-		
			Warning (66.67%) < tank level < full (100%)	=	OK	-		
			Restriction (33.33%) < tank level < Warning (66.67%)	=	Warning	-		
			Empty < tank level < Restriction (33.33%)	=	Restriction	-		
			Tank level < = 0.1%	=	Empty	-		
		Status of Reductant tank level reset when refilling is detected (please see the definition)	(					
			time since potential Reductant refill detection is set and with	>=	12	sec		
			(					
			Derivation of the PT1 filtered level signal (DT1)	>=	1.00	%/sec		
			ignition on	=	TRUE	-		
			engine speed	>	550	rpm	Crank Position	P0335,P0336, P0016
			Vehicle speed	>=	6.22	mph	Transmission output speed sensor	P0722, P0721
			time since engine started	<=	(a) * (b)			
			(a) Time period for a positive slope to detect refueling	=	12	sec		
			(b) Factor for the extension of the detection time for refueling	=	20	factor		
			since the following conditions met:	=	TRUE	-		
			(					
			Falling edge of ignition	=	TRUE	-		
			or					
			Reductant Refill enabling conditions reset timers	=	TRUE	-		
			)))					
			or					
			(					
			time since potential Reductant refill detection is set and with	>=	8	sec		
			(					
			Derivation of the PT1 filtered level signal (DT1)	>=	1.00	%/sec		
			filter release for Reductant tank level calculation at ignition on on (Please see the definition)	=	TRUE	-		
			and with					
			(					

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			Frozen state is active during a certain warning level (please see the definition)	=	TRUE	-		
			and with					
			(					
			Reductant tank Temperature	>=	-100.04	°C	Reductant Tank Temperature Sensor	P205D, P205C, P205B
			or					
			Reductant low warning level (Please see the definition)	>=	0	level		
			)))					
		Status of Reductant Tank Level Release	status of reductant tank level release (please see the definition)					
			Status of Filter release for reductant tank level calculation (please see the definition)	=	TRUE	-		
			and					
			((					
			ambient temperature	>=	-100.04	°C	Intake Air Temperature 2	P0097, P0098, P111C
			((					
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-		
			Waiting time before tank heater released	<	32767	sec		
			and					
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-		
			Waiting time after tank heater release expired	>	0	sec		
			)					
			or					
			(					
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-		
			Waiting time before tank heater released	>=	32767	sec		
			and					
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-		
			Waiting time after tank heater release expired	>=	0	sec		
			))					
			or					
			Frozen state is active during a certain warning level (please see the definition)	=	TRUE	-		
			)					
			Vehicle speed	>=	6.22	mph	Transmission output speed sensor	P0722, P0721
			)					
			or					
			filter release for Reductant tank level calculation at ignition on on (Please see the definition)	=	TRUE	-		
		Status of Filter release for reductant tank level calculation						
			Reductant tank Temperature	>=	-100.04	°C	Reductant Tank Temperature Sensor	P205D, P205C, P205B
			or					
			Reductant low warning level (Please see the definition)	>=	0	-		
			NO Pending or Confirmed DTCs:	=	TRUE	-		
			or					
			Frozen state is active during a certain warning level (please see the definition)	=	TRUE	-		
		Filter release for Reductant tank level calculation at Ignition on	ignition	=	on	-		
			Engine on timer is expired (please see the definition)	=	FALSE	-		
			Vehicle speed	>=	0.62	mph	Transmission output speed sensor	P0722, P0721
			Reductant low warning level (Please see the definition)	>=	49	level		
			and with					
			((					
			Raw Reductant tank level	>=	33.3	%		
			and with					
			(					
			Remaining Reductant quantity (a) - (b):	<	(a) - (b)			
			(a) Tank level for reserve mode (Restriction level) in [g]	=	2614	g		

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Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			(b) Tank level threshold range below Restriction threshold for ignition on refill detection release	=	1015	g		
			)					
			or					
			Raw Reductant tank level	>=	66.7	%		
			and with					
			(					
			Remaining Reductant quantity (a) - (b):	<	(a) - (b)			
			(a) Tank level for reserve mode (Warning level) in [g]	=	5279	g		
			(b) Tank level threshold range below WARNING threshold for ignition on refill detection release	=	1617	g		
			)					
			or					
			Raw Reductant tank level	>=	100	%		
			and with					
			(					
			Remaining Reductant quantity (a) - (b):	>=	(a) - (b)			
			(a) Tank level for reserve mode (Warning level) in [g]	=	5279	g		
			(b) Tank level threshold range below WARNING threshold for ignition on refill detection release	=	1617	g		
			))					
		Status of Refill detection of Reductant tank	Status of Refill detection of Reductant tank (please see the definition)					
			Reductant tank level changed	=	TRUE	-		
			((					
			Captured Reductant tank level at last tank level change	=	Empty	-		
			or					
			Captured Reductant tank level at last tank level change	=	Restriction	-		
			)					
			and					
			(					
			one or more of following conditions are met					
			status of Reductant tank level (please see the definition)	=	Warning	-		
			or					
			status of Reductant tank level (please see the definition)	=	OK	-		
			or					
			status of Reductant tank level (please see the definition)	=	Full	-		
			))					
			or					
			((					
			Captured Reductant tank level at last tank level change	=	Warning	-		
			or					
			Captured Reductant tank level at last tank level change	=	OK	-		
			)					
			and					
			(					
			status of Reductant tank level (please see the definition)	=	Full	-		
			)					
			or					
			(					
			Captured Reductant tank level at last tank level change	=	OK	-		
			status of Reductant tank level (please see the definition)	=	Full	-		
			))					
		Engine on timer is expired	time since engine started	>=	(a) * (b)	sec		
					12	sec		

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
					20	-		
			and with					
			((					
			ignition	=	on	sec		
			engine speed	>	550	rpm	Crank Position	P0335,P0336, P0016
			Vehicle speed	>=	6.22	mph	Transmission output speed sensor	P0722, P0721
			)					
			or					
			(					
			Vehicle speed	>=	6.22	mph	Transmission output speed sensor	P0722, P0721
			NO Pending or Confirmed DTCs:	=	TRUE			
			for time	>	1	sec		
			))					
			and with timer reset conditions					
			(					
			Falling edge of ignition	=	TRUE	-		
			or					
			Reductant Refill enabling conditions reset timers	=	TRUE	-		
			)					
	Reducant Tank Level Low Warning States	Normal_Operation_OK: 0 decimal, normal operation	Reductant tank level	=	Full	-		
			and with					
			(					
			Warning level	<=	49	-		
			or					
			(					
			Previous warning level	>	49	-		
			vehicle speed	<=	98.75	mph	Transmission output speed sensor	P0722, P0721
			))					
			or					
			Reductant Quality state	>	0	-		
		Warning_Leve1: 1 decimal, Warning level 1	Reductant tank level	<	Full	-		
			Remaining mileage	>	1558.75	miles		
			and with					
			(					
			Warning level	<=	49	Warning level		
			or					
			(					
			Previous warning level	>	49	Warning level		
			vehicle speed	<=	98.75	mph	Transmission output speed sensor	P0722, P0721
			))					
			and with					
			Reductant Quality state	=	0	-		
		Warning_Level2: 2 decimal, Warning level 2	Reductant tank level	<	Full	-		
			Remaining mileage	<=	1558.75	miles		
			and with					
			(					
			Warning level	<=	49	Warning level		
			or					
			(					
			Previous warning level	>	49	Warning level		
			vehicle speed	<=	98.75	mph	Transmission output speed sensor	P0722, P0721
			))					
			and with					
			Reductant Quality state	=	0	-		

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Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		Warning_Level3: 16 decimal, Warning level 3	Reductant tank level	<	Full	-		
			Remaining mileage	>	855	miles		
			and with					
			(					
			Warning level	=	2	Warning level		
			or					
			Warning level	=	16	Warning level		
			)					
			and with					
			initialization phase after Reductant refill event is active	=	TRUE	-		
			Reductant Quality state	=	0	-		
		Warning_Level4: 32 decimal, Warning level 4	Reductant tank level	<	Full	-		
			Remaining mileage	<=	855	miles		
			and with					
			(					
			Warning level	<=	49	Warning level		
			or					
			(					
			Previous warning level	>	49	Warning level		
			vehicle speed	<=	98.75	mph	Transmission output speed sensor	P0722, P0721
			))					
			and with					
			Reductant Quality state	=	0	-		
		Warning_Level5: 48 decimal, Warning level 5	((					
			Reductant tank level	<	Full	-		
			Remaining mileage	<=	628.75	miles		
			and with					
			(					
			Warning level	<=	49	Warning level		
			or					
			(					
			Previous warning level	>	49	Warning level		
			vehicle speed	<=	98.75	mph	Transmission output speed sensor	P0722, P0721
			)))					
			or					
			(					
			Warning level	=	48	Warning level		
			initialization phase after Reductant refill event is active	=	TRUE	-		
			))					
			and with					
			Reductant Quality state	=	0	-		
		Warning_Level6: 49 decimal, Warning level 6	((					
			Warning level	=	49	Warning level		
			initialization phase after Reductant refill event is active	=	TRUE	-		
			)					
			or					
			(					
			Warning level	<	49	Warning level		
			Failed Reductant system pressure build up	=	1	-		
			))					
			and with					
			Reductant Quality state	=	0	-		

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		Warning_Level8: 80 decimal,Vehicle speed restriction mild	Warning level	=	80	Warning level		
			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		
			initialization phase after Reductant refill event is active and with	=	TRUE	-		
			Reductant Quality state	=	0	-		
		Warning_Level12: 144 decimal, Vehicle speed restriction severe	Warning level	=	144	Warning level		
			initialization phase after Reductant refill event is active and with	=	TRUE	-		
			Reductant Quality state	=	0	-		
		Warning_Level14: 176 decimal, Vehicle speed restriction final	Warning level	=	176	Warning level		
			initialization phase after Reductant refill event is active and with	=	TRUE	-		
			Reductant Quality state	=	0	-		
	Reductant frozen System States	Frozen state is active during a certain warning level	ignition	=	On	-		
			for time	>	5	sec		
			Reductant tank Temperature	<=	-9.04	°C	Reductant Tank Temperature Sensor	P205D, P205C, P205B
			Reductant low warning level (Please see the definition)	>=	2	level		
		Status of Reductant tank as frozen	(					
			Engine off Time	>	14400	sec		
			Reductant tank Temperature	<	-11.04	°C	Reductant Tank Temperature Sensor	P205D, P205C, P205B
			)					
			or					
			(					
			Engine off Time	<=	7200	sec		
			time since the following conditions are met	<=	7200	sec		
			(					
			status of reductant tank heater defrost	=	On or Defrost	-		
			Vehicle speed	>	6.22	mph	Transmission output speed sensor	P0722, P0721
			Status of urea tank as frozen (please see the definition)	=	TRUE	-		
			))					
	SCR System Pressure State	Status of Low Reductant Pump Pressure - Under Reductant warning level 3 - Main state 0x30						
			Reductant low warning level (Please see the definition)	>=	64	-		
			number of pressure build-up attempts and	>=	2	counts		
			(					
			status of SCR control sub state (please see the definition)	=	Pressure Build up	-		
			Reductant Pump Module Pressure	<	350	kPa	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			Dwell time in Pressure Build up substate	>	10	sec		
			system pressurizes in pressure buildup and ventilation states	>=	10	counts		

16 OBDG09 Closed Loop Enable Condition Table - ECM

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG09	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			Reductant Defrost check (please see the definition))	=	TRUE	-		

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

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

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	100	100	100

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	100	100	100

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	18000	28799	28800	30000	32000
Delta Temperature (°C)	999	999	999	999	999	999	999	999	999	999	999	999	999	100	100	100

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
5	P2199	Air_tDiffMaxLoTAFS_CUR

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
6	P10CF	Air_tDiffMaxLoTCACDs_CUR

Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	17999	18000	28799	28800	30000	32000
Delta Temperature (°C)	999	999	999	999	999	999	999	999	999	999	999	999	999	27	27	27

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

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

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

Ambient Pressure (kPa)	70	75	80	82.5	87.5	90	97.5	100
Correction Factor (-)	0.48	0.48	0.6	0.7	0.867	0.9	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
Air Mass Flow (g/rev)	0.8	0.8	0.8	0.8	0.85	0.9	0.95	1	1.05	1.1	1.15	1.2

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

Injection Qty (mm^3/rev) / Engine Speed (rpm)	1000	1100	1200	1300	1400	1500	1600	1700
120	0.48	0.4	0.36	0.32	0.32	0.32	0.32	0.32
160	0.48	0.4	0.36	0.32	0.32	0.32	0.32	0.32
200	0.6	0.6	0.56	0.52	0.4	0.32	0.32	0.32
240	0.7	0.7	0.64	0.64	0.56	0.36	0.32	0.32
280	0.8	0.8	0.8	0.8	0.64	0.56	0.48	0.48
320	0.92	0.96	0.96	0.96	0.88	0.8	0.72	0.72
360	0.96	1	1	1.04	0.96	1.04	0.8	0.8
400	1	1.04	1.04	1.08	1.12	1.12	1.12	1.12

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
11	P0400	AirCtl_mMaxDvtPwr_MAP

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

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

Ambient Pressure (kPa)	65	70	75	80	83	90	95	100
Correction Factor (-)	2	2	1.75	1.594	1.5	1.208	1	1

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

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
14	P057B	Brk_facEWMASlowTest_CUR

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

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

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

16 OBDG09 Calibration Look Up Table - ECM

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

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
17	**P0336**	EpmCrS_facGapPlausHigh_CA

-	8	5.8125	3.375	3.375

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
18	**P0336**	EpmCrS_facIncPlausHigh_CA

-	2	1.8125	1.5	1.5

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
19	**P02CD, P02CF, P02D1, P02D3, P02D5, P02D7, P02D9, P02DB**	ETClb_pRailSet_CA

Rail Pressure Setpoint (kPa)	30000	70000	90000

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
20	**P02CD, P02CF, P02D1, P02D3, P02D5, P02D7, P02D9, P02DB**	ETClb_tiET_MAX_CA

Injector Energizing Time (usec)	670.8	384.4	353.2

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
21	**P01CD, P01CF, P01D1, P01D3, P01D5, P01D7, P01D9, P01DB**	ETClb_tiETFbOfsMax_CA

Injector Energizing Time (usec)	16	12	10

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
22	**P01CD, P01CF, P01D1, P01D3, P01D5, P01D7, P01D9, P01DB**	ETClb_tiETFbOfsMin_CA

Injector Energizing Time (usec)	16	12	10

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
23	**P144B**	ETCtl_stPOpCtVILopMax_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	750	900	2250	3000
0	0	1	1	0
40	0	1	1	0
160	0	1	1	0
200	0	0	0	0

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

Injection Qty (mm^3/rev) / Engine Speed (rpm)	750	900	2250	3000
0	0	1	1	0
40	0	1	1	0
160	0	1	1	0
200	0	0	0	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
25	**P24A0**	ETCtlHCI_stPOpCtVHCILopMaxInjMs_MAP

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

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

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

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

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

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

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

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

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

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

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

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

31 **P20E2** Exh_tDiffMaxLoTOxiCatDs_CUR

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

32 **P0483** FanCtl_facDiaDrvSpd_CUR

Fan Speed (rpm)	400	1679	1680	1800	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6400	6800
factor (-)	0	0	1	1	1	1	1	1	0.9	0.8	0.7	0.6	0.4	0.2	0	0	0

33 **P0483** FanCtl_facDiaDrvStab_CUR

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

34 **P0483** FanCtl_facDiaECT_CUR

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

35 **P0483** FanCtl_facDiaIAT_CUR

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

36 **P0495** FanCtl_nDiaHiSpd_CUR

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

37 **P0495** FanCtl_volClthDia_CUR

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

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

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

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

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

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

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
44	**P026D**	FMO_qFlSysThresMax_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	450	500	550	600	650	700	750	800
28	8	8	8	8	13.2	13.2	13.2	15.2
32	8	8	8	8	13.2	13.2	13.2	15.2
36	8	10	10	10	14	14	14	16
40	12	12	12	12	14.4	14.4	14.4	16.4
44	14	14	14	14	16	16	16	18
48	16	16	16	16	20	20	20	22
52	20	20	20	20	24	24	24	26
56	24	24	24	24	28	28	28	30

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

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
47	**P0171**	FMO_qOBDMin_MAP

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

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

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

49	**P11B4, P11B5**	Hegn_facLamDiaFdbk_CUR

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

50	**P054F**	InjCtl_qDesGearMonMax_MAP

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

54	**P0606**	MoFCoOfs_rTrqPtdOfs_MAP

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

63	P2263	PCR_pOvrBstDvt_MAP

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

64	P2263	PCR_pUndrBstDvt_MAP

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

65	P2459	PFlt_mSotThresRgnFreq_CUR

g	0	5	10	20	30	45
Soot Mass (g)	0	13.5	27.1	54.1	81.2	121.8

67	P128E	Rail_pCPCFltMin_CUR

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

68	P0087	Rail_pMeUnDvtMax_CUR

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

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

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

70	**P128E**	Rail_pMeUnFltMin_CUR

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

71	**P0087**	Rail_pPCVDvtMax_CUR

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

72	**P128E**	Rail_pPCVFltMin_CUR

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

74	**P11CB**	SCRChk_idcPOpMaxNOxUsPlaus_GMAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	600	1000	1199	1200	1300	1400	1500	1600	1700	1800	1900	2000	2001	2002	2100	2200
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
79.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
120	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
160	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
200	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
200.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

75	**P11CC**	SCRChk_idcPOpMinNOxUsPlaus_GMAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2001	2500	2600	3000
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
79.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
120	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
160	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
200	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
200.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
76	**P20EE**	SCRChk_mEstNH3LdMax_CUR

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
77	**P20EE**	SCRChk_mEstNH3LdMin_CUR

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
78	**P20EE**	SCRChk_mNH3LdDvtMax_CUR

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
79	**P20EE**	SCRChk_mNH3LdDvtMin_CUR

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

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

Injection Qty (mm^3/rev) / Engine Speed (rpm)	1100	1199	1200	1400	1600	1800	2000	2001	2200	2400
40	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
60	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
79.6	-1	-0.5358	-0.5358	-0.5233	-0.4972	-0.549	-0.4863	-0.4863	-1	-1
80	-1	-0.5358	-0.5358	-0.5233	-0.4972	-0.549	-0.4863	-0.4863	-1	-1
120	-1	-0.5674	-0.5674	-0.5975	-0.5458	-0.5417	-0.5541	-0.5541	-1	-1
160	-1	-0.5092	-0.5092	-0.5607	-0.5867	-0.5824	-0.5643	-0.5643	-1	-1
200	-1	-0.5237	-0.5237	-0.561	-0.5796	-0.5466	-0.5643	-0.5643	-1	-1
200.04	-1	-0.5237	-0.5237	-0.561	-0.5796	-0.5466	-0.5643	-0.5643	-1	-1
204	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
240	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

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

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

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

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

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

Filtered Exh Mass Flow (g/s) / SCR Upstream Temp (°C)	219.96	239.96	244.96	249.96	254.96	259.96	264.96	269.96	274.96	279.96	284.96	289.96	294.96	299.96	314.96	329.96
61.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.44	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
80.56	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
83.33	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0
97.22	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0
102.78	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0
111.11	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
119.44	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
127.78	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
136.11	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
144.44	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
152.78	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
161.11	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0
169.44	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0
177.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
186.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
85	**P20EE**	SCRChk_tDeltaTempSCRMax_CUR

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
88	**P20EE**	SCRChk_tiAddDisbl_MAP

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

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

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

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

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)

92 **P2598, P2599** TrbCh_tiDiaEnblDly_CUR

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

93 **P01CB, P01CD, P01D7, P01D9, P01D1, P01D3, P01D5, P01CF, P01CC, P01CE, P01D8, P01DA, P01D2, P01D4, P01D6, P01D0** ZFC_stGearRls_CA

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

94 **P01CB, P01CD, P01D7, P01D9, P01D1, P01D3, P01D5, P01CF, P01CC, P01CE, P01D8, P01DA, P01D2, P01D4, P01D6, P01D0** ZFC_tiCldCham_CUR

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

95 **P113A**

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

96 **P054E** InjCtl_qDesGearMonMin_MAP

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

97 **P0299** PCR_facPresDvtCorMax_CUR

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

98 **P026A** CAClg_dmThresHi_CUR

Vehicle Speed (mph)	25	75
Air Mass Flow (g/sec)	55.56	277.78

99 **P22FE** Hegn_VdSlfDiagB1S2.tiDlyHCUnLd_CUR

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

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

100 **P20EE** SCRChk_facEtaEstOfs1_MAP

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

101 **P20EE** SCRChk_tDeltaTempSCRMin_CUR

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

102 **P24C7** Exh_tPPDsTempMeaDifPos_CUR

Modeled Exhaust Gas Temperature at PM Sensor (°C)	-0.04	49.96	99.96	139.96	159.96	179.96	239.96	299.96
Temeperature Difference Threshold (°C)	74.96	74.96	74.96	64.96	54.96	44.96	34.96	34.96

103 **P24C7** Exh_tPPDsTempMeaDifNeg_CUR

Modeled Exhaust Gas Temperature at PM Sensor (°C)	-0.04	49.96	99.96	139.96	159.96	179.96	239.96	299.96
Temeperature Difference Threshold (°C)	-70.04	-70.04	-70.04	-80.04	-90.04	-100.04	-110.04	-110.04

16 OBDG09 Calibration Parameter Definition Tables - ECM

Table no.	Status or State	Label (Internal Manufacturer Reference)
1	**Status of NOx signal of upstream NOx sensor**	DewDet_wThresLSU0_MAP

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

Table no.	Status or State	Label (Internal Manufacturer Reference)
2	**Status of NOx signal of downstream NOx sensor**	DewDet_wThresLSU1_MAP

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

Table no.	Status or State	Label (Internal Manufacturer Reference)
3	**Status thermal regeneration active**	PFltLd_dmSotSimRgnBas_CUR

DPF Soot Mass (g)	0	10	20	30	40	50	55	60	65	70	75	80
Mass Flow (g/s)	0.01	0.03	0.05	0.09	0.12	0.13	0.14	0.15	0.16	0.18	0.19	0.20

Table no.	Status or State	Label (Internal Manufacturer Reference)
4	**Status thermal regeneration active**	PFltLd_facO2SimRgn_MAP

Exhaust Mass Flow (g/s) / Lambda (-)	1	1.2	1.35	1.5	2	2.5	3	25
0.00	0	0.53	0.83	1.07	1.62	1.96	2.19	3.21
2.78	0	0.55	0.87	1.12	1.70	2.05	2.29	3.37
5.56	0	0.55	0.87	1.12	1.70	2.05	2.29	3.37
8.33	0	0.55	0.87	1.12	1.70	2.05	2.29	3.37
11.11	0	0.58	0.91	1.18	1.79	2.16	2.41	3.40
13.89	0	0.58	0.91	1.18	1.79	2.16	2.41	3.40
25.00	0	0.58	0.91	1.18	1.79	2.16	2.41	3.40
36.11	0	0.62	0.97	1.26	1.91	2.30	2.57	3.40

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

Particulate Filter Surface Temp (°C)	49.96	199.96	299.96	499.96	524.96	549.96	574.96	599.96	624.96	649.96	674.96	699.96
Temperature Factor (-)	0	0	0	0.02	0.05	0.10	0.20	0.34	0.60	1.03	1.72	2.81

Table no.	Status or State	Label (Internal Manufacturer Reference)
6	**Rail Control - PCV Closed Loop Control Only**	Rail_dvolMeUnCtlUpLim_CUR

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

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

Engine Speed (rpm)	900	901	1200	1400	1600	1800	2000	4800
Injection Qty (mm^3/rev)	100	15	15	15	3	3	3	3

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

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

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

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

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

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

Table no.	Status or State	Label (Internal Manufacturer Reference)
11	Request for pre controlled dosing	SCRFFC_stNQntCurrHi_MAP

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

Table no.	Status or State	Label (Internal Manufacturer Reference)
12	Request for pre controlled dosing	SCRFFC_stNQntCurrMid_MAP

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

Table no.	Status or State	Label (Internal Manufacturer Reference)
13	Request for pre controlled dosing	SCRFFC_stNQntCurrSeaLvl_MAP

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

16 OBDG09 Calibration Parameter Definition Tables - ECM

Table no.	Status or State	Label (Internal Manufacturer Reference)
14	**Engine Running**	StSys_nStrtCutOut_MAP

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

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

Vehicle Speed (mph) / SCR Upstream Temp (°C)	99.96	199.96	299.96	399.96	499.96	599.96
0	104.96	104.96	104.96	104.96	95.46	89.96
20	109.96	109.96	109.96	107.96	100.26	94.96
50	109.96	109.96	109.96	108.96	107.96	103.96
60	109.96	109.96	109.96	109.96	109.96	105.96
100	109.96	109.96	109.96	109.96	109.96	107.96
150	109.96	109.96	109.96	109.96	109.96	109.96

16	**Release of tank heater circuit**	UHC_tiC1Dfrst_CUR

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

17	**Release of tank heater circuit**	UHC_tiC1On_CUR

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

18	**Release of tank heater circuit**	UHC_tiDfrstC2_CUR

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

19	**Release of tank heater circuit**	UHC_tiDfrstC3_CUR

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

20	**Release of tank heater circuit**	UHC_tiOnC2_CUR

Reductant Tank Temp. (°C)	-30.04	-18.04	-15.04	-11.04	-7.04	-0.04	4.96	5.06
Reductant Heater Time (sec)	3276.7	3276.7	3276.7	3276.7	600	300	90	0

Table no.	Status or State	Label (Internal Manufacturer Reference)
21	**Release of tank heater circuit**	UHC_tiOnC3_CUR

Reductant Tank Temp. (°C)	-30.04	-18.04	-15.04	-11.04	-7.04	-0.04	4.96	5.06
Reductant Heater Time (sec)	3276.7	3276.7	3276.7	3276.7	600	300	90	0

16 OBDG09 Closed Loop Enable Conditions - ECM

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

22 **EGR Closed Loop - Overlong Idle Time Delay** AirCtl_tiDbShOffExtdIdl_MAP

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

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

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

24 **Intake Manifold Pressure Cold Start** PCR_tiCldStrt_CUR

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

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

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

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

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

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

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

16 OBDG09 Closed Loop Enable Conditions - ECM

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
28	**Intake Manifold Closed Loop High Altitude**	PCR_GovOnHi_CUR

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
29	**Intake Manifold Closed Loop Medium Altitude**	PCR_GovOnMed_CUR

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
30	**Intake Manifold Closed Loop Low Altitude**	PCR_GovOnSea_CUR

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

Table no.	Fault Codes	Label (Internal Manufacturer Reference)
31	**FBC Closed Loop Fuel Quantity**	FBC_qGvrnThresMax_CUR

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

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

Active DTC	Inhibited DTCs								
P0118 - Engine Coolant Temperature Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0191 - Fuel Rail Pressure Sensor Performance	P0234 - Turbocharger Engine Overboost	P0263 - Cly 1 Balance System	P0266 - Cly 2 Balance System	P0269 - Cly 3 Balance System	P0272 - Cly 4 Balance System	P0275 - Cly 5 Balance System	P0278 - Cly 6 Balance System
	P0281 - Cly 7 Balance System	P0284 - Cly 8 Balance System	P0299 - Turbocharger Engine Underboost	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected
	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P0506 - Idle Speed Low	P0507 - Idle Speed High	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance
	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance							
P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P0101 - Mass Air Flow Sensor Performance								
P014C - HO2S Slow Response Rich to Lean Sensor 1	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1			
P0171 - Fuel Trim System Lean	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1							
P0172 - Fuel Trim System Rich	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1							
P0182 - Fuel Temperature Sensor 1 Circuit Low	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded
	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded	P01DA - Cylinder 8 Injection Timing Advanced		
P0183 - Fuel Temperature Sensor 1 Circuit High	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded
	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded	P01DA - Cylinder 8 Injection Timing Advanced		
P0192 - Fuel Rail Pressure Sensor Circuit Low	P0191 - Fuel Rail Pressure Sensor Performance								
P0193 - Fuel Rail Pressure Sensor Circuit High	P0191 - Fuel Rail Pressure Sensor Performance								
P01F0 - Coolant Temperature Dropped Below Diagnostic Monitoring Temperature	P2181 - Engine Thermostat stuck open								
P0201 - Injector 1 Control Circuit	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded
	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded	P01DA - Cylinder 8 Injection Timing Advanced
	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High							
P0202 - Injector 2 Control Circuit	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded
	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded	P01DA - Cylinder 8 Injection Timing Advanced
	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High							
P0203 - Injector 3 Control Circuit	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded
	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded	P01DA - Cylinder 8 Injection Timing Advanced
	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High							
P0204 - Injector 4 Control Circuit	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded
	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded	P01DA - Cylinder 8 Injection Timing Advanced
	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High							
P0205 - Injector 5 Control Circuit	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded
	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded	P01DA - Cylinder 8 Injection Timing Advanced
	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High							

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Active DTC	Inhibited DTCs								
P0206 - Injector 6 Control Circuit	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded
	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded	P01DA - Cylinder 8 Injection Timing Advanced
	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High							
P0207 - Injector 7 Control Circuit	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded
	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded	P01DA - Cylinder 8 Injection Timing Advanced
	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High							
P0208 - Injector 8 Control Circuit	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded
	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded	P01DA - Cylinder 8 Injection Timing Advanced
	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High							
P0234 - Turbocharger Engine Overboost	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1							
P0299 - Turbocharger Engine Underboost	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1							
P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1						
P026D - Injection Quantity Too High	P026C - Injection Quantity Too Low	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1						
P02E7 - Diesel Intake Air Flow Position Sensor Circuit Range Performance	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive							
P02E8 - Diesel Intake Air Flow Position Sensor Circuit Low	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning Limit	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P02E9 - Diesel Intake Air Flow Position Sensor Circuit High	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning Limit	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P02EB - Intake Air Flow Valve Control Motor Current Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning Limit				
P0335 - Crankshaft Position Sensor Circuit	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0191 - Fuel Rail Pressure Sensor Performance	P0315 - Crankshaft Position System Variation Not Learned	P0506 - Idle Speed Low	P0507 - Idle Speed High			
P0336 - Crankshaft Position Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0191 - Fuel Rail Pressure Sensor Performance	P0315 - Crankshaft Position System Variation Not Learned	P0506 - Idle Speed Low	P0507 - Idle Speed High			
P0340 - Camshaft Position Sensor Circuit	P0191 - Fuel Rail Pressure Sensor Performance	P0315 - Crankshaft Position System Variation Not Learned							
P0341 - Camshaft Position Sensor Performance	P0191 - Fuel Rail Pressure Sensor Performance	P0315 - Crankshaft Position System Variation Not Learned							
P0400 - Exhaust Gas Recirculation (EGR) Flow Incorrect	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High					
P0401 - Exhaust Gas Recirculation Flow Insufficient	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P2459 - Diesel Particulate Filter Regeneration Frequency	P246F - Exhaust Temperature Sensor 4 Performance	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High
P0402 - Exhaust Gas Recirculation Flow Excessive	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P2459 - Diesel Particulate Filter Regeneration Frequency	P246F - Exhaust Temperature Sensor 4 Performance	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High
P0405 - Exhaust Gas Recirculation Position Sensor Circuit Low	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P049D - EGR Control Position Not Learned	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance		
P0406 - Exhaust Gas Recirculation Position Sensor Circuit High	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P049D - EGR Control Position Not Learned	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance		
P040C - Exhaust Gas Recirculation (EGR) Temperature Sensor 2 Circuit Low Voltage	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation								

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Active DTC	Inhibited DTCs						
P040D - Exhaust Gas Recirculation (EGR) Temperature Sensor 2 Circuit High Voltage	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation						
P041C - Exhaust Gas Recirculation (EGR) Temperature Sensor 1 Circuit Low Voltage	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation						
P041D - Exhaust Gas Recirculation (EGR) Temperature Sensor 1 Circuit High Voltage	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation						
P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High					
P046C - Exhaust Gas Recirculation(EGR) Position Sensor Performance	P0101 - Mass Air Flow Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P0545 - Exhaust Gas Temperature (EGT) Sensor 1 Circuit Low Voltage	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P2428 - Exhaust Gas High Temperature			
P0546 - Exhaust Gas Temperature (EGT) Sensor 1 Circuit High Voltage	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P2428 - Exhaust Gas High Temperature			
P0575 - Cruise Control Input Circuit	P0567 - Cruise Control Resume Switch Circuit	P0568 - Cruise Control Set Switch Circuit					
P057C - Brake Pedal Position Sensor Circuit High Voltage	P057D - Brake Pedal Position Sensor Circuit Low Voltage						
P057D - Brake Pedal Position Sensor Circuit Low Voltage	P057C - Brake Pedal Position Sensor Circuit High Voltage						
P0606 - Control Module Internal Performance	P2146 - Injector Positive Voltage Control Circuit Group 1	P2149 - Injector Positive Voltage Control Circuit Group 2	P2152 - Injector Positive Voltage Control Circuit Group 3	P2155 - Injector Positive Voltage Control Circuit Group 4			
P064C - Glow Plug Control Module Performance	P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P2209 - N0x Heater Performance Bank 1 Sensor 1					
P0651 - 5 Volt Reference 2 Circuit	P2127 - Accelerator Pedal Position Sensor 2 Circuit Low	P2128 - Accelerator Pedal Position (APP) Sensor 2 Circuit High Voltage					
P0697 - 5 Volt Reference 3 Circuit	P2122 - Accelerator Pedal Position Sensor 1 Circuit Low	P2123 - Accelerator Pedal Position Sensor 1 Circuit High					
P0851 - Park/Neutral Position (PNP) Switch Circuit Low Voltage	P0852 - Park/Neutral Position (PNP) Switch Circuit High Voltage						
P0852 - Park/Neutral Position (PNP) Switch Circuit High Voltage	P0851 - Park/Neutral Position (PNP) Switch Circuit Low Voltage						
P1048 - Reductant Injector High Control Circuit Low Voltage	P202E - Reductant Injector Performance						
P1049 - Reductant Injector High Control Circuit High Voltage	P202E - Reductant Injector Performance	P2510 - ECM Power Relay Circuit Performance					
P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High					
P11DC - NOx Sensor Current Performance Bank 1 Sensor 2	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High					
P1224 - Injector 1 Control Circuit Shorted	P0201 - Injector 1 Control Circuit	P0606 - Control Module Internal Performance	P2146 - Injector Positive Voltage Control Circuit Group 1				
P1227 - Injector 2 Control Circuit Shorted	P0202 - Injector 2 Control Circuit	P0606 - Control Module Internal Performance	P2152 - Injector Positive Voltage Control Circuit Group 3				
P122A - Injector 3 Control Circuit Shorted	P0203 - Injector 3 Control Circuit	P0606 - Control Module Internal Performance	P2155 - Injector Positive Voltage Control Circuit Group 4				
P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning Limit	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive			
P1233 - Injector 4 Control Circuit Shorted	P0204 - Injector 4 Control Circuit	P0606 - Control Module Internal Performance	P2146 - Injector Positive Voltage Control Circuit Group 1				

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Active DTC	Inhibited DTCs					
P1236 - Injector 5 Control Circuit Shorted	P0205 - Injector 5 Control Circuit	P0606 - Control Module Internal Performance	P2152 - Injector Positive Voltage Control Circuit Group 3			
P1239 - Injector 6 Control Circuit Shorted	P0206 - Injector 6 Control Circuit	P0606 - Control Module Internal Performance	P2149 - Injector Positive Voltage Control Circuit Group 2			
P1242 - Injector 7 Control Circuit Shorted	P0207 - Injector 7 Control Circuit	P0606 - Control Module Internal Performance	P2149 - Injector Positive Voltage Control Circuit Group 2			
P1247 - Injector 8 Control Circuit Shorted	P0208 - Injector 8 Control Circuit	P0606 - Control Module Internal Performance	P2155 - Injector Positive Voltage Control Circuit Group 4			
P125B - Fuel Pressure Regulator 2 High Control Circuit High Voltage	P2510 - ECM Power Relay Circuit Performance					
P140B - Exhaust Gas Recirculation Slow Response-Increasing Flow	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High		
P140C - Exhaust Gas Recirculation Slow Response-Decreasing Flow	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High		
P140F - Exhaust Gas Recirculation (EGR) Motor Current Performance	P0101 - Mass Air Flow Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P049D - EGR Control Position Not Learned
P1414 - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Current Performance	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P140A - EGR Cooler BY Pass Position Sensor Exceded Learning Limit			
P163C - Glow Plug Control Module Primary Circuit	P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P2209 - N0x Heater Performance Bank 1 Sensor 1				
P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2459 - Diesel Particulate Filter Regeneration Frequency					
P2032 - Exhaust Gas Temperature (EGT) Sensor 2 Circuit Low Voltage	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P2428 - Exhaust Gas High Temperature	P242B - Exhaust Temperature Sensor 3 Performance	
P2033 - Exhaust Gas Temperature (EGT) Sensor 2 Circuit High Voltage	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P2428 - Exhaust Gas High Temperature	P242B - Exhaust Temperature Sensor 3 Performance	
P2047 - Reductant Injector Control Circuit	P202E - Reductant Injector Performance					
P2048 - Reductant Injector Control Circuit Low Voltage	P202E - Reductant Injector Performance					
P2049 - Reductant Injector Control Circuit High Voltage	P202E - Reductant Injector Performance	P2510 - ECM Power Relay Circuit Performance				
P204B - Reductant Pump Pressure Sensor Performance	P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	P20E8 - Reductant Pressure Too Low	P20E9 - Reductant Pressure Too High			
P204C - Reductant Pump Pressure Sensor Circuit Low	P204B - Reductant Pump Pressure Sensor Performance	P20A1 - Reductant Purge Valve Performance				
P204D - Reductant Pump Pressure Sensor Circuit High	P204B - Reductant Pump Pressure Sensor Performance	P20A1 - Reductant Purge Valve Performance				
P205C - Reductant Tank Temperature Sensor Circuit Low	P20BA - Reductant Heater 1 Performance					
P205D - Reductant Tank Temperature Sensor Circuit High	P205B - Reductant Tank Temperature Sensor Performance	P20BA - Reductant Heater 1 Performance				
P208A - Reductant Pump Control Circuit	P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	P20A1 - Reductant Purge Valve Performance	P20E8 - Reductant Pressure Too Low	P20E9 - Reductant Pressure Too High		
P208D - Reductant Pump Control Circuit High Voltage	P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	P20A1 - Reductant Purge Valve Performance	P20E8 - Reductant Pressure Too Low	P20E9 - Reductant Pressure Too High	P2510 - ECM Power Relay Circuit Performance	
P20A0 - Reductant Purge Valve Control Circuit	P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	P20A1 - Reductant Purge Valve Performance	P20E8 - Reductant Pressure Too Low	P20E9 - Reductant Pressure Too High		
P20A2 - Reductant Purge Valve Control Circuit Low Voltage	P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	P20A1 - Reductant Purge Valve Performance	P20E8 - Reductant Pressure Too Low	P20E9 - Reductant Pressure Too High		
P20A3 - Reductant Purge Valve Control Circuit High Voltage	P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	P20A1 - Reductant Purge Valve Performance	P20E8 - Reductant Pressure Too Low	P20E9 - Reductant Pressure Too High	P2510 - ECM Power Relay Circuit Performance	

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

16 OBDG09 Inhibit Table for Diagnostic System Manager - ECM

Active DTC	Inhibited DTCs								
P22A7 - NOx Heater Performance Bank 1 Sensor 2	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High							
P2413 - Exhaust Gas Recirculation (EGR) System Performance	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High					
P242C - Exhaust Gas Temperature (EGT) Sensor 3 Circuit Low Voltage	P2428 - Exhaust Gas High Temperature	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance						
P242D - Exhaust Gas Temperature (EGT) Sensor 3 Circuit High Voltage	P2428 - Exhaust Gas High Temperature	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance						
P2453 - Diesel Particulate Filter Differential Pressure Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2459 - Diesel Particulate Filter Regeneration Frequency			
P2454 - Diesel Particulate Filter Differential Pressure Sensor Circuit Low Voltage	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2453 - Diesel Particulate Filter Differential Pressure Sensor Performance	P2455 - Diesel Particulate Filter Differential Pressure Sensor Circuit High Voltage	P2459 - Diesel Particulate Filter Regeneration Frequency					
P2455 - Diesel Particulate Filter Differential Pressure Sensor Circuit High Voltage	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2453 - Diesel Particulate Filter Differential Pressure Sensor Performance	P2454 - Diesel Particulate Filter Differential Pressure Sensor Circuit Low Voltage	P2459 - Diesel Particulate Filter Regeneration Frequency					
P245A - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P140A - EGR Cooler BY Pass Position Sensor Exceded Learning Limit	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance	P2510 - ECM Power Relay Circuit Performance	
P2463 - Diesel Particulate Filter - Soot Accumulation	P2002 - Diesel Particulate Filter (DPF) Low Efficiency								
P2470 - Exhaust Gas Temperature (EGT) Sensor 4 Circuit Low Voltage	P2428 - Exhaust Gas High Temperature	P246F - Exhaust Temperature Sensor 4 Performance							
P2471 - Exhaust Gas Temperature (EGT) Sensor 4 Circuit High Voltage	P2428 - Exhaust Gas High Temperature	P246F - Exhaust Temperature Sensor 4 Performance							
P2493 - EGR Cooler BY Pass Position Sensor Performance	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive							
P2494 - EGR Cooler BY Pass Position Sensor Circuit Low	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P140A - EGR Cooler BY Pass Position Sensor Exceded Learning Limit	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P2495 - EGR Cooler BY Pass Position Sensor Circuit High	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P140A - EGR Cooler BY Pass Position Sensor Exceded Learning Limit	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P249D - Closed loop Reductant Injection Control at Limit-Flow too high	P20EE - SCR Nox Catalyst Efficiency Below Threshold Bank 1								
P249E - Closed loop Reductant Injection Control at Limit-Flow too low	P20EE - SCR Nox Catalyst Efficiency Below Threshold Bank 1								
P2564 - Turbocharger Boost Control Position Sensor Circuit Low	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive					
P2565 - Turbocharger Boost Control Position Sensor Circuit High	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive					
P2598 - Turbocharger Boost Control Position Sensor "A" Circuit Range/Performance - Stuck Low	P0101 - Mass Air Flow Sensor Performance								
P2599 - Turbocharger Boost Control Position Sensor "A" Circuit Range/Performance - Stuck High	P0101 - Mass Air Flow Sensor Performance								
U0073 - CAN A BUS OFF	P0851 - Park/Neutral Position (PNP) Switch Circuit Low Voltage	P0852 - Park/Neutral Position (PNP) Switch Circuit High Voltage							
U0101 - Lost Communications With Transmission Control System	P0851 - Park/Neutral Position (PNP) Switch Circuit Low Voltage	P0852 - Park/Neutral Position (PNP) Switch Circuit High Voltage							

16 OBDG09 Inhibit Table for Diagnostic System Manager - ECM

Active DTC		Inhibited DTCs		
U0106 - Lost Communication With Glow Plug Control Module		P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High

16 OBDG09 Inhibit Table for Diagnostic System Manager - ECM

Active DTC	Inhibited DTCs								
U029D - N0x 1 loss of comm	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High							
U029E - N0x 2 loss of comm	P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High						
Fuel Level less than 15%	P0087 - Fuel Rail Pressure Too Low	P0088 - Fuel Rail Pressure Too High	P0191 - Fuel Rail Pressure Sensor Performance	P0263 - Cly 1 Balance System	P0266 - Cly 2 Balance System	P0269 - Cly 3 Balance System	P0272 - Cly 4 Balance System	P0275 - Cly 5 Balance System	P0278 - Cly 6 Balance System
	P0281 - Cly 7 Balance System	P0284 - Cly 8 Balance System	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected
	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P11AF - HO2S Performance - Signal High During Moderate Load Bank 1 Sensor 2	P11B2 - HO2S Performance - Signal Low During Moderate Load Bank 1 Sensor 2	P128E - Fuel Rail Pressure Performance				

DTC		Additional Basic Enable Conditions						
P0016 - Crankshaft to Camshaft Correlation		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P003A - Turbocharger Boost Control Position Not Learned		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0045 - Turbocharger Boost Control Circuit		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P0047 - Turbocharger Boost Control Circuit Low Voltage		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P0048 - Turbocharger Boost Control Circuit High Voltage		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P006E - Turbocharger Boost High Control Circuit Low Voltage		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P006F - Turbocharger Boost High Control Circuit High Voltage		engine is not in standby state (standby state occurs after ECM initialization or following after-run)						
P007C - CAC Temperature Sensor Circuit Low Voltage		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P007D - CAC Temperature Sensor Circuit High Voltage		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0087 - Fuel Rail Pressure Too Low		ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P0088 - Fuel Rail Pressure Too High		ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P008F - Engine Coolant Temperature (ECT)-Fuel Temperature Not Plausible		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0090 - Fuel Pressure Regulator 1 Control Circuit/Open		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P0091 - Fuel Pressure Regulator 1 Control Circuit Low		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P0092 - Fuel Pressure Regulator 1 Control Circuit High		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P0097 - Intake Air Temperature Sensor 2 Circuit Low		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0098 - Intake Air Temperature Sensor 2 Circuit High		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P00C9 - Fuel Pressure Regulator 1 High Control Circuit Low Voltage		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P00CA - Fuel Pressure Regulator 1 High Control Circuit High Voltage		engine is not in standby state (standby state occurs after ECM initialization or following after-run)						
P00EA - Intake Air Temperature (IAT) Sensor 3 Circuit Low Voltage		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P00EB - Intake Air Temperature (IAT) Sensor 3 Circuit High Voltage		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P00F4 - Humidity Sensor Circuit Low		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P00F5 - Humidity Sensor Circuit High		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)

DTC	Additional Basic Enable Conditions								
P00F6 - Humidity Sensor Circuit Intermittent/Erratic	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0101 - Mass Air Flow Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0102 - Mass Air Flow Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0103 - Mass Air Flow Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0106 - Manifold Absolute Pressure Sensor Performance	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P0107 - Manifold Absolute Pressure (MAP) Sensor Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0108 - Manifold Absolute Pressure (MAP) Sensor Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0112 - Intake Air Temperature Sensor 1 Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0113 - Intake Air Temperature Sensor 1 Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0117 - Engine Coolant Temperature Sensor Circuit Low	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P0118 - Engine Coolant Temperature Sensor Circuit High	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P0131 - HO2S Bank 1 Sensor 1 circuit low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0132 - HO2S Bank 1 Sensor 1 circuit high	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0137 - HO2S Bank 1 Sensor 2 circuit low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0138 - HO2S Bank 1 Sensor 2 circuit high	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P014C - HO2S Slow Response Rich to Lean Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0171 - Fuel Trim System Lean	System is not in active regeneration mode								
P0172 - Fuel Trim System Rich	System is not in active regeneration mode								
P0182 - Fuel Temperature Sensor 1 Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0183 - Fuel Temperature Sensor 1 Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		

DTC	Additional Basic Enable Conditions								
P0191 - Fuel Rail Pressure Sensor Performance	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								
P0192 - Fuel Rail Pressure Sensor Circuit Low	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P0193 - Fuel Rail Pressure Sensor Circuit High	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P01CB - Cylinder 1 Injection Timing Retarded	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P01CC - Cylinder 1 Injection Timing Advanced	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P01CD - Cylinder 2 Injection Timing Retarded	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P01CE - Cylinder 2 Injection Timing Advanced	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P01CF - Cylinder 3 Injection Timing Retarded	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P01D0 - Cylinder 3 Injection Timing Advanced	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P01D1 - Cylinder 4 Injection Timing Retarded	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P01D2 - Cylinder 4 Injection Timing Advanced	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P01D3 - Cylinder 5 Injection Timing Retarded	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P01D4 - Cylinder 5 Injection Timing Advanced	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P01D5 - Cylinder 6 Injection Timing Retarded	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P01D6 - Cylinder 6 Injection Timing Advanced	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P01D7 - Cylinder 7 Injection Timing Retarded	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P01D8 - Cylinder 7 Injection Timing Advanced	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P01D9 - Cylinder 8 Injection Timing Retarded	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P01DA - Cylinder 8 Injection Timing Advanced	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P01F0 - Coolant Temperature Dropped Below Diagnostic Monitoring Temperature	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P0234 - Turbocharger Engine Overboost	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0263 - Cly 1 Balance System	Power Take-Off (PTO) is not engaged								
P0266 - Cly 2 Balance System	Power Take-Off (PTO) is not engaged								
P0269 - Cly 3 Balance System	Power Take-Off (PTO) is not engaged								
P026A - CAC Effiecientcy Below Threshold	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P026C - Injection Quantity Too Low	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	Power Take-Off (PTO) is not engaged	System is not in active regeneration mode					
P026D - Injection Quantity Too High	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	Power Take-Off (PTO) is not engaged	System is not in active regeneration mode					

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

DTC	Additional Basic Enable Conditions								
P0400 - Exhaust Gas Recirculation (EGR) Flow Incorrect	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0401 - Exhaust Gas Recirculation Flow Insufficient	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm
	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								
P0402 - Exhaust Gas Recirculation Flow Excessive	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm
	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								
P0403 - Exhaust Gas Recirculation (EGR) Motor Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P0405 - Exhaust Gas Recirculation Position Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0406 - Exhaust Gas Recirculation Position Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P040C - Exhaust Gas Recirculation (EGR) Temperature Sensor 2 Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P040D - Exhaust Gas Recirculation (EGR) Temperature Sensor 2 Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P041C - Exhaust Gas Recirculation (EGR) Temperature Sensor 1 Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P041D - Exhaust Gas Recirculation (EGR) Temperature Sensor 1 Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0461 - Fuel Level Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0462 - Fuel Level Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0463 - Fuel Level Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P046C - Exhaust Gas Recirculation(EGR) Position Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P0480 - Cooling Fan Speed Output Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P0483 - Cooling Fan System Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	ambient pressure is above 74.8kPa	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0489 - Exhaust Gas Recirculation (EGR) Motor Control Circuit 1 Low Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							

DTC		Additional Basic Enable Conditions							
P0490 - Exhaust Gas Recirculation (EGR) Motor Control Circuit 1 High Voltage		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0495 - Cooling Fan Speed High		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P049D - EGR Control Position Not Learned		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0506 - Idle Speed Low		Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P0507 - Idle Speed High		Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)						
P0526 - Cooling Fan Speed Sensor Circuit		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0545 - Exhaust Gas Temperature (EGT) Sensor 1 Circuit Low Voltage		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P0546 - Exhaust Gas Temperature (EGT) Sensor 1 Circuit High Voltage		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P0567 - Cruise Control Resume Switch Circuit		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0568 - Cruise Control Set Switch Circuit		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0575 - Cruise Control Input Circuit		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P057C - Brake Pedal Position Sensor Circuit High Voltage		engine is not in standby state (standby state occurs after ECM initialization or following after-run)							
P057D - Brake Pedal Position Sensor Circuit Low Voltage		engine is not in standby state (standby state occurs after ECM initialization or following after-run)							
P0606 - Control Module Internal Performance		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0627 - Fuel Pump Relay Control Circuit		battery voltage is above 11 V for at least 3s							
P0628 - Fuel Pump Relay Control Circuit Low		battery voltage is above 11 V for at least 3s							
P0629 - Fuel Pump Relay Control Circuit High		battery voltage is above 11 V for at least 3s							
P062F - Control Module Long Term Memory Performance		engine is not in standby state (standby state occurs after ECM initialization or following after-run)							
P0640 - Intake Air (IA) Heater Switch/Control Circuit		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0641 - 5 Volt Reference 1 Circuit		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P064C - Glow Plug Control Module Performance		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0650 - Malfunction Indicator Lamp Control Circuit		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				
P0651 - 5 Volt Reference 2 Circuit		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0671 - Glow Plug 1 Control Circuit		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						

DTC	Additional Basic Enable Conditions							
P0672 - Glow Plug 2 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0673 - Glow Plug 3 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0674 - Glow Plug 4 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0675 - Glow Plug 5 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0676 - Glow Plug 6 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0677 - Glow Plug 7 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0678 - Glow Plug 8 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0697 - 5 Volt Reference 3 Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P06A3 - 5 Volt Reference 4 Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P06D2 - 5 Volt Reference 5 Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0700 - Transmission Control Module Requested Malfunction Indicator Lamp Illumination	engine is not in standby state (standby state occurs after ECM initialization or following after-run)							
P0851 - Park/Neutral Position (PNP) Switch Circuit Low Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)							
P0852 - Park/Neutral Position (PNP) Switch Circuit High Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)							
P1043 - Reductant Pump High Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P1044 - Reductant Pump High Control Circuit High Voltage	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P1048 - Reductant Injector High Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P1049 - Reductant Injector High Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P10CC - Exhaust Aftertreatment Fuel Injector Control Circuit Shorted	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				
P10CD - Exhaust Aftertreatment Fuel Injector High Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				
P10CE - Exhaust Aftertreatment Fuel Injector High Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				
P10D0 - Reductant Injector Temperature - Exhaust Gas Temperature 2 Correlation	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P111F - Fuel Temperature Sensor 1 - Fuel Temperature Sensor 2 Not Plausible	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P113A - Exhaust Gas Temperature Sensors 3-4 Not Plausible	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)

DTC	Additional Basic Enable Conditions								
P11A9 - HO2S Performance - Signal Low During Moderate Load Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P11AF - HO2S Performance - Signal High During Moderate Load Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P11B2 - HO2S Performance - Signal Low During Moderate Load Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P11B4 - HO2S Current Performance Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P11B5 - HO2S Current Performance Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode
	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)							
P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode
	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)							
P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P11DC - NOx Sensor Current Performance Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P122C - Intake Air Flow Valve Control Circuit Shorted	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning Limit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P122E - Intake Air Flow Valve Control Circuit 2 Low Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P122F - Intake Air Flow Valve Control Circuit 2 High Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P125A - Fuel Pressure Regulator 2 High Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P125B - Fuel Pressure Regulator 2 High Control Circuit High Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)								
P128E - Fuel Rail Pressure Performance	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								
P1407 - Exhaust Gas Recirculation (EGR) Motor Control Circuit Shorted	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P140B - Exhaust Gas Recirculation Slow Response-Increasing Flow	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm
	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								

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DTC		Additional Basic Enable Conditions								
P140C - Exhaust Gas Recirculation Slow Response-Decreasing Flow		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm
		engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								
P140D - Exhaust Gas Recirculation (EGR) Motor Control Circuit 2 Low Voltage		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P140E - Exhaust Gas Recirculation (EGR) Motor Control Circuit 2 High Voltage		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P140F - Exhaust Gas Recirculation (EGR) Motor Current Performance		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P144B - Closed Loop Diesel Particulate Filter (DPF) Regeneration Control At Limit - Stage 1 Temperature Too Low		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P144C - Closed Loop Diesel Particulate Filter (DPF) Regeneration Control At Limit - Stage 1 Temperature Too High		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P1472 - Particulate Matter Sensor Signal Message Counter Incorrect		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P1479 - Particulate Matter Sensor Sensitivity Factor Performance		battery voltage is above 11 V for at least 3s								
P154A - Intake Air (IA) Heater Feedback Circuit		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P154B - Intake Air (IA) Heater Voltage Signal Circuit		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P154C - Intake Air (IA) Heater Current Signal Circuit		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P154D - Intake Air (IA) Heater Temperature Signal Circuit		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P160C - Engine Calibration Information Not Programed In The Control Module		Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s							
P161A - Glow Plug Control Module Not Programed		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P1631 - Theft Deterrent Fuel Enable Signal Not Correct		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)						
P163C - Glow Plug Control Module Primary Circuit		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P163D - Glow Plug Control Module Secondary Circuit		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P163E - Glow Plug Control ModuleOvertemperature		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P166B - Intake Air (IA) Heater Over Temperature		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P2002 - Diesel Particulate Filter (DPF) Low Efficiency		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P2032 - Exhaust Gas Temperature (EGT) Sensor 2 Circuit Low Voltage		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				
P2033 - Exhaust Gas Temperature (EGT) Sensor 2 Circuit High Voltage		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				
P203B - Reductant Level Sensor 1 Performance		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Status of the Reductant Tank is not Frozen which means ambient air temperature is >= -7°C and the reductatn tank temperature is >= -7°C	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	

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

DTC	Additional Basic Enable Conditions								
P20A3 - Reductant Purge Valve Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P20B9 - Reductant Heater 1 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20BA - Reductant Heater 1 Performance	SCR Reductant Level not in restriction or empty level state (see reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P20BB - Reductant Heater 1 Control Circuit Low	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20BC - Reductant Heater 1 Control Circuit High	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20BD - Reductant Heater 2 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20BF - Reductant Heater 2 Control Circuit Low	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20C0 - Reductant Heater 2 Control Circuit High	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20C1 - Reductant Heater 3 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20C3 - Reductant Heater 3 Control Circuit Low	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20C4 - Reductant Heater 3 Control Circuit High	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P20CB - Exhaust Aftertreatment Fuel Injector Control Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P20CC - Exhaust Aftertreatment Fuel Injector Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P20CD - Exhaust Aftertreatment Fuel Injector Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P20CE - Exhaust Aftertreatment Fuel Injector Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P20E8 - Reductant Pressure Too Low	SCR Reductant Level not in restriction or empty level state (see parameter definitions for reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P20E9 - Reductant Pressure Too High	SCR Reductant Level not in restriction or empty level state (see parameter definitions for reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P20EE - SCR Nox Catalyst Efficiency Below Threshold Bank 1	SCR Reductant Level not in restriction or empty level state (see reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Status of the Reductant Tank is not Frozen which means ambient air temperature is >= -7°C and the reductatn tank temperature is >= -7°C	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm
	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								
P214F - Reductant Heater 1 Current Too High	SCR Reductant Level not in restriction or empty level state (see parameter definitions for reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P21AA - Reductant Level Sensor 2 Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P21AB - Reductant Level Sensor 2 Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		

DTC	Additional Basic Enable Conditions							
P21AF - Reductant Level Sensor 3 Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P21B0 - Reductant Level Sensor 3 Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P21DD - Reductant Heater 1 Current Too Low	SCR Reductant Level not in restriction or empty level state (see parameter definitions for reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P2200 - N0x Sensor Circuit Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P2202 - N0x Sensor Circuit Low Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P2203 - N0x Sensor Circuit High Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P2205 - N0x Heater Control Circuit Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P2209 - N0x Heater Performance Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P220A - N0x Sensor Supply Voltage Out Of Range Bank 1 Sensor 1	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P220B - N0x Sensor Supply Voltage Out Of Range Bank 1 Sensor 2	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P221C - Reductant Heater 2 Current Too Low	SCR Reductant Level not in restriction or empty level state (see parameter definitions for reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P221D - Reductant Heater 2 Current Too High	SCR Reductant Level not in restriction or empty level state (see parameter definitions for reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P221E - Reductant Heater 3 Current Too Low	SCR Reductant Level not in restriction or empty level state (see parameter definitions for reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P221F - Reductant Heater 3 Current Too High	SCR Reductant Level not in restriction or empty level state (see parameter definitions for reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P2228 - Barometric Pressure Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P2229 - Barometric Pressure Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P2263 - Turbo Boost System Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P2295 - Fuel Pressure Regulator 2 Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				
P2296 - Fuel Pressure Regulator 2 Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				

DTC		Additional Basic Enable Conditions								
P229E - NOx Sensor Circuit Bank 1 Sensor 2		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P22A0 - NOx Sensor Circuit Low Bank 1 Sensor 2		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P22A1 - NOx Sensor Circuit High Bank 1 Sensor 2		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P22A3 - NOx Heater Control Circuit Bank 1 Sensor 2		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P22A7 - NOx Heater Performance Bank 1 Sensor 2		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P22FA - NOx Sensor 1 Performance - Slow Response High to Low		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P2428 - Exhaust Gas High Temperature		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P242B - Exhaust Temperature Sensor 3 Performance		Engine speed greater than 600 to 850 rpm	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P242C - Exhaust Gas Temperature (EGT) Sensor 3 Circuit Low Voltage		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				
P242D - Exhaust Gas Temperature (EGT) Sensor 3 Circuit High Voltage		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				
P2453 - Diesel Particulate Filter Differential Pressure Sensor Performance		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P2454 - Diesel Particulate Filter Differential Pressure Sensor Circuit Low Voltage		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P2455 - Diesel Particulate Filter Differential Pressure Sensor Circuit High Voltage		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P2457 - Exhaust Gas (EGR) Cooler Performance		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P2459 - Diesel Particulate Filter Regeneration Frequency		ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa							
P245A - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P245C - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit 1 Low Voltage		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P245D - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit 1 High Voltage		engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P2459 - Diesel Particulate Filter Regeneration Frequency		ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa							
P2463 - Diesel Particulate Filter - Soot Accumulation		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P246F - Exhaust Temperature Sensor 4 Performance		Engine speed greater than 600 to 850 rpm	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				

DTC	Additional Basic Enable Conditions								
P2470 - Exhaust Gas Temperature (EGT) Sensor 4 Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				
P2471 - Exhaust Gas Temperature (EGT) Sensor 4 Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				
P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	SCR Reductant Level not in restriction or empty level state (see reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High	SCR Reductant Level not in restriction or empty level state (see reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P24A0 - Closed Loop Particulate Filter Regeneration Control At Limit - Temperature Too Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P24A1 - Closed Loop Particulate Filter Regeneration Control At Limit - Temperature Too High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P24B3 - Particulate Matter Sensor Heater Control Circuit	battery voltage is above 11 V for at least 3s								
P24B6 - Particulate Matter Sensor Heater Control Circuit High Voltage	battery voltage is above 11 V for at least 3s								
P24D0 - Particulate Matter Sensor Supply Voltage Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)						
P24D1 - Particulate Matter Sensor Regneration Success Monitor	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	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 is running which means the engine speed is greater than 600 to 850 rpm			
P2510 - ECM Power Relay Circuit Performance	battery voltage is above 11 V for at least 3s								
P2564 - Turbocharger Boost Control Position Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P2565 - Turbocharger Boost Control Position Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P2598 - Turbocharger Boost Control Position Sensor "A" Circuit Range/Performance - Stuck Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P2599 - Turbocharger Boost Control Position Sensor "A" Circuit Range/Performance - Stuck High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P2610 - Control Module Ignition Off Timer Performance	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P268A - Fuel Injector Calibration Not Programmed ECM	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)								
P268C - Cylinder 1 Injector Data Incorrect	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)								
P268D - Cylinder 2 Injector Data Incorrect	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)								
P268E - Cylinder 3 Injector Data Incorrect	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)								
P268F - Cylinder 4 Injector Data Incorrect	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)								
P2690 - Cylinder 5 Injector Data Incorrect	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)								
P2691 - Cylinder 6 Injector Data Incorrect	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)								
P2692 - Cylinder 7 Injector Data Incorrect	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)								

16 OBDG09 Enable Table for Diagnostic System Manager - ECM

DTC	Additional Basic Enable Conditions						
P2693 - Cylinder 8 Injector Data Incorrect	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)						
U0073 - CAN A BUS OFF	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s				
U0074 - CAN B BUS OFF	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s				
U0101 - Lost Communications With Transmission Control System	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s				
U0106 - Lost Communication With Glow Plug Control Module	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s				
U010E - Lost Communications With Reductant Control Module	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
U02A3 - Lost Communication with PM Sensor	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
U029D - N0x 1 loss of comm	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
U029E - N0x 2 loss of comm	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			

16 OBDG09 Glow Plug Control Module (GPCM) Summary Tables

Component / System	Fault Code Master	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Secondary Parameters	Enable Condition	Time Required	MIL Illum.
Glow Plug switch defect and open	P064C	Electronic circuitry determines fault with GP switch	Glow Plug Current and Glow plug is commanded and voltage at glow plug	< 6.6 A = On = 0 volts	glow plugs are commanded on DTCs P163E, P163C, P0671-P0678	= True Not set	inner loop: 500 ms total time: 3500 ms	B
ROM error		Checksum error between calculated and stored values are compared	Checksums match	= NO	Module power	On	inner loop: 1500 ms total time: 4500 ms	B
RAM error		Compariarson of read write values	Read write values match	= NO	Module power	On	inner loop: 200 ms total time: 3200 ms	B
EEPROM error		Checksum error between calculated and stored values	Checksums match	= NO	Module power	On	inner loop: 200 ms total time: 3200 ms	B
Charge Pump Under Voltage		measured voltage of charge pump is determined to be out of tolerance	Charge Pump Voltage	<= Battery voltage at GPCM + 7 volts	Battery voltage at GPCM	> 6 volts	inner loop: 130 ms total time: 3130 ms	B
Charge Pump Over Voltage		measured voltage of charge pump is determined to be out of tolerance	Charge Pump Voltage	>= Battery voltage at GPCM + 18 volts	Battery	< 19.9 volts	inner loop: 160 ms total time: 3160 ms	B
GPCM reverse polarity switch "high voltage drop"		Elecrtonic circuitry determines that the reverse polarity protection voltage drop is in range	Path 1 [Battery voltage at GPCM - mean glow plug voltage value] Path 2 (Battery voltage at GPCM - mean glow plug voltage value with charge pump off) - (Battery - mean glow plug voltage value with charge pump on) ie. delta from charge pump on to charge pump off	> 2.3 volts < 300 mvolts	glow plugs are commanded Battery voltage at GPCM GP current GP current P0671,P0672, P0675, P0676 Battery voltage at GPCM stable for 30ms	= On > 6 volts > 6 amps < 60 amps = Not set < 2 volts	Path1: inner loop: 6000 ms total time: 9000 ms Path2: inner loop: 10000 ms total time 13000	B
GPCM running reset		Internal and external Watchdogs are monitored for interuption Monitor for undefined instruction code interupt Monitor for osolation stop detection	number of running resets or undefined instruction code detected or Osolation stop detection	> 9 events in a row	none		inner loop: 2000 ms total time: 5000 ms	B
difference between internal and external value of battery voltage too high		GMLAN Battery voltage from ECM is compared to GPCM internal measured battery voltage	abs[GPCM internal measured battery voltage - GMLAN Battery voltage]	'> 3 volts	glow plugs are commanded GMLAN battery signal glow command message Battery voltage at GPCM RPM RPM	= On = valid = valid > 6 volts <= 10 >= 400	inner loop: 190 ms total time: 3190 ms	B
system basic chip VSUPLOW		monitor internal chip supply voltage	internal chip supply voltage	< = 5.8 volts	Intake Air Heater commanded Battery supply at GPCM	= On > 9 volts	inner loop: 130 ms total time: 3130 ms	B
system basic chip (SBC) over temperature		measure temperature of the SBC	temperature of the high side switch inside the SBC	> 155 degC	Internal GPCM temperature	< 100 deg C	inner loop: 130 ms total time: 3130 ms	B

16 OBDG09 Glow Plug Control Module (GPCM) Summary Tables

Component / System	Fault Code Master	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Secondary Parameters	Enable Condition	Time Required	MIL Illum.
NOx sensor power supply fault		Electronic circuitry detects a failure in the NOx sensor power supply	Path1: DC/DC booster current. For Path 2: DC/DC booster current. Path 3: Voltage at main switch Path 4: (DC/DC Booster voltage - GPCM battery voltage)	> 25 amps > 640 msec > 60 (by hardware protection (time varies with temperature)) amps = 0 volts = ± 3 volts	Battery voltage at the GPCM Battery voltage at the GPCM	> 6 volts = 8 to 14 volts	inner loop: 6000 ms total time: 9000 ms	B
DEF heater current not calibrated.		Checksum error between calculated and stored values	Checksums match	= No	Ignition on		inner loop: 200 ms total time: 3200 ms	B
glow plug open	P0671-P0678	Electronic circuitry determines a fault exists on GP circuit	Glow Plug Current and Voltage at glow plug pin	< 4.25 A and and > 6.0 Volt	Ignition - glow plugs are commanded on P163E,P163D,P163C Supply voltage	= On > 5 secs not set > 6 volts	inner loop: 130 ms total time: 1130 ms	B
glow plug short		Electronic circuitry determines a fault exists on GP circuit	Path 1: Glow Plug Current Path 2: Hardware over current	> 60 A > 80 A	Ignition glow plug command over temperature condition over voltage condition abs[Battery supply at GPCM - IGN voltage at GPCM]	= on = on = false = false < 6.0 Volts	Path1: inner loop: 130 ms total time: 1130 ms Path2: inner loop: 260 ms total time 1260 ms	
glow plug high resistance		Electronic circuitry determines a fault exists on GP circuit	Glow Plug Resistance AND Glow Plug Current	> 1.0 Ohm >= 4.25 A	Ignition on Battery voltage at GPCM glow plugs are commanded on over temperature condition over voltage condition abs[Battery supply at GPCM - IGN voltage at GPCM]	= on > 7.0 volts = on = false false < 7.0 volts	inner loop: 160 ms total time: 1160 ms	
Glow plug low resistance		Electronic circuitry determines a fault exists on GP circuit	Glow Plug Resistance	< 250 mOhm	glow plugs are commanded on over temperature condition over voltage condition- abs[Battery supply at GPCM - IGN voltage at GPCM]	= on = false = false < 7.0 volts	inner loop: 160 ms total time: 1160 ms	
Engine Calibration Information Not Programmed – GPCM	P160C	ECM monitors serial data from GPCM for P160C Error Message indicating GPCM is not programmed with injector trim values.	Glow Plug Control Module determines IQA data has not been programmed in the GPCM		Ignition	ON	inner loop: 200 ms total time: 1200 ms	A
GMLAN Communication ECM -> GPCM	U0106	ECM monitors serial data from GPCM for U0106. Error Message indicating GPCM is not receiving major GMLAN signals.	Timeout of message $C9 or Timeout of message $4C1 or Timeout of message $4F1	> 100 ms > 2000 ms > 3000 ms	Ignition 1 battery voltage at GPCM	> 3.9 volts > 7.0	inner loop: 10000 ms total time: 11000 ms	?
Intake Air (IA) Heater Feedback Circuit	P154A	Electronic GPCM circuitry determines if faults related to the IA heater feedback circuit exist.	PATH1: IAH indicates its state is AND IAH current OR PATH2: IAH indicates its state is	OFF > 20 A = ON	DTCs not active Path1 IAH Commanded and Battery Voltage at IAH OR Path2 IAH Commanded	P0640, P154B, P154D, P154C, P166B = ON > 8.6 volts = OFF	inner loop: 650 ms total time: 3650 ms	B
Intake Air (IA) Heater Voltage Signal Circuit	P154B	Electronic GPCM circuitry determines if faults related to the voltage level present at the IA heater exist.	PATH1: Voltage signal line IAH Battery voltage OR PATH2: IAH Battery voltage AND GPCM IGN voltage AND GPCM Battery Voltage IAH Battery voltage	> 1.5 Volt < 6.9 Volt > 6.9 Volt < 16.0 Volt > 9.5 Volt	Path 1: IAH Commanded Path 2: DTCs not active IAH Commanded	= OFF for more then 65 msec P064C, P154D, P154C, P166B = ON	inner loop: 1000 ms total time: 4000 ms	B

Component / System	Fault Code Master	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Secondary Parameters	Enable Condition	Time Required	MIL Illum.
Intake Air (IA) Heater Current Signal Circuit	P154C	Electronic GPCM circuitry determines if faults related to the IA heater current signal circuit or heater grid exist.	PATH1: IAH current IAH voltage signal feedback to GPCM or PATH2: IAH current IAH voltage signal feedback to GPCM or PATH3:IAH current signal feedback to GPCM or PATH 4:IAH grid current IAH heater grid calculated resistance	< 20 A > 0.9 Volt < 20 A < 0.9 Volt > 4.96 Volt > 20 A > 500 mOhm	DTC's are not set IAH Commanded Battery Voltage at IAH GPCM Ignition voltage or DTC's are not set IAH Commanded Battery Voltage at IAH GPCM Ignition voltage or IAH Command or DTC's are not set IAH Commanded Battery Voltage at IAH	P154B, P154D, P0640, P0154A = ON > 6.9 Volt >= 6.9 Volt P154B, P154D, P0640, P0154A = ON > 6.9 Volt >= 6.9 Volt = off P154B, P154D, P0640, P0154A = ON > 8.0 Volt	inner loop: 5000 ms total time: 8000 ms	B
Intake Air (IA) Heater Temperature Signal Circuit	P154D	Electronic GPCM circuitry determines if faults related to the temperature feedback circuit of the IA heater exist.	PATH1: IAH temperature AND GMLAN signal "IntakeAirTemperature" or PATH2:IAH temperature signal feedback line or PATH3: IAH temperature signal feedback line or PATH4; IAH temperature signal feedback line or PATH5: IAH temperature signal feedback line	< -20 °C > +20 °C = Open > 4.96 Volt short to B+ or short to ground	DTC's are not set IAH Commanded Battery Voltage at IAH Engine General Status (engine sensor info) IntakeAirtemperature message from ECM or IAH Commanded active test function or DTC's are not set IAH Commanded Battery Voltage at IAH IAH Commanded IAH Commanded	P154B, P0640, P0154A, P154C, P166B = ON > 11.0 Volts = valid = valid = OFF = ON P154B, P0640, P0154A, P154C, P166B = ON > 6.0 Volts < ~~15.0~~ Volts OFF OFF	650ms (internal) + 75% failure over 4 seconds.	B
Intake Air (IA) Heater Switch/Control Circuit	P0640	Electronic GPCM circuitry determines if faults related to the control circuit of the IA heater exist.	Activation Reply signal (digital response) from IAH	= high when heartbeat signal is activated	DTC's are not set IAH Commanded	= P154A OFF	2000ms (internal) + 75% failure over 4 seconds.	B
Intake Air (IA) Heater Over Temperature	P166B	ECM monitors serial data from GPCM for P166B Error Message indicating GPCM detects IAH overtemperature	Internal Temperature of IAH module	> 80 °C	DTC's are not set IAH Commanded engine run time Battery Voltage at IAH **Conditions PATH1 P16AB**	P154B,P154C, P0640, P154D = ON > 40 sec sec > 6.9 Volt Volt **= True**	650ms (internal) + 75% failure over 4 seconds.	B

16 OBDG09 Glow Plug Control Module (GPCM) Summary Tables

Component / System	Fault Code Master	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Secondary Parameters	Enable Condition	Time Required	MIL Illum.
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	inner loop: 200 ms total time: 3200 ms	
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 Volt > +/-5 Volt > +/-3 Volt	GPCM Ignition voltage or GPCM Voltage supply GPCM Ignition Voltage or GPCM supply voltage Engine speed	> 9.0 Volt Volt > 6.0 Volt > 4.0 Volt > 6 Volt > 10< rpm >400 >	inner loop: 1000 ms total time: 4000 ms	
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 Volt > 1.5 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 %	inner loop: 1000 ms total time: 4000 ms	
Glow Plug Module Overtemperature	P163E	ECM monitors serial data from GPCM for P163E Error Message indicating GPCM detects GPCM overtemperature	GPCM Temperature	> 85 °C	GMLAN signal "coolant temperature" **Conditions PATH1 P16AD**	< 60 °C **= True**	inner loop: 650 ms total time: 3650 ms	
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 A and and > 3.0 Volt	DTCs not set: reductan heater commanded: GPCM temperature GPCM battery supply voltage	P20BB = ON < 123 °C > 7.0 Volt	inner loop: 3440 ms total time: 3940 ms	
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 or Path 2: load at output (detected by hardware) Path 3: hardware over current Path 4: hardware over temperature condition	> 21 A or < 47 mOhm > 27 A > 175 °C	reductan heater commanded: GPCM temperature GPCM supply voltage KL30 or reductan heater commanded: GPCM temperature GPCM supply voltage KL30	= ON °C < 123 Volt > 7.0 Volt or or or = ON < 123 °C > 7.0 Volt	inner loop: 1000 ms total time: 1500 ms	
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	inner loop: 2000 ms total time: 2500 ms	
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 and voltage at heater pin	< 0.2 A and and > 3.0 Volt	DTCs not set: reductan heater commanded: GPCM temperature GPCM battery supply voltage	P20BF = ON < 123 °C > 7.0 Volt	inner loop: 3440 ms total time: 3940 ms	

16 OBDG09 Glow Plug Control Module (GPCM) Summary Tables

Component / System	Fault Code Master	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Secondary Parameters	Enable Condition	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 or Path 2: load at output (detected by hardware) Path 3: hardware over current Path 4: hardware over temperature condition	> 21 A or < 47 mOhm > 27 A > 175 °C	reductan heater commanded: GPCM temperature GPCM supply voltage KL30 or reductan heater commanded: GPCM temperature GPCM supply voltage KL30	= ON °C < 123 Volt > 7.0 Volt or or or = ON < 123 °C > 7.0 Volt	inner loop: 1000 ms total time: 1500 ms	
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	inner loop: 2000 ms total time: 2500 ms	
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 and voltage at heater pin	< 0.2 A and and > 3.0 Volt	DTCs not set: reductan heater commanded: GPCM temperature GPCM battery supply voltage	P20C3 = ON < 123 °C > 7.0 Volt	inner loop: 3440 ms total time: 3940 ms	
Reductant Heater 3 Control Circuit Low Voltage	P20C3	ECM monitors serial data from GPCM for P20C3 Error Message indicating GPCM detects reductant heater output shorted to ground or an overload condition	Path 1: Reductant Heater Plug Current or Path 2: load at output (detected by hardware) Path 3: hardware over current Path 4: hardware over temperature condition	> 21 A or < 47 mOhm > 27 A > 175 °C	reductan heater commanded: GPCM temperature GPCM supply voltage KL30 or reductan heater commanded: GPCM temperature GPCM supply voltage KL30	= ON °C < 123 Volt > 7.0 Volt or or or = ON < 123 °C > 7.0 Volt	inner loop: 1000 ms total time: 1500 ms	
Reductant Heater 3 Control Circuit High Voltage	P20C4	ECM monitors serial data from GPCM for P20C4 Error Message indicating GPCM detects reductant heater to be shorted to battery	hardware (power stage) determines voltage at reductant heater output pin	> V_{batt} - 0.8 volts	reductan heater commanded:	= OFF	inner loop: 2000 ms total time: 2500 ms	
Nox Sensor Supply Voltage Circuit Bank 1 Sensor 1	P220A	ECM monitors serial data from GPCM for P220A Error Message indicating GPCM detects DC/DC booster output shorted to ground or shorted to battery	PATH 1:GPCM Electronic circuitry determines voltage at DC/DC booster output pin or PATH 2: DC/DC booster output current duration or PATH 3: DC/DC booster output current duration	> 5.0 Volt > 5.0 A > 10 ms > 37.5 A > 20 µs	status DC/DC booster or status DC/DC booster or status Dc/DC booster	= OFF, power up procedure has started after reset = ON = ON	inner loop: 5000 ms total time: 5500 ms	
Nox Sensor Supply Voltage Circuit Bank 1 Sensor 2	P220B	ECM monitors serial data from GPCM for P220B Error Message indicating GPCM detects DC/DC booster output shorted to ground or shorted to battery	PATH 1:Electronic circuitry determines voltage at DC/DC booster output pin or PATH 2: DC/DC booster output current duration or PATH 3: DC/DC booster output current duration	> 5.0 Volt > 5.0 A > 10 ms > 37.5 A > 20 µs	status DC/DC booster or status DC/DC booster or status Dc/DC booster	= OFF, power up procedure has started after reset or = ON or = ON	inner loop: 5000 ms total time: 5500 ms	

Component / System	Fault Code Master	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Secondary Parameters	Enable Condition	Time Required	MIL Illum.
Glow Plug Control Module Temperature Sensor Circuit Low Voltage	P16AD	ECM monitors serial data from GPCM for P16AD Error Message indicating GPCM detects GPCM temperature sensore voltage out of range low	PATH 1: GPCM temperature sensor voltage PATH 2: GPCM temperature sensor voltage	< 210 mV < 615 mV	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 Intake Air Temperature (GMLAN))	>= 8 hours >= -7 °C > 70 °C > -10 °C < 8 hours < -7 °C <= 60 °C <= -10 °C	inner loop: 1310 ms total time: 1810 ms	
Glow Plug Control Module Temperature Sensor Circuit High Voltage	P16AE	ECM monitors serial data from GPCM for P16AE Error Message indicating GPCM detects GPCM temperature sensore voltage our of range high	GPCM temperature sensor voltage	> 4,94 V	Engine Off Timer (GMLAN) and Intake Air Temperature (GMLAN) or Engine Coolant Temperature (GMLAN) and Intake Air Temperature (GMLAN)	>= 8 hours >= -7 °C > 70 °C > -10 °C	inner loop: 1310 ms total time: 1810 ms	
Glow Plug Control Module Temperature-Intake Air Heater Temperature Not Plausible	P16A8	ECM monitors serial data from GPCM for P16A8 Error Message indicating GPCM detects GPCM temperature and IAH temperature are not plausible	Tenperature difference between internal temperature of GPCM and internal temperature of IAH module	> absolute 22 °C	Engine Off Timer (GMLAN) and Intake Air Temperature (GMLAN) and IAH Battery Voltage and IAH PWM and DTC P154D	>= 8 hours > -7 °C > 10,5 V = 100 % = not set	83% failure over 3.0 seconds.	
Intake Air Heater Temperature Sensor Circuit Low Voltage	P16AA	ECM monitors serial data from GPCM for P16AA Error Message indicating GPCM detects IAH temperature sensore voltage out of range low	IAH temperature sensor voltage	< threshold selected by look-up table refer to table 1 in sheet "Look-Up Tables" mV	Engine Off Timer (GMLAN) and Intake Air Temperature (GMLAN) and IAH Battery Voltage and IAH PWM and DTC P154D or IAH Run Time and IAH PWM Intake Air Temperature (GMLAN) IAH Battery Voltage and DTC P154D or Intake Air Temperature (GMLAN) and IAH Battery Voltage and IAH PWM and DTC P154D	>= 8 hours >= -7 °C > 11 V = 100 % = not set > 120 sec = 100 % > -35 °C > 11 V = not set > 25 °C > 11 V = 100 % = not set	inner loop: 1310 ms total time: 1810 ms	

16 OBDG09 Glow Plug Control Module (GPCM) Summary Tables

Component / System	Fault Code Master	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Secondary Parameters	Enable Condition	Time Required	MIL Illum.
Intake Air Heater Temperature Sensor Circuit High Voltage	P16AB	ECM monitors serial data from GPCM for P16AB Error Message indicating GPCM detects IAH temperature sensore voltage out of range high	PATH1: IAH temperature sensor voltage	> IAH Battery Voltage * 158/512 V	Engine Off Timer (GMLAN) and	>= 8 hours	inner loop: 655 ms total time: 1155 ms	
					Intake Air Temperature (GMLAN) and	>= -7 °C		
					DTC P154D	= not set		
					or			
					IAH Run Time and	> 120 sec		
					IAH PWM and	> 90 %		
					Intake Air Temperature (GMLAN) and	> -35 °C		
					DTC P154D	= not set		
					or			
					Intake Air Temperature (GMLAN) and	> 25 °C		
					DTC P154D	= not set		
			PATH2: IAH temperature sensor voltage	> IAH Battery Voltage* 146/512 V				
					(Engine Off Timer (GMLAN) or	< 8 hours		
					Intake Air Temperature (GMLAN))	< -7 °C		
					and			
					(IAH Run Time or	< 120 sec		
					IAH PWM or	< 90 %		
					Intake Air Temperature (GMLAN))	< -35 °C		
					and			
					(Engine Coolant Temperature (GMLAN) and	< 60 °C		
					Engine Run Time)	> 40 sec		
					and			
					DTC P154D	= not set		