Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Valu	e	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Crankshaft to Carnshaft Correlation	P0016	Detects a shift of the camshaft angle by monitoring the average offset angle.	average value of camshaft offset OR average value of camshaft offset	~	-20.00	-	Engine backward rotation detected and NO pending or confirmed DTCs and Ignition ON and basic enable conditions met:	=	FALSE see sheet inhibit tables TRUE see sheet enable tables	-	fail conditions exists for more than 2 events test performed continuously 0.01 s rate	В
Turbocharger Boost Control Position Not Learned	Poosa	Detects in range vane position errors during a vane sweep initiated to learn minimum and maximum vane position values. The Open Position of the Turbocharger is learned prior to the Closed Position	Path 1: mean offset learned value at fully closed valve position or mean offset learned value at fully closed valve position	V 7	68.01 95.61	%	injection quantity and injection quantity and accelerator pedal position and Engine Speed and Vehicle speed and Vehicle speed and Vehicle speed and Sattery voltage and engine coolant temperature and Barometric pressure and Barometric pressure and Earometric pressure and Earometric pressure and Earometric pressure and Earometric pressure and Earometric pressure and Earometric pressure and Engine is Idling and Rich idle regeneration and	>=	0.00 100.00 0.10 500.00 760.00 0.00 3.11 10.00 71.96 130.06 65.00 110.00 10.08 TRUE inactive inactive	mm^3/rev % rpm rpm mph V °C °C kPa kPa kPa sec - -	fail conditions exists for 0.01 s monitor runs once per trip with 0.01 s rate whenever enable conditions are met	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold gic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							and Adaption is finished for this driving cycle	=	FALSE	-		
							and turbocharger offset adaption timer and	>=	0.60	sec		
							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 and	>=	0.15	sec		
							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	>	30.00	sec	injection quantity and	>=	0.00	mm^3/rev	fail conditions exists for	
			position				injection quantity and	<=	100.00	mm^3/rev	0.01 s monitor runs once per trip	
						accelerator pedal position and	<=	0.10	%	with 0.01 s rate		
							Engine Speed	>=	500.00	rpm	whenever	
							and Engine Speed and	<=	760.00	rpm	enable conditions are met	
							Vehicle speed	>=	0.00	mph	aremet	
							and Vehicle speed and	<=	3.11	mph		
							Battery voltage and	>=	10.00	V		
							engine coolant temperature and	>=	71.96	°C		
							engine coolant temperature and	<=	130.06	°C		
							Barometric pressure and	>=	65.00	kPa		
							Barometric pressure and	<=	110.00	kPa		
						time since start and	>	10.08	sec			
					Engine is Idling and	=	TRUE	-				
						Rich idle regeneration and	=	inactive	-			
					Rich idle (see closed loop enable condition for details) and	=	inactive	-				
							Adaption is finished for this driving cycle	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold gic 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	%		1
							and mean offset learned value at fully open valve position	<=	36.94	%		l
							and valve closed	=	TRUE			1
							and turbocharger offset adaption timer and	>=	0.15	sec		1
							No Pending or confirmed DTCs	=	see sheet inhibit tables	-		1
							and basic enable conditions met:	=	see sheet enable tables	-		l
				_	_			_				1
			Path 3: mean offset learned value at fully open	<	5.54	%	injection quantity and	>=	0.00	mm^3/rev	fail conditions	1
			valve position or mean offset learned value at fully open	>	36.94	%	injection quantity and	<=	100.00	mm^3/rev	exists for 0.01 s monitor runs	1
			valve position				accelerator pedal position and	<=	0.10	%	once per trip with 0.01 s rate	1
							Engine Speed and	>=	500.00	rpm	whenever enable	1
							Engine Speed and	<=	760.00	rpm	conditions	1
							Vehicle speed	>=	0.00	mph	are met	1
							and Vehicle speed	<=	3.11	mph		1
							and Battery voltage	>=	10.00	V		1
							and engine coolant temperature	>=	71.96	°C		1
							and engine coolant temperature	<=	130.06	°C		1
							and Barometric pressure	>=	65.00	kPa		1
							and Barometric pressure	<=	110.00	kPa		1
							and time since start	>	10.08	sec		1
							and Engine is Idling	=	TRUE	-		1
							and Rich idle regeneration	=	inactive	-		1
							and Rich idle (see closed loop enable condition for details)	=	inactive	-		1
							and Adaption is finished for this driving cycle	=	FALSE	-		I
							and valve open and	=	TRUE	-		I

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:		injection quantity	>=	0.00	mm^3/rev	fail	
			time taken to learn the mean offset learned value at fully open valve position	> 30.00 sec	and				conditions exists for	
					injection quantity	<=	100.00	mm^3/rev	0.01 s monitor runs	
					and accelerator pedal position	<=	0.10	%	once per trip with 0.01 s	
					and Engine Speed	>=	500.00	rpm	rate whenever	
					and Engine Speed	<=	760.00	rpm	enable conditions	
					and Vehicle speed	>=	0.00	mph	are met	
					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	=	inactive			
					condition for details) 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			
					and	_	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.
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	> 11.00	V	fail conditions exists for 3 s monitor runs with 0.01 s rate	В
					for time and starter is active cranking No Pending or confirmed DTCs and	 > 3.00 = FALSE = see sheet inhibit tables 	sec -	whenever enable conditions are met	1
					basic enable conditions met:	= see sheet enable tables			1
		Diagnoses the Turbocharger Boost Control low side driver circuit for driver over temperature faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match and the IC maximum temperature has been exceeded		battery voltage	> 11.00	V	fail conditions exists for 1 s monitor runs with 0.01 s	1
			IC Tempeature	> 150.00 °C	for time and starter is active cranking No Pending or confirmed DTCs and basic enable conditions met:	 > 3.00 = FALSE = see sheet inhibit tables = see sheet enable 	sec -	vitin 0.01 s rate whenever enable conditions are met	
						tables			
Turbocharger Boost Control Circuit Low Voltage	P0047	Diagnoses the Turbocharger Boost Control low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	 Short to ground: - ≤ 0.5 Ω impedance between signal and controller ground 	battery voltage	> 11.00	V	fail conditions exists for 3 s monitor runs with 0.01 s rate whenever	В
					for time and starter is active cranking No Pending or confirmed DTCs and	> 3.00 = FALSE = see sheet inhibit tables	sec -	enable conditions are met	
					basic enable conditions met:	= see sheet enable tables			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions		Time Required	MIL Illum.
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	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	В
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	В
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	В
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	= 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: and NO Pending or Confirmed DTCs:	=	see sheet enable tables see sheet inhibit tables	-	performed continuously 0.1 s rate	
					_				_			
CAC Temperature Sensor Circuit High Voltage	P007D	Detects a CAC temperature sensor circuit short to high voltage or a sensor open circuit	CAC downstream temperature sensor voltage same as downstream CAC temperature	~	4.93 -53	v °C	ignition on and basic enable conditions met: and NO Pending or Confirmed DTCs:	=	TRUE see sheet enable tables see sheet inhibit tables		fail conditions exists for 5 s test performed continuously 0.1 s rate	A
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 and basic enable conditions met: and metering unit actuator test active and NO Pending or Confirmed DTCs:	=	TRUE see sheet enable tables FALSE see sheet inhibit tables	-	fail conditions exists for 8 s monitor runs with 0.02 s rate whenever enable conditions are met	В
			rail pressure deviation from set point calculated out of difference between desired and actual value (see Look-Up- Table #71)	>	11000 to 80000	kPa	(state machine rail pressure control equal to pressure control valve or state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)) and basic enable conditions met: and metering unit actuator test active and NO Pending or Confirmed DTCs:	=	TRUE 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	

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	>	8.00	mm^3/rev	fail conditions exists for 8 s monitor runs	В
							and state machine rail pressure control equal to metering unit control mode	=	TRUE	-	with 0.02 s rate whenever	
							and basic enable conditions met:		see sheet enable tables	-	enable conditions are met	
							and metering unit actuator test active and	=	FALSE	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			rail pressure deviation from set point	<	-18000.00	kPa	(-	_	-	fail	
			calculated out of difference between desired and actual value		-18000.00	кга					conditions exists for 8 s	
							state machine rail pressure control equal to pressure control valve or	=	TRUE	-	monitor runs with 0.02 s rate	
							state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-	whenever enable conditions are met	
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
	80005											
Engine Coolant Temperature (ECT)-Fuel Temperature Not	P008F	Detects a biased ECT or fuel temperature by comparing start-up temperatures between the	Path 1:				minimum engine-off time	>=	28800.00	sec	fail conditions exists for 0.2 s	В
Plausible		two sensors.	(a) - (b) (see Look-Up-Table #15) where	>	100.00	°C	and				monitor runs once per trip with 0.2 s	
			((a) captured engine coolant	=	measured	-	ambient temperature and	>	-60.04	°C	rate whenever	
			temperature at start and		parameter		Engine Running	=	TRUE	-	enable conditions	
			(b) captured fuel temperature at start	=	measured parameter	-	for time	>	0.00	sec	are met	
			or				engine post drive/ afterun and	=	FALSE			
			Path 2: (a) - (b) (see Look-Up-Table #15)	<=	100.00	°C	diagnostic performed in current drive cycle (once per trip monitor) and	=	FALSE			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
			with (a) captured engine coolant temperature at start and (b) captured fuel temperature at start and	=	measured parameter measured parameter	-	basic enable conditions met: and NO Pending or Confirmed DTCs:	=	see sheet enable tables see sheet inhibit tables	-		
			 (a) - (b) (see Look-Up-Table #16) where (a) captured engine coolant temperature at start and (b) captured fuel temperature at start and (b) captured fuel temperature at start 	∧ = = =	20.00 measured parameter measured parameter FALSE	°C - -						
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)	2 ir b	Dpen Circuit:≥ 200 K Ω mpedance petween ECU pin ind load		battery voltage for time and starter is active cranking for time and NO Pending or Confirmed DTCs: and Basic enable conditions met	> = =	11.00 3.00 FALSE 3.00 see sheet inhibit tables see sheet enable tables	V - sec - -	fail conditions exists for 1 monitor runs with 0.01 s rate whenever enable conditions are met	A
		Diagnoses the Fuel Pressure Regulator 1 low side driver circuit for circuit faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.				battery voltage for time and starter is active cranking for time and NO Pending or Confirmed DTCs: and	> = >	11.00 3.00 FALSE 3.00 see sheet inhibit tables	V sec - sec -	fail conditions exists for 1 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.
					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 	for time and starter is active cranking for time and	= FALSE	V fail conditions exists for 0.75s monitor runs with 0.01 s rate whenever enable conditions - are met sec	A
					NO Pending or Confirmed DTCs: and Basic enable conditions met	 see sheet inhibit tables 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 for time and starter is active cranking for time and NO Pending or Confirmed DTCs: and Basic enable conditions met	= FALSE	V fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable sec conditions are met - sec -	A
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 same as intake air temperature	< 0.08 V > 150 °C	and	= TRUE = see sheet enable tables	 fail conditions exists for 5 s test performed continuously with 0.1 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.
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 same as intake air temperature	~		°C	ignition on and basic enable conditions met:	=	TRUE see sheet enable tables	-	fail conditions exists for 5 s test performed continuously with 0.1 s rate	A
Fuel Pressure Regulator 1 High Control Circuit Low Voltage	P00C9	Diagnoses the Fuel Pressure Regulator 1 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	ignition on and Basic enable conditions met	=	TRUE See sheet enable tables		fail conditions exists for 0.5s monitor runs with 0.01 s rate whenever enable conditions are met	A
Fuel Rail Pressure Regulator 1 High Control Circuit High Voltage	PooCA	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 for time and starter is active cranking for time and NO Pending or Confirmed DTCs: and Basic enable conditions met	> = =	11.00 3.00 FALSE 3.00 see sheet inhibit tables see sheet enable tables	V sec - sec -	fail conditions exists for 0.1 s monitor runs with 0.1 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold .ogic and Valu	e	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Intake Air Temperature Sensor 3 Circuit Low Voltage	POOEA	Detects low voltage readings on the intake air temperature sensor 3 circuit, indicating an OOR low condition.	intake air temperature sensor 3 voltage same as temperature of intake air temperature sensor 3	~	0.03	°C	ignition on and basic enable conditions met: and NO Pending or Confirmed DTCs:	=	TRUE see sheet enable tables see sheet inhibit tables	-	fail conditions exists for 5 s test performed continuously 0.1 s rate	В
Intake Air Temperature Sensor 3 Circuit	P00EB	Detects high voltage readings on the intake air temperature sensor 3	intake air temperature sensor 3 voltage	>	4.93	V	ignition on	=	TRUE	·	fail conditions exists for 5 s	В
High Voltage		circuit, indicating an OOR high condition.	same as temperature of intake air temperature sensor 3	<	-53	°C	and basic enable conditions met: and NO Pending or Confirmed DTCs:	=	see sheet enable tables see sheet inhibit tables	-	test performed continuously 0.1 s rate	
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	В
			Humidity Sensor Duty Cycle same as relative humidity	<	5.00	%	and following conditions for time: battery voltage and basic enable conditions met: and no pending or confirmed DTCs	> < =	1.00 11.00 655.34 see sheet enable tables see sheet inhibit tables	sec V V	continuously with 0.1 s rate	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Lo	Threshold ogic 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.					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 and	=	TRUE	-	and following conditions for time:	>	1.00	sec		
			ECM PWM circuit maximum period detected	=	TRUE	-	battery voltage	>	11.00	V		
			or Internal ECM PWM period not received	=	TRUE	-	battery voltage and	<	655.34	V		
							basic enable conditions met:	=	see sheet enable tables	-		
							and no pending or confirmed DTCs	=	see sheet inhibit tables	-		
	DOOLE	Detecte e high data quela	Path 1:		_		Facility Durating (classes and the		TRUE		fail	В
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	-	conditions exists for 0.1 s test performed	в
			Humidity Sensor Duty Cycle same as	>	95.00	%	and following conditions for time:	>	1.00	sec	continuously with 0.1 s	
			relative humidity	<	0.00	%	battery voltage battery voltage	> <	11.00 655.34	V V	rate	
							and basic enable conditions met:	=	see sheet enable tables	-		
							and no pending or confirmed DTCs	=	see sheet inhibit tables	-		
		The internal ECM PWM	Path 2:				Engine Running (please see the	=	TRUE		fail	
		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.					definition)				conditions exists for 0.1 s test performed continuously with 0.1 s rate	
			Internal ECM PWM circuit high voltage and	=	TRUE	-	and following conditions for time:	>	1.00	sec		
			ECM PWM circuit maximum period detected	=	TRUE	-	battery voltage	>	11.00	V		
			or Internal ECM PWM period not received	=	TRUE	-	battery voltage and	<	655.34	V		
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	e	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.		>=	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	В
			accumulated over a defined time interval same as accumulated over time	>	5.00 0.13	sec	and basic enable conditions met: and no pending or confirmed DTCs	=	see sheet enable tables see sheet inhibit tables	-	rate	
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	В
			measured air mass flow signal with (a) engine load dependent MAP for calculating lower threshold (see Look- Up-Table #1) and with (b) air temperature dependent	< = =	(a) - (b) 0.75 to 0.8 0	- ratio factor	and engine coolant temperature and engine coolant temperature	>=	-20.04 129.96	°C °C	whenever enable conditions are met	
			or measured air mass flow signal with (c) Engine load dependent MAP for calculating higher threshold	>	(c) + (b) 1.2	- ratio	and gradient of the charge-air temperature and	>=	-2.00	°C / sec		
			and with (b) air temperature dependent correction factor curve	=	0	factor	gradient of the charge-air temperature and (<=	2.00	°C / sec		
							Engine Running for	=	TRUE 90.00	-		
							time since start) and control value of the throttle valve and	> >=	-400.00	sec %		

			Criteria	L L	ogic and Value	•	Parameters		Conditions		Required	MIL Illum.
1							control value of the throttle valve and	<=	5.00	%		
							(set point valve position of exhaust-gas recirculation and	>=	-400.00	%		
							set point valve position of exhaust-gas recirculation for	<=	2.00	%		
							time) and	>	3.00	sec		
							injection quantity and	<=	300.00	mm^3/rev		
							air pressure in the induction volume and engine speed	<=	280.00 625.00	kPa rpm		
							and engine speed	<=	1500.00	rpm		
							and intake air temperature and	>=	-7.04	°C		
							intake air temperature basic enable conditions met:	<= =	51.96 see sheet enable tables	°C -		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Mass Air Flow	P0102	Detects low frequency	signal period of air mass flow sensor	>	881.00	usec	ignition on	=	TRUE			A
(MAF) Sensor Circuit High Voltage	10102	readings on the MAF circuit, indicating an OOR low condition on the MAF circuit		<	14.04	g/sec	and basic enable conditions met: and NO Pending or Confirmed DTCs:	=	see sheet enable tables see sheet inhibit tables	-	fail conditions exists for 3 s monitor runs 0.01 s rate whenever enable conditions are met	
	50.000				70.15	_			70.15	_	6.11	
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	A
			or signal period of air mass flow sensor (MAF) same as	<	50.00	usec	and basic enable conditions met: and	=	see sheet enable tables	-	whenever enable conditions are met	
			air mass flow	>	7354.80	g/sec	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	uro mor	

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:		Yie and fund		engine coolant temperature	>	-3549.94	°C	fail conditions exists for 5 s monitor runs	В
			(a) - (b) or	<	-15.00	kPa	and current injection quantity and	<	1308.00	mm^3/rev	with 0.01 s rate	
			Path 2: (a) - (b)	>	15.00	kPa	actuator position of throttle valve and	<=	327.67	%	whenever enable conditions	
			where (a) MAP sensor measured pressure	=	measured	-	turbo charger (VNT) wiping is active (see parameter definition) and	=	FALSE	-	are met	
			and		parameter	_	(0.00			
			(b) BARO sensor measured pressure	=	measured parameter	-	engine speed and	>=	0.00	rpm		
							engine speed) and	<=	100.00	rpm		
							vehicle speed and	<	3.11	mph		
							basic enable conditions met: and	=	see sheet enable tables	-		
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-				
											4.7	
Manifold Absolute Pressure (MAP)	P0107	Detects low voltage	Path 1:				engine synchronization completed	=	TRUE	-	fail	A
Sensor Circuit Low Voltage	ensor Circuit Low indicating an OOR low									conditions exists for 5 s test		
		readings on the MAP circuit, indicating an OOR low condition on the MAP circuit	(sensor voltage of manifold absolute	<	0.91	V	which means number of crankshaft revolutions	>=	4.00	revs	exists for 5 s	
		indicating an OOR low	(< <	0.91 44.9	V kPa		>=	4.00 TRUE	revs -	exists for 5 s test performed continuously	
		indicating an OOR low	(sensor voltage of manifold absolute pressure same as				number of crankshaft revolutions				exists for 5 s test performed continuously	
		indicating an OOR low	(sensor voltage of manifold absolute pressure same as				number of crankshaft revolutions and crankshaft reference mark detected (reference mark is the 2 missing teeth				exists for 5 s test performed continuously	
		indicating an OOR low	(sensor voltage of manifold absolute pressure same as manifold absolute pressure and	<	44.9	kPa	number of crankshaft revolutions and crankshaft reference mark detected (reference mark is the 2 missing teeth in the 50-2 tooth-wheel configuration) and	=	TRUE see sheet enable		exists for 5 s test performed continuously	
		indicating an OOR low	(sensor voltage of manifold absolute pressure same as manifold absolute pressure and actuator position of throttle valve) or Path 2: (sensor voltage of manifold absolute pressure	<	44.9	kPa	number of crankshaft revolutions and crankshaft reference mark detected (reference mark is the 2 missing teeth in the 50-2 tooth-wheel configuration) and	=	TRUE see sheet enable		exists for 5 s test performed continuously	
		indicating an OOR low	(sensor voltage of manifold absolute pressure same as manifold absolute pressure and actuator position of throttle valve) or Path 2: (sensor voltage of manifold absolute	<	44.9 20.00	kPa %	number of crankshaft revolutions and crankshaft reference mark detected (reference mark is the 2 missing teeth in the 50-2 tooth-wheel configuration) and	=	TRUE see sheet enable		exists for 5 s test performed continuously	
		indicating an OOR low	(sensor voltage of manifold absolute pressure same as manifold absolute pressure and actuator position of throttle valve) or Path 2: (sensor voltage of manifold absolute pressure same as manifold absolute pressure	< = <	44.9 20.00 0.38	kPa % V	number of crankshaft revolutions and crankshaft reference mark detected (reference mark is the 2 missing teeth in the 50-2 tooth-wheel configuration) and	=	TRUE see sheet enable		exists for 5 s test performed continuously	

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	A
			same as manifold absolute pressure	>	371.3	kPa	which means number of crankshaft revolutions and	>=	4.00 TRUE	revs	continuously 0.01 s rate	
							crankshaft reference mark detected (reference mark is the 2 missing teeth in the 50-2 tooth-wheel configuration)	=	TRUE	-		
							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: Humidity Temperature sensor period	<	0.26	centisec	Engine Running (please see the definition) and	=	TRUE	-	fail conditions exists for 0.1 s test performed continuously	В
			same as humidity temperature	>	145.96	°C	following conditions for time: battery voltage battery voltage and basic enable conditions met:	> > < =	1.00 11.00 655.34 see sheet enable tables	sec V V	with 0.1 s rate	
							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.					Engine Running (please see the definition)	=	TRUE	·	fail conditions exists for 0.1 s test performed continuously with 0.1 s	
			Internal ECM PWM circuit low voltage and ECM PWM circuit maximum period	=	TRUE TRUE	-	and following conditions for time: battery voltage	>	1.00 11.00	sec V	rate	
			detected or Internal ECM PWM period not received	=	TRUE	-	battery voltage and basic enable conditions met:	< =	655.34 see sheet enable	V -		
							and no pending or confirmed DTCs	=	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.
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	> 10.00 centised ond	Engine Running (please see the definition) and following conditions for time:	= TRUE	- Sec	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	
			humidity temperature	< -60.00 °C	battery voltage battery voltage and basic enable conditions met:	> 11.00 < 655.34 = see sheet enable	V V	Tale	
					and no pending or confirmed DTCs	tables = 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	
			Internal ECM PWM circuit high voltage and ECM PWM circuit maximum period detected or	= TRUE - = TRUE -	and following conditions for time: battery voltage battery voltage	> 1.00 > 11.00 < 655.34	sec V V	rate	
			Internal ECM PWM period not received	= TRUE -	and and	= see sheet enable tables	-		
					no pending or confirmed DTCs	= see sheet inhibit tables	-		
Engine Coolant Temperature (ECT) Sensor Circuit Low Voltage	P0117	Detects low voltage readings on the ECT circuit, indicating an OOR low condition on the ECT circuit	voltage of engine coolant temperature sensor	< 0.51 V	ignition on	= TRUE	-	fail conditions exists for 15 s test	A
			same as engine coolant temperature	> 149 °C	and basic enable conditions met:	= see sheet enable tables	-	performed continuously 0.2 s rate	

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 same as engine coolant temperature	~	4.90 -53	°C	ignition on and basic enable conditions met:	-	TRUE see sheet enable tables	-	fail conditions exists for 60 s test performed continuously 0.2 s rate	A
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)		>=	59.96	°C	engine pre drive	=	FALSE		fail conditions exists for 0.2 s monitor runs once per trip with 0.2 s rate	В
			and measured engine coolant temperature	<	49.96	°C	and time since start	<	1440.00	sec	whenever enable	
						and measured engine coolant temperature and	>=	-53.04	°C	conditions are met		
							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 engine speed	<= <=	9.94 750.00	mph rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Lo	Threshold ogic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							and diagnostic performed in current dc and basic enable conditions met: and NO Pending or Confirmed DTCs:	= =	FALSE see sheet enable tables see sheet inhibit tables	-		
		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)		*	81.96	°C	engine pre drive	=	FALSE	-		
		High region Engine Temperature at start < 52 degC AND ambient air temperature > 10 degC	measured engine coolant temperature	<	70.96	°C	and time since start and measured engine coolant temperature and	< >=	1440.00 -53.04	sec °C		
							captured value of coolant temperature during start and	<=	51.96	°C		
							ambient temperature and ambient temperature	> <	-7.04 59.96	℃ ℃		
) and ambient temperature (used for high region determination)	>	9.96	°C		
							and engine idle time ratio which is defined by (idle time divided by time since start) where idle time is incremented when:	<	0.50	%		
							(accelerator pedal value and	<=	10.01	%		
							vehicle speed and engine speed	<= <=	9.94 750.00	mph rpm		
) and diagnostic performed in current dc and	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold gic 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		-150.00 150 counts = 100 Lambda = ~27 %O2)	counts	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 see sheet enable tables	- - Sec	fault exists for more than 3 sec; monitor runs at 0.1 s when enable conditions are met	В
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	0.6	1550.00 1550 counts = 55 Lambda = - 0.1178 %O2)	counts	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 see sheet enable tables	- sec	fault exists for more than 3 sec; monitor runs at 0.1 s when enable conditions are met	В
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		-150.00 150 counts = 100 Lambda = ~27 %O2)	counts	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 see sheet enable tables	- SeC	fault exists for more than 3 sec; monitor runs at 0.1 s when enable conditions are met	В

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	В
					(1550 counts = 0.65 Lambda = - 0.1178 %O2)		Engine Running (see parameter definition)	=	TRUE	-	at 0.1 s when enable conditions	
					0.1170 /002)		for time (required for the NOx sensor to give valid response) and	>	20.00	sec	are met	
							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	В
		Slate	with O2 concentration of the sensor	<=	((0.2095 - (a)) *	factor	Engine speed Engine speed	> <	600.00 4000.00	rpm rpm	are met	
	02		~-	((0.2095 - (a)) (b)) + (a)	lacioi	- ·						
			where (a) modeled O2 in waiting-injection	=	modeled O2	factor	Battery voltage Ambient Air Pressure	> >=	11.00 74.80	V kPa		
			falling state (b) factor for the determination of the upper limit of modeled O2 concentration	=	concentration 0.60	factor	Ambient Air Pressure	<=	106.00	kPa		
							Ambient Air Temperature Ambient Air Temperature	>= <=	-7.04 124.96	℃ ℃		
							Engine operation mode	=	normal	-		
							Post injection	=	inactive	-		
							Oxygen Concentration Signal NO Pending or Confirmed DTCs:	=	active 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: modeled O2 signal (based on injection quantity, air mass and fuel	> < <	1.80 0.12	sec -		
							density) Fuel Injection Quantity Engine speed	>	120.00 600.00	mm^3/rev rpm		
						Additional enable conditions for transitioning state machine from stable operation state to wait-Injection falling state: Fuel Injection Quantity	<	a+b	_			
							with		atu	-		

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	=	measured parameter	-		
					diagnosis b) Decline of Injection Quantity from stored fuel quantity at start of diagnosis	>=	18.00	mm^3/rev		
					and Fuel Injection Quantity with	>	a-b	-		
					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 Fuel Injection Quantity with	< <	120.00 a+b	mm^3/rev		
					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 and	>=	0.00	%		
					actual valve position of exhaust-gas recirculation and	<=	80.00	%		
					within the time fuel injection falling below	<	1.05	sec		
					Fuel Injection Quantity and	<	4.00	mm^3/rev		
					Fuel Injection Quantity with	<	a+b			
					a) Measured Minimum Fuel Injection Quantity	=	measured parameter	-		
					 b) Maximum fluctuation of Injection Quantity 	=<	16.00	mm^3/rev		
					Additional enable conditions for transitioning state machine from overrun state to delay state: actual valve position of exhaust-gas	>=	0.00	%		
					recirculation and	-	0.00	,,		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
					actual valve position of exhaust-gas recirculation Deviation from maximum O2 concentration during overrun	<= <	80.00 0.06	% -		
					Additional enable conditions for transitioning from delay state to diagnostic completion state: actual valve position of exhaust-gas recirculation and actual valve position of exhaust-gas recirculation Deviation from maximum O2 concentration during overrun	>= <= <	0.00 80.00 0.06	% % -		
Fuel Trim System Lean		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/r ev	(Status of the Observer function's lambda-signal means	-	TRUE		fail conditions exists for 12 s monitor runs with 0.02 s	В
			(lambda signal from NOx sensor ready (see parameter definition)	=	TRUE	-	rate whenever enable			
					fuel system is in fuel cut off (see parameter definition)	=	FALSE	-	conditions are met	
					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 means	=	TRUE	-		
					(Load dependent release state (see look up table #48) AND	=	0 to 1	-		
			Component Protection release state (see look up table #43)	>	0 to 1	-				
) engine coolant temperature	<=	199.96	°C				
			engine coolant temperature Normal Injection Mode	>= =	64.96 TRUE	°C				
			Barometric pressure	= >=	74.80	kPa				
			Ambient temperature NO Pending or Confirmed DTCs:	>= =	-7.04 see sheet inhibit	°C -				
					basic enable conditions met:	=	tables see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	9	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/r ev	(Status of the Observer function's lambda-signal means	=	TRUE	-	fail conditions exists for 12 s monitor runs with 0.02 s	В
							(lambda signal from NOx sensor ready (see parameter definition)	=	TRUE	-	rate whenever enable	
							fuel system is in fuel cut off (see parameter definition)	=	FALSE	-	conditions are met	
							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 means	=	TRUE	-		
							Load dependent release state (see look up table #48) AND	=	0 to 1	-		
							Component Protection release state (see look up table #43))	>	0 to 1	-		
							, engine coolant temperature engine coolant temperature	<= >=	199.96 64.96	℃ ℃		
							Normal Injection Mode	=	TRUE	-		
							Barometric pressure Ambient temperature	>= >=	74.80 -7.04	kPa °C		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
Fuel pump	P0182	Detects low voltage	voltage of fuel temperature sensor 1	<	0.60	V	ignition on	-	TRUE		fail	В
Temperature Sensor 1 Circuit Low	F U 102	readings in the fuel pump temperature sensor 1 circuit, indicating an OOR low condition on the fuel pump temperature sensor 1 circuit		~	0.00	v		=	TRUE	-	conditions exists for 5 s test performed continuously 0.2 s rate	В
			same as fuel temperature	>	59	°C	and basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold ogic and Value	e	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 same as fuel temperature	>	4.71	۷ °C	ignition on and basic enable conditions met:	=	TRUE see sheet enable tables	-	fail conditions exists for 5 s test performed continuously 0.2 s rate	В
									Lables			
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 same as	<	0.60	V	ignition on and	=	TRUE	-	fail conditions exists for 5 s test performed continuously	В
			fuel temperature	>	150	C	basic enable conditions met:	=	see sheet enable tables	-	0.2 s rate	
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	В
			same as fuel temperature	<	-50	°C	and basic enable conditions met:	=	see sheet enable tables	-	continuously 0.2 s rate	
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	A
			or fuel pressure regulator 2 adaptation factor	<=	0.75	factor	and adaptation for fuel pressure regulator 2 active	=	TRUE	-	with 0.01 s rate whenever	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold gic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							means (counter for successful adaption	>	0	counts	enable conditions are met	
							or counter for the successful calculation of the adaptation and	>	9.00	counts	are mor	
							(engine speed and	>	400.00	rpm		
							engine speed	<	1000.00	rpm		
							and vehicle speed and	<=	1.86	mph		
							t state machine rail pressure control equal to pressure control valve or	=	TRUE	-		
							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	
			rail pressure sensor voltage or	<	0.35	V	and fuel temperature	>	-0.04	°C	rate whenever	
			rail pressure sensor voltage)	>	0.65	V	and engine has already run in this driving cycle and	=	TRUE	-	enable conditions are met	
							rail pressure is reduced means	=	TRUE	-		
							rail pressure and	<	0.00	Кра		
							fuel pressure regulator 2 current and	<=	1.70	Amps		
							time since engine off and	>	30.08	sec		
							number of fault measurements during engine postdrive/ afterun and	>	10.00	counts		
							and basic enable conditions met:	=	see sheet enable tables			
							NO Pending or Confirmed DTCs:		see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
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: and NO Pending or Confirmed DTCs:	=	see sheet enable tables see sheet inhibit	-		
							No renaing of committee bros.	_	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 same as	>	4.81	V	ignition on	=	TRUE		fail conditions exists for 0.2 s monitor runs with 0.01 s	A
			rail pressure	>	220000.00	kPa	basic enable conditions met: and	=	see sheet enable tables	-	rate whenever enable	
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables		conditions are met	
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.	(corrected energizing time for the rail pressure calibration points and cylinder 1	>	(a) - (b)		environmental temperature and	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	В
			(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-	>=	5 to 30	sec		
					Up-Table #94) and					
					intake manifold pressure and intake manifold pressure	> <	75.00 150.00	kPa kPa		
					and accelerator pedal position	<	0.05	%		
					and Fuel system status and	=	Fuel cut off	-		
					(engine speed and	>	(b) - (a)	-		
					engine speed with	<	(a) + (c)	-		
					(a) value of engine speed and with	=	30.00	rpm		
					 (b) gear specific minimum engine speed and with 	=	950.00	rpm		
					 (c) gear specific maximum engine speed 	=	1850.00	rpm		
					and current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1) and	=	0 to 1	-		
					vehicle speed and	>	0.00	mph		
					rail pressure deviation from set point calculated out of difference between desired and actual value for	<	5000.00	kPa		
					time and	>	0.10	sec		
					no gear change is occurred and	=	TRUE	-		
					4 wheel mode and basic enable conditions met:	=	see sheet enable tables	-		
					and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
	B015-								6.5	
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	В

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 (a) maximum injection energizing time	=	384.4	usec	(fuel temperature and	>=	0.06	°C		
			and with (b) offset of the maximum filtered energizing time	=	12	usec	fuel temperature) and	<=	79.96	°C		
) for rail pressure point	=	70000.00	kPa	engine temperature and	>	49.96	°C		
							battery voltage and combustion chamber is not cold off	>	10.00	V		
							means time since last combustion (see Look- Up-Table #94) and	>=	5 to 30	sec		
							intake manifold pressure and	>	75.00	kPa		
							intake manifold pressure and	<	150.00	kPa		
							accelerator pedal position and Fuel system status	< =	0.05 Fuel cut off	%		
							and (engine speed	>	(b) - (a)	-		
							and engine speed with	<	(a) + (c)	-		
							(a) value of engine speed and with	=	30.00	rpm		
							(b) gear specific minimum engine speed and with	=	950.00	rpm		
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							, and current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1) and	=	0 to 1	-		
							vehicle speed and	>	0.00	mph		
							rail pressure deviation from set point calculated out of difference between desired and actual value for	<	5000.00	kPa		
							time and	>	0.10	sec		
							no gear change is occurred and	=	TRUE	-		
							4 wheel mode and	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	I	Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							basic enable conditions met: and	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		I
Cylinder 7 Injection Timing Retarded	P01D7	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point. Detects a fault when the corrected energizing time exceeds the allowed limit.	(corrected energizing time for the rail pressure calibration points and cylinder 7	>	(a) - (b)	-	environmental temperature and	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	В
			(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)	<=	79.96	°C		1
							and					
			/ for rail pressure point	=	70000.00	kPa	engine temperature and	>	49.96	°C		
			raii pressure point	=	70000.00	кга	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 and	<	0.05	%		
							Fuel system status and	=	Fuel cut off	-		
							(engine speed and	>	(b) - (a)	-		
							engine speed with	<	(a) + (c)	-		
							(a) value of engine speed and with	=	30.00	rpm		
							and with (b) gear specific minimum engine speed and with	=	950.00	rpm		
							(c) gear specific maximum engine speed	=	1850.00	rpm		1
		l) and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold ogic 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 and	>	0.00	mph		
							rail pressure deviation from set point calculated out of difference between desired and actual value for	<	5000.00	kPa		
							time and	>	0.10	sec		
							no gear change is occurred and	=	TRUE	-		
							4 wheel mode and	=	FALSE	-		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 8 Injection	P01D9	Monitors the correction	(environmental temperature	>	-7.04	°C	fail	В
Timing Retarded		values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point. Detects a fault when the corrected energizing time exceeds the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 8	>	(a) - (b)	-	and				conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	
			(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		70000.00	1.5	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) and intake manifold pressure and	>=	5 to 30 75.00	sec kPa		
							intake manifold pressure and	<	150.00	kPa		
							accelerator pedal position and	<	0.05	%		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							Fuel system status and	=	Fuel cut off	-		
							(engine speed and	>	(b) - (a)	-		
							engine speed with	<	(a) + (c)	-		
							(a) value of engine speed and with	=	30.00	rpm		
							(b) gear specific minimum engine speed and with	=	950.00	rpm		
							(c) gear specific maximum engine speed	=	1850.00	rpm		
) and current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1) and	=	0 to 1	-		
							vehicle speed and	>	0.00	mph		
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for time and	>	0.10	sec		
							no gear change is occurred and	=	TRUE	-		
							4 wheel mode and	=	FALSE	-		
							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. 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)		environmental temperature and	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	В
			(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)	<=	79.96	°C		
)				and					
1		I	for				engine temperature	>	49.96	°C	I	

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		
					ballery vollage	>	10.00	v		
					and combustion chamber is not cold off					
					means					
					time since last combustion (see Look- Up-Table #94) and	>=	5 to 30	sec		
					intake manifold pressure	>	75.00	kPa		
					and intake manifold pressure	<	150.00	kPa		
					and		150.00			
					accelerator pedal position and	<	0.05	%		
					Fuel system status and /	=	Fuel cut off	-		
					engine speed and	>	(b) - (a)	-		
					engine speed with	<	(a) + (c)	-		
					(a) value of engine speed and with	=	30.00	rpm		
					(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) and	=	0 to 1	-		
					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 and	=	TRUE	-		
					4 wheel mode and	=	FALSE	-		
					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.	(corrected energizing time for the rail pressure calibration points and cylinder 5	>	(a) - (b)	-	environmental temperature	>	-7.04	℃	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	В
			(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				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 and	>	75.00	kPa		
							intake manifold pressure and	<	150.00	kPa		
							accelerator pedal position and	<	0.05	%		
							Fuel system status and /	=	Fuel cut off	-		
							engine speed and	>	(b) - (a)	-		
							engine speed with	<	(a) + (c)	-		
							(a) value of engine speed and with	=	30.00	rpm		
							 (b) gear specific minimum engine speed and with 	=	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 and	>	0.00	mph		

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 and	>	0.10	sec		
							no gear change is occurred and	=	TRUE	-		
							4 wheel mode and	=	FALSE	-		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables			
Cylinder 6 Injection	P01D5	Monitors the correction	(environmental temperature	>	-7.04	°C	fail	В
Timing Retarded		values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point. Detects a fault when the corrected energizing time exceeds the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 6	>	(a) - (b)	-	and				conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	
			(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		
				-	70000.00	Νü	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 and	<	150.00	kPa		
							accelerator pedal position and	<	0.05	%		
							Fuel system status and	=	Fuel cut off	-		
							(engine speed and	>	(b) - (a)	-		
ļ		l					engine speed	<	(a) + (c)	-		

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

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 and	>	75.00	kPa		
					intake manifold pressure and	<	150.00	kPa		
					accelerator pedal position and	<	0.05	%		
					Fuel system status and (=	Fuel cut off	-		
					vengine speed and	>	(b) - (a)	-		
					engine speed with	<	(a) + (c)	-		
					(a) value of engine speed and with	=	30.00	rpm		
					(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) and	=	0 to 1	-		
					vehicle speed and	>	0.00	mph		
					rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
					for time and	>	0.10	sec		
					no gear change is occurred and	=	TRUE	-		
					4 wheel mode and	=	FALSE	-		
					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. 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) -	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	В

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 and with 	=	107.2	usec	and fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered	=	47.2	usec)	<=	79.90	C		
			energizing time									
)				and					
			/ for				engine temperature	>	49.96	°C		
			rail pressure point	=	70000.00	kPa	and battery voltage	>	10.00	V		
							ballery vollage	>	10.00	v		
							and					
							combustion chamber is not cold off means					
							time since last combustion (see Look-	>=	5 to 30	sec		
							Up-Table #94)					
							and intake manifold pressure	>	75.00	kPa		
							and	-				
							intake manifold pressure and	<	150.00	kPa		
							accelerator pedal position	<	0.05	%		
							and					
							Fuel system status and	=	Fuel cut off	-		
							(
							engine speed	>	(b) - (a)	-		
							and engine speed	<	(a) + (c)	-		
							with					
							 (a) value of engine speed and with 	=	30.00	rpm		
							(b) gear specific minimum engine	=	950.00	rpm		
							speed			·		
							and with (c) gear specific maximum engine	=	1850.00	rpm		
							speed	-	1030.00	ipin		
)					
							and current gear (see Look-Up-Table #93)	=	0 to 1	-		
							(diagnostic enabled when equal to 1)		0.00			
							and		0.00			
							vehicle speed and	>	0.00	mph		
							rail pressure deviation from set point	<	5000.00	kPa		
							calculated out of difference between desired and actual value					
							for					
							time	>	0.10	sec		
							and no gear change is occurred	=	TRUE	-		
							and	-				
							4 wheel mode and	=	FALSE	-		
							and basic enable conditions met:	=	see sheet enable	-		
									tables			
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit			
							No Fonding of Committee D103.	-	tables	-		
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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. 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)		environmental temperature and	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	В
			v with (a) minimum injection energizing time	=	107.2	usec	fuel temperature and	>=	0.06	°C		
			(a) minimum injection chergizing time and with (b) offset of the minimum filtered energizing time	=	47.2	usec	fuel temperature)	<=	79.96	°C		
)				and					
			for rail pressure point	=	70000.00	kPa	engine temperature and	>	49.96	°C		
							battery voltage	>	10.00	V		
							and combustion chamber is not cold off means current gear (see Look-Up-Table #93)	>=	5 to 30	sec		
							(diagnostic enabled when equal to 1) and	/-	5 10 50	360		
							intake manifold pressure and	>	75.00	kPa		
							intake manifold pressure	<	150.00	kPa		
							and accelerator pedal position	<	0.05	%		
							and Fuel system status and (=	Fuel cut off	-		
							engine speed and	>	(b) - (a)	-		
							engine speed with	<	(a) + (c)	-		
							(a) value of engine speed	=	30.00	rpm		
							and with (b) gear specific minimum engine speed and with	=	950.00	rpm		
							(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		
				I			and no gear change is occurred and	=	TRUE	-		
				I			4 wheel mode and	=	FALSE	-		
				I			basic enable conditions met:	=	see sheet enable tables	-		
				l			and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
	20120				_						()	
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. 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)	-	environmental temperature and	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	В
			(with (a) minimum injection energizing time	1	107.2		fuel temperature	>=	0.06	°C		
			 (a) minimum injection energizing time and with (b) offset of the minimum filtered energizing time 	=	47.2	usec usec	and fuel temperature) and	<=	79.96	°C		
) for	I	70000.00		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) and	>=	5 to 30	sec		
				I			intake manifold pressure and	>	75.00	kPa		
				1			intake manifold pressure	<	150.00	kPa		
				I			and accelerator pedal position	<	0.05	%		
				I			and Fuel system status and	=	Fuel cut off	-		
				I			(engine speed	>	(b) - (a)	-		
				1			and engine speed with	<	(a) + (c)	-		
				I			(a) value of engine speed and with	=	30.00	rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold ogic and Value	•	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							 (b) gear specific minimum engine speed and with (c) gear specific maximum engine speed 	=	950.00 1850.00	rpm rpm		
							/ and current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1) and	=	0 to 1	-		
							vehicle speed and	>	0.00	mph		
							rail pressure deviation from set point calculated out of difference between desired and actual value for	<	5000.00	kPa		
							time	>	0.10	sec		
							and no gear change is occurred and	=	TRUE	-		
							4 wheel mode and	=	FALSE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
							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. 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)		environmental temperature and	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	В
	P01DA	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	pressure calibration points and cylinder 8 (with				and (fuel temperature	>	-7.04	℃ ⊃°	conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions	В
	P01DA	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	pressure calibration points and cylinder 8	< = =	(a) + (b) 107.2 47.2	- usec usec	and				conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions	В
	P01DA	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	pressure calibration points and cylinder 8 (with (a) minimum injection energizing time and with (b) offset of the minimum filtered energizing time) for	=	107.2 47.2	usec usec	and (fuel temperature and fuel temperature) and engine temperature	>=	0.06	°C	conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions	В
	P01DA	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	pressure calibration points and cylinder 8 (with (a) minimum injection energizing time and with (b) offset of the minimum filtered energizing time)	=	107.2	usec	and (fuel temperature and fuel temperature) and	>= <=	0.06 79.96	℃ ℃	conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions	В
	P01DA	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	pressure calibration points and cylinder 8 (with (a) minimum injection energizing time and with (b) offset of the minimum filtered energizing time) for	=	107.2 47.2	usec usec	and (fuel temperature and fuel temperature) and engine temperature and battery voltage and combustion chamber is not cold off means time since last combustion (see Look-	>= <= >	0.06 79.96 49.96	℃ ℃	conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions	В
	P01DA	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	pressure calibration points and cylinder 8 (with (a) minimum injection energizing time and with (b) offset of the minimum filtered energizing time) for	=	107.2 47.2	usec usec	and (fuel temperature and fuel temperature) and engine temperature and battery voltage and combustion chamber is not cold off means	>= <= >	0.06 79.96 49.96 10.00	°C ∨ v	conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold ogic and Value	•	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							and intake manifold pressure	<	150.00	kPa		
							and accelerator pedal position and	<	0.05	%		
							Fuel system status and	=	Fuel cut off	-		
							(engine speed and	>	(b) - (a)	-		
							engine speed with	<	(a) + (c)	-		
							(a) value of engine speed and with	=	30.00	rpm		
							(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) and	=	0 to 1	-		
							vehicle speed and	>	0.00	mph		
							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 and	=	TRUE	-		
							4 wheel mode and	=	FALSE	-		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 4 Injection	P01D2	Monitors the correction	(_		environmental temperature	>	-7.04	°C	fail	В
Timing Advanced		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.	corrected energizing time for the rail pressure calibration points and cylinder 4 (<	(a) + (b)	-	and (0.06	*	conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	
			with (a) minimum injection energizing time	=	107.2	usec	fuel temperature and fuel temperature	>=	0.06	°C °C		
1 1		I	and with	ł			fuel temperature	<=	79.96	°C	I I	

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 roil procesure point		70000.00	kPa	engine temperature and	>	49.96	°C		
			rail pressure point	=	70000.00	кра	and battery voltage	>	10.00	V		
							and combustion chamber is not cold off means time since last combustion (see Look- Up-Table #94) and	>=	5 to 30	Sec		
							intake manifold pressure and	>	75.00	kPa		
							intake manifold pressure and	<	150.00	kPa		
							accelerator pedal position and	<	0.05	%		
							Fuel system status and	=	Fuel cut off	-		
							(engine speed	>	(b) - (a)	-		
							and engine speed with	<	(a) + (c)	-		
							(a) value of engine speed and with	=	30.00	rpm		
							(b) gear specific minimum engine speed and with	=	950.00	rpm		
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							/ and current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1) and	=	0 to 1	-		
							vehicle speed and	>	0.00	mph		
							rail pressure deviation from set point calculated out of difference between desired and actual value for	<	5000.00	kPa		
							time and	>	0.10	sec		
							no gear change is occurred and	=	TRUE	-		
							4 wheel mode and	=	FALSE	-		
							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. 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)	-	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	В
			(with				(fuel temperature	>=	0.06	°C	are mer	
			(a) minimum injection energizing time and with	=	107.2	usec	and fuel temperature	<=	79.96	°C		
			(b) offset of the minimum filtered energizing time	=	47.2	usec)	~-	79.90	C		
)				and					
			for rail pressure point	=	70000.00	kPa	engine temperature and	>	49.96	°C		
							battery voltage	>	10.00	V		
							and combustion chamber is not cold off means time since last combustion (see Look- Up-Table #94)	>=	5 to 30	sec		
							and intake manifold pressure	>	75.00	kPa		
							and intake manifold pressure	<	150.00	kPa		
							and accelerator pedal position	<	0.05	%		
							and Fuel system status and	=	Fuel cut off	-		
							(engine speed	>	(b) - (a)	-		
							and engine speed with	<	(a) + (c)	-		
							(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 and	>	0.00	mph		
							rail pressure deviation from set point calculated out of difference between desired and actual value for	<	5000.00	kPa		

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

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	e	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) and	=	0 to 1			
							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 and	>	0.10	sec		
							no gear change is occurred and	=	TRUE	-		
							4 wheel mode and	=	FALSE	-		
							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. 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)	-	environmental temperature and	>	-7.04	°C	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	В
			(with (a) minimum injection energizing time	=	107.2	usec	(fuel temperature and	>=	0.06	°C		
			(b) offset of the minimum filtered energizing time	=	47.2	usec	fuel temperature)	<=	79.96	°C		
)				and					
			tor rail pressure point	=	70000.00	kPa	engine temperature and better weltage	>	49.96	°C V		
							battery voltage and combustion chamber is not cold off means time since last combustion (see Look- Up-Table #94)	>	10.00 5 to 30	v		
							and intake manifold pressure	>	75.00	kPa		
							and intake manifold pressure	<	150.00	kPa		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold ogic and Value	9	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							and accelerator pedal position and Fuel system status	< =	0.05 Fuel cut off	%		
							and (-		
							engine speed and engine speed	> <	(b) - (a)	-		
							with (a) value of engine speed	=	(a) + (c) 30.00	- rpm		
							and with (b) gear specific minimum engine	=	950.00	rpm		
							speed 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 and	>	0.00	mph		
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for time and	>	0.10	sec		
							no gear change is occurred and	=	TRUE	-		
							4 wheel mode and	=	FALSE	-		
							basic enable conditions met: and	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Coolant Temperature Dropped Below	P01F0	Detects a stuck open thermostat by monitoring for a decrease of the engine	engine coolant temperature	<	70.96	°C	engine pre drive	=	FALSE	-	fail conditions exists for 0.2	В
Diagnostic Monitoring Temperature		coolant temperature below the OBD monitoring threshold during normal operating conditions									s monitor runs with 0.2 s rate	
			for fault counter which is equivalent to fault time	>= >=	200.00 40.00	- sec	and ambient temperature	>=	-7.04	°C	whenever enable	
							and engine coolant temperature at least once in driving cycle	>=	70.96	°C	conditions are met	
							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:2 - 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 moritor 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/Sup ercharger "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) with (d) The lower threshold pressure (see Look-Up-Table #62) (e) correction factor (see Look-Up- Table #60)	< (d*e*f) = -31.5 to -10 = 0.699951 to 1	- kPa factor	(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 and	= FALSE	fail conditions exists for 10 s monitor runs with 0.02 s rate whenever enable conditions are met	
			(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 means	=	TRUE	-		
							increase of injection quantity	<	40.00	(mm^3/rev) /s		
							and engine speed is stable	=	TRUE	-		
							means increase of engine speed and	<	35.00	rpm/s		
							injection Quantity injection Quantity and	>= <=	132.00 480.00	mm^3/rev mm^3/rev		
							engine Speed engine Speed	>= <=	1450.00 2000.00	rpm rpm		
							and working range of boost pressure is in closed-loop means	=	TRUE	-		
							(engine speed and	>	1200.00	rpm		
							injection quantity	>	20.00	mm^3/rev		
							NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
) for time and	>	2.00	sec		
							Basic enable conditions met	=	see sheet enable tables	-		
Turbocharger/Sup ercharger "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	В
			with				VNT turbocharger offset adaptation active	=	FALSE	-	with 0.02 s rate	
			(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 				whenever enable conditions are met	
			(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	L	Threshold ogic and Value	e	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 means	=	TRUE			l
							increase of injection quantity	<	40.00	(mm^3/rev) /s		1
							and engine speed is stable	=	TRUE	-		1
							means increase of engine speed and	<	35.00	rpm/s		I
							injection Quantity injection Quantity and	>= <=	132.00 480.00	mm^3/rev mm^3/rev		l
							engine Speed engine Speed	>= <=	1450.00 2000.00	rpm rpm		1
							and working range of boost pressure is in closed-loop means	=	TRUE	-		l
							(engine speed	>	1200.00	rpm		1
							and injection quantity	>	20.00	mm^3/rev		1
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		1
) for time and	>	2.00	sec		1
							Basic enable conditions met:	=	see sheet enable tables	-		1
				_		_						
Cylinder 1 Balance System	P0263	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold		<	(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	В
			or fuel balance correction quantity	>	(c) * (b)	-	and current commanded injection quantity	>	52.00	mm^3/rev	rate whenever enable	I
			with (a) lower limitation (see Look-Up-Table	=	-68 to 0	mm^3/r	current commanded injection quantity engine coolant temperature	< >=	380.00 39.96	mm^3/rev °C	conditions are met	1
			#38) and with			ev	ambient pressure engine speed	>=	0.00 590.00	kpa		1
			and with (b) factor for correction quantity and with	=	0.95	factor	engine speed engine speed vehicle speed	> < <=	590.00 3000.00 186.45	rpm rpm mph		1
			(c) upper limitation (see Look-Up-Table #39)	=	0 to 68	mm^3/r ev	and	~-	100.10	mpir		1

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Valu	e	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	-		
Cylinder 2 Balance System	P0266	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	or fuel balance correction quantity with (a) lower limitation (see Look-Up-Table #38) and with (b) factor for correction quantity and with (c) upper limitation (see Look-Up-Table #39)	V A I I I	(a) * (b) (c) * (b) -68 to 0 0.95 0 to 68		fuel balance control in closed loop (see closed loop conditions document for details) and current commanded injection quantity engine coolant temperature ambient pressure engine speed engine speed vehicle speed and basic enable conditions met: and NO Pending or Confirmed DTCs:	" ^ Y X ^ Y " "	TRUE 52.00 380.00 39.96 0.00 590.00 3000.00 186.45 see sheet enable tables see sheet inhibit tables	- mm^3/rev °C kpa rpm rpm mph -	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	В
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 or fuel balance correction quantity with (a) lower limitation (see Look-Up-Table #38) and with (b) factor for correction quantity and with (c) upper limitation (see Look-Up-Table #39)	<	(a) * (b) (c) * (b) -68 to 0 0.95 0 to 68	ev	fuel balance control in closed loop (see closed loop conditions document for details) and current commanded injection quantity engine coolant temperature ambient pressure engine speed engine speed vehicle speed and basic enable conditions met: and NO Pending or Confirmed DTCs:	= > < 7 = =	TRUE 52.00 380.00 39.96 0.00 590.00 3000.00 186.45 see sheet enable tables see sheet inhibit tables	- mm^3/rev °C kpa rpm rpm mph -	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	9	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 or fuel balance correction quantity with (a) lower limitation (see Look-Up-Table #38) and with (b) factor for correction quantity and with (c) upper limitation (see Look-Up-Table #39)		(a) * (b) (c) * (b) -68 to 0 0.95 0 to 68	- mm^3/r ev factor mm^3/r ev	fuel balance control in closed loop (see closed loop conditions document for details) and current commanded injection quantity engine coolant temperature ambient pressure engine speed engine speed vehicle speed and basic enable conditions met: and NO Pending or Confirmed DTCs:	= ^ < ½ ½ ^ < 🦉 = =	TRUE 52.00 380.00 39.96 0.00 590.00 3000.00 186.45 see sheet enable tables see sheet inhibit tables	- mm^3/rev °C kpa rpm rpm mph -	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	В
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 or fuel balance correction quantity with (a) lower limitation (see Look-Up-Table #38) and with (b) factor for correction quantity and with (c) upper limitation (see Look-Up-Table #39)	V N II II II	(a) * (b) (c) * (b) -68 to 0 0.95 0 to 68	ev	fuel balance control in closed loop (see closed loop conditions document for details) and current commanded injection quantity engine coolant temperature ambient pressure engine speed engine speed vehicle speed and basic enable conditions met: and NO Pending or Confirmed DTCs:		TRUE 52.00 380.00 39.96 0.00 590.00 3000.00 186.45 see sheet enable tables see sheet inhibit tables	- mm^3/rev mm^3/rev °C kpa rpm rpm mph -	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	В

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	В
			or fuel balance correction quantity with (a) lower limitation (see Look-Up-Table #38) and with (b) factor for correction quantity and with (c) upper limitation (see Look-Up-Table #39)	> = =	(c) * (b) -68 to 0 0.95 0 to 68	- mm^3/r ev factor mm^3/r ev	and current commanded injection quantity current commanded injection quantity engine coolant temperature ambient pressure engine speed engine speed vehicle speed and basic enable conditions met: and NO Pending or Confirmed DTCs:	> < ;; ;; , , , , ;; ; ; ; ; ; ; ; ; ; ; ;	52.00 380.00 39.96 0.00 590.00 3000.00 186.45 see sheet enable tables see sheet inhibit tables	mm^3/rev mm^3/rev °C kpa rpm rpm mph -	rate whenever enable conditions are met	
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 or fuel balance correction quantity with (a) lower limitation (see Look-Up-Table #38) and with (b) factor for correction quantity and with (c) upper limitation (see Look-Up-Table #39)	<pre></pre>	(a) * (b) (c) * (b) -68 to 0 0.95 0 to 68	- mm^3/r ev factor mm^3/r ev	ambient pressure engine speed engine speed vehicle speed		TRUE 52.00 380.00 39.96 0.00 590.00 3000.00 186.45 see sheet enable tables see sheet inhibit tables	- mm^3/rev °C kpa rpm rpm mph -	fail conditions exists for 30 s monitor runs with 0.01 s rate whenever enable conditions are met	В

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	В
			or fuel balance correction quantity with (a) lower limitation (see Look-Up-Table #38)	> =	(c) * (b) -68 to 0	- mm^3/r ev	and current commanded injection quantity current commanded injection quantity engine coolant temperature	> < >=	52.00 380.00 39.96 0.00	mm^3/rev mm^3/rev °C	rate whenever enable conditions are met	
			and with (b) factor for correction quantity and with (c) upper limitation (see Look-Up-Table	=	0.95 0 to 68	factor mm^3/r	ambient pressure engine speed engine speed vehicle speed and	>= > < <=	590.00 3000.00 186.45	kpa rpm rpm mph		
			(c) upper initiation (see Look-op-rable #39)	-	01000	ev	basic enable conditions met:	=	see sheet enable tables	-		
							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	В
							air mass flow air mass flow (see Look-Up-Table #98) engine coolant temperature engine coolant temperature (maximum value of (a) and (b)) the maximum value is then divided by (b)	>= <= >= <= >=	13.89 55.5 to 277.78 69.96 129.96 1.22	g/sec g/sec °C -	are met	
							with (a) boost pressure downstream compressor and with	=	measured parameter	-		
							(b) ambient pressure	=	measured parameter	-		
							control value of the throttle valve control value of the throttle valve	>= <=	-400.00 5.00	% %		
							and (a) - (b) with	>=	50.00	°C		
							(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 and injection quantity injection quantity ambient pressure modeled ambient air temperature and basic enable conditions met: and NO Pending or Confirmed DTCs:		- mm^3/rev kPa °C - -		
Injection Quantity Too Low	P026C	observer correction quantity.	Unlimited fuel mass observer correction quantity - emission control correction quantity	<= -32.00 mm^3/r ev	((Status of the Observer function's lambda-signal means (lambda signal from NOx sensor ready (see parameter definition) fuel system is in fuel cut off (see parameter definition) Particulate Filter Regeneration Mode ((fraction of total fuel injected that is involved in combustion (Fuel Mass for Combustion / Total fuel injected) or calculated EGR rate) for time)) AND Controller status of the observer means (Load dependent release state (see look up table #48) AND Component Protection release state (see look up table #48) AND Component Protection release state (see look up table #43)) engine coolant temperature Normal Injection Mode (not in DPF regeneration) Barometric pressure Ambient temperature Vehicle speed NO Pending or Confirmed DTCs:) AND	$= TRUE \\ = TRUE \\ = FALSE \\ = FALSE \\ = 1 \\ >= 0 \\ > 1.00 \\ = TRUE \\ = 0 to 1 \\ > 0 to 1 \\ <= 199.96 \\ >= 64.96 \\ = TRUE \\ >= 74.80 \\ >= 74.80 \\ >= 7.04 \\ < 1.86 \\ = see sheet inhibit tables$	- - - - sec - - - - - - kPa °C mph	fail conditions exists for 12 s monitor runs with 0.02 s rate whenever enable conditions are met	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
						Engine speed AND	<=	1040	rpm		
						Engine speed) AND NO Pending or Confirmed DTCs:	>=	448 see sheet inhibit	rpm -		
)		tables			
						basic enable conditions met:	=	see sheet enable tables	-		
Injection Quantity	P026D		Unlimited fuel mass observer correction	>= 8 to 30		((Status of the Observer function's	=	TRUE	-	fail	В
Too High			quantity - emission control correction quantity (see look up table #44)		ev	lambda-signal				conditions exists for 12 s	
		emissions limit.				means				monitor runs with 0.02 s	
						(lambda signal from NOx sensor ready (see parameter definition)	=	TRUE	-	rate whenever enable	
						fuel system is in fuel cut off (see parameter definition)	=	FALSE	-	conditions are met	
					Particulate Filter Regeneration Mode ((=	FALSE	-			
						fraction of total fuel injected that is involved in combustion (Fuel Mass for Combustion / Total fuel injected) or	=	1	-		
						calculated EGR rate	>=	0	-		
						for time))	>	1.00	sec		
						AND Controller status of the observer means (=	TRUE	-		
						Load dependent release state (see look up table #48) AND	=	0 to 1	-		
						Component Protection release state (see look up table #43))	>	0 to 1	-		
) engine coolant temperature	<=	199.96	°C		
						engine coolant temperature Normal Injection Mode (not in DPF	>= =	64.96 TRUE	°C		
						regeneration) Barometric pressure	>=	74.80	kPa		
						Ambient temperature	>=	-7.04	°С		
						Vehicle speed	<	1.86	mph		
						NO Pending or Confirmed DTCs:	=	see sheet inhibit tables			
) AND (
						Engine speed AND	<=	1040	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	>=	448	rpm		
) AND					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
)					
							basic enable conditions met:	=	see sheet enable tables	-		
	BaaaB								201		6.11	
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	(environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.5 s	В
		for each cylinder at three different rail pressure									monitor runs with 0.01 s	
		operating point. Detects a fault when the corrected energizing time exceeds the feedback	corrected energizing time for the rail pressure calibration points and cylinder 1	>	(a) - (b)	-	and				rate whenever enable conditions	
		control limit.	((are met	
			with (a) maximum injection energizing time	=	353.2 to 670.8	usec	fuel temperature and	>=	0.06	°C		
			(see Look-Up-Table #20) and with (b) offset of the maximum filtered	=	10 to 16	usec	fuel temperature)	<=	79.96	°C		
			energizing time (see Look-Up-Table #21)				and					
)) OR				engine temperature	>	49.96	°C		
			(corrected energizing time for the rail pressure calibration points and cylinder 1	<	(a) + (b)	-	and battery voltage	>	10.00	V		
			with				and					
			 (a) minimum injection energizing time and with (b) effect of the minimum filtered 	=	107.2 10 to 16	usec	combustion chamber is not cold off means		5 to 30			
			 (b) offset of the minimum filtered energizing time (see Look-Up-Table #22) 	=	101016	usec	time since last combustion (see Look- Up-Table #94)	>=	5 10 30	sec		
)) for				and intake manifold pressure and	>	75.00	kPa		
			rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	intake manifold pressure	<	150.00	kPa		
			"10)				and accelerator pedal position	<	0.05	%		
							and Fuel system status and	=	Fuel cut off	-		
							(engine speed and	>	(b) - (a)	-		
		l					engine speed	<	(a) + (c)	-		

with (a) value of engine speed = 30.00 and with (b) gear specific minimum engine = 950.00 speed and with (c) gear specific maximum engine = 1850.00 and (c) gear specific maximum engine = 0 to 1 and current gear (see Look-Up-Table #93) = 0 to 1 (diagnostic enabled when equal to 1) and vehicle speed > 0.00 and current gear (see Look-Up-Table #93) = 0.00 and rail pressure deviation from set point < 5000.00 calculated out of difference between desired and actual value for for time > 0.10 and and = TRUE and wheel mode = TRUE and = FALSE	rpm rpm - mph kPa sec -		
(b) gear specific minimum engine speed (c) gear specific maximum engine speed) and current gear (see Look-Up-Table #93) = 0 to 1 and current gear (see Look-Up-Table #93) = 0 to 1 (diagnostic enabled when equal to 1) and vehicle speed > 0.00 and rail pressure deviation from set point calculated out of difference between desired and actual value for time > 0.10 and estimation and and and and and and and and and an	rpm - mph kPa		
(c) gear specific maximum engine speed = 1850.00 and current gear (see Look-Up-Table #93) = 0 to 1 (diagnastic enabled when equal to 1) and vehicle speed > 0.00 and rail pressure deviation from set point rail pressure deviation from set point for time > 0.00 and no gear change is occurred and 4 wheel mode = TRUE	- mph kPa		
Image: contrast gear (see Look-Up-Table #93) = 0 to 1 Image: contrast gear (see Look-Up-Table #93) = 0 to 1 Image: contrast gear (see Look-Up-Table #93) = 0 to 1 Image: contrast gear (see Look-Up-Table #93) = 0 to 1 Image: contrast gear (see Look-Up-Table #93) = 0 to 1 Image: contrast gear (see Look-Up-Table #93) = 0 to 1 Image: contrast gear (see Look-Up-Table #93) = 0 to 1 Image: contrast gear (see Look-Up-Table #93) = 0.00 Image: contrast gear (see Look-Up-Table #93) = 0.10 Image: contrast gear (see Look-Up-Table #93) = 0.10 Image: contrast gear (see Look-Up-Table #93) = TRUE Image: contrast gear (see Look-Up-Table #94) = FALSE Image: contrast gear (see Lo	mph kPa		
Image: second	kPa		
rail pressure deviation from set point calculated out of difference between desired and actual value for time > 0.10 and no gear change is occurred = TRUE and 4 wheel mode = FALSE and			
time > 0.10 and no gear change is occurred = TRUE and avheel mode and and a three mode = FALSE and	sec -		
no gear change is occurred = TRUE and 4 wheel mode = FALSE and	-		
4 wheel mode = FALSE and			
	-		
basic enable conditions met: = see sheet enable tables	ole -		
and NO Pending or Confirmed DTCs: = see sheet inhib tables	it -		
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	В
with imaximum injection energizing time = 353.2 to 670.8 usec >= 0.06 (see Look-Up-Table #20) = 353.2 to 670.8 usec and	°C		
and with (b) offset of the maximum filtered energizing time (see Look-Up-Table #21) fuel temperature <= 79.96	°C		
) and			
OR engine temperature > 49.96 (°C		
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 (a) minimum injection energizing time and with (b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	=	107.2 10 to 16	usec usec	and combustion chamber is not cold off means time since last combustion (see Look- Up-Table #94)	>=	5 to 30	sec		
)) for				and intake manifold pressure and	>	75.00	kPa		
			rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	intake manifold pressure	<	150.00	kPa		
							and accelerator pedal position and	<	0.05	%		
							Fuel system status and	=	Fuel cut off	-		
							(engine speed and	>	(b) - (a)	-		
							engine speed with	<	(a) + (c)	-		
							(a) value of engine speed and with	=	30.00	rpm		
							 (b) gear specific minimum engine speed and with 	=	950.00	rpm		
							(c) gear specific maximum engine speed	=	1850.00	rpm		
							, and current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1) and	=	0 to 1			
							vehicle speed and	>	0.00	mph		
							rail pressure deviation from set point calculated out of difference between desired and actual value for	<	5000.00	kPa		
							time and	>	0.10	sec		
							no gear change is occurred and	=	TRUE	-		
							4 wheel mode and basic enable conditions met:	=	FALSE see sheet enable	-		
							and NO Pending or Confirmed DTCs:	=	tables see sheet inhibit tables	-		
Cylinder 7 Injection Timing Reached Feedback Limit	P02D9	Monitors the correction values for the energizing time of each cylinder.	(environmental temperature	>	-7.04	°C	fail conditions exists for	В
		A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point.									more than 0.5 s monitor runs with 0.01 s rate	

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 (a) maximum injection energizing time (see Look-Up-Table #20)	=	353.2 to 670.8	usec	fuel temperature and	>=	0.06	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	fuel temperature) and	<=	79.96	℃		
) OR (engine temperature and	>	49.96	°C		
			corrected energizing time for the rail pressure calibration points and cylinder 7	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(with (a) minimum injection energizing time and with	=	107.2	usec	and 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		
)) for				and intake manifold pressure and	>	75.00	kPa		
			rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	intake manifold pressure	<	150.00	kPa		
							and accelerator pedal position and	<	0.05	%		
							Fuel system status and	=	Fuel cut off	-		
							(engine speed and	>	(b) - (a)	-		
							engine speed with	<	(a) + (c)	-		
							(a) value of engine speed and with	=	30.00	rpm		
							 (b) gear specific minimum engine speed and with 	=	950.00	rpm		
							(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 and	>	0.10	sec		

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 and 4 wheel mode	=	TRUE 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. 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)	-	environmental temperature and	>	-7.04	°C	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	В
			with (a) maximum injection energizing time (see Look-Up-Table #20)	=	353.2 to 670.8	usec	(fuel temperature and	>=	0.06	°C		
			and with (b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	fuel temperature) and	<=	79.96	°C		
) OR (engine temperature and	>	49.96	°C		
			corrected energizing time for the rail pressure calibration points and cylinder 8	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(with (a) minimum injection energizing time and with (b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	=	107.2 10 to 16	usec usec	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		
			tor rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	and intake manifold pressure	<	150.00	kPa		
			-/				and accelerator pedal position and	<	0.05	%		
							Fuel system status and	=	Fuel cut off	-		
							(engine speed and	>	(b) - (a)	-		
							engine speed with	<	(a) + (c)	-		

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 and with (b) gear specific minimum engine	=	30.00 950.00	rpm rpm		
							speed 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) and	=	0 to 1	-		
							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 and	>	0.10	sec		
							no gear change is occurred and	=	TRUE	-		
							4 wheel mode and	=	FALSE	-		
							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.	(corrected energizing time for the rail pressure calibration points and cylinder 4 (>	(a) - (b)	-	environmental temperature and	>	-7.04	°C	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	В
			with (a) maximum injection energizing time	=	353.2 to 670.8	usec	fuel temperature and	>=	0.06	°C		
			(see Look-Up-Table #20) and with (b) offset of the maximum filtered energizing time (see Look-Up-Table	=	10 to 16	usec	fuel temperature)	<=	79.96	°C		
			#21))				and					
			/ OR (engine temperature and	>	49.96	°C		
			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 (b) offset of the minimum filtered energizing time (see Look-Up-Table #22) 	=	107.2 10 to 16	usec usec	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		
			ror rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	and intake manifold pressure	<	150.00	kPa		
			,				and accelerator pedal position	<	0.05	%		
							and Fuel system status and	=	Fuel cut off	-		
							(engine speed and	>	(b) - (a)	-		
							engine speed with	<	(a) + (c)	-		
							(a) value of engine speed and with	=	30.00	rpm		
							 (b) gear specific minimum engine speed and with 	=	950.00	rpm		
							(c) gear specific maximum engine speed	=	1850.00	rpm		
) and current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1) and	=	0 to 1	-		
							vehicle speed and	>	0.00	mph		
							rail pressure deviation from set point calculated out of difference between desired and actual value for	<	5000.00	kPa		
							time and	>	0.10	sec		
							no gear change is occurred and	=	TRUE	-		
							4 wheel mode and basic enable conditions met:	=	FALSE see sheet enable	-		
							and NO Pending or Confirmed DTCs:	=	tables see sheet inhibit tables	-		
Cylinder 5 Injection	P02D5	Monitors the correction	(-	_	-	environmental temperature	>	-7.04	°C	fail	В
Cylinder 5 Injection Timing Reached Feedback Limit	FUZDƏ	Nonitors 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.	ι 				ionan onmentar tempetature	>	-1.04	C	conditions exists for more than 0.5 s monitor runs with 0.01 s rate	d

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 (a) maximum injection energizing time (see Look-Up-Table #20)	=	353.2 to 670.8	usec	fuel temperature and	>=	0.06	°C		
			(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	fuel temperature) and	<=	79.96	°C		
) OR (engine temperature and	>	49.96	°C		
			corrected energizing time for the rail pressure calibration points and cylinder 5	<	(a) + (b)	-	battery voltage	>	10.00	V		
			(with (a) minimum injection energizing time and with	=	107.2	usec	and 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		
)) for				and intake manifold pressure and	>	75.00	kPa		
			rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	intake manifold pressure	<	150.00	kPa		
							and accelerator pedal position and	<	0.05	%		
							Fuel system status and	=	Fuel cut off	-		
							(engine speed and	>	(b) - (a)	-		
							engine speed with	<	(a) + (c)	-		
							(a) value of engine speed and with	=	30.00	rpm		
							 (b) gear specific minimum engine speed and with 	=	950.00	rpm		
							(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 and	>	0.00	mph		
							and rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for time and	>	0.10	sec		

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 and 4 wheel mode and basic enable conditions met: and NO Pending or Confirmed DTCs:	= = =	TRUE FALSE see sheet enable tables 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. 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)		environmental temperature and	>	-7.04	°C	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	В
			(with (a) maximum injection energizing time (see Look-Up-Table #20)	=	353.2 to 670.8	usec	(fuel temperature and	>=	0.06	°C		
			and with (b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	fuel temperature) and	<=	79.96	°C		
) OR (engine temperature and	>	49.96	°C		
			corrected energizing time for the rail pressure calibration points and cylinder 6	<	(a) + (b)	-	battery voltage	>	10.00	V		
			with (a) minimum injection energizing time and with (b) offset of the minimum filtered energizing time (see Look-Up-Table #22)	=	107.2 10 to 16	usec usec	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		
			for rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	and intake manifold pressure	<	150.00	kPa		
							and accelerator pedal position and	<	0.05	%		
							Fuel system status and	=	Fuel cut off	-		
							(engine speed and	>	(b) - (a)	-		
							engine speed with	<	(a) + (c)	-		

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 and with (b) gear specific minimum engine 	=	30.00 950.00	rpm rpm		
							speed 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) and	=	0 to 1	-		
							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 and	>	0.10	sec		
							no gear change is occurred and	=	TRUE	-		
							4 wheel mode and	=	FALSE	-		
							basic enable conditions met: and	=	see sheet enable tables	-		
							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.	(corrected energizing time for the rail pressure calibration points and cylinder 3 (>	(a) - (b)	-	environmental temperature and	>	-7.04	°C	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	В
			with (a) maximum injection energizing time	=	353.2 to 670.8	usec	fuel temperature and	>=	0.06	°C		
			(see Look-Up-Table #20) and with (b) offset of the maximum filtered energizing time (see Look-Up-Table	=	10 to 16	usec	fuel temperature)	<=	79.96	°C		
			#21))				and					
) OR (engine temperature and	>	49.96	°C		
			(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 (b) offset of the minimum filtered energizing time (see Look-Up-Table #22) 	=	107.2 10 to 16	usec usec	combustion chamber is not cold off means time since last combustion (see Look- Up-Table #94)	>=	5 to 30	sec		
)) for				and intake manifold pressure	>	75.00	kPa		
			for rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	and intake manifold pressure	<	150.00	kPa		
							and accelerator pedal position and	<	0.05	%		
							Fuel system status and	=	Fuel cut off	-		
							(engine speed and	>	(b) - (a)	-		
							engine speed with	<	(a) + (c)	-		
							(a) value of engine speedand with(b) gear specific minimum engine	=	30.00 950.00	rpm rpm		
							speed 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 and	>	0.00	mph		
							rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for time and	>	0.10	sec		
							no gear change is occurred and	=	TRUE	-		
							4 wheel mode and basic enable conditions met:	=	FALSE see sheet enable	-		
							and		tables			
							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	В
							for time and	>	3.00	sec	rate whenever enable	
							starter is active cranking	=	FALSE		conditions	

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		
					for time	>	3.00	sec	fail conditions exists for 3 s	
					and starter is active cranking	=	FALSE		monitor runs with 0.005 s rate	
					for time and	>	3.00	sec	whenever enable	
					Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-	conditions are met	
					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	
					for time	>	3.00	sec	rate whenever	
					and starter is active cranking for	=	FALSE		enable conditions	
					time and	>	3.00	sec	are met	
					Throttle Valve Actuator Solenoid Control Circuit and	=	ACTIVE	-		
					and	=	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.
Intake Air Flow Valve Control Circuit 1 Low Voltage	P02E2	Diagnoses the Throttle Valve low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	 Short to ground: - ≤ 0.5 Ω impedance between signal and controller ground 	battery voltage	> 11.00		fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable	В
					time and starter is active cranking	> 3.00 = FALSE	sec	conditions are met	
					for time and	> 3.00	sec		
					Throttle Valve Actuator Solenoid Control Circuit and	= ACTIVE	-		
					basic enable conditions met	= see sheet enable tables	-		
					and NO Pending or Confirmed DTCs:	= see sheet inhibit tables	-		
Intake Air Flow Valve Control Circuit 1 High Voltage	P02E3	Diagnoses the Throttle Valve low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: - ≤ 0.5 Ω impedance between signal and controller power	battery voltage	> 11.00		fail conditions exists for 3 s monitor runs with 0.005 s rate whenever	В
					for time and	> 3.00	sec	enable conditions are met	
					starter is active cranking for	= FALSE			
					time and Throttle Valve Actuator Solenoid Control	> 3.00 = ACTIVE	sec -		
					Circuit 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 Valve Actuator (TVA) Position Sensor Performance	P02E7	Detects in range TVA	or throttle valve control deviation calculated out of difference between desired and actual value or throttle valve control deviation calculated out of difference between desired and actual value	~	-10.00	%	and throttle valve controller bypass is active and throttle valve is driven to a mechanical stop and Throttle Governor Active and Throttle Valve Permanent Control Deviation and Engine Coolant Temperature and Engine Running and basic enable conditions met and NO Pending or Confirmed DTCs:	= = = =	FALSE FALSE TRUE FALSE 198.96 TRUE see sheet enable tables see sheet inhibit tables	- - - - - - - -	fail conditions exists for 10 s monitor runs with 0.005 s rate whenever enable conditions are met	В
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 and basic enable conditions met and analog digital converter error present and NO Pending or Confirmed DTCs:	-	TRUE see sheet enable tables FALSE see sheet inhibit tables	-	fail conditions exists for 5 s test performed continuously 0.005 s rate	A
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 and basic enable conditions met and no sensor supply error and SENT frame correctly received and NO Pending or Confirmed DTCs:	-	TRUE see sheet enable tables TRUE FALSE see sheet inhibit tables	-	fail conditions exists for 5 s test performed continuously 0.005 s rate	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	I	Threshold Logic and Value)	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Intake Air Flow Valve Control Motor Current Performance	P02EB		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	>	11.00	V	fail conditions exists for 2 s monitor runs with 0.005 s rate	В
							and starter is active cranking for	=	FALSE		whenever enable conditions	
							time and	>	3.00	sec	are met	
							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	В
			and				Engine Running (see parameter definition)	=	TRUE	-	monitor runs with 0.02 s	
			evaluated crankshaft revolutions with (a) number of crankshaft revolutions per block (see general description	>= =	(a) * (b) 20.00	- counts	and engine speed and	>	448.00	rpm	rate whenever enable conditions are met	
			document for details) and with (b) number of test blocks	=	20.00	counts	,	<	1560.00	rpm	aremet	
			and misfires exist on more than one cylinder	=	TRUE	-	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		
							, engine coolant temperature and	>=	39.96	°C		
							vehicle speed and	<=	1.86	mph		
							time since start	>=	10.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	e	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
					<u> </u>		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 and	=	TRUE	-		
							number of detected misfires and	>	140.00	counts		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 1 Misfire	P0301	Detects cylinder misfire.	angular acceleration of the crankshaft	<	-1.40	s^(2)			_		fail	В
Detected	20301	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.		<	-1.40	\$^(2)	(conditions exists for 0.02 s monitor runs with 0.02 s rate whenever enable	в
			and				Engine Running (see parameter definition)	=	TRUE	-	conditions are met	
			evaluated crankshaft revolutions with (a) number of crankshaft revolutions per block (see general description	>=	(a) * (b) 20.00	- counts	and engine speed and	>	448.00	rpm		
			document for details) and with (b) number of test blocks	=	20.00	counts	engine speed)	<	1560.00	rpm		
							and (a) - (b) with	<	200.00	rpm		
							(a) actual desired idle speed	=	calculated parameter	-		
							and with (b) engine speed and	=	measured parameter	-		
							(current injection quantity	>	12.00	mm^3/rev		
							and current injection quantity)	<	400.00	mm^3/rev		
							and engine coolant temperature	>=	39.96	°C		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threaheld					and vehicle speed and	<=	1.86	mph		
		threshold.					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 and	=	TRUE	-		
							number of detected misfires and	>	140.00	counts		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Ordinator O Misfing	Doooo	Detecto culiados mietico	non de seclaritas ef the conclusion (4.40	- 4(0)	((-i)	
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	В
			and				Engine Running (see parameter definition)	=	TRUE	-	conditions are met	
			evaluated crankshaft revolutions with (a) number of crankshaft revolutions per block (see general description	>=	(a) * (b) 20.00	- counts	and engine speed and	>	448.00	rpm		
			document for details) and with (b) number of test blocks	=	20.00	counts	engine speed)	<	1560.00	rpm		
							and (a) - (b) with	<	200.00	rpm		
							(a) actual desired idle speed	=	calculated parameter	-		
							and with (b) engine speed and	=	measured parameter	-		
							(current injection quantity	>	12.00	mm^3/rev		
							and current injection quantity)	<	400.00	mm^3/rev		
							and engine coolant temperature	>=	39.96	°C		
		Calculates angle acceleration after an					and vehicle speed and	<=	1.86	mph		
		injection event for the cylinder under test and compares it to the minimum threshold.					time since start	>=	10.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	e	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
					<u> </u>		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 and	=	TRUE	-		
							number of detected misfires and	>	140.00	counts		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Outindan 0 Miefina	Doooo	Detecto culiados mistina			4.40	- 4(0)	((-i)	
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	В
			and				Engine Running (see parameter definition)	=	TRUE	-	conditions are met	
			evaluated crankshaft revolutions with (a) number of crankshaft revolutions per block (see general description	>=	(a) * (b) 20.00	- counts	and engine speed and	>	448.00	rpm		
			document for details) and with (b) number of test blocks	=	20.00	counts	engine speed)	<	1560.00	rpm		
							and (a) - (b) with	<	200.00	rpm		
							(a) actual desired idle speed	=	calculated parameter	-		
							and with (b) engine speed and	=	measured parameter	-		
							(current injection quantity	>	12.00	mm^3/rev		
							and current injection quantity)	<	400.00	mm^3/rev		
							and engine coolant temperature	>=	39.96	°C		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum					and vehicle speed and	<=	1.86	mph		
		threshold.					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 and	=	TRUE	-		
							number of detected misfires and	>	140.00	counts		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Ordinalan 4 Miafina	D0204	Detecto culiados mistino	non de seclaritas ef the conclusion (4.40	- 4(0)					(-i)	
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	В
			and				Engine Running (see parameter definition)	=	TRUE	-	conditions are met	
			evaluated crankshaft revolutions with (a) number of crankshaft revolutions per block (see general description	>=	(a) * (b) 20.00	- counts	and engine speed and	>	448.00	rpm		
			document for details) and with (b) number of test blocks	=	20.00	counts	engine speed)	<	1560.00	rpm		
							and (a) - (b) with	<	200.00	rpm		
							(a) actual desired idle speed	=	calculated parameter	-		
							and with (b) engine speed and	=	measured parameter	-		
							(current injection quantity	>	12.00	mm^3/rev		
							and current injection quantity)	<	400.00	mm^3/rev		
							and engine coolant temperature	>=	39.96	°C		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum					and vehicle speed and	<=	1.86	mph		
		threshold.					time since start	>=	10.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	9	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
					<u> </u>		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 and	=	TRUE	-		
							number of detected misfires and	>	140.00	counts		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Oulindan 5 Miefina	Dooos	Detecto culiados mistina			4.40	- 4(2)	((-i)	
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	В
			and		() + ()		Engine Running (see parameter definition)	=	TRUE	-	conditions are met	
			evaluated crankshaft revolutions with (a) number of crankshaft revolutions per block (see general description document for details)	=	(a) * (b) 20.00	- counts	and engine speed and	>	448.00	rpm		
			and with (b) number of test blocks	=	20.00	counts	engine speed)	<	1560.00	rpm		
							and (a) - (b) with	<	200.00	rpm		
							(a) actual desired idle speed	=	calculated parameter	-		
							and with (b) engine speed and	=	measured parameter	-		
							(current injection quantity and	>	12.00	mm^3/rev		
							current injection quantity)	<	400.00	mm^3/rev		
							and engine coolant temperature	>=	39.96	°C		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum					and vehicle speed and	<=	1.86	mph		
		threshold.					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 and	=	TRUE	-		
							number of detected misfires and	>	140.00	counts		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Oulinder C Miefine	Doooc	Detecto culiados mistino			4.40	- 4(0)					(-i)	
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	В
			and				Engine Running (see parameter definition)	=	TRUE	-	conditions are met	
			evaluated crankshaft revolutions with (a) number of crankshaft revolutions per block (see general description	>=	(a) * (b) 20.00	- counts	and engine speed and	>	448.00	rpm		
			document for details) and with (b) number of test blocks	=	20.00	counts	engine speed)	<	1560.00	rpm		
							and (a) - (b) with	<	200.00	rpm		
							(a) actual desired idle speed	=	calculated parameter	-		
							and with (b) engine speed and	=	measured parameter	-		
							(current injection quantity	>	12.00	mm^3/rev		
							and current injection quantity)	<	400.00	mm^3/rev		
							and engine coolant temperature	>=	39.96	°C		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum					and vehicle speed and	<=	1.86	mph		
		threshold.					time since start	>=	10.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	e	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
					<u> </u>		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 and	=	TRUE	-		
							number of detected misfires and	>	140.00	counts		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Ordinalan 7 Miafina	D0207	Data etc. exiliados mistina			4.40	- 4(0)					(-i)	
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	В
			and		() + ()		Engine Running (see parameter definition)	=	TRUE	-	conditions are met	
			evaluated crankshaft revolutions with (a) number of crankshaft revolutions per block (see general description desument for details)	=	(a) * (b) 20.00	- counts	and engine speed and	>	448.00	rpm		
			document for details) and with (b) number of test blocks	=	20.00	counts	engine speed)	<	1560.00	rpm		
							and (a) - (b) with	<	200.00	rpm		
							(a) actual desired idle speed	=	calculated parameter	-		
							and with (b) engine speed and	=	measured parameter	-		
							(current injection quantity and	>	12.00	mm^3/rev		
							current injection quantity)	<	400.00	mm^3/rev		
							, and engine coolant temperature	>=	39.96	°C		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum					and vehicle speed and	<=	1.86	mph		
		threshold.					time since start	>=	10.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	9	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
					<u> </u>		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 and	=	TRUE	-		
							number of detected misfires and	>	140.00	counts		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Oulinder 0 Miefine	Doooo	Detecto culiados mistina			4.40	- 4(2)	((-i)	
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	В
			and				Engine Running (see parameter definition)	=	TRUE	-	conditions are met	
			evaluated crankshaft revolutions with (a) number of crankshaft revolutions per block (see general description	=	(a) * (b) 20.00	- counts	and engine speed and	>	448.00	rpm		
			document for details) and with (b) number of test blocks	=	20.00	counts	engine speed)	<	1560.00	rpm		
							and (a) - (b) with	<	200.00	rpm		
							(a) actual desired idle speed	=	calculated parameter	-		
							and with (b) engine speed and	=	measured parameter	-		
							(current injection quantity	>	12.00	mm^3/rev		
							and current injection quantity)	<	400.00	mm^3/rev		
							and engine coolant temperature	>=	39.96	°C		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum					and vehicle speed and	<=	1.86	mph		
		threshold.					time since start	>=	10.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Lo	Threshold gic 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 and	=	TRUE	-		I
							number of detected misfires and	>	140.00	counts		1
							and basic enable conditions met:	=	see sheet enable tables	-		1
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		1
Crankshaft Position System Variation Not Learned	P0315	Wheel Learn - Fuel Balance System - Tooth Wheel Variation and Crankshaft Dynamics not learned quickly enough	fuel balance wheel learn complete	=	FALSE		fuel system is in fuel cut off	=	TRUE	-	fail conditions exists for 5000 s cumulative time	В
		Wheel learn only occurs when the memory is cleared within the ECM. Once the wheel learn is completed once, the wheel					engine speed engine speed	> <	900 2700	rpm rpm	monitor runs with 1 s rate whenever enable conditions are met	
		learn values are stored within the EEPROM					fuel balance wheel learn values stored in EEPROM	=	FALSE			I
							Inhibit Status (no inhibiting faults) (No pending or stored DTC)	=	see sheet inhibit tables	-		1
						_		_		_		
Crankshaft Position [CKP] Sensor Circuit	P0335		ECM has detected reference mark on the crankshaft	=	FALSE	-	Ignition ON	=	TRUE	-	fail conditions exists for more than 6 events	A
			AND number of crankshaft rotations not detected	>=	6.00	counts	and Engine backward rotation detected and	=	FALSE	-	with 0.1 s rate whenever	l
							(engine speed	>=	400.00	rpm	enable conditions	I
							and synchronization completed	=	TRUE	-	are met	I
							which means number of crankshaft revolutions and	>=	4.00	revs		I

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	e	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
					Ţ		crankshaft reference mark detected (reference mark is the 2 missing teeth in the 50-2 tooth-wheel configuration)	=	TRUE	-		
) or starter is active cranking) and	=	TRUE	-		
							(vehicle speed	=	0	mph		
							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	A
			crankshaft signal disturbance detected under the following conditions: Current tooth time period	>	200000.00	us	and ECM has detected reference mark on the crankshaft	=	FALSE	-	monitor runs with 0.1 s rate whenever enable	
			or Crankshaft tooth counts between detected gaps or	>	68.00	counts	and basic enable conditions met:	=	see sheet enable tables	-	conditions are met	
			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	A
							and basic enable conditions met:	=	see sheet enable tables	-	performed continuously 0.01 s rate	
								=		-	contir	nuously

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time MI Required IIIu
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 and basic enable conditions met:	= TRUE - = see sheet enable - tables	fail conditions exists for more than 6 events test performed continuously 0.01 s rate
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 and battery voltage for time and Basic enable conditions met:	= TRUE - > 11.00 V > 3.00 sec = see sheet enable - tables	fail E conditions exists for 0.2 s monitor runs with 0.01 s rate whenever enable conditions are met
		Diagnoses the Glow Lamp Circuit high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short-to-ground)	 Short to ground: - ≤ 0.5 Ω impedance between signal and controller ground 	lamp is commanded on and battery voltage for time and Basic enable conditions met:	= TRUE - > 11.00 V > 3.00 sec = see sheet enable - tables	fail conditions exists for 3 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.
		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 and battery voltage for time and Basic enable conditions met:	= > > =	TRUE 11.00 3.00 see sheet enable tables	- V sec -	fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions are met	
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 and VGT offset learning is active and NO Pending or Confirmed DTCs: and basic enable conditions met:	=	TRUE FALSE see sheet inhibit tables see sheet enable tables	-	fail conditions exists for 15 s monitor runs 0.02 s rate whenever enable conditions are met	A
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 with (a) Minimum Controller Deviation (b) Environmental Pressure correction factor (see Look-Up-Table #8)	>	(a) * (b) -0.63 0.48 to 1	- factor	(EGR controller is active and change of injection quantity between actual and last received value for time and change of engine speed between actual and last received value for time and VGT offset learning is active maximum set point for air-mass flow (see Look-Up-Table #9) and Engine speed	= < = > <=	TRUE 80.00 0.25 35.00 0.99 FALSE 0.8 to 1.2 1900.00	(mm^3/rev) /sec sec rpm/sec sec - g/rev rpm	fail conditions exists for 10 s monitor runs 0.02 s rate whenever enable conditions are met	В

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	<=	120.00	mm^3/rev		
							fuel injection quantity Torque generating commanded engine fuel injection quantity	>=	20.00	mm^3/rev		
							and set point valve position of exhaust-gas recirculation and	>	5.00	%		
							throttle position and	<	5.00	%		
							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	flow. Actual MAF readings	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	В
		flowing.	with			,	EGR controller is active	=	TRUE	-	whenever enable	
			(a) Maximum Controller Deviation (see Look-Up-Table #10)	=	0.32 to 1.12	g/rev	and		00.00	(conditions are met	
			(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 and	=	0.25	sec		
							change of engine speed between actual and last received value	<	35.00	rpm/sec		
							for time and	=	1.00	sec		
							VGT offset learning is active	=	FALSE	-		
							maximum set point for EGR mass flow and	<	0.79	g/rev		
							Engine speed Engine speed	<= >=	1600.00 1100.00	rpm rpm		
							and Torque generating engine fuel injection	<=	480.00	mm^3/rev		
							quantity 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	=	ACTIVE	-	fail conditions exists for 7 s monitor runs with 0.005 s rate whenever enable	В
					offset learning for EGR valve is completed and	=	TRUE	-	conditions are met	
					battery voltage for	>	11.00	V		
			time and	>	3.00	sec				
			starter is active cranking for	=	FALSE	-				
			time and basic enable conditions met:	> =	3.00 see sheet enable	sec -				
					and NO Pending or Confirmed DTCs:	=	tables see sheet inhibit			
							tables			
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		EGR Solenoid Control Circuit	=	ACTIVE	•	fail conditions exists for 3 s	В
					and offset learning for EGR valve is completed	=	TRUE	-	monitor runs with 0.005 s rate	
					and battery voltage for	>	11.00	V	whenever enable conditions	
					time and	>	3.00	sec	are met	
					starter is active cranking for	=	FALSE	-		
					time and	>	3.00	sec		
					basic enable conditions met:	=	see sheet enable tables	-		
					and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Exhaust Gas Recirculation(EGR) Position Sensor Circuit Low Voltage	P0405	Detects low voltage readings on the EGR position circuit, indicating an OOR low condition on the EGR position circuit	raw voltage of EGR actuator position sensor same as EGR actuator position	< <	-25	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 0.005 s rate	A
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	A
Circuit High Voltage		EGR position circuit	same as EGR actuator position	>	127	%	and basic enable conditions met: and NO Pending or Confirmed DTCs:	=	see sheet enable tables see sheet inhibit tables	-	0.005 s rate	
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	В
			same as EGR sensor 2 temperature	>	220	°C	time since engine start and	>	0.00	sec	enable conditions are met	
							engine coolant temperature and ambient temperature	<	199.96 -60.04	℃ ℃		
							and ambient pressure and	>	20.00	kPa		
							(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) and (=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	1	Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							valve position of EGR cooler bypass and valve position of EGR cooler bypass	> <	-100.00 200.00	%		
							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 same as EGR sensor 2 temperature	~	-50	v ℃	(time since engine start and engine coolant temperature and ambient temperature and ambient pressure and (set point valve position of exhaust-gas recirculation and set point valve position of exhaust-gas recirculation) and Engine Running (see parameter definition) and current injection quantity and (valve position of EGR cooler bypass and valve position of EGR cooler bypass and valve position of EGR cooler bypass and valve position of EGR cooler bypass)) for time and basic enable conditions met: and NO Pending or Confirmed DTCs:		0.00 -60.04 -60.04 20.00 -100.00 200.00 TRUE 0.00 -100.00 200.00 0.00 see sheet enable tables see sheet inhibit	sec °C kPa % % - mm^3/rev % % sec - -	fail conditions exists for 5 s monitor runs 0.05 s rate whenever enable conditions are met	В
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	В

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

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	1	Threshol Logic and V		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							and Engine Running (see parameter definition) and	=	TRUE	-		
							(valve position of EGR cooler bypass and	>	-100.00	%		
							valve position of EGR cooler bypass	<	200.00	%		
) and basic enable conditions met: and	=	see sheet enable tables	-		
							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	В
			same as EGR sensor 1 temperature	<	-50	°C	time since engine start and	>	0.00	sec	enable conditions	
			EGR sensor i temperature	~	-50	C	engine coolant temperature and	>	-60.04	°C	are met	
							ambient temperature and	>	-60.04	°C		
							and ambient pressure and	>	20.00	kPa		
							(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) and	=	TRUE	-		
							current injection quantity and (>	0.00	mm^3/rev		
							valve position of EGR cooler bypass	>	-100.00	%		
							valve position of EGR cooler bypass	<	200.00	%		
) for time and	>	0.00	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.
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	В
					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	conditions are met	
					and average HC mass flow calculated by Average HC mass flow is determined by dividing the integrated HC mass by the integrated time step and	> 0.00	g/sec		
			simulated heat quantity in oxidation > 0.00 catalyst and	> 0.00	kJ				
					particulate filter regeneration and no reset condition for evaluation is active	= TRUE			
					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 and	> 249.96	°C		
					(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 and	=	FALSE	-		
							reset condition which becomes False under following conditions	=	FALSE	-		
							(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 or	=	FALSE	-		
							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	В
			with				for				enable	
			(a) total vehicle distance and with	=	measured parameter	-	time	>=	60.00	sec	are met	
			(b) change in mileage	=	calculated parameter	-	and fuel transfer pump active means	=	FALSE	-		
			and (c) - (d) with	<	4.00	I	(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	>	1638.35	I		
			(c) maximum volume of fuel reached in primary tank during driving cycle and with	=	measured parameter	-	capacity) and filtered fuel volume in secondary tank	<	0.00	I		
			(d) minimum volume of fuel reached in primary tank during driving cycle	=	measured parameter	-	for					
1		l	,		F		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 means	=	TRUE	-		
					(filtered fuel volume in primary tank and	<	137.40	I		
					filtered fuel volume in secondary tank	>	0.00	I		
) or fuel level zone 4 means	=	TRUE	-		
					filtered fuel volume in primary tank and	<	137.40	Ι		
					filtered fuel volume in secondary tank	<=	0.00	Ι		
) and basic enable conditions met:	=	see sheet enable tables	-		
					and NO Pending or Confirmed DTCs:	-	see sheet inhibit tables	-		
SRC low for fuel	P0462	Detects low voltage	voltage of fuel level sensor 1	< 0.20 V	ignition on	=	TRUE		fail	В
level sensor of primary tank		readings in the fuel level primary tank sensor circuit, indicating an OOR low condition on the fuel level sensor circuit			and basic enable conditions met:	=	see sheet enable tables	-	conditions exists for 24 s test performed continuously 0.1 s rate	
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	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold gic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Exhaust Gas Recirculation (EGR) Position Sensor Performance	P046C		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	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	-	rate whenever enable conditions	
							and Engine Running and	=	TRUE	-	are met	
							duty cycle of the Intake Air Heater output	<	5.00	%		
							and battery voltage and	>=	11.00	V		
							EGR Valve	=	ACTIVE	-		
							EGR Valve Jammed and	=	FALSE	-		
							NO Pending or Confirmed DTCs: and		see sheet inhibit tables	-		
							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	В
							for time and	>	3.00	sec	test performed continuously 0.02 s rate	
							starter is active cranking for	=	FALSE	-		
							time and ignition on	>	3.00	sec		
							ignition on and	=	TRUE	-		1

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold ogic 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	1
							for time and	>	3.00 FALSE	sec	performed continuously 0.02 s rate	l
							starter is active cranking for time and	=	3.00	sec		1
							ignition on and basic enable conditions met:	=	TRUE see sheet enable	-		1
									tables			I
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	В
			or fan speed difference between actual and commanded value or	>=	500.00	rpm	and Commanded fan speed and	>=	999.00	rpm	120 s monitor runs with 0.1 s rate	l
			fan speed difference between actual and commanded value, unfiltered or fan speed difference between actual and	<=	-500.00 500.00	rpm rpm	(fan input speed means	<	5320.00	rpm	whenever enable conditions are met	1
			commanded value, unfiltered				Fan input speed is calculated by the engine speed * the pulley ratio and					I
							fan input speed means Fan input speed is calculated by the engine speed * the pulley ratio)	>	400.00	rpm		1
							and engine coolant temperature and	>	69.96	°C		I
							fan drive speed rate of change and	<	2000.00	rpm		L
							fan speed weight factor calculated out of (>	0.59	factor		1
							 (a) * (b) * (c) * (d) with (a) factor based on input shaft stability (see Look-Up-Table #32) and with 	=	0 to 1	factor	conditions exists for 120 s monitor runs with 0.1 s rate whenever enable conditions are met	1
							(b) factor based on intake air temperature (see Look-Up-Table #35)	=	0 to 1	factor		I

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)	= 0 to 1	factor		
					and with (d) factor based on fan drive speed (see Look-Up-Table #33)	= 0 to 1	factor		
) and basic enable conditions met:	= see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Motor Control Circuit 1 Low Voltage	P0489	Diagnoses the EGR Valve low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	 Short to ground: - ≤ 0.5 Ω impedance between signal and controller ground 	EGR Solenoid Control Circuit	= ACTIVE	-	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable	В
					and battery voltage	> 11.00	V	conditions are met	
					for time and	> 3.00	sec	aremet	
					starter is active cranking for	= FALSE	-		
					time and	> 3.00	sec		
					basic enable conditions met:	 see sheet enable tables 	-		
Exhaust Gas Recirculation (EGR) Motor Control Circuit 1 High Voltage	P0490	Diagnoses the EGR Valve low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: - ≤ 0.5 Ω impedance between signal and controller power	EGR Solenoid Control Circuit	= ACTIVE	-	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever	В
					and battery voltage	> 11.00	V	enable conditions	
					for time	> 3.00	sec	are met	
					and starter is active cranking	= FALSE	-		
					for time and	> 3.00	sec		
					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.
System Cooling Fan Speed High	Code P0495	Description Detects a locked fan. When fan speed control solenoid is off, the fan speed should follow accessory drive input speed plus some slip.	fan speed (see Look-Up-Table #36) for Error counter equivalent to 80 sec	>=	Logic and Value 400 to 1500 800.00	rpm counts	Parameters fluid volume in Clutch (see Look-Up- Table #37) calculated by a model where fluid flow in and fluid flow out are calculated. The fluid flow in model is based on fan output speed. The fluid out model is based on fluid temperature and the difference between fan input and output speed. or Maximum allowed clutch pump out time when { input fan speed means Fan input speed is calculated by the engine speed * the pulley ratio and (PWM of fan driver output and commanded fan speed) and intake air temperature and time since engine off and (Engine Running for time) } and	<	Conditions 0.005 to 0.0115 600 to 65534 1500.00 45.00 600.00 55.00 -40.04 0.00 TRUE 0.00	I sec rpm % rpm kPa °C sec - sec	Required fail conditions exists for 0.02 s monitor runs with 0.1 s rate whenever enable conditions are met	B
							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: (a) - (b) with (a) maximum learned offset value for	>	30.00 measured	%	offset learning is active active under following conditions (engine coolant temperature	=	TRUE 5.06	- °C	fail conditions exists for 0.005 s monitor runs with 0.005 s rate whenever enable conditions	В
			EGR valve and with		parameter		and				are met	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold _ogic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
		Description Only the closed position is learned. 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 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 learn procedure.	Criteria (b) minimum learned offset value for EGR valve or	-		- %	engine coolant temperature) and (battery voltage and battery voltage and battery voltage) and EGR sweep has ended - no movement in EGR valve 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	<=		°C V V -		
							that this cleaning procedure is complete.		TOUS			
							and engine was running during last driving cycle	=	TRUE	-		
							means engine running during last driving cycle and	=	TRUE	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							basic enable conditions met:	=	see sheet enable tables	-		
						-						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
- Cystom	0000	Detects a jammed EGR valve during opening or	Path 1:		_ogio and value		Path 1:		Conditions		fail conditions	inditi.
		closing the valve.	EGR valve stuck during opening means	=	TRUE	-	EGR valve is opening or	=	TRUE	-	exists for 0.005 s monitor runs	
			((a) + (b) with	>=	20.01	%	Path 2: EGR valve is closing and	=	TRUE	-	with 0.005 s rate	
			(a) position of EGR valve	=	measured parameter	-	engine post drive/ afterun	=	TRUE	-	whenever enable conditions	
			and with (b) learned offset value of EGR valve in the previous driving cycle	=	measured parameter	-	and offset learning active and	=	TRUE	-	are met	1
			(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	-						1
) for time	>	5.00	sec						
			or Path 2: EGR valve stuck during closing means	=	TRUE	-						
			(position of EGR valve with	<=	(a) * (b)	-						
			 (a) reference position of the EGR valve in open position and with 	=	measured parameter	-						
			(b) factor for EGR valve close position or	=	0.50	factor						1
			(c) - (d) with	>	0.02	%						
			(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	-						1
			for time	>	5.00	sec						
Idle Speed Too	P0506	Detects an idle speed	engine speed	<	maximum value	-	Engine Running	=	TRUE		fail	В
Low	r 0300	governor that is unable to achieve the desired idle speed and the idle speed is too low	ungine speeu		of (a) OR (b - (b * c))			=	INUE	-	conditions exists for 20 s monitor runs	J

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters	_	Enable Conditions		Time Required	MIL Illum.
			with (a) minimum engine speed and with (b) minimum idle speed set point (see table #91 for commanded) minimum idle speed and with (c) factor for calculation of engine	=	300.00 calculated parameter 24.00	rpm - %	and (engine coolant temperature and engine coolant temperature	>	-7.04 129.96	°C °C	with 0.1 s rate whenever enable conditions are met	
			speed interval	_	24.00	70	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 and	<	1.86	mph		
							no other torque demanding function active means no torque demand based on accelerator pedal input and	=	TRUE	-		
							set point torque of the speed controller and	>	0 300.00	NM		
							measured engine speed and basic enable conditions met:	> =	see sheet enable	rpm -		
							and NO Pending or Confirmed DTCs:	=	tables 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 with	>	minimum value of (a) OR (b + (b * c))		Engine Running and	=	TRUE		fail conditions exists for 20 s monitor runs with 0.1 s	В
			(a) maximum engine speedand with(b) minimum idle speed set point (see table #91 for commanded) minimum	=	2500.00 calculated parameter	rpm -	(engine coolant temperature and	>	-7.04	°C	rate whenever enable conditions	
			idle speed and with (c) factor for calculation of engine speed interval	=	24.00	%	engine coolant temperature)	<	129.96	°C	are met	
							and idle speed controller active active when TCC not in lock up and when the commanded pedal torque is less than idle governor torque and	=	TRUE	-		
							vehicle speed and no other torque demanding function	< =	1.86 TRUE	mph -		
		l					active					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold ogic and Value	I	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 and measured engine speed and basic enable conditions met: and NO Pending or Confirmed DTCs:	> > = =	0 300.00 see sheet enable tables see sheet inhibit tables	NM rpm -		
Cooling Fan Speed Sensor Circuit	P0526	This diagnostic checks the circuit for electrical integrity during operation.	Path 1: period is too long to measure and (current state of the signal received from fan is low) or Path 2: period is too long to measure and (current state of the signal received from fan is high)	> = > =	0.21 TRUE 0.21 TRUE	sec - sec -	engine speed and { (PWM of fan driver output and Commanded fan speed) for time or vehicle speed for time } and basic enable conditions met: and NO Pending or Confirmed DTCs:	> , , , , , , , , , , , , , , , , , , ,	550.00 45.00 0.00 30.00 203.65 327.67 see sheet enable tables see sheet inhibit tables	rpm % rpm sec mph sec -	fail conditions exists for 3 s monitor runs with 0.020 s rate whenever enable conditions are met	В
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 same as temperature upstream of oxidation catalyst	<	0.65	°C	NO Pending or Confirmed DTCs: for time and ignition on and basic enable conditions met:	-	see sheet inhibit tables 0.00 TRUE see sheet enable tables	- Sec -	fail conditions exists for 3 s monitor runs 0.050 s rate whenever enable conditions are met	В

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 same as temperature upstream of oxidation catalyst	<	-50	°C	NO Pending or Confirmed DTCs: for time and ignition on and basic enable conditions met:	= = =	see sheet inhibit tables 0.00 TRUE see sheet enable tables	- sec -	fail conditions exists for 3 s monitor runs 0.050 s rate whenever enable conditions are met	В
					_				_			
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	В
			same as temperature upstream of oxidation catalyst	>	1000	°C	for time	>	0.00	sec	whenever enable conditions	
							and ignition on and	=	TRUE	-	are met	
							basic enable conditions met:	=	see sheet enable tables	-		
					_	-			_	-		
Idle Control System	P054E	Quantity Threshold - Fuel Quantity Lower Than Expected	(Current injection quantity	<	minimum expected injection quantity (map) * factor for calculating the minimum threshold out of the reference map	mm^3/r ev	(Current gear	=	unchanged	-	fail conditions exists for 15 s monitor runs 0.2 s rate whenever enable conditions are met	В
			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/r ev	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 AND	>=	448.00	rpm		
							Engine coolant temperature AND	>	-20.04	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value		Secondary Parameters	Enable Conditions		Time Required	MIL Illum.
System	P054F	Quantity Threshold - Fuel Quantity Higher Than Expected	Current injection quantity with Current gear and maximum expected injection quantity (see Look-Up-Table #50) and factor for calculating the maximum threshold out of the reference map)	 Cogic and Value maximum expected injection quantity (map) * factor for calculating the maximum threshold out of the reference map Neutral 122.8 to 244.4 1.50 	mm^3/r ev mm^3/r ev factor	Idle speed controller all for time) AND Fluctuation range of engine speed AND Basic enable conditions met	Conditions active 5.00 16383.50 see sheet enable tables unchanged 1.86 not active 1040.00 448.00 -20.04 active 5.00 16383.50 see sheet enable	- rpm - mph rpm rpm °C - sec rpm	fail conditions exists for 15 s monitor runs 0.2 s rate whenever enable conditions are met	B
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 and input circuit active and basic enable conditions met and NO Pending or Confirmed DTCs:	 tables TRUE TRUE see sheet enable tables see sheet inhibit tables	-	fail conditions exists for 5 sec 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 MIL Required 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	= TRUE -	fail conditions exists for 20s monitor runs with 0.005 s
					and basic enable conditions met and NO Pending or Confirmed DTCs:	= see sheet enable - tables = see sheet inhibit - tables	rate whenever enable conditions are met
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
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

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	e	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 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 Input Circuit	P0575	Cruise control CAN communication monitoring	amount of errors in consecutive frames with number of consecutive frames	-	3.00	counts	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 0.005 s monitor runs with 0.005 s rate whenever enable conditions are met	Special C
Brake Pedal Position Sensor "A" Circuit Range/Performanc e	P057B		EWMA filtered test result based on the difference of (a) - (b) where (a) maximum analog brake sensor raw voltage during test (b) minimum analog brake sensor raw voltage during test where difference of the brake sensor voltage corresponds to a corrected value of (see Look-Up-Table #14)	<pre><= = = </pre>	0.40 calculated parameter calculated parameter 0 to 1	factor V V factor	following conditions for time: (ignition on and starter is active cranking for time and battery voltage for time) and gear has been in Park during this driving cycle	> = = > > =	4 TRUE FALSE 3.00 11.00 3.00 TRUE	sec - Sec V sec -	monitor runs 0.02 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.
					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 >= 4.35 m < 5.00 %	- - iph - -	
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:	= see sheet inhibit tables	 fail conditions exists for 0.5 s monitor runs 0.01 s rate whenever enable conditions are met 	
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:	= see sheet inhibit tables	 fail conditions exists for 0.5 s monitor runs 0.01 s rate whenever enable conditions are met 	
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 = see sheet enable 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 MIL Required 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
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 A conditions exists for 0.01 s test performed once per drive cycle during afterrun
Control Module Not Programmed	P0602	Detects if the ECM is programmed.	ECM not programmed	= TRUE -	ignition on and engine pre drive	= TRUE -	fail A conditions exists for 0.01 s test performed test performed once per driving cycle during ECU initialization
Control Module Internal Performance	P0606	Monitors and detects the improper operation of the ECM. This is accomplished by monitoring the output of various hardware modules 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 A conditions exists for 0.5 s test performed continuously

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 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 Valu	le	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							rail pressure and	>	20000.00	kPa		
							engine test active via diagnosis tester	=	FALSE	-		
							and					
			Path 1:				engine speed and	>	1200.00	rpm	fail conditions	
			parallel redundant calculation of angle for pilot injection 1 quantity or	<	-32.98	degrees	engine test active via diagnosis tester	=	FALSE	-	exists for at least 0.05 s monitor runs	
			parallel redundant calculation of angle for pilot injection 1 quantity	>	102.99	degrees					with 0.01 s rate whenever	
			or Path 2: (enable conditions are met	
			parallel redundant calculation of angle for main injection quantity or	<	-32.98	degrees						
			parallel redundant calculation of angle for main injection quantity)	>	43.53	degrees						
			or Path 3: (
			varallel redundant calculation of angle for post injection quantity 1 or	<	-360.00	degrees						
			parallel redundant calculation of angle for post injection quantity 1	>	-67.00	degrees						
			or Path 4: (
			parallel redundant calculation of angle for post injection quantity 2 or	<	-83.00	degrees						
			parallel redundant calculation of angle for post injection quantity 2	>	43.53	degrees						
) or Path 5: (
			f parallel redundant calculation of angle for post injection quantity 3	<	-83.00	degrees						
			or parallel redundant calculation of angle for post injection quantity 3)	>	0.00	degrees						
			(redundant engine speed calculation	>=	1200.00	rpm	fail	
			l parallel redundant calculation of energizing times of the correction value for pilot injection quantity (see Look-Up-	<	-500 to -50	usec	and	~-	1200.00		conditions exists for at least 0.2 s	
			Table #56) or				engine test active via diagnosis tester	=	FALSE	-	monitor runs with 0.04 s	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	•	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
			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 and change in injection operation mode requested	=	FALSE	-	fail conditions exists for at least 0.4 s monitor runs with 0.04 s rate whenever enable conditions are met	
			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	
			and activation counter (intervention) of the surge damper	>=	74.00	counts	for time and	>	0.65	sec	monitor runs with 0.04 s rate whenever	
							redundant engine speed calculation and	>	1440.00	rpm	enable conditions	
							general engine speed demand (see parameter definition line #213) and	=	FALSE	-	are met	
							external torque demand from stability ECU via CAN and	=	FALSE	-		
							external torque demand from transmission ECU via CAN and	=	FALSE	-		
							((cruise control active or	=	FALSE	-		
							(brake pedal status or	=	TRUE	-		
							redundant brake pedal status	=	TRUE	-		
							for time)	>	0.28	sec		
							and (
I I	l	I	1				pedal position	=	0	%		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	e	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							or redundant calculation of pedal position for time) and	= >	0 0.02	% sec		
							(redundant engine speed calculation after start detected and	>	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	
			or parallel redundant calculation of averaged wave correction quantity for main injection	>=	7.50	mm^3	and engine test is active via diagnosis tester	=	FALSE	-	least 0.2 s monitor runs with 0.04 s rate	
			or parallel redundant calculation of averaged wave correction quantity for post injection 2 or	>=	7.50	mm^3					whenever enable conditions are met	
			parallel redundant calculation of averaged wave correction quantity for post injection 3	>=	7.50	mm^3						
			(rail pressure	<=	16000.00	kPa	() parallel redundant calculation of voltage of rail pressure sensor	<	0.19	V	fail conditions exists for	
			or rail pressure	>=	204000.00	kPa	or parallel redundant calculation of voltage of rail pressure sensor)	>	4.81	V	0.120 s monitor runs with 0.01 s rate	
							and delay time and	>	0.21	sec	whenever enable conditions	
							parallel redundant calculation of injections active and	=	TRUE	-	are met	
							redundant engine speed calculation	>	1000.00	rpm		
							and engine test active via diagnosis tester and	=	FALSE	-		
							conditions for level one signal range check fault detection are met	=	TRUE	-		
											4.11	
			internal supply voltage or internal supply voltage	<	4.2 5.25	V V	ignition on	=	TRUE	-	fail conditions exists for	
											0.05 s test	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time MIL Required 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	L	Threshold .ogic 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	Ξ	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: Path 1: [(maximum (a) (b)) - 2 * (maximum (c) (b))] with (a) voltage accelerator pedal 1 and with (b) lower limit for accelerator pedal voltage and with (c) voltage accelerator pedal 2 and (voltage accelerator pedal 1	>	0.29 0.95 1.45	v v	ignition on and engine test active via diagnosis tester and Input signal fault present and ADC fault present	= = =	TRUE FALSE FALSE FALSE	- - -	fail conditions exists for 0.28 s monitor runs with 0.04 s rate whenever enable conditions are met	
			voltage accelerator pedal 1 or voltage accelerator pedal 2) or Path 2: [(maximum (a) (b)) - 2 * (maximum (c) (b))] with (a) voltage accelerator pedal 1 and with	>	1.45 1.45 0.41	v v v						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters	Enab Conditi		Time Required	MIL Illum.
			(b) lower limit for accelerator pedal voltage and with (c) voltage accelerator pedal 2 and (0.95	V					
			voltage accelerator pedal 1	<=	1.45	V					
			voltage accelerator pedal 2)	<=	1.45	V					
			no response to an injection request processor internal	=	TRUE	-	ignition on and NO Pending or Confirmed DTCs:	= TRUI = see sheet table	inhibit -	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:	= TRUI = see sheet table	inhibit -	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:	= TRUI = see sheet table	inhibit -	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:	= TRUI = see sheet table	inhibit -	fail conditions exists for more than 0.08 s monitor runs at least twice	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	TimeMILRequiredIllum.every 0.00 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)	< 2.00 cc	ignition on and injection shut-off path test unts	= TRUE -	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		- 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 MIL Required 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		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 V > 3.30 V	main injection	= ACTIVE -	fail conditions exists for more than 0.1 s monitor runs with 0.01 s rate whenever enable conditions are met	
			Path 1: engine speed or Path 2: engine speed	> 1500.00 rpm > 1600.00 rpm	injection cut off demand from ECM internal monitoring	= TRUE -	fail conditions exists for 0.02 s test performed continuously with 0.02 s	
			security torque limitation request due to implausible air system control requests	= TRUE -	ignition on	= TRUE -	fail conditions exists for more than 533 events test	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions		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 with (a) modeled inner engine torque and with (b) torque tolerance offset (see Look-Up- Table #54) and with (c) torque of engine speed controller and with (d) torque of surge damper control	 (a) + (b) + (c) + - (d) calculated - parameter 11.72 to 99.61 % calculated - parameter calculated - parameter calculated - parameter 	Engine Running and basic enable conditions met:	= TRUE - = see sheet enable - tables	fail conditions exists for more than 0.28 s monitor runs with 0.04 s 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.
			voltage of charging switch or voltage of charging switch if buffer of a bank is not charged completely, or not at all	>	210.00	v	ECM is in startup before injections are released	=	TRUE	-	fail conditions exists for more than 4 events monitor runs with 0.01 s rate whenever enable conditions are met	
			error at startup of DC/DC converter of one bank	=	TRUE	·	ignition on and DC/DC converter is in startup	=	TRUE	-	fail conditions exists for 0.01 ms monitor runs with 0.01 s rate whenever enable conditions	
			DC/DC converter cannot be switched off.	=	TRUE	-	ignition on	=	TRUE	-	are met	
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	<	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)] with (a) voltage accelerator pedal signal 2 at internal ADC and with (b) voltage accelerator pedal signal 2 at external ADC 	> = =	0.16 measured parameter	vv	ignition on and (counter for steady state detection of the internal AD converter means [(a) - (b)] with (a) voltage accelerator pedal signal 2 at internal ADC and with (b) voltage of the accelerator pedal signal 2 at the external ADC or counter for steady state detection of the external AD converter means (c) - (d) with (c) voltage accelerator pedal signal 2 at external ADC and with (d) voltage of the accelerator pedal signal 2 at the internal ADC	=	TRUE 4.00 0.06 measured parameter 4.00 0.06 measured parameter measured parameter	- events V V v events V V	fail conditions exists for at least 0.12 s monitor runs with 0.01 s rate whenever enable conditions are met	
			(ratio metric correction factor or ratio metric correction factor)	< >	0.62 0.74	factor factor	ignition on	=	TRUE	-	fail conditions exists for at least 0.15 s test performed continuously 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.
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	A
			with (a) redundant calculated engine speed	=	calculated parameter	-	and engine synchronization	=	TRUE	-	enable conditions are met	
			and with (b) engine speed	=	measured parameter	-	engine synchronization completed which means	=	TRUE	-	aremet	
							number of crankshaft revolutions and	>=	4.00	revs		
							crankshaft reference mark detected (reference mark is the 2 missing teeth in the 50-2 tooth-wheel configuration)	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
Fuel Pre-supply Pump Control Circuit Open	P0627	Diagnoses the Fuel Pre- Supply Pump low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	=	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	engine post drive/ afterun	=	FALSE	-	fail conditions exists for 1.99s monitor runs with 0.2 s	В
							for time and	>	1.00	sec	rate whenever	
							battery voltage for	>	11.00	V	enable conditions	
							time and	>	3.00	sec	are met	
							(ignition on and	=	TRUE	-		
							basic enable conditions met:)	=	see sheet enable tables	-		
Fuel Pre-supply Pump Control Circuit Low Voltage	P0628	Diagnoses the Fuel Pre- Supply Pump low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground		engine post drive/ afterun	=	FALSE	-	fail conditions exists for 1s monitor runs with 0.2 s rate whenever	В
							for time and battery voltage	>	1.00 11.00	sec V	enable conditions are met	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	1	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							for time and	>	3.00	sec		
							(ignition on and	=	TRUE	-		
							basic enable conditions met:	=	see sheet enable tables	-		
	_				_				_	_		
Fuel Pre-supply Pump Control Circuit High Voltage	P0629	Diagnoses the Fuel Pre- Supply Pump low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	-	engine post drive/ afterun	=	FALSE	-	fail conditions exists for 2 s monitor runs with 0.2 s rate whenever	В
							for time	>	1.00	sec	enable conditions	
							and battery voltage for	>	11.00	V	are met	
							time and	>	3.00	sec		
							(ignition on	=	TRUE	-		
							and basic enable conditions met:)	=	see sheet enable tables	-		
Control Module Long Term Memory Performance	P062F	Each data block of memory is read for a check sum error and flags if a fault is found.	EEPROM sector reports faults regarding:				ignition on	=	TRUE	-	fail conditions exists for 0.01 s	A
i chomanoo			unable to erase or change whole EEPROM sector	=	TRUE	-	and				test performed	
			or				basic enable conditions met:	=	see sheet enable tables	-	continuously at the 0.01 s	
			read order is not successfully accomplished for more than amount of blocks or	=	3	counts					rate	
			or amount of write errors in current block	=	3	counts						
5 Volt Reference 1 Circuit	P0641	Sensor supply voltage circuitry determines if faults related to maintaining the voltage level exist.	sensor supply voltage 1	<=	4.6	V	ignition on	=	TRUE	-	fail conditions exists for 0.1 s	A
							and basic enable conditions met:	=	see sheet enable tables	-	test performed continuously 0.01s rate	

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	a	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 N	ā	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 \	ć	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	В
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.		<= 4.6 \\		ignition on	=	TRUE	-	fail conditions exists for 0.1 s test performed continuously	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters basic enable conditions met:	=	Enable Conditions see sheet enable	-	Time Required 0.01s rate	MIL Illum.
							tables			
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	B (No MIL)
					ignition on and	=	TRUE	-	whenever enable conditions are met	
					ECU Initialization tasks in progress for	=	FALSE	-		
					time and	>	1.00	sec		
					ECU Shutdown tasks in progress	=	FALSE	-		
					time and Batterrune kenne	>	1.00	sec		
					Battery voltage for time	>	10.50 3.00	V 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	B (No MIL)
					ignition on and	=	TRUE	-	conditions are met	
					ECU Initialization tasks in progress	=	FALSE	-	aremet	
					time and	>	1.00	sec		
					ECU Shutdown tasks in progress for	=	FALSE	-		
					time and	>	1.00	sec		
					Battery voltage for	>	10.50	V		
					time and basic enable conditions met:	>	3.00 see sheet enable tables	sec -		

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 and ignition on and ECU Initialization tasks in progress for time and ECU Shutdown tasks in progress for time and Battery voltage for time	= =	TRUE FALSE 1.00 FALSE 1.00 10.50 3.00	- - sec - sec V sec	fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	
					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	A (No MIL
					for time and	>	0.25	sec	performed continuously	,
					new message is received via CAN and basic enable conditions met	=	TRUE see sheet enable	-	0.5 s rate	
					and NO Pending or Confirmed DTCs:	=	tables see sheet inhibit tables	-		
	Dooro			TOUE				-	6.1	
Park/Neutral Position (PNP) Switch Circuit Low Voltage	P0852	by comparing the ECM sensed input to the	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	
					battery voltage and	>=	11.00	V	rate whenever	
					battery voltage) and engine speed and	<=	655.34 7000.00	V	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.
					(selected gear position is park or selected gear position is neutral	=	TRUE TRUE	-		
) and basic enable conditions met: and	=	see sheet enable tables	-		
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Traction Control Input Signal	P0856	Detects a failure when a certain number of Traction Control System torque request messages within a defined message group checksum or rolling count values are incorrect	Error counter for Traction Control torque request message group	>= 8.00 counts	Traction Control Torque Request CAN Message Received	-	TRUE		fault exists for 1 message group ; monitor runs whenever enable conditions are met.	Special C
					and no rolling count or protection errors on CAN Frame \$1C7	=	TRUE	-		
					and ignition on and	=	TRUE	-		
					basic enable conditions met:	=	see sheet enable tables	-		
					and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Pump High Control Circuit Low Voltage	P1043	Diagnoses the Ruductant Pump Motor high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	= Short to ground: - ≤ 0.5 Ω impedance between signal and controller ground	ECU initialization tasks in progress	=	FALSE	·	fail conditions exists for 3 s monitor runs with 10 msec rate	A
					time and	>	1.00	sec	whenever enable conditions	
					battery voltage for	>	11.00	V	are met	
					time and	>	3.00	sec		
					battery voltage for time	<	655.34 3.00	V sec		
					and (-	0.00	000		
					battery voltage correction factor (please see the parameter definition (please see the parameter definition and	>	0.00	factor		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold gic and Value	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
						battery voltage correction factor (please see the parameter definition (please see the parameter definition) for	<	4.00	factor		
						time and	>	3.00	sec		
						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)	0.5 bet and	ort to power: ≤ - Ω impedance tween signal d controller wer	ECU initialization tasks in progress	=	FALSE	-	fail conditions exists for 3 s monitor runs with 10 msec rate	A
						for time	>	1.00	sec	whenever enable	
						and battery voltage for	>	11.00	V	conditions are met	
						time and	>	3.00	sec		
						battery voltage for	<	655.34	V		
						time and	>	3.00	sec		
						battery voltage correction factor (please see the parameter definition and	>	0.00	factor		
						battery voltage correction factor (please see the parameter definition	<	4.00	factor		
						/ for time and	>	3.00	sec		
						basic enable conditions met:	=	see sheet enable tables	-		
						and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables			
Reductant Purge	P1046	Diagnoses the Reductant	Voltage high during driver off state	= Sh	ort to power: ≤ -	ECU initialization tasks in progress	=	FALSE	-	fail	В
Valve High Control Circuit High Voltage			(indicates short to power)	0.5 bet and	Ω in power 2 ween signal d controller wer	for	_			conditions exists for 3 s monitor runs with 10 msec rate whenever	-
						time and	>	1.00	sec	enable conditions	
						battery voltage for	>	11.00	V	are met	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							time and battery voltage for time and	~ ~ ~	3.00 655.34 3.00	sec V sec		
							(battery voltage correction factor (please see the parameter definition and battery voltage correction factor (please	>	0.00	factor		
							see the parameter definition) for time	>	3.00	sec		
							and basic enable conditions met:	=	see sheet enable tables	-		
							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	A
			OR Output current to dosing valve	>	1.60	Amps	for time and	>	1.00	sec	whenever enable conditions	
							battery voltage for	>	11.00	V	are met	
							time and	>	3.00	sec		
							battery voltage for time and	<	655.34 3.00	V sec		
							(battery voltage correction factor (please see the parameter definition and	>	0.00	factor		
							battery voltage correction factor (please see the parameter definition	<	4.00	factor		
							for time and	>	3.00	sec		
							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	A
			OR Output current to dosing valve	×	0.10	Amps	for time and battery voltage for time and battery voltage for time and (battery voltage correction factor (please see the parameter definition and battery voltage correction factor (please see the parameter definition and battery voltage correction factor (please see the parameter definition) for time and basic enable conditions met: and NO Pending or Confirmed DTCs:	~ ~ ~ ~ ~ ~ = =	1.00 11.00 3.00 655.34 3.00 0.00 4.00 3.00 see sheet enable tables	sec V sec factor factor sec -	msec rate whenever enable conditions are met	
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 and NO Pending or Confirmed DTCs limiting rail pressure set point for time and basic enable conditions met:	=	tables TRUE see sheet inhibit tables 2.00 see sheet enable tables	- sec -	fail conditions exists for 720 crank revolutions monitor runs with 0.02 s rate whenever enable conditions are met	В

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	tertreatment Aftertreatment Fuel Inje lel Injector Iow side driver circuit for pontrol Circuit circuit faults.	Diagnoses the Exhaust Aftertreatment Fuel Injector low side driver circuit for	Voltage high during driver on state (indicates short to power)	=	Short to power: $\leq 0.5 \Omega$ impedance between signal and controller power	engine pre drive	=	FALSE	-	fail conditions exists for more than 5 events monitor runs with 0.1 s	В
						for time and battery voltage	>	1.00 11.00	sec V	rate whenever enable conditions	
						for time	>	3.00	sec	are met	
						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	-		
Exhauat	D10CD	Electronic out put driver	The FCM detects that the commanded				=	FALSE	-	fail	В
Aftertreatment Fuel Injector High Control Circuit Low Voltage	Aftertreatment circu Fuel Injector High integ Control Circuit Low valve		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	-	conditions exists for more than 30 events	D
						for time	>	1.00	sec	monitor runs with 0.1 s	
						and battery voltage for	>	11.00	V	rate whenever	
						time and	>	3.00	sec	enable conditions are met	
						starter is active cranking for	=	FALSE	-	are met	
						time and	>	3.00	sec		
						basic enable conditions met:	=	see sheet enable tables	-		
Exhaust	P10CE	Diagnoses the Exhaust	Voltage high during driver off state	=	Short to power: -	engine pre drive	=	FALSE		fail	В
Aftertreatment Fuel Injector High Control Circuit High Voltage		Aftertreatment Fuel Injector high side driver circuit for circuit faults.	(indicates short to power)		≤ 0.5 Ω impedance between signal and controller power					conditions exists for more than 30 events monitor runs with 0.1 s	
						for time	>	1.00	sec	rate whenever	
						and battery voltage	>	11.00	V	enable conditions	
						for time	>	3.00	sec	are met	
						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: [(a) - (b)] (see Look-Up-Table #3) with (a) captured charge air cooler downstream temperature at start and with (b) captured charge air cooler upstream temperature at start ([(a) - (b)] (see Look-Up-Table #3) with (a) captured charge air cooler downstream temperature at start and with (b) captured charge air cooler upstream temperature at start and with (b) captured charge air cooler upstream temperature at start and ([a] - (b)] (see Look-Up-Table #6) with (a) captured charge air cooler downstream temperature at start and with (b) captured charge air cooler upstream temperature at start and with (b) captured charge air cooler upstream temperature at start and with (b) captured charge air cooler upstream temperature at start and ((status of block heater (see parameter definition) status of sun-load detection (see parameter definition))		100.00 measured parameter measured parameter 100.00 measured parameter 27.00 measured parameter measured parameter FALSE FALSE	℃ - - - - - - - - - - - -	minimum engine-off time and ambient temperature and engine speed (see Look-Up-Table #3) for time and engine post drive/ afterun and diagnostic performed in current dc and basic enable conditions met: and NO Pending or Confirmed DTCs:	>	-60.04 530 to 870 0.00 FALSE FALSE see sheet enable tables see sheet inhibit tables	sec rpm sec - -	fail conditions exists for 0.1 s monitor runs once per trip with 0.1 s rate whenever enable conditions are met	В
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	В

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 and	=	FALSE	-		
							and battery voltage and	>	11.00	V		
							ambient temperature and	>=	-60.04	°C		
							engine run time and	<	10.00	sec		
							engine off time and	>	28800.00	sec		
							urea pump motor output duty cycle and	=	0.00	%		
							Max [(a), (b)] - Min [(a), (b)] where	<=	3276.70	°C		
							(a) ambient temperature	=	measured parameter	-		
							 (b) oxidation catalyst downstream temperature and 	=	measured parameter	-		
							and urea dosing valve output duty cycle and	>	3.00	%		
							coil current measurement is valid and	=	TRUE	-		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
	B 4445							-		-	6.13	
Fuel Temperature Sensor 1 Circuit High	P111F	pump temperature sensor performance by comparing	Path 1:				minimum engine-off time	>=	28800.00	sec	fail conditions exists for 0.2	В
		start-up temperatures between fuel pump temperature and fuel rail									s monitor runs once per trip	
		temperature	(a) - (b) (see Look-Up-Table #41) where	>	100.00	°C	and				with 0.2 s rate	
			((a) captured fuel temperature 1 at start	=	measured parameter		ambient temperature and	>	-60.04	°C	whenever enable conditions	
			and with (b) captured fuel temperature 2 at start	=	measured	-	engine speed (see Look-Up-Table #91) for	>	600 to 850	rpm	are met	
)		parameter		time and	>	0.00	sec		
			or Path 2:				and 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) with (a) captured fuel temperature 1 at start and with 	<= =	100.00 measured parameter	°C -	diagnostic performed in current dc and basic enable conditions met: and	=	FALSE see sheet enable tables	-		
			(b) captured fuel temperature 2 at start and	=	measured parameter	-	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			(a) - (b) (see Look-Up-Table #42) where	>	20.00	°C						
			 (a) captured fuel temperature 1 at start and with 	=	measured parameter	-						
			(b) captured fuel temperature 2 at start and	=	measured parameter	-						
			(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	В
			with ((a) captured temperature downstream of the urea catalyst at start	=	measured parameter	°C	and Engine Running for	=	TRUE	-	enable conditions are met	
			and with (b) captured temperature downstream of the particulate filter at start	=	measured parameter	°C	time and	>	0.00	Sec		
)				engine post drive/ afterun and	=	FALSE	-		
							diagnostic performed in current dc and	=	FALSE	-		
							basic enable conditions met: and	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

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/performanc e	P118B	Plausibility check of PM sensor temperature value upon start-up after a calibrated soaking time: stuck high check (temperature cross check of	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	В
		PM temperature with 3 reference sensors after cold start)	where reference temperatures (a) DOC downstream temperature (b) SCR downstream temperature (c) DPF downstream temperature	= =	measured parameter measured parameter measured	-	means Raw value of start temperature of particulate sensor Particulate sensor can be reached via CAN Barometric pressure	>= = >	-40.00 TRUE 75	°C - kPa		
					parameter		Cold start detection means (=	TRUE	-		
							Engine ECU shut-off time is reported as valid (see P262B) for details on ECU / Engine-Off Time Shut-off time of the particulate sensor	=	TRUE 21600	- sec		
							control unit) Temperature range check of the reference sensors is set means	=	TRUE	-		
							(Temperature after Oxi-Catalyst and	>=	-40.04	°C		
							Temperature after Oxi-Catalyst Temperature after SCR-Catalyst and	<= >=	79.96 -40.04	°C °C		
							Temperature after SCR-Catalyst Temperature after particulate filter and	<= >=	79.96 -40.04	2° 2°		
							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	В
Darik i Sensor i			where (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	factor	engine speed commanded fuel injection quantity	> <	550 240.00	rpm mm^3/rev	monitor runs with 0.1 s rate whenever enable conditions	
			(b) Positive O2 concentration margin	=	concentration 0.04	factor	Inner combusted quantity Air mass per cylinder Air mass per cylinder Status of binary lambda signal valid	> < > =	88.00 3.96 1.98 TRUE	mm^3/rev g/rev g/rev -	are met	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							for time oxidation catalyst upstream temperature	> <	0.50 999.96	sec °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	I		
							Deceleration fuel cut-off	=	FALSE	-		
							Injection active	=	TRUE	-		
							calculated oxygen concentration calculated oxygen concentration	<=	(a) + (b) (a) - (b)	factor factor		
							where	>=	(a) - (b)	laciol		
							(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 ambient pressure	> <	-45.04 110.00	°C kPa		
							ambient pressure	>	74.80	kPa		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit	-		
							basic enable conditions met:	=	table 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	В
			where				engine speed	>	550	rpm	monitor runs	
			(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	with 0.1 s rate whenever enable conditions are met	
			(b) Positive O2 concentration margin	=	0.04	factor	Inner combusted quantity	>	88.00	mm^3/rev	are met	
			(1) Contro of consolitation margin	_	0.01		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 Fuel volume in fuel tank Deceleration fuel cut-off Injection active calculated oxygen concentration calculated oxygen concentration where (a) Oxygen concentration is captured at the moment when the above steady state conditions are met (b) tolerance range of calculated Oxygen concentration for time Engine operation mode (Please see the definition) engine speed engine speed engine speed ambient temperature ambient pressure ambient pressure ambient pressure NO Pending or Confirmed DTCs: basic enable conditions met:	> > = = , = = > = < > < > < > = =	11.00 -1638.40 FALSE TRUE (a) + (b) (a) - (b) measure variable 0.02 0.10 normal operation 4500.00 600.00 122.96 -45.04 110.00 74.80 see sheet inhibit table see sheet enable tables	V I factor factor factor factor sec - rpm rpm °C °C kPa kPa - -		
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 where (a) Filtered calculated O2 concentration based on injection quantity, air mass and fuel density	>	(a) + (b) Please see the general description for details of this calculated O2 concentration	factor	engine speed engine speed commanded fuel injection quantity	~ > ~	1800 550 240.00	rpm rpm mm^3/rev	fail conditions exists for more than 2 event monitor runs with 0.1 s rate whenever enable conditions are met	В
			(b) Positive O2 concentration margin	=	0.05	factor	Inner combusted quantity Air mass per cylinder Air mass per cylinder Status of binary lambda signal valid for time SCR downstream temperature SCR downstream temperature integrated air mass since all other release conditions are fulfilled for O2 plausibility battery voltage Fuel volume in fuel tank Deceleration fuel cut-off Injection active calculated oxygen concentration calculated oxygen concentration where	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	88.00 3.96 1.98 TRUE 0.50 999.96 2.5 11.00 -1638.40 FALSE TRUE (a) + (b) (a) - (b)	mm^3/rev g/rev g/rev - sec °C °C °C g y V I - - factor factor		

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

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

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	В
							(Status of NOx signal of upstream NOx sensor (please see the definition)	=	TRUE	-		
							Normal Mode (Particulate Filter Regeneration not active)	=	TRUE	-		
							for time ambient pressure	>=	15.00 75.00	sec kPa		
							ambient pressure ambient temperature ambient temperature	<= >= <=	106.00 -7.04 37.96	kPa ℃ ℃		
							((filtered modeled NOx concentration	<=	0.05	-		
							percent positive deviation filtered modeled NOx concentration	>=	0.05	-		
							percent negative deviation for time)	>	2.00	sec		
)) for time	>	2.00	sec		
							time since start Engine Coolant Temperature Engine Coolant Temperature	> >= <=	30.00 68.96 129.96	sec °C °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 24 = pilot 1 main 56 = pilot 2, pilot 1, main	pattern		
									58 = pilot 2, pilot 1, main, post 2 26 = pilot 1 main, post 2 0 = all off			
							Vehicle speed for time	>= >	(overrun) 37.29 1.00	mph 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		
			1				Air mass per cylinder	>=	0.00	g/rev		
			1				Air mass per cylinder for time	<=	5.40 5.00	g/rev sec		
							actual valve position of exhaust-gas recirculation	> >=	0.00	%		
							actual valve position of exhaust-gas recirculation	<=	100.00	%		
							for time filtered modeled NOx-concentration upstream of the SCR	> >=	0.50 0.00	sec 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 for time Diagnostic has not completed this driving cycle NO Pending or Confirmed DTCs basic enable conditions met:)		1650.00 0.50 FALSE see sheet inhibit tables see sheet enable tables	ppm sec - -		
NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P11CC		(a) Table for the base value of the lower plausibility limit (see Look-Up- Table #80)	<	(a) * (b) -1 to -0.486328	-	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	В
			(b) Factor correction based on Environmental Pressure	=	1	-	Status of NOx signal of upstream NOx sensor (please see the definition) Normal Mode (Particulate Filter	=	TRUE	-		
							Regeneration not active) for time	=	15.00	sec		
							ambient pressure	>=	75.00	kPa		
							ambient pressure	<=	106.00	kPa		
							ambient temperature ambient temperature ((>= <=	-7.04 37.96	°C °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 Engine Coolant Temperature	>= <=	68.96 129.96	°C °C		
							Exhaust gas temperature range at Upstream NOx sensor (see Look-Up-	>0	0 to 1	factor		
							Table #81) 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) 37.29			
							Vehicle speed for time	>= >	1.00	mph sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		hreshold ic and Value	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
						Enable range for the plausibility check of Upstream NOx sensor (see Look-Up-	≠0	0 to 1	factor		
						Table #75)		0.00			
						for time Air mass per cylinder	> >=	0.00 0.00	sec g/rev		
						Air mass per cylinder	<=	5.40	g/rev		
						for time	>	5.00	sec		
						actual valve position of exhaust-gas	>=	0.00	%		
						recirculation actual valve position of exhaust-gas recirculation	<=	100.00	%		
1						for time	>	0.50	sec		
						filtered modeled NOx-concentration	>=	0.00	ppm		
						upstream of the SCR filtered modeled NOx-concentration	<=	1650.00	ppm		
1						upstream of the SCR		0.50			
1						for time Diagnostic has not completed this driving	> =	0.50 FALSE	sec		
1 1						cycle	-	TALSE			
						NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
						basic enable conditions met:	=	see sheet enable tables	-		
)					
										4.11	
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	В
						and				36 sec	
						Engine Running (see parameter	=	TRUE	-	monitor runs	
						definition) for time (required for the NOx sensor to	>	20.00	sec	with 0.02 s rate	
						give valid response)		20.00	300	whenever	
						and				enable	
						Upstream NOx sensor detects a lean	=	TRUE	-	conditions	
						A/F mixture and				are met	
						Valid NOx signal from CAN is received	=	TRUE	-		
						(no NOx sensor communication failures)					
						or					
						following conditions for time:	>	45.00	sec		
				1		battery voltage	>=	11.00	V		
						battery voltage	<=	655.34	∨ °C		
						SCR upstream temperature SCR upstream temperature	>= <=	94.96 3003.56	°C °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	<=	0.1 to 10	-		
						condition (see Look-Up-Table #28) for time	>=	5.00	sec		
1 1						Inhibit Status (no inhibiting faults)	=	see sheet inhibit	-		
I I											
						(No pending or stored DTC)		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) and	>=	18.00	sec	fail conditions exists for more than 36 sec	В
							Engine Running (see parameter definition)	=	TRUE	-	monitor runs with 0.02 s	
							for time (required for the NOx sensor to give valid response) and	>	20.00	sec	rate whenever enable	
							Downstream NOx sensor detects a lean A/F mixture and	=	TRUE	-	conditions are met	
							Valid NOx signal from CAN is received (no NOx sensor communication failures)	=	TRUE	-		
							or following conditions for time: battery voltage battery voltage	> >= <=	120.00 11.00 655.34	sec V V		
							SCR downstream temperature	>=	94.96	°C		
							SCR downstream temperature Engine Running (see parameter definition)	<= =	3003.56 TRUE	°C -		
						for time (required for the NOx sensor to give valid response) and	>	20.00	sec			
							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) basic enable conditions met:	=	see sheet inhibit tables 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	r	fail conditions exists for more than 0.04 s nonitor 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	r	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 for time and Throttle Valve Actuator Solenoid Control Circuit and Open Load Diagnosis active and basic enable conditions met	 > 11.00 > 3.00 = ACTIVE = FALSE = see sheet enable tables 	e r sec	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	В

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	В
			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	-	rate whenever enable conditions	
							and Engine Coolant Temperature	<	199.96	°C	are met	
							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.	learned throttle valve offset position at	<	-20.00	%	(engine temperature	>=	4.96	°C	fail conditions exists for	
			open or closed position or learned throttle valve offset position at open or closed position or	>	20.00	%	and engine temperature)	<=	130.06	°C	0.005 s monitor runs once per driving cycle with 0.005 s	
			Path 2: difference between the maximum and minimum positions learned at closed position	>	30.00	%	/ and (rate whenever enable conditions	
			or Path 3: difference between the maximum and	>	30.00	%	battery voltage and	>=	8.00	V	are met	
			minimum positions learned at open position				battery voltage	<=	655.34	V		
) and Throttle Valve is not frozen consisting of:					
							(Engine Coolant Temperature or	>=	5.06	°C		
							if Engine Coolant Temperature	<	5.06	°C		
							then Engine Coolant Temperature for	>	6.06	°C		
							time) and		10.00	sec		
							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 and basic enable conditions met	=	TRUE 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	for time and and Throttle Valve Actuator Solenoid Control Circuit and Open Load Diagnosis active and basic enable conditions met	>	11.00 3.00 ACTIVE FALSE see sheet enable tables	V sec - -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	В
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 	for time and Throttle Valve Actuator Solenoid Control Circuit and Open Load Diagnosis active and basic enable conditions met	>	11.00 3.00 ACTIVE FALSE see sheet enable tables	V sec - -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	В

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 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 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 = TRUE = see sheet inhibit tables > 2.00 = see sheet enable tables	rpm - sec -	fail conditions exists for 0.1 s monitor runs with 0.1s rate whenever enable conditions are met	В
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	 a 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	a 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 and	=	TRUE	-		
							basic enable conditions met:	=	see sheet enable tables	-		I
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		1
			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) and	=	TRUE		fail conditions exists for 1.01 s. monitor runs	I
							basic enable conditions met:	=	see sheet enable tables	-	with 0.02 s rate	I
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	whenever enable conditions are met	I
			rail pressure	>	215000.00	kPa	state machine rail pressure control equal to pressure control valve	=	TRUE	-		1
							and basic enable conditions met:	=	see sheet enable tables	-		1
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		1
			rail pressure	>	215000.00	kPa	state machine rail pressure control equal to metering unit control mode	=	TRUE	-		I
							and basic enable conditions met:	=	see sheet enable tables	-		I
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		l
Cold Start	P1400	Detects problems resulting	Path 1:		_				_			В
Emission Reduction Control System		in improper delivery of fuel for catalyst light off and aftertreatment system										I
		preparation	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	1
			or				which means: Cold Start Injection Monitoring and	=	ENABLED	-	test performed continuously	1
			Path 2:				engine operating mode state transition and	=	FALSE	-	0.01 s rate	I
1		I	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	=	TRUE	-						
			or	_	_							
			Path 4: Pilot Injection 2 is prohibited due to exceeding the allowed number of injections (see general description for details)	=	TRUE	-						
			or		_							
			Path 5: Pilot Injection 2 is prohibited due to collision (overlap) with Pilot Injection 1 (see general description for details)	=	TRUE	-						
			or									
			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)	=	TRUE	-						
			or									
			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		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 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	В
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	(ambient pressure and engine coolant temperature and EGR control is in closed loop for time and EGR control is active for time and exhaust gas system regeneration mode for time and Engine speed Engine speed and injection quantity injection quantity and desired delta air mass flow	> 74.80 kPa > 69.96 °C = TRUE - > 2.00 sec = TRUE - > 0.00 sec = TRUE - > 0.00 sec = FALSE - > 5.00 sec >= 1300.00 rpm <=	3V	В

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

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions		Time Required	MIL Illum.
					for time and starter is active cranking for time and basic enable conditions met:	 > 3.00 = FALSE > 3.00 = see sheet enable tables 	sec - sec -	conditions are met	
Exhaust Gas Recirculation (EGR) Motor Control Circuit 2 High Voltage	P140E	Diagnoses the EGR Valve high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power)	 Short to power: ≤ 0.5 Ω impedance between signal and controller power 	EGR Solenoid Control Circuit and battery voltage for time and starter is active cranking for time and basic enable conditions met:	 ACTIVE 11.00 3.00 FALSE 3.00 see sheet enable tables 	V sec - sec -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	В
Exhaust Gas Recirculation (EGR) Motor Current Performance	P140F	Diagnoses the EGR Valve low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	 Short to power: - ≤ 0.5 Ω impedance between signal and controller power 	EGR Solenoid Control Circuit and battery voltage for time and starter is active cranking for time and basic enable conditions met:	 ACTIVE 11.00 3.00 FALSE 3.00 see sheet enable tables 	V Sec - Sec -	fail conditions exists for 2 s monitor runs with 0.005 s rate whenever enable conditions are met	В

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 and battery voltage for	= >	ACTIVE	- V	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable	В
					time and	>	3.00	sec	conditions are met	
					starter is active cranking for time	=	FALSE 3.00	- sec		
					and basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation	P1412	Diagnoses the EGR Cooler Bypass high side driver	Voltage high during driver off state (indicates short to power)	= Short to power: ≤ - 0.5 Ω impedance	EGR Cooling Bypass Solenoid Control Circuit	=	ACTIVE	-	fail conditions	В
(EGR) Motor Control Circuit 2 High Voltage		circuit for circuit faults.	(between signal and controller power	and				exists for 3 s monitor runs with 0.005 s rate whenever	
					battery voltage for time	>	11.00 3.00	V sec	enable conditions are met	
					and starter is active cranking	=	FALSE	-	aremet	
					for time and	>	3.00	sec		
					basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas	P1413	Electronic output driver	The ECM detects that the commanded		EGR Cooling Bypass Solenoid Control	=	ACTIVE		fail	В
Recirculation (EGR) Motor Control Circuit Shorted		circuitry determines circuit integrity on the EGR cooler bypass solenoid.	state of the driver and the actual state of the control circuit do not match.		Circuit				conditions exists for 3 s monitor runs with 0.005 s	
	This failure detects a short between the two output circuits	t		and battery voltage	>	11.00	V	rate		
					for time and	>	3.00	sec	are met	
					starter is active cranking for	=	FALSE	-		
					time and	>	3.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters basic enable conditions met:	=	Enable Conditions see sheet enable	-	Time Required	MIL Illum.
									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	В
							and battery voltage	>	11.00	V	whenever enable	
							for time	>	3.00	sec	conditions are met	
							and starter is active cranking for	=	FALSE	-		
							time and	>	3.00	sec		
							basic enable conditions met:	=	see sheet enable tables	-		
						_						_
Closed Loop Diesel Particulate Filter (DPF) Regeneration Control At Limit - Stage 1 Temperature Too Low	Diesel Particulate temperature. Actual Filter (DPF) controller ratio and Regeneration temperature reading Control At Limit - Stage 1 controller ratio and Femperature Too temperature values a Low indication of an insuf	temperature readings are compared to desired	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	В
			and deviation from the temperature set point	>	maximum of (a)	-	and release of the exhaust gas temperature	_	TRUE	_	are met	
			for inner control loop (with	-	and (b)		outer loop control monitoring means					
			 (a) limitation of the temperature threshold and with (b) temperature threshold value for 	=	100.00	°C °C	active operation mode of the inner control loop means (=	TRUE	-		
			maximum deviation				particulate filter regeneration	=	TRUE	-		
					and 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 means	=	TRUE	-		
							vehicle speed and	<=	124.30	mph		
							Relative accelerator pedal position for	>	3.00	%		
							time and	>	1.00	Sec		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables			
Diesel Particulate Filter (DPF) Controller ratio and Regeneration Control At Limit - Stage 1 Temperature Too High High Limit - Control ki Limit - Controller ratio and temperature ratio and temperature values as an indication of an excessive exhaust gas temperature. Control ki Limit - 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	В		
			and deviation from the temperature set point for inner control loop (<	minimum of (a) and (b)	-	and release of the exhaust gas temperature outer loop control monitoring means	=	TRUE	-	aremet	
			with (a) limitation of the temperature threshold and with (b) temperature threshold value for	=	-100.00 100	°C °C	(active operation mode of the inner control loop means (=	TRUE	-		
			minimum deviation				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		
								<	649.96	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold gic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							and status maximum governor deviation means vehicle speed and Relative accelerator pedal position for time and basic enable conditions met: and NO Pending or Confirmed DTCs:	= > = =	TRUE 124.30 3.00 1.00 see sheet enable tables see sheet inhibit tables	- mph % sec -		
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)	Ξ	TRUE	-	Battery voltage (ECM) Ignition on for time Ignition on	>= > =	11.00 TRUE 1.20 TRUE	V - sec -	fault exists for more than 1.4 sec; monitor runs at 0.1 s when enable conditions are met	В
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.		>=	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	В
			for time	>=	2.00	Sec	Particulate sensor plausibility check is terminated means One successful sensor-Regeneration is completed Battery voltage (ECM) Supply voltage is on Ignition on for time	= = = >	TRUE TRUE 11.00 TRUE TRUE 3.00	- V - 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	В

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 Particulate sensor is not in the "measure" or "regeneration" state Battery voltage (ECM) Supply voltage is off Ignition on for time	= >= = >	TRUE 11.00 TRUE TRUE 3.00	- V - sec	when enable conditions are met	
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	В
			Sensitivity Factor adjustment value sent from the sensor control unit (SCU) in the engine ECM has been transmitted Sensor sensitivity calibration factor	=	TRUE 0.75	-	SCU is in the state "ready" means	=	TRUE	-		
			OR Sensor sensitivity calibration factor OR Path 2: Sensitivity Factor adjustment value sent from the sensor control unit (SCU) in the engine ECM has been transmitted Time after SCU "ready" until sensor sensitivity calibration factor transmitted	> = >=	1.25 FALSE 2.00	- sec	Battery voltage (ECM)	>=	11.00	V		
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 and PM Sensor temperature Particulate sensor regeneration is completed Battery voltage (ECM) IDE supply voltage and IDE supply voltage Ignition on for time	> < = ,= ,= ,= ,= ,	200.00 425.00 TRUE 11.00 41.55 49.72 TRUE 3.00	°C - V V V Sec	fault exists for more than 5 sec; monitor runs at 0.1 s when enable conditions are met	В

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 Circult Range/Performanc e	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	В
			when when when when when when when when	=	((a) / (b)) * (100)		Absolute, filtered and temperature compensated exhaust gas acceleration and	>	0.8	m / sec ^2		
			(a) change in the heater voltage and with	=	measured parameter	-	Absolute, filtered and temperature compensated exhaust gas acceleration	<	6.51	m / sec ^2		
			(b) minimum change in the heater voltage	=	0.4	V	for time	>	0.9	sec		
			Vollago				Diagnosis by the local unit is released means	=	TRUE	-		
							(PM sensor temperature and	>	190.00	°C		
							PM sensor temperature	<	210.00	°C		
							/ Time has elapsed since diagnosis by the local unit is released	>=	15	sec		
							Protection heating is active means	=	TRUE	-		
							PM sensor heater target temperature PM sensor dewpoint achieved	=	200 FALSE	°C		
							Initialization values have been transferred (i.e. CAN communication with ECM established)	=	TRUE	-		
							Sensor temperature at engine start	>	-10.04	°C		
							Sensor temperature at engine start	<	249.96	°C		
							Exhaust gas temperature and	>	-10.04	°C		
							Exhaust gas temperature	<	179.96	°C		
							PM sensor temperature start temperature and	>	-10.04	°C		
							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	<u>2000</u> P150C	Detects implausible engine speed 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) or		7.00 12.00 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 exists for 0.01 s test performed continuously 0.01 s	A
			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 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 15.5s monitor runs with 0.005 s rate whenever enable conditions are met	Special C
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 in the last number of messages (sliding window) received PTO frames		4.00	counts	ignition on for time and Bus off or error passive on CAN and basic enable conditions met: and NO Pending or Confirmed DTCs:	=	TRUE 3.00 FALSE see sheet enable tables see sheet inhibit tables	- sec - -	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

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_LIN V E_LOW	ignition on	= TRUE -	fail conditions exists for 5 s test performed continuously 0.005 s rate	В
					and basic enable conditions met and	= see sheet enable - tables		
					no sensor supply error and	= TRUE -		
					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		>= SENT_INFO_LIN V E_HIGH	ignition on	= TRUE -	fail conditions exists for 5 s test performed continuously 0.005 s rate	В
					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	P16A2	Detects an error in the	throttle valve position sensor	= TRUE -	ignition on	= TRUE -	fail	В
Communication Circuit Performance		throttle sensor communication.	communication circuit disturbed due to noise or wrong CRC (cyclic redundancy check)				conditions exists for 8 s test	
					and basic enable conditions met	= see sheet enable - tables	performed continuously 0.005 s rate	
					and no sensor supply error	= TRUE -		
					^{and} NO Pending or Confirmed DTCs:	= see sheet enable - tables		
Cruipo Control	D4707	Driver Coloriz d Mada	Driver Selected Media and the status		ignition on	TOUE	f-11	Special C
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	Special C
					and Frame timeout	= FALSE -	s monitor runs	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold ogic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							and Bus off or error passive on CAN and)	=	FALSE	-	with 0.005 s rate whenever	
							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:		12	uA	Particulate sensor is in the "measurement" state when failure occurs which means	=	TRUE	-	fault exists for more than 1 event; monitor runs at 0.1 s	В
			measured and filtered interdigital electrode(IDE) current	>		uA					when enable	
			measured and filtered interdigital electrode(IDE) current when	< <	41	uA	Sensor regeneration complete and	=	TRUE	-	conditions are met once per trip	
			integrated reciprocal of the predicted trigger time	=	1		PM sensor dewpoint reached (please see the definition)	=	FALSE	•	onee per aip	
			or				DPF regeneration not active Calculated soot particles mass based on	>=	TRUE 0	g		
							sensor flow resistance 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		
			then				Exhaust gas velocity at particulate sensor position for	<=	50	m/sec		
			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) (
			Note: Two sensor regeneration performed following Path 2 test to confirm sensor not electrically shorted (see general description for flowchart				Exhaust gas pressure Exhaust gas pressure for	>= <=	75.0 135	kPa kPa		
			process for Path 2)				Duration for exhaust gas pressure	>=	10	sec		
							(Exhaust gas temperature Exhaust gas temperature	>= <=	89.960 399.960	°C ℃		
							for Duration for exhaust gas temperature	>=	5	sec		
) (Engine running	=	TRUE	-		
							(NOx concentration in exhaust gas Meander temperature of particulate sensor	< <	200 249.960	ppm °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	°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	°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/Performanc e	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	В

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) (measured tank level sensor 1 voltage after 1.5 ms since a test impulse was applied)) or ((measured tank level sensor 3	=	(0.0 to 1.7) (1.71 to 3.56) (0.0 to 1.7)	V V V						
			voltage after 1.5 ms since a test impulse was applied) (measured tank level sensor 2 voltage after 1.5 ms since a test impulse was applied))	=	(0.0 to 1.7)	V						
Reductant Level Sensor 1 Circuit	P203C	CAN message: Discrete level sensor level 1 short to	Reductant Tank Level 1 Error Status	=	1	-	ignition on	=	TRUE	-	fail conditions	A
Low		ground error	(tank level sensor 1 voltage directly measured after a test impulse was	<	(0.17)	V	battery voltage	>	8	V	exists for more than 3 sec.	
			applied)				basic enable conditions met:	=	see sheet enable tables	-	monitor runs with 1 s rate whenever enable conditions are met	
Reductant Level Sensor 1 Circuit	P203D	Path 1:									fail conditions	A
High		CAN message: Discrete level sensor 1 open load error	Reductant Tank Level 1 Error Status	=	3	-	ignition on	=	TRUE	-	exists for more than 3 sec. monitor runs	
			(measured tank level sensor 1 voltage after 1.5 ms since a test impulse was applied)	>	(3.56)	V	battery voltage	>	8	V	with 1 s rate whenever enable	
			(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		conditions are met	
		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	A
					time and	>	1.00	sec	whenever enable	
					battery voltage for	>	11.00	V	conditions are met	
					time and	>	3.00	sec		
					battery voltage for	<	655.34	V		
					time and	>	3.00	sec		
					(battery voltage correction factor (please see the parameter definition and	>	0.00	factor		
			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	-		
	D0040					-	FALOE	-	6.7	Â
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	A
					time and	>	1.00	sec	conditions are met	
					battery voltage for	>	11.00	V		
					time and	>	3.00	sec		
					battery voltage for	<	655.34	V		
					time and (>	3.00	sec		

System Cod	e 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 and battery voltage correction factor (please see the parameter definition) for time	~ ~ ~	0.00 4.00 3.00	factor factor sec		
				and No Pending or confirmed DTCs and basic enable conditions met:	=	See sheet inhibit tables see sheet enable tables	-		
Reductant Injector Control Circuit High Voltage	9 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 1.00 11.00 3.00 655.34 3.00 0.00 4.00 3.00 See sheet inhibit tables see sheet enable tables	- Sec V sec V sec factor factor 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.
Reductant Pressure Sensor Circuit Range/Performanc e	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	A
							and status of SCR control state (please see the definition) and	=	No Pressure Control	-	rate whenever enable	
							State of the defrosting check of pressure line (please see the definition) and	=	TRUE	-	conditions are met	
							ambient pressure and	>	0.00	kPa		
							ambient temperature and	>	-30.04	°C		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
								_		_		
Reductant Pump Pressure Sensor	P204C	Measured reductant pump pressure sensor signal low	Reductant pump pressure sensor signal	<	0.41	V	ignition on	=	TRUE	-	fail conditions	A
Circuit Low		voltage	same as:				NO Pending or Confirmed DTCs:	=	see sheet	-	exists for more than	
			reductant pump pressure	<	0	kPa	basic enable conditions met:	=	inhibit tables see sheet enable tables	-	0.4 sec. monitor runs with 0.01 s rate whenever enable	
Reductant Pump Pressure Sensor Circuit High	P204D	Measured reductant pump pressure sensor signal high voltage	Reductant pump pressure sensor signal same as:	>	4.80	V	ignition on NO Pending or Confirmed DTCs:	=	TRUE see sheet inhibit tables	-	fail conditions exists for more than 0.4 sec.	A
			reductant pump pressure	^	800.00	kPa	basic enable conditions met:	-	see sheet enable tables		monitor runs with 0.01 s rate whenever enable conditions are met	
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	A
1							AND status byte in substate PRESSUREBUILDUP	=	RUNNING		event monitor runs with 0.1 s	

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) ambient pressure ambient temperature number of pressure build-up attempts in pressure buildup and ventilation states Dwell time in Pressure Build up substate Dwell time in ventilation substate Urea heater release reason NO Pending or Confirmed DTCs: basic enable conditions met:	= > > >= >= >= ==	TRUE 0.00 -30.04 20 10.00 0.23 COMPONENT PROTECTION see sheet inhibit tables see sheet enable tables	- °C counts sec - -	rate whenever enable conditions are met	
Reductant Tank Temperature Sensor Performance	P205B	Path 1: 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	Ξ	TRUE		fail conditions exists for more than 0.5 sec monitor runs with 0.01 s rate whenever enable conditions are met	В
			where (a) Reductant tank temperature (b) fuel temperature	=	measured parameter measured parameter	-	status of SCR control state (please see the definition) Engine off Time time since start Max [(a), (b), (c)] - Min [(a), (b), (c)] where (a) Oxidation Catalyst upstream temperature (b) fuel temperature (c) Particulate filter downstream temperature NO Pending or Confirmed DTCs: basic enable conditions met:	= > = = = =	No Pressure control 28800.00 6.00 6.96 measured parameter measured parameter measured parameter see sheet inhibit tables see sheet enable tables	- sec °C - - -		
		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	
			where (a) Reductant tank temperature (b) fuel temperature	=	measured parameter measured parameter		Engine off Time time since start Max [(a), (b), (c)] - Min [(a), (b), (c)] where (a) Oxidation Catalyst upstream temperature (b) fuel temperature (c) Particulate filter downstream temperature NO Pending or Confirmed DTCs:	> > <= = =	28800.00 6.96 measured parameter measured parameter measured parameter see sheet inhibit	sec sec °C - -	enable conditions are met	
							basic enable conditions met:	=	tables see sheet enable tables	-		
Reductant Tank P 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 Corresponds to a temperature of Corresponds to a resistance of	< <= >=	0x001 -55.0 1200	hex ℃ kOhm	basic enable conditions met: and No rolling count or protection value errors. (sliding window errors) in the	=	see sheet enable tables TRUE		fault exists for more than 3 sec; monitor runs at 1 s whenever enable conditions	A
			Corresponds to a voltage of	>=	5.0	V	CAN frame				are met	
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		>	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	В
			Corresponds to a temperature of Corresponds to a resistance of Corresponds to a voltage of	>= <= <=	160.0 0.153 0.270	°C kOhm V	and No rolling count or protection value errors. (sliding window errors) in the CAN frame	=	TRUE	-	are met	
			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	e	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Secondary Fuel Sensor Performance	ensor secondary fue erformance performance the decrease level for a cer	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) with (a) total vehicle distance	<	100.00 measured	miles	Engine Running for time	=	TRUE 60.00	- Sec	fail conditions exists for 0.02 s monitor runs 0.02 s rate whenever enable	В
			and with (b) change in mileage	=	parameter	-	and diagnosis tester	=	FALSE	-	conditions are met	
			and		parameter		and					
	(((c) - (d) with (c) maximum volume of fuel reached in	< =	4.00 measured	 -	fuel transfer pump active means (=	FALSE	-			
			secondary tank during driving cycle and with (d) minimum volume of fuel reached in secondary tank during driving cycle	=	parameter measured parameter	-	filtered fuel volume in primary tank or	>	1638.35	I		
	and			>	0.00	I	filtered fuel volume in secondary tank for	<	0.00	I		
				0.00	·	time and	>	0.00	sec			
							cumulative transfer pump on time in current ignition cycle) and fuel level zone 1 means (>	0.00	sec		
							filtered fuel volume in primary tank	>=	137.40	Ι		
							filtered fuel volume in secondary tank) and	>=	0.00	Ι		
							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	voltage of fuel level sensor 2	<	0.20	V	ignition on	=	TRUE	-	fail conditions exists for 24 s	В
		low condition on the fuel level sensor circuit					and basic enable conditions met:	=	see sheet enable tables	-	test performed continuously 0.2 s rate	

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 and basic enable conditions met:	=	TRUE see sheet enable tables	-	fail conditions exists for 24 s test performed continuously 0.2 ms rate	В
Exhaust	P2080	Detects a fault in the	integrated heat quantity of exhaust gas	<	(a) / (b) * (c) / (d)	-	exhaust gas system regeneration mode	=	FALSE	-	fail	В
Temperature Sensor 1 Performance		exhaust temperature sensor 1 performance by comparing the heat quantity on the sensor position to a threshold.	temperature sensor 1		* (e) * (f)						conditions exists for 5 times monitor runs with 0.1 s	
			or integrated heat quantity of exhaust gas temperature sensor 1	>	(a) / (b) * (c) / (d) * (e) * (g)	-	for time	>	1500.00	sec	rate whenever enable	
		with (a) exhaust gas mass flow	=	calculated parameter	-	and time since start	>	327.00	sec	conditions are met		
			and with (b) factor and with		3.60	g/sec	and (exhaust-gas temperature sensor 1	>	-60.04	°C		
			(c) heat capacity and with	=	1050.00	J/Kg/°C		<	1999.96	°C		
			(d) factor and with	=	1000	kW/°C				-		
			 (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		
			and with (f) minimum permissible temperature deviation for exhaust gas temperature	=	-100.00	°C	for time and	=	5.00	sec		
			sensor 1 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 and	>=	50.00	sec		
							change in modeled exhaust-gas temperature sensor 1 and	>	4.00	°C		
							(heat quantity for exhaust gas temperature sensor 1 and	>	10.00	kJ		
							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	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	В
		on the sensor position to a threshold.	or integrated heat quantity of exhaust gas	>	(a) / (b) * (c) / (d)	-	for time	>	1500.00	Sec	monitor runs with 0.1 s rate whenever	
			temperature sensor 2 with (a) exhaust gas mass flow	=	* (e) * (g) calculated parameter	-	and time since start	>	327.00	sec	enable conditions are met	
			and with (b) factor and with	=	3.60	g/sec	and (exhaust-gas temperature sensor 2	>	-60.04	°C		
			(c) heat capacity and with (d) factor	=	1050.00 1000	J/Kg/°C kW/°C	exhaust-gas temperature sensor 2)	<	1999.96	°C		
			and with (e) correction factor for heat flow quantity depending on exhaust gas mass flow for temperature sensor 2	=	1.00	factor	and change in exhaust-gas temperature sensor 2	<	7.00	°C		
			and with (f) minimum permissible temperature deviation for exhaust gas temperature sensor 2	=	-100.00	°C	for time and	=	5.00	sec		
			(g) maximum permissible temperature deviation for exhaust gas	=	100.00	°C	engine operation point suitable for diagnostic (see Look-Up-Table #29) for	=	0 to 255	-		
			temperature sensor 2				time and	>=	0.05	sec		
							change in modeled exhaust-gas temperature sensor 2 and	>	4.00	°C		
							(heat quantity for exhaust gas temperature sensor 2 and	>	10.00	kJ		
							heat quantity for exhaust gas temperature sensor 2	<	12.00	kJ		
		l					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	v	(a) / (b) * (c) / (d) * (e) * (f)	-	exhaust gas system regeneration mode	=	FALSE	-	fail conditions exists for 5 times monitor runs with 0.1 s	В
			or integrated heat quantity of exhaust gas temperature sensor 3	>	(a) / (b) * (c) / (d) * (e) * (g)	-	for time	>	1500.00	sec	rate whenever enable	
			with (a) exhaust gas mass flow and with	=	calculated parameter	-	and time since start and	>	327.00	sec	conditions are met	
			(b) factor and with (c) heat capacity	=	3.60 1050.00	g/sec J/Kg/°C	(exhaust-gas temperature sensor 3	>	-60.04	°C		
			and with (d) factor	=	1000	kW/°C	exhaust-gas temperature sensor 3)	<	1999.96	°C		
			and with (e) correction factor for heat flow quantity depending on exhaust gas mass flow for temperature sensor 3	=	1.00	factor	and change in exhaust-gas temperature sensor 3	<	7.00	°C		
			and with (f) minimum permissible temperature deviation for exhaust gas temperature	=	-100.00	°C	for time and	=	5.00	sec		
			sensor 3 and with (g) maximum permissible	=	100.00	°C	engine operation point suitable for diagnostic (see Look-Up-Table #29) for	=	0 to 255	-		
			temperature deviation for exhaust gas temperature sensor 3		100.00	Ũ			0.05			
							time and	>=	0.05	sec		
							change in modeled exhaust-gas temperature sensor 3 and /	>	4.00	°C		
							(heat quantity for exhaust gas temperature sensor 3 and	>	10.00	kJ		
							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.		<	(a) / (b) * (c) / (d) * (e) * (f)	-	exhaust gas system regeneration mode	=	FALSE	-	fail conditions exists for 5 times monitor runs with 0.1 s	В
			or integrated heat quantity of exhaust gas temperature sensor 3 with	>	(a) / (b) * (c) / (d) * (e) * (g)		for time and	>	1500.00	sec	rate whenever enable conditions	
			(a) exhaust gas mass flow	=	calculated parameter	-	time since start	>	327.00	sec	are met	
			and with (b) factor and with	=	3.60	g/sec	and (exhaust-gas temperature sensor 4	>	-60.04	°C		
			(c) heat capacity and with	=	1050.00	J/Kg/°C	and exhaust-gas temperature sensor 4	<	1999.96	°C		
			(d) factor and with	=	1000	kW/°C) 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		
			and with (f) minimum permissible temperature deviation for exhaust gas temperature	=	-100.00	°C	for time and	=	5.00	sec		
			sensor 3 and with		100.00	*0	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 and	>=	0.05	sec		
							change in modeled exhaust-gas temperature sensor 4 and	>	4.00	°C		
							(heat quantity for exhaust gas temperature sensor 4 and	>	10.00	kJ		
							heat quantity for exhaust gas temperature sensor 4	<	12.00	kJ		
) and engine has been in normal mode for time	>=	1.00	sec		
		l					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 and basic enable conditions met: and NO Pending or Confirmed DTCs:	>= =	1.00 see sheet enable tables see sheet inhibit tables	sec - -		
Reductant Pump Control Circuit	P208A		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	A
					for time and battery voltage for time and	> > >	1.00 11.00 3.00	sec V sec	enable conditions are met	
					battery voltage for time and	<	655.34 3.00	V sec		
					(battery voltage correction factor (please see the parameter definition and battery voltage correction factor (please	>	0.00	factor		
					see the parameter definition) for time and basic enable conditions met: and NO Pending or Confirmed DTCs:	> = =	3.00 see sheet enable tables see sheet inhibit tables	sec - -		
			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	
					time and battery voltage for	>	1.00 11.00	sec V	monitor runs with 0.01 sec rate whenever	
					time and battery voltage for	> <	3.00 655.34	sec V	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.
							time and	>	3.00	sec		
							(battery voltage correction factor (please see the parameter definition and	>	0.00	factor		1
							battery voltage correction factor (please see the parameter definition	<	4.00	factor		I
							for time and basic enable conditions met:	>	3.00 see sheet enable	sec		
							and	=	tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		1
Reductant Pump	P208B	The ECM detects that the	timer for functional acknowledgement of	>	4.00	sec	(fault exists	A
Performance		commanded state of the Reductant Pump driver and the actual state of the control circuit do not match.	the reductant pump motor								for more than 0.3 s; monitor runs at 0.1 s	ļ
			timer for functional acknowledgement of the reductant pump motor	<=	6.00	sec	Reductant Pump Warm-up status where the Warm-up state is defined as:	=	FALSE	-	whenever enable conditions are met	
							(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		I
							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: $\leq 0.5 \Omega$ 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 and	>	1.00	sec	enable conditions are met	
					battery voltage for	>	11.00	V		
					time and	>	3.00	sec		
					battery voltage for	<	655.34	V		
					time and (>	3.00	Sec		
					battery voltage correction factor (please see the parameter definition and	>	0.00	factor		
					battery voltage correction factor (please see the parameter definition	<	4.00	factor		
					for time and	>	3.00	sec		
					basic enable conditions met:	=	see sheet enable tables	-		
					and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Purge Valve Control Circuit	P20A0		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	A
					time and	>	1.00	sec	whenever enable	
					battery voltage for	>	11.00	V	conditions are met	
					time and	>	3.00	sec		
					battery voltage for	<	655.34	V		
					time and	>	3.00	sec		
					(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 and	>	3.00	sec		
					and	=	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.
Reductant Purge Valve Performance	P20A1	This diagnostic checks the Reductant Purge valve performance during operation by detecting a lack of reduction of the	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	
		reductant pressure			Reductant Dosing System state pressure reduction Reductant Dosing System pump relative pressure to initiate test) AND ((Time attempting to reduce dosing pressure AND Reductant Dosing System pump relative pressure after attempting to reduce pressure) OR Reductant Dosing System pump relative pressure) OR Reductant Dosing System pump relative pressure) OR Reductant Dosing System pump relative pressure) NO Pending or Confirmed DTCs basic enable conditions met:	= TRUE - >= 350.00 kPa >= 5.00 sec > 50.00 kPa <= 50.00 kPa > 0.00 kPa > 0.00 kPa > 100.04 °C = see sheet inhibit = see sheet enable = see sheet enable = see sheet enable	rate whenever enable conditions are met	
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 for time and battery voltage for time and battery voltage for time and d	= FALSE - > 1.00 sec > 11.00 V > 3.00 sec < 655.34 V > 3.00 sec > 0.00 facto	fail conditions exists for 2 s monitor runs with 10 msec 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.
					battery voltage correction factor (please see the parameter definition) for	<	4.00	factor		
					time and basic enable conditions met:	>	3.00 see sheet enable	sec -		
					and NO Pending or Confirmed DTCs:	=	tables 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	A
					time and	>	1.00	sec	conditions are met	
					battery voltage for	>	11.00	V		
					time and battery voltage	>	3.00 655.34	sec V		
					for time and	>	3.00	sec		
					(battery voltage correction factor (please see the parameter definition and	>	0.00	factor		
					battery voltage correction factor (please see the parameter definition)	<	4.00	factor		
					for time and	>	3.00	sec		
					basic enable conditions met:	=	see sheet enable tables	-		
					and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust	P20CB	Electronic output driver	The ECM detects that the commanded		engine pre drive	=	FALSE		fail	В
Aftertreatment Fuel Injector Control Circuit	12000	circuitry determines circuit integrity on the exhaust aftertreatment fuel injector control circuit.	state of the driver and the actual state of the control circuit do not match.		for				conditions exists for more than 30 events monitor runs with 0.1 s	J
					time battery voltage	> >	1.00 11.00	sec V	rate whenever	
					for time	>	3.00	sec	enable conditions	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		eshold Ind Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							and starter is active cranking for time and basic enable conditions met: and basic enable conditions met:	= > =	FALSE 3.00 see sheet enable tables see sheet enable tables	- sec -	are met	
Exhaust Aftertreatment Fuel Injector Performance	P20CC	Detects high exhaust temperatures in order to protect the engine	oxidation catalyst downstream temperature - oxidation catalyst upstream temperature OR particulate filter downstream temperature - SCR downstream temperature	>	300	℃ ℃	(oxidation catalyst upstream temperature change for time	< >	50.00 10.00	°C sec	fail conditions exists for 180 s test performed continuously 0.1 s rate	A
) AND (time since last successful regeneration) AND ((Normal Mode (Particulate Filter Regeneration not active) OR Exhaust Gas Temperature (Active) Management Mode) for time	> = >	900.00 TRUE TRUE 300.00	sec - 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: HCI Injector is not currently activated	>	300.00 TRUE	Sec		
							SCR Catalyst downstream temperature SCR Catalyst downstream temperature DOC Upstream Temperature Engine Speed		499.96 179.96 219.96 500	°C °C °C 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 Exhaust Mass Flow) AND basic enable conditions met: AND NO Pending or Confirmed DTCs:	>	3.10 72.00 see sheet enable tables see sheet inhibit tables	mph g/sec -		
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 for time battery voltage for time and starter is active cranking for time and basic enable conditions met: and Diesel dosing valve: fuel injection and basic enable conditions met:		FALSE 1.00 11.00 3.00 FALSE 3.00 see sheet enable tables INACTIVE see sheet enable tables	sec V sec - sec -	fail conditions exists for more than 30 events monitor runs with 0.1 s rate whenever enable conditions are met	В
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 for time battery voltage for time and starter is active cranking for time and basic enable conditions met: and	=	FALSE 1.00 11.00 3.00 FALSE 3.00 see sheet enable tables	- Sec V Sec - Sec -	fail conditions exists for more than 30 events monitor runs with 0.1 s rate whenever enable conditions are met	В

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	В
			 (a) - (b) (see Look-Up-Table #30) with (a) captured oxidation catalyst downstream temperature at start and with 	>	100.00 measured parameter	°C -	and ambient temperature and Engine Running (see parameter	>	-60.04 TRUE	°C -	enable conditions are met	
			 (b) captured oxidation catalyst upstream temperature at start as reference temperature or 	=	measured parameter	-	definition) for time	>	0.00	sec		
			Path 2: (and engine post drive/ afterun	=	FALSE	-		
			 (a) - (b) (see Look-Up-Table #30) with (a) captured oxidation catalyst downstream temperature at start and with 	<=	100.00 measured parameter	°C -	and diagnostic performed in current dc and	=	FALSE	-		
			and with (b) captured oxidation catalyst upstream temperature at start as reference temperature	=	measured parameter	-	basic enable conditions met: and	=	see sheet enable tables	-		
			and (a) - (b) (see Look-Up-Table #31)	>	30.00	°C	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			with (a) captured oxidation catalyst downstream temperature at start and with	=	measured parameter	-						
			(b) captured oxidation catalyst upstream temperature at start as reference temperature and	=	measured parameter	-						
			status of block heater	=	FALSE	-						

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	status of SCR control sub state (please see the definition) status byte in substate METERING CONTROL Dwell time in Metering control substate ambient pressure ambient temperature NO Pending or Confirmed DTCs: basic enable conditions met:	= = ^ > 1 =	Metering control Running 1.00 0.00 -30.04 see sheet inhibit tables see sheet enable tables	- kPa °C -	fail conditions exists for more than 60.0 s monitor runs with 0.1 s rate whenever enable conditions are met	A
Reductant System Performance Bank 1	P20E9	Path 1: Compare Reductant tank	Reductant Pump Module Pressure	>	650.00	kPa	status of SCR control sub state (please		Metering control		fail conditions exists for more than	A
		pressure with upper threshold under metering control		-	030.00	KI d	see the definition)		-	-	10 s monitor runs with 0.1 s	
							status byte in substate METERING CONTROL	=	Running	-	rate whenever enable	
							Dwell time in Metering control substate ambient pressure ambient temperature NO Pending or Confirmed DTCs: basic enable conditions met:	> >= = =	1.00 0.00 -30.04 see inhibit tables see sheet enable tables	sec kPa ℃ -	conditions are met	
		Path 2: Or		-	-				_		fail conditions	
		Reductant tank pressure high	Unfiltered Reductant Pump Module Pressure	>=	795.00	kPa	ambient pressure ambient temperature	>	0.00 -30.04	kPa °C	exists for more than 1 s	
							basic enable conditions met:	-	see sheet enable tables	-	monitor runs with 0.1 s rate whenever enable conditions	
SCR NOx Catalyst Efficiency Below Threshold Bank 1	P20EE	Compare EWMA filtered NOx conversion efficiency of SCR catalyst with a	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	A
		threshold value	where (a) measured SCR catalyst efficiency	=	calculated parameter	factor	for time	>	300.00	sec	more than 1 event monitor runs with 0.01 s	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		eshold and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
			(b) offset-corrected modeled SCR		culated	factor	Status of NOx signal of upstream NOx	=	TRUE	-	rate	
			catalyst efficiency: (b) = $((a) * (d) * (a)) + (f)$	para	ameter		sensor (please see the definition)				whenever	
			(b) = ((c) * (d) * (e)) + (f) where				for time	>	60.00	sec	enable conditions	
			(c) SCR modeled NOx conversion	cald	culated	factor	Status of NOx signal of downstream	=	TRUE	-	are met	
			efficiency	para	ameter		NOx sensor (please see the definition)					
			(d) correction map dependent on SCR	1	1.00	factor	for time	>	60.00	sec		
			catalyst temperature and upstream NOx mass flow									
			(e) correction map dependent on SCR	1	1.00	factor						
			catalyst temperature and exhaust mass flow									
			(f) Offset threshold (see Look-Up-Table #100)	-0.3	to -0.1	factor	(
							Release of dosing strategy (please see	=	TRUE	-		
							the definition) for time		(a) (b)			
							(a) Turn on delay time 1 of status	>=	(a) + (b) 330.00	sec sec		
							(a) full of delay time for status metering strategy		000.00	500		
							(b) Turn on delay time 2 of status		20.00	sec		
							metering strategy					
							,					
							(Status for disabling SCR Efficiency	=	FALSE	-		
							monitoring following an SCR Adaptation					
							completion (please see the definition)					
							for time		(a) (b)			
							(a) Debounce time after pre controlled	>	(a) + (b) 0.50	sec sec		
							dosing over					
							(b) delay time the status of disabling	>	80.00	sec		
							SCR Efficiency monitoring					
							integrated upstream NOx	>=	3276.70	g		
)			Ū		
							(Status of pre controlled dosing (please	=	FALSE	-		
							see the definition)	-	TALOL	-		
							for time	>	(a) + (b)			
							(a) Debounce time after pre controlled	=	0.50	sec		
							dosing off (b) Delay time after pre controlled dosing	=	300.00	sec		
							(b) Delay time after pre controlled dosing off	=	300.00	Sec		
							or		2070 70	_		
							integrated upstream NOx)	>=	3276.70	g		
							,					
							(Decrease of Reductant load level	=	FALSE	-		
							(please see the definition)	-	I ALSE	-		
							for time	>	300.00	sec		
)					
							(_	0.20	alaaa		
							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	>	0 to 120	sec		
					NOx mass flow and the time (see Look- Up-Table #88)					
)					
					for time with		E 00			
					for time with ((>	5.00	Sec		
					Delta SCR temperature (see Look-Up-	<	59.96 to 64.96	°C		
					Table #85) Delta SCR temperature (see Look-Up-	>	-50.04 to -0.04	°C		
					Table #101)	-				
					Delta SCR temperature Delta SCR temperature	<= >=	524.96 199.96	℃ ℃		
					Initialization time of temperature gradient	>=	2.50	sec		
					calculation		2.00	000		
)					
					or Delta SCR temperature	<	229.96	°C		
					or					
					Delta SCR temperature for time	> >	499.96 10.00	°C sec		
)	-	10.00	360		
					(normalized HC load in SCR catalyst	>	21.00	_		
)		21.00			
							= / 00			
					ambient pressure ambient temperature	>= >=	74.80 -7.04	kPa °C		
)	/-	-7.04	C		
					(
					Stuck reductant dosing valve fault was healed	=	FALSE	-		
					last particulate filter regeneration	=	TRUE	-		
					successful					
)					
					State of the NH3 slip detection	=	FALSE	-		
					integrated upstream NOx during SCR	>=	20.00	g		
					adaptation plausibility check active Status of the SCR adaptation plausibility	=	FALSE	-		
					check active (please see the definition)	-	TALOL			
					for time	>	600.00	Sec		
					SCR NOx Catalyst Efficiency Below	=	FALSE	-		
					Threshold Bank 1 was performed this					
					drive cycle					
					engine speed	>=	1000.00	rpm		
					engine speed	<=	3000.00	rpm		
					for time	>	0.00	Sec		
					SCR estimated current Reductant load	>=	0.05 to 0.75	g		
					(see Look-Up-Table #77) SCR estimated current Reductant load	<=	2 to 2.2	c		
					(see Look-Up-Table #76)	<=	2 10 2.2	g		
					Difference between nominal and	>=	-0.5 to -0.1	g		
					estimated Reductant (see Look-Up-					
1	I	I	l	I	Table #79)				I I	

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-	<=	0.15 to 0.25	g		
					Table #78)		541.05			
					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					
					() ()		14.96	°C		
					(a) - (b) 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	=	0 to 1	-		
					SCR efficiency monitoring (see Look-Up- Table #83)					
					for time	>	0.00	sec		
					Inverse calculated accelerator pedal	>	5.00	%		
					value for time	>	0.00	sec		
					EWMA fast initialization mode:		0.07	6 ·		
					filter coefficient for fast initialization number of SCR efficiency	=	0.35 3.00	factor count		
					measurements for fast initialization mode	>=	3.00	COUNT		
					EWMA Rapid Response mode:					
					EWMA filtered delta SCR catalyst efficiency	>	0.12	factor		
					(a) - (b) (a) measured SCR catalyst efficiency	<	-0.01	factor		
1		I	I	I	(a) measureu SCR catalyst emclency				I I	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Lo	Threshold ogic 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) filter coefficient for Rapid Respond mode	>	0.00 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 number of SCR efficiency measurements for stabilized mode	= =	0.04 1	factor count		
							not disabled during following conditions	=	see sheet enable tables	-		
											4.0	
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 same as acceleration pedal position	<=	-6.6	V %	ignition on and basic enable conditions met: and NO Pending or Confirmed DTCs:	=	TRUE see sheet enable tables see sheet inhibit tables	-	fail conditions exists for 0.19 s monitor runs with 0.01 s rate whenever enable conditions are met	A
	50/00									_		
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 same as acceleration pedal position	>= >=	4.75 125.6	V %	ignition on and basic enable conditions met:	=	TRUE see sheet enable		fail conditions exists for 0.19 s monitor runs with 0.01 s rate	A
							and NO Pending or Confirmed DTCs:	=	tables see sheet inhibit tables	-	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.
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 same as acceleration pedal position	<=	0.31	V %	ignition on and basic enable conditions met: and NO Pending or Confirmed DTCs:	-	TRUE see sheet enable tables see sheet inhibit tables	-	fail conditions exists for 0.19 s monitor runs with 0.01 s rate whenever enable conditions are met	A
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 same as acceleration pedal position	>=	2.32	V %	ignition on and basic enable conditions met: and NO Pending or Confirmed DTCs:	=	TRUE see sheet enable tables see sheet inhibit tables	-	fail conditions exists for 0.19 s monitor runs with 0.01 s rate whenever enable conditions are met	A
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.	Imaximum value ((a/b) or (c)) - maximum value ((c) or (d)) (see Look- Up-Table #13) with (a) voltage of acceleration pedal position sensor 1 and with (b) factor between sensor raw values and with (c) minimum voltage and with (d) redundant voltage of acceleration pedal (from pedal position sensor 2)	> I I I I	0.12 to 0.18 measured parameter 2.00 0.45 calculated parameter	V V factor V -	ignition on and basic enable conditions met: and NO Pending or Confirmed DTCs:	=	TRUE see sheet enable tables see sheet inhibit tables	-	fail conditions exists for 0.2 S monitor runs with 0.01 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 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) and fuel system status	= TRUE -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector Positive Voltage Control Circuit Group 2	P2149	ECM Electronic out-put driver circuitry determines if faults (open/short/no load) exist on injector charging bank #2.	Voltage high during driver off state (indicates short to power, short to ground, or open circuit)	 Short to power: ≤ - 0.5 Ω impedance between signal and controller power Open Circuit: ≥ 200 K Ω impedance between ECU pin and load signal and controller ground Short to ground: ≤ 0.5 Ω impedance between signal and controller ground 	Engine Running (see parameter definition) and fuel system status	= TRUE -	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 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) and fuel system status	= 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	9	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) upper threshold (b) factor for tolerances	= =	(a) * (b) with 0.98 1.00		ignition switch on urea tank heater powerstage on battery voltage battery voltage engine off time urea tank temperature (conductance of the urea tank heater is steady or falling maximum counter or heater activation time) basic enable conditions met: NO Pending or Confirmed DTCs:	= >= <= = > = =	TRUE TRUE 11.00 655.34 5400.00 41.96 TRUE 1000.00 600.00 see sheet enable tables see sheet inhibit tables	- V V sec °C - count sec -	fail conditions exists for 0.001 s monitor runs once per trip with 0.001 s rate whenever enable conditions	В
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: [(a) - (b)] (see Look-Up-Table #2) where (a) captured intake air temperature at start and (b) captured humidity temperature at start or Path 2: ([(a) - (b)] (see Look-Up-Table #2) where (a) captured intake air temperature at start and (b) captured humidity temperature at start and [(a) - (b)] (see Look-Up-Table #5) where (a) captured intake air temperature at start and (b) captured intake air temperature at start and (b) captured intake air temperature at start and (b) captured humidity temperature at start and (c) captured humidity temperature at start (c) captured humidity temperature at start (c) captured humidity temperature at (c)	> = = = = = =	100 to 999 measured parameter measured parameter 100 to 999 measured parameter 20 to 999 measured parameter 20 to 999 measured parameter measured	00 - - - - - - - - - - - -	minimum engine-off time and ambient air temperature and Engine Running (see parameter definition) for time and engine post drive/ afterun and diagnostic performed in current dc and basic enable conditions met: and NO Pending or Confirmed DTCs:	>= > = = =	28800.00 -60.04 TRUE 0.00 FALSE FALSE see sheet enable tables see sheet inhibit tables	sec °C - sec - -	fail conditions exists for 0.1 s monitor runs once per trip with 0.1 s rate whenever enable conditions are met	В

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) 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 (tank level sensor 2 voltage directly measured after a test impulse was applied)	= <	1 (0.17)	V	ignition on battery voltage basic enable conditions met:	=	TRUE 8 see sheet enable tables	- V -	fail conditions exists for more than 3 sec monitor runs with 1 s rate whenever enable conditions	A
Reductant Level Sensor 2 Circuit High CAN message: Discrete level sensor 2 open load error	Reductant Tank Level 2 Error Status (measured tank level sensor 2 voltage after 1.5 ms since a test impulse was applied) (measured tank level sensor 2 voltage after 1.5 ms since a test impulse was applied)	= > <	3 (3.56) (4.74)	- V V	ignition on battery voltage basic enable conditions met:	=	TRUE 8 see sheet enable tables	- V -	are met			
		Path 2: CAN message: Discrete level sensor 2 short to battery error	Reductant Tank Level 2 Error Status (measured tank level sensor 2 voltage after 1.5 ms since a test impulse was applied)	= ^	2 (4.74)	- V	ignition on battery voltage basic enable conditions met:	= > =	TRUE 8 see sheet enable tables	- V -		
Reductant Level Sensor 3 Circuit Low	P21AF	CAN message: Discrete level sensor level 3 short to ground error	Reductant Tank Level 3 Error Status (tank level sensor 3 voltage directly measured after a test impulse was applied)	=	1 (0.17)	V	ignition on battery voltage basic enable conditions met:	=	TRUE 8 see sheet enable tables	- V -	fail conditions exists for more than 3 sec monitor runs with 1 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	e	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	-		1
			(measured tank level sensor 3 voltage after 1.5 ms since a test impulse was applied)	>	(3.56)	V	battery voltage	>	8	V		1
			(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	-		1
		Path 2:										1
			Reductant Tank Level 3 Error Status	=	2	-	ignition on	=	TRUE	-		1
			(measured tank level sensor 3 voltage after 1.5 ms since a test impulse was applied)	>	(4.74)	V	battery voltage	>	8	V		1
							basic enable conditions met:	=	see sheet enable tables	-		l
Reductant tank	P21DD	Compare the maximum	maximum conductance of tank heater	<=	(a) * (b)	1/Ohm	ignition switch on	=	TRUE		fail	В
heater open circuit		measured conductance of a tank heater against the threshold	(a) lower threshold (b) factor for tolerances	=	with 0.28 1.00	1/Ohm factor	urea tank heater powerstage on battery voltage battery voltage engine off time urea tank temperature	= >= <= >= <=	TRUE 11.00 655.40 5400.00 41.96	V V sec °C	conditions exists for 0.001 s monitor runs once per trip with 0.001 s rate	
							conductance of the urea tank heater is steady or falling maximum counter	=	TRUE 1000.00	- count	whenever enable conditions are met	1
							or heater activation time	>=	600.00	sec	are met	1
) basic enable conditions met:	=	see sheet enable	-		1
							NO Pending or Confirmed DTCs:	=	tables see sheet inhibit tables	-		1
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	A
							battery voltage battery voltage SCR upstream temperature SCR upstream temperature Engine Running for time	>= <= >= = >=	11.00 655.34 94.96 3003.56 TRUE 20.00	V °C °C - sec	with 0.01 s rate whenever enable conditions are met	1

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time MIL Required Illum
					Can Bus Initialized (CAN Bus is Active) consisting of: ignition on for time battery voltage battery voltage Upstream NOx sensor dewpoint achieved (please see the definition) no pending or confirmed faults basic enable conditions met:	= TRUE - = TRUE - >= 3 se > 9.8 V < 655.34 V = TRUE - = see sheet inhibit - tables = see sheet enable - tables	c
		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 battery voltage battery voltage SCR upstream temperature SCR upstream temperature Engine Running for time Can Bus Initialized (CAN Bus is Active) consisting of: ignition on for time battery voltage battery voltage Upstream NOx sensor dewpoint achieved (please see the definition) no pending or confirmed faults basic enable conditions met:	> 0.50 set >= 11.00 V <=	conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever enable conditions are met c
		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 battery voltage battery voltage SCR upstream temperature SCR upstream temperature Engine Running for time Can Bus Initialized (CAN Bus is Active) consisting of:	> 0.50 se >= 11.00 V <= 655.34 V >= 94.96 °C <= 3003.56 °C = TRUE - >= 20.00 se = TRUE -	conditions exists for more than 13 sec. 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.
					ignition on for time battery voltage battery voltage Upstream NOx sensor dewpoint achieved (please see the definition) no pending or confirmed faults basic enable conditions met:	= TRUE >= 3 > 9.8 < 665.34 = TRUE = see sheet inhibit tables = see sheet enable tables	sec V V -		
		Detects a failure when short circuit status message from NOx sensor is received continuously for a time period	Short Circuit NOx signal error	= TRUE -	following conditions for time	> 0.50	sec	fail conditions exists for more than 13 sec. monitor runs	
					battery voltage battery voltage SCR upstream temperature SCR upstream temperature Engine Running for time Can Bus Initialized (CAN Bus is Active)	>= 11.00 <= 655.34 >= 94.96 <= 3003.56 = TRUE >= 20.00 = TRUE	V V°C °C - sec -	with 0.01 s rate whenever enable conditions are met	
					, consisting of: ignition on for time battery voltage battery voltage Upstream NOx sensor dewpoint achieved (please see the definition) no pending or confirmed faults	= TRUE >= 3 > 9.8 < 655.34 = TRUE = see sheet inhibit	sec V V		
					basic enable conditions met:	tables = 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	
					battery voltage battery voltage SCR upstream temperature SCR upstream temperature Engine Running for time Can Bus Initialized (CAN Bus is Active	>= 11.00 <= 655.34 >= 94.96 <= 3003.56 = TRUE >= 20.00 = TRUE	V V°C °C - sec -	rate whenever enable conditions are met	
) consisting of: ignition on for time battery voltage	= TRUE >= 3 > 9.8	- sec V		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold ogic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							battery voltage Upstream NOx sensor dewpoint achieved (please see the definition) no pending or confirmed faults basic enable conditions met:	< = =	655.34 TRUE see sheet inhibit tables see sheet enable tables	V - -		
		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 battery voltage battery voltage SCR upstream temperature Engine Running for time Can Bus Initialized (CAN Bus is Active) consisting of: ignition on for time battery voltage battery voltage Upstream NOx sensor dewpoint achieved (please see the definition) no pending or confirmed faults basic enable conditions met:	>	0.50 11.00 655.34 94.96 3003.56 TRUE 20.00 TRUE TRUE 3 9.8 655.34 TRUE see sheet inhibit tables see sheet enable tables	V V °C °C - sec - Sec V V V - -	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever enable conditions are met	
N0x Sensor Circuit High Bank 1 Sensor 1	P2203	fault of the upstream NOx	NOx sensor signal (raw information received via CAN from NOx sensor)	>	2500.00	ppm	NOx sensor 1 ready status (see parameter definition) Valid NOx signal from CAN is received (no NOx sensor communication failures) Engine Running (see parameter definition) for time	= = = >	TRUE TRUE TRUE 20.00	- - - Sec	fault exists for more than 10 sec; monitor runs at 0.1 s when enable conditions are met	В
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 or Upstream NOx sensor dewpoint achieved (please see the definition) for time	> = >	8.00 TRUE 600.00	mm^3/rev - 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	A
					battery voltage battery voltage	>= <=	11.00 655.34	V V	with 0.01 s rate	
					SCR upstream temperature	>=	94.96	°C	whenever	
					SCR upstream temperature Engine Running	<= =	3003.56 TRUE	°C -	enable conditions	
					for time	>=	20.00	sec	are met	
					Can Bus Initialized (CAN Bus is Active)	=	TRUE	-		
					consisting of: ignition on	=	TRUE	-		
					for time	>=	3	sec		
					battery voltage battery voltage	> <	9.8 655.34	V V		
					Upstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
					no pending or confirmed faults	=	see sheet inhibit	-		
					basic enable conditions met:	=	tables see sheet enable	-		
							tables			
		Detects a failure when short	Short Circuit NOx heater signal error	= TRUE -	following conditions for time	>	0.50	sec	fail	
		circuit status message from NOx sensor heater is received continuously for a time period							conditions exists for more than 13 sec. monitor runs	
					battery voltage battery voltage	>= <=	11.00 655.34	V V	with 0.01 s rate	
					SCR upstream temperature	>=	94.96	°C	whenever	
					SCR upstream temperature Engine Running	<= =	3003.56 TRUE	°C -	enable conditions	
					for time Can Bus Initialized (CAN Bus is Active	>=	20.00 TRUE	sec	are met	
)	=	TRUE	-		
					consisting of: ignition on	=	TRUE	-		
					for time battery voltage	>= >	3 9.8	sec V		
					battery voltage	~	655.34	V		
					Upstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
					no pending or confirmed faults	=	see sheet inhibit	-		
					basic enable conditions met:	=	tables see sheet enable	-		
							tables			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshole Logic and Va		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	В
							battery voltage and	>=	11.00	V	when dewpoint	
							battery voltage and	<=	655.34	V	end is reached;	
							Oxidation Catalyst upstream temperature and	>=	94.96	°C	monitor runs at 0.02 s	
							and Oxidation Catalyst upstream temperature and	<=	3003.56	°C	when enable conditions are met	
							Engine running	=	TRUE	-		
							for time and	>	20.00	sec		
							Upstream NOx sensor dewpoint end is reached (please see parameter definition)	=	TRUE	-		
							, for time and	>	150.5	sec		
							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) with	1/Ohm	ignition switch on	=	TRUE	-	fail conditions exists for 5 s monitor runs with 3 s rate	В
			(a) upper threshold	=	0.26	1/Ohm	urea pressure line heater powerstage on	=	TRUE	-	whenever enable	
			(b) factor for tolerances	=	1.00	factor	battery voltage	>=	11.00	V	conditions	
							battery voltage engine off time	<= >=	655.34 0.00	V sec	are met	
							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	В
			(a) lower threshold	=	with 0.05	1/Ohm	and urea pressure line heater powerstage on	=	TRUE	-	with 3 s rate whenever	
			(b) factor for tolerances	=	1.00	factor	battery voltage	>=	11.00	V	enable conditions	
							battery voltage	<=	655.34	V	are met	
							engine off time heater activation time	>= >=	0.00 81.00	sec 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	9	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 with	=	TRUE	-	ignition switch on and	=	TRUE	-	fail conditions exists for 0.1 s monitor runs	В
			(a) maximum conductance of the supply module heater and with	=	calculated parameter	1/Ohm	supply module heater powerstage on and	=	TRUE	-	once per trip with 0.1 s rate	
			(b) minimum tolerance threshold of the conductance for the supply module heater	=	0.14	1/Ohm	battery voltage	>=	11.00	V	whenever enable conditions are met	
							and battery voltage and	<=	655.34	V		
							engine off time and	>=	7600.00	sec		
							and (
							conductance of the urea tank heater is steady or falling for					
							time or	>	100.00	sec		
							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	P221F	Detects a supply module	a >= b	=	TRUE	-	ignition switch on	=	TRUE	-	fail	В
short circuit		heater short circuit by detecting high conductance in the heater	with				and				conditions exists for 0.1 s monitor runs	
			(a) maximum conductance of the supply module heater	=	calculated parameter	1/Ohm	supply module heater powerstage on	=	TRUE	-	once per trip with 0.1 s rate	
			and with (b) maximum tolerance threshold of the conductance for the supply module heater	=	0.35	1/Ohm	and battery voltage	>=	11.00	V	whenever enable conditions	
			neater				and battery voltage and	<=	655.34	V	are met	
							engine off time and	>=	7600.00	sec		
							and (
							conductance of the urea tank heater is steady or falling for		100.00			
							time or	>	100.00	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Lo	Threshold gic and Value	•	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
					-		heater activation time) and basic enable conditions met: and NO Pending or Confirmed DTCs:	>= =	10.00 see sheet enable tables see sheet inhibit tables	Sec - -		
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 same as ambient pressure	<=	1.97	V kPa	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 0.8 s monitor runs 0.1 s rate whenever enable conditions are met	A
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 same as ambient pressure	^ ,	4.54	V kPa	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 0.8 s monitor runs 0.1 s rate whenever enable conditions are met	A
Turbo Boost System Performance	P2263	Detects if the Turbocharger is severely over or under boosting based on control deviation	Path 1 control deviation of the boost pressure calculated out of difference between desired and actual value with (g) the upper limit (see Look-Up- Table #64) (h) correction factor (see Look-Up- Table #59)		(g*h) 42.5 to 45.0 0.900024 to 1	kPa factor	 (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 and VNT turbocharger wiping is active 	-	FALSE		fail conditions exists for 15 s monitor runs with 0.01 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Lo	Threshold ogic 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 means	=	TRUE	-		
							increase of injection quantity	<	80.00	(mm^3/rev) /sec		
							and engine speed is stable means	=	TRUE	-		
							increase of engine speed and	<	100.00	rpm/sec		
							injection Quantity injection Quantity and	>= <=	80.00 480.00	mm^3/rev mm^3/rev		
							engine Speed engine Speed and	>= <=	1200.00 3400.00	rpm rpm		
							working range of boost pressure is in closed-loop means	=	TRUE	-		
							(engine speed and	>	1200.00	rpm		
							injection quantity)	>	20.00 see sheet inhibit	mm^3/rev		
							NO Pending or Confirmed DTCs:	=	tables			
							for time and	>	2.00	sec		
							basic enable conditions met:	=	see sheet enable tables			
			Path 2				(fail	
			control deviation of the boost pressure calculated out of difference between desired and actual value	<	(i*j)	-	VNT turbocharger offset adaptation active	=	FALSE	-	conditions exists for 15 s	
			with				 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 				s monitor runs with 0.01 s rate whenever enable conditions are met	
			(i) the upper limit (see Look-Up-Table #63)	=	-80 to -40	kPa	and				aremet	
I I			(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 means	=	TRUE	-		
					increase of injection quantity	<	80.00	(mm^3/rev) /sec		
					and engine speed is stable means	=	TRUE	-		
					increase of engine speed	<	100.00	rpm/sec		
					injection Quantity injection Quantity and	>= <=	80.00 480.00	mm^3/rev mm^3/rev		
					engine Speed engine Speed	>= <=	1200.00 3400.00	rpm rpm		
					and working range of boost pressure is in closed-loop means	=	TRUE	-		
			(engine speed	>	1200.00	rpm				
					and injection quantity	>	20.00	mm^3/rev		
) NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					for time and	>	2.00	sec		
					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	A
			for time	>	3.00	sec	whenever enable conditions			
					and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	are met	
					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		battery voltage	>	11.00	V	fail conditions exists for 1 s monitor runs with 0.01 s	
			IC Tempeature	> 150.00 °C	for time and NO Pending or Confirmed DTCs:	>	3.00 see sheet inhibit	sec	rate whenever enable	
					and ignition on	=	tables	-	conditions are met	
					and basic enable conditions met:	=	see sheet enable tables	-		
Fuel Pressure Regulator 2 Control Circuit Low Voltage	P2295	Diagnoses the Fuel Pressure Regulator 2 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: - ≤ 0.5 Ω impedance between signal and controller ground	battery voltage	>	11.00	V	fail conditions exists for 0.75 s monitor runs with 0.01 s rate	A
					for time and	>	3.00	sec	whenever enable conditions	
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	are met	
					ignition on and	=	TRUE	-		
					basic enable conditions met:	=	see sheet enable tables	-		
							_			
Fuel Pressure Regulator 2 Control Circuit High Voltage	P2296	Diagnoses the Fuel Pressure Regulator 2 low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: - ≤ 0.5 Ω impedance between signal and controller power	battery voltage	>	11.00	V	fail conditions exists for 0.5 s monitor runs with 0.01 s rate	A
					for time and NO Pending or Confirmed DTCs: and	> =	3.00 see sheet inhibit tables	sec -	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.
					ignition on and basic enable conditions met:	= TRUE = see sheet enable tables	-		
NOx Sensor Circuit Bank 1 Sensor 2	P229E		Open circuit downstream NOx signal error	= 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 >= 11.00 <= 655.34 >= 94.96 <= 3003.56 = TRUE >= 20.00 = TRUE = TRUE = 3 > 9.8 < 655.34 = TRUE = see sheet inhibit tables = see sheet nable tables 	V V °C - sec - Sec V V V - -	fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	A
		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 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 battery voltage Downstream NOx sensor dewpoint achieved (please see the definition) no pending or confirmed faults basic enable conditions met:	 > 0.50 >= 11.00 <= 655.34 >= 94.96 <= 3003.56 = TRUE >= 20.00 = TRUE = TRUE = 3 > 9.8 < 655.34 = TRUE = see sheet inhibit tables = see sheet enable tables 	Sec V °C - Sec - Sec V V - -	fail conditions exists for more than 13 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
		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	
					battery voltage battery voltage SCR downstream temperature SCR downstream temperature Engine Running	>= 11.00 <= 655.34 >= 94.96 <= 3003.56 = TRUE	∨ ℃ ℃	13 s monitor runs with 0.1 s rate whenever	
					for time Can Bus Initialized (CAN Bus is Active) consisting of:	>= 20.00 = TRUE	sec -	enable conditions are met	
					ignition on for time battery voltage battery voltage Downstream NOx sensor dewpoint	= TRUE >= 3 > 9.8 < 655.34 = TRUE	sec V V		
					achieved (please see the definition) no pending or confirmed faults basic enable conditions met:	 see sheet inhibit tables 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	
					battery voltage battery voltage SCR downstream temperature	>= 11.00 <= 655.34 >= 94.96	∨ ∨ °C	more than 13 s monitor runs	
					SCR downstream temperature Engine Running for time Can Bus Initialized (CAN Bus is Active	<= 3003.56 = TRUE >= 20.00 = TRUE	°C - sec -	with 0.1 s rate whenever enable	
) consisting of: ignition on for time	= TRUE >= 3	- sec	conditions are met	
					battery voltage battery voltage Downstream NOx sensor dewpoint achieved (please see the definition)	> 9.8 < 655.34 = TRUE	V V		
					no pending or confirmed faults basic enable conditions met:	 see sheet inhibit tables 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	
		via une cana message			battery voltage battery voltage SCR downstream temperature	>= 11.00 <= 655.34 >= 94.96	∨ ∨ °C	13 s monitor runs with 0.1 s	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold ogic and Value.		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							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:	<= = >= = >= = =	3003.56 TRUE 20.00 TRUE TRUE 3 9.8 655.34 TRUE see sheet inhibit tables see sheet enable tables	°C - sec - Sec V V - -	rate whenever enable conditions are met	
			Short circuit lambda linear 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 battery voltage Downstream NOx sensor dewpoint achieved (please see the definition) no pending or confirmed faults basic enable conditions met:	> > > = = = = = = = =	0.50 11.00 655.34 94.96 3003.56 TRUE 20.00 TRUE TRUE 3 9.8 655.34 TRUE see sheet inhibit tables see sheet enable tables	V V °C °C - sec V V V -	fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	
NOx Sensor Circuit High Bank 1 Sensor 2	P22A1	fault of the downstream NOx	Downstream NOx sensor signal (raw information received via CAN from NOx sensor)	>	2500.00	ppm	Downstream NOx sensor ready status (see parameter definition) Valid NOx signal from CAN is received (no NOx sensor communication failures)	=	TRUE	-	fault exists for more than 10 sec; monitor runs at 0.1 s when enable	В
NOx Sensor Circuit Low Bank 1 Sensor 2	P22A0	fault of the downstream NOx	Downstream NOx sensor signal (raw information received via CAN from NOx sensor)	<	-90.00	ppm	Engine Running (see parameter definition) for time and Injection Quantity or Downstream NOx sensor dewpoint achieved (please see the definition)	= > > =	TRUE 20.00 8.00 TRUE	- sec mm^3/rev -	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.
					for time	>	600.00	sec		
NOx Heater Control Circuit Bank 1 Sensor 2	P22A3	Downstream NOx sensor heater open circuit error via the CAN message	Open circuit heater error of downstream NOx sensor via CAN message	= TRUE -	following conditions for time	>	0.50	Sec	fail conditions exists for	A
					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 Downstream NOx sensor dewpoint achieved (please see the definition) no pending or confirmed faults basic enable conditions met:	,	11.00 655.34 94.96 3003.56 TRUE 20.00 TRUE TRUE 3 9.8 655.34 TRUE see sheet inhibit tables see sheet enable tables	V V °C - sec - Sec V V -	more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	
		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 11.00 655.34 94.96 3003.56 TRUE 20.00 TRUE TRUE 3 9.8 655.34 TRUE see sheet inhibit tables see sheet enable tables	Sec V °C - Sec V V V -	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;	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Lo	Threshold ogic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							battery voltage and battery voltage	>= <=	11.00 655.34	V V	monitor runs at 0.02 s when enable	
							and SCR downstream temperature	>=	94.96	°C	conditions are met	
							and SCR downstream temperature and	<=	3003.56	°C		
							Engine running for time	= >	TRUE 20.00	- sec		
							and Downstream NOx Sensor Dewpoint end is reached (please see the parameter definition)	=	TRUE	-		
) for time and	>	0.50	sec		
							basic enable conditions met:	=	see sheet enable tables	-		
							No Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
N0x Sensor	P22FA	Compare the measured	measured upstream NOx response time	>	2.30	Sec	global enable conditions:				fail	В
Performance Bank 1 Sensor 1		NOx signal response time with the threshold when injection quantity changes from fueling to overrun	from 70% of the initial NOx value to 40% of the initial NOx value								conditions exist for 1 event, test is performed in the 0.01 ms	
			Or measured upstream NOx response time from the initial NOx value to 40% of the initial value.	>	5.00	sec	upstream NOx readiness Engine operation mode ≠ DPF Regeneration	=	TRUE TRUE	-	rate when enable conditions are met	
							no post injection No Pending or Confirmed DTC	=	TRUE see sheet inhibit	-		
							basic enable conditions met:	=	tables 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 injection quantity for combustion upstream NOx concentration)	>= >= >=	1200.00 120.00 100.00	rpm mm^3/rev 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 upstream NOx concentration injection quantity for combustion injection quantity for combustion	>= >= <= >=	1200.00 100.00 (a) + (b) (a) - (b)	rpm ppm mm^3/rev mm^3/rev		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold gic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
					-		with (a) Reference injection quantity picked in Check-operating point state	=	measured parameter	mm^3/rev mm^3/rev		
							(b) Maximum deviation of injection	=	40.00	mm^3/rev		
							quantity 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 with	<	(a) - (b)	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		
							state-machine: evaluate-edge the following conditions moves the state machine from evaluate-edge state to overrun state: (injection quantity for combustion time since the last state	< <	2.00 1.05	mm^3/rev sec		
Downstream NOx	P22FE	NOx sensor self-diagnosis,	average stored NOx sensor self-	>	143.99	%) Global Release conditions:				fault exists	В
sensor Self diagnostic Bank 1 Sensor 2		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.	diagnostic result								for more than 3 events; monitor runs at 0.1 s once per trip during the afterrun	
			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 SCR downstream temperature	>= <=	-7.04 399.96	℃ ℃		
							status of current engine operation system ≠ Post Drive	=	TRUE	-		
							Engine operation mode = normal mode engine speed	= <=	TRUE 1500.00	-		
							engine speed engine speed for time	<= >=	0.00	rpm rpm 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.
					Pottory voltage		655 Q4	V		
					Battery voltage Battery voltage	<= >=	655.34 10.00	V 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 With (((<=	14400.00	Sec		
					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 Or	=	FALSE	-		
					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 Or	=	TRUE	-		
					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 Or (<=	2.00	g		
					(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	=	-0.01	g/sec		
					catalyst (b) time factor	=	0.20	sec		
						=	0.20	560		
					And					
					(
					Estimated HC Load in SCR catalyst	>=	32.00	g		
					engine speed engine speed	<= >=	4000.00 500.00	rpm rpm		
					SCR downstream temperature	>= <=	199.96	°C		
					SCR downstream temperature	>=	-40.04	°Č		
					((
					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 for time in ECM afterrun	>= <=	30.00 300.00	sec sec		
					status of heater temperature validity for	<=	True	sec		
					downstream NOx sensor	-				
					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:	~	10.00	350		
					following conditions for time:	>	30.00	sec		
					vehicle speed	<	0.60	mph		
					engine running	=	TRUE	-		
					vehicle speed deceleration rate (calculated based on vehicle	>	2.00	m/sec^2		
					speed)					
					and vehicle speed deceleration rate	>	2.00	m/sec^2		
					(calculated based on vehicle speed)	-	2.00			
					Afterrun Conditions:					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					Engine operation status = Post Drive	=	True	-		
	1		l	1	vehicle speed	=	0			

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

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Exhaust Gas Temperature (EGT) Sensor 3 Circuit High Voltage	P242D	Detects high voltage condition of the downstream SCR catalyst temperature sensor circuit, indicating an OOR high condition	voltage of SCR downstream catalyst temperature sensor	>	2.21	V	((fail conditions exists for more than 5.0 sec.	A
			same as Downstream SCR Catalyst temperature	>	1000	℃	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 0.00 800.00 -50.04 0.00 0.00 -45.04 0.00 see sheet inhibit tables see sheet enable tables	rpm rpm mm^3/rev °C sec g/sec °C sec -	monitor runs with 0.1 s rate whenever enable conditions are met	
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 1.00	kPa/s 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 -375.00 375.00 see sheet enable tables see sheet inhibit tables	m^3/h/s m^3/h/s m^3/h -	fail conditions exists for 3 s test performed continuously 0.1 s rate	В
			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 see sheet enable tables see sheet inhibit tables	sec - -	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 same as differential pressure	< 0.83 < -4.20	V kPa	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 3 s test performed continuously 0.020 s rate	В
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 same as differential pressure	> 4.67 > 91.70	V kPa	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 3 s test performed continuously 0.020 s rate	
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 (engine speed and engine speed) and (injection quantity and (recirculated exhaust-gas mass flow downstream of the EGR cooler and recirculated exhaust-gas mass flow downstream of the EGR cooler) and	>= <= <= >= <=	120.00 1100.00 2000.00 20.00 240.00 16.68 40.28	sec rpm rpm mm^3/rev mm^3/rev g/sec g/sec	fail conditions exists for 120 s monitor runs with 0.1 s rate whenever enable conditions are met	В

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	-	210.00	Ũ		
					(a) filtered temperature upstream of					
					EGR-cooler					
					and with (b) engine temperature					
)					
					and					
					(0070 70			
					(a) - (b) with	<=	3276.70	°C		
					(a) filtered temperature upstream of					
					EGR-cooler					
					and with					
					(b) engine temperature					
) and					
					engine coolant temperature	>=	69.96	°C		
					and					
					engine coolant temperature and	<=	129.96	°C		
					and (
					actual valve position of exhaust-gas	>=	9.9976	%		
					recirculation					
					and		200.00	0/		
					actual valve position of exhaust-gas recirculation	<=	399.99	%		
)					
					and					
					(400.00	0/		
					control value provided for EGR cooling bypass	>=	-400.00	%		
					and					
					control value provided for EGR cooling	<=	5.00	%		
					bypass					
					for time	>	10.00	sec		
)	-	10.00	300		
					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	=	FALSE	-		
					Cycle and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit	-		
							tables			
)					
					and	=	and about another			
					basic enable conditions met:	=	see sheet enable tables	-		
1 I		1	I	1	· ·		(0)(0)		. 1	

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	В
			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	-	monitor runs 0.1 s rate whenever enable conditions	
	 (b) soot mass at the end of previous DPF regeneration and with (c) factor for calculation of a soot m 		=	calculated parameter	-	or particulate filter regeneration must have been completed and	=	TRUE	-	are met		
			(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	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	P245A	Diagnoses the EGR Cooler	Voltage low during driver off state	=	Open Circuit:≥		battery voltage	>	11.00	V	fail	В
Recirculation (EGR) Cooler Bypass Valve Control Circuit		Bypass low side driver circuit for circuit faults.	(indicates open circuit)		200 K Ω impedance between ECU pin and load		for			-	conditions exists for 7s (in engine postdrive/ afterun	_
	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					time and	>	3.00	sec	duration limited to 5s) monitor runs with 0.01s rate whenever enable conditions		
		ECM.					starter is active cranking for	=	FALSE	-	are met	
							time and	>	3.00	sec		
					EGR Cooling Bypass Solenoid Control Circuit for	=	ACTIVE	-				
						time and (open load diagnostics is triggered after	>	3.00	Sec			
							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 > 3.00 = FALSE > 3.00 = ACTIVE = see sheet inhibit tables = see sheet enable tables 	V sec - sec -	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 	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 > 3.00 = FALSE > 3.00 = ACTIVE = see sheet inhibit tables = see sheet enable tables 	V sec - sec -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	В

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 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 > 3.00 = FALSE > 3.00 = ACTIVE = see sheet inhibit tables = see sheet enable tables 	V sec - sec -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	В
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 and basic enable conditions met: and NO Pending or Confirmed DTCs:	 TRUE see sheet enable tables see sheet inhibit tables 	-	fail conditions exists for 30 s test performed continuously 0.1 s rate	A
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 same as particulate filter downstream temperature	< 0.65 V < -60 °C	ignition on and basic enable conditions met:	= TRUE = see sheet enable tables		fail conditions exists for 3 s monitor runs 0.05 s rate whenever enable conditions are met	В

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 same as particulate filter downstream temperature	>	2.21 999.6	°C	ignition on and basic enable conditions met:	=	TRUE see sheet enable tables	-	fail conditions exists for 3 s monitor runs 0.05 s rate whenever enable conditions are met	В
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 or controller deviation of EGR cooling bypass valve actuator calculated out of difference between desired and actual value	~ ~	-10.00	%	engine coolant temperature and offset learning of EGR cooling bypass valve actuator active and offset learning in the previous driving cycle was complete and engine speed and EGR Cooler Bypass Valve Actuator and basic enable conditions met: and NO Pending or Confirmed DTCs:		-7.04 FALSE TRUE 100.00 ACTIVE see sheet enable tables see sheet inhibit tables	°C - rpm - -	fail conditions exists for 8 s monitor runs with 0.02 s rate whenever enable conditions are met	В

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 same as EGR cooling bypass actuator position	<		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 0.01 s rate when enable conditions are met	A
												_
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 same as EGR cooling bypass actuator position	7		V %	ignition on and basic enable conditions met:	=	TRUE see sheet enable tables	-	fail conditions exists for 5 s test performed continuously 0.01 s rate when enable conditions are met	A
							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 fa	ctor	long term adaption triggered NO Pending or Confirmed DTCs basic enable conditions met:	=	TRUE see sheet inhibit tables see sheet enable tables	-	fault exists for more than 0.1 s; monitor runs at 0.1 s whenever enable conditions are met	В

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	V	0.41	factor	long term adaption triggered NO Pending or Confirmed DTCs basic enable conditions met:	-	TRUE see sheet inhibit tables see sheet enable tables	-	fail conditions exists for more than 5 sec. monitor runs with 0.01 s rate whenever enable conditions are met	В
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)	Ξ	0 to 1	·	fail conditions exists for 300 s monitor runs with 0.1 s rate whenever	В
	and deviation from the temperature se for HCI control loop	deviation from the temperature set point for HCI control loop with	>	maximum of (a) and (b+c)		for time and	>	30.00	sec	enable conditions are met		
			(a) temperature threshold value and with(b) temperature value for threshold of	=	0.00	°C °C	(exhaust gas temperature control is active means	=	TRUE	-		
			monitoring and with (c) basic temperature threshold value for monitoring	=	100.00	°C	(temperature upstream of the oxidation catalyst and	>	224.96	°C		
							(particulate filter temperature	>	229.96	°C		
		l					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 or	<	719.96	°C		1
							particulate filter temperature for activated post injection))	<	749.96	°C		l
							and release status means	=	TRUE	-		1
							(vehicle speed and	>=	14.92	mph		I
							vehicle speed and	<=	124.30	mph		1
							Actual time spent in coastdown mode	<	60.00	sec		1
) and basic enable conditions met:	=	see sheet enable tables	-		l
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		l
					_			-	_	-		
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	В
			and				for				are met	1
			deviation from the temperature set point for HCI control loop with	<	minimum of (a) and (b+c-(d-e))		time and	>	30.00	sec		1
			(a) and with	=	-75.00	°C	(1
			(b) temperature value for threshold of monitoring with	=	0.00	°C	exhaust gas temperature control is active means	=	TRUE	-		1
			(c) basic temperature threshold value for monitoring	=	100.00	°C	(1
			and with (d) temperature set point for exhaust	=	calculated	_	temperature upstream of the oxidation catalyst and	>	224.96	°C		I
			gas system control loop and with		parameter	-	(particulate filter temperature		229.96	°C		1
	(e) actual temperature for exhaust gas system control loop	=	measured parameter	-	and	>	223.30	U		1		
							(particulate filter temperature or	<	719.96	°C		1

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold ogic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							particulate filter temperature for activated post injection)	<	749.96	°C		
							and release status means	=	TRUE	-		
							(vehicle speed and	>=	14.92	mph		
							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	В
			OR Measured IDE current change (when temperature changed from higher	<	0.094	μA	means (
			temperature to lower temperature)				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 with	=	TRUE	-		
							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	L	Threshold ogic 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	В
			IDE supply voltage is on IDE supply voltage OR IDE supply voltage OR Path 2: (IDE supply voltage is on IDE supply voltage)	= ,	TRUE 49.72 41.55 FALSE 2.00	v v v	Battery voltage (ECM)	>=	11.00	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" means Heater voltage (detected by µC-digital- in-port)	=	TRUE 3.00	- V	Battery voltage (ECM) Heater on with Heater duty cycle Ignition on for time	=	11.00 TRUE 0.00 TRUE 3.00	V - sec	fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	В
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" means (Heater voltage (detected by µC-digital- in-port) OR Heater current		TRUE 7.00 0.20	- V A	Battery voltage (ECM) Heater off with Heater duty cycle Ignition on for time	>= <= = >	11.00 TRUE 0.00 TRUE 3.00	V - sec	fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL
GR Cooling /pass erformance	P24C4	Description 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.	Criteria Path 1:				Farallieters	(CONDITIONS		fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever	B
			difference between the max and min EGR cooler bypass valve offset values or	>	50.00	%		(enable conditions are met	
			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 and	=	FALSE	-		
			learned offset value for EGR cooler bypass valve in the present driving cycle	<	-16.00	%	engine post drive/ afterun	=	TRUE	-		
			or 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	%	and (battery voltage	>=	10.00	V		
			or mean value for EGR cooling bypass valve offset learned at the open end during the current driving cycle over multiple open-close cycles	<	-16.00	%	and battery voltage) and	<=	655.34	V		
							(engine coolant temperature and	>=	5.06	°C		
							engine coolant temperature))	<=	130.06	°C		
							or offset learning active or	=	TRUE	-		
							diagnosis tester present)	=	FALSE	-		
							and completion of offset learning and	=	TRUE	-		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
		Detects a jammed EGR	Path 1:	-	_		EGR cooler bypass valve is opening	=	TRUE		fail	
		cooling bypass valve during opening or closing the valve.	r aur 1.						INOL	-	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	=	TRUE	-	or				with 0.01 s	
			opening which means (75.04	%	EGR cooler bypass valve is closing and	=	TRUE	-	rate whenever enable	
			(a) + (b) with	>=	75.01	%	(conditions are met	
			(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 (b) learned offset value of EGR cooler bypass valve in the previous driving cycle	=	calculated parameter	-	and engine post drive/ afterun	=	TRUE	-		
			and				and					
			(a) - (b) with (a) position of the EGR cooling bypass valve	>=	0.99	% -	(battery voltage and	>=	10.00	V		
			and with (b) position of the EGR cooling bypass valve of the previous process cycle	=	calculated parameter	-	battery voltage)	<=	655.34	V		
) for time	>	5.00	sec	and (
			or				engine coolant temperature and	>=	5.06	°C		
			Path 2: EGR cooler bypass valve stuck during closing	=	TRUE	-	engine coolant temperature)	<=	130.06	°C		
			which means (position of the EGR cooling bypass valve	<	(a) * (b)	-) or offset learning active	=	TRUE	-		
			with (a) reference position of the EGR cooling bypass valve in open position and with	=	calculated parameter	-	or diagnosis tester present	=	FALSE	-		
			(b) calibrateable factor of the EGR cooling bypass valve close position	=	0.15	factor) and					
			and (a) - (b)	<=	0.02	%	completion of offset learning and	=	TRUE	-		
			with (a) position of the EGR cooling bypass				basic enable conditions met: and	=	see sheet enable tables	-		
			valve 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	-			ladies			
) 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 3.00	- sec	fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	В
			Voltage of meander temperature signal	<	0.30	V	Battery voltage (ECM)	>=	11.00	V		
			OR Temperature as measured by meander	>	920.00	°C	Exhaust gas temperature and	>=	-40.04	°C		
							Exhaust gas temperature	<=	799.96	°C		
Destinuiste Metter	D0407		difference of the manufactory DM common		04.00 to 74.00	**	Concer in a management share		TRUE		fourth outlets	В
Particulate Matter Sensor Temperature Circuit Range/performanc e	P24C7	sensor is monitored for temperature deviations	difference of the measured PM sensor temperature and the modeled exhaust gas temperature (see Look-Up-Table #102) or	>	34.96 to 74.96	°C	Sensor in a measurement phase	=	IRUE		fault exists for more than 5 sec; monitor runs at 0.1 s when enable conditions	в
			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	are met	
			,				Vehicle velocity and	>=	15.53	mph		
							Vehicle velocity	<=	155.34	mph		
							Barometric pressure Engine running (please see the	> =	75 TRUE	kPa -		
							definition) exhaust model temperature at PM sensor	>	49.96	°C		
							and exhaust model temperature at PM sensor /	<	249.96	°C		
							A - BI (Absolute value of the temperature difference) for	<=	29.96	°C		
							time since stationary modeled temperature in the driving mode is detected with	>=	90.00	sec		
							(a) Model temperature and with	=	measured parameter	-		
							(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	В
		threshold	Battery voltage (ECM) difference of ECM measured voltage and SCU voltage	> >	15.00 3.00	V V	for time Initialization values have been transferred (i.e. CAN communication with ECM established) Sensor is in the state "ready"	> = =	3.00 TRUE TRUE	sec - -	are met	
			or				means Battery voltage (ECM)	>=	11.00	V		
			Path 2: Battery voltage (ECM) difference of ECM measured voltage and SCU voltage or	< >	11.7 1.90	V V						
			Path 3: Battery voltage (ECM) and Battery voltage (ECM)	>= <=	11.7 15.00	V 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	В
			Battery voltage (ECM) difference of ECM measured voltage and SCU voltage	> >	15.00 3.00	V V	for time Initialization values have been transferred (i.e. CAN communication with ECM established)	= =	3.00 TRUE	sec -		
			or				Sensor is in the state "ready" means Battery voltage (ECM) Heater duty cycle of PM Sensor	= = >	TRUE 11.00 23	- V %		
			Path 2: Battery voltage (ECM) difference of ECM measured voltage and SCU voltage or	< >	11.7 1.90	V V						

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) and Battery voltage (ECM) difference of ECM measured voltage and SCU voltage	>=	11.7 15.00 2.60	V V 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 and Monitor is released		TRUE	-	regeneration phase is active measurement request to particulate matter sensor is active PM sensor dewpoint achieved the time the particle sensor spent under unacceptable working conditions during the regeneration, means (exhaust gas acceleration or ratio between demanded and max available heater power) Battery voltage (ECM)		TRUE TRUE TRUE 10 5 1 11.00	- sec m/s^2 - V	fault event exists for one time; monitor runs at 0.1 s when enable conditions are met	В
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 and engine pre drive and Basic enable conditions met:	= =	TRUE TRUE see sheet enable conditions	-	fail conditions exists for 0.02 s monitor runs once per driving cycle during predrive with 0.02 s rate whenever enable	В
		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 and engine pre drive and	=	FALSE	-	fail conditions exists for 0.02 s monitor runs once per driving cycle	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Lo	Threshold ogic 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	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	В
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 93,5	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 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 %	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/Performanc e - Stuck Low	P2598		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	В
					_		and adaption not active and	=	FALSE	-	whenever enable	
Turbocharger Boost Control Position Sensor "A" Circuit Range/Performanc e - Stuck High	P2599		turbo charger control deviation calculated out of difference between desired and actual value	<	-15.00	%	offset learned since last clearing of fault code memory	=	TRUE	-	conditions are met	
							and engine running	=	TRUE	-		
							for time (see Look-Up-Table #92) and	>	30 to 327.67	sec		
							(engine coolant temperature	>=	69.96	°C		
							and engine coolant temperature) and	<	129.96	°C		
							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		>	4900.00	rpm	ignition on	-	TRUE	-	fail conditions exists for .01 s test performed continuously	A
							basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time MIL Required Illur
					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: acquired engine off time or Path 2: acquired engine off time (where (a) Tolerance threshold for diagnosis of stop counter	< (100% - ((a) - 7.5%)) > (100% + ((a) - 7.5%)) = 17.19 %	time since engine post drive/ afterun and engine post drive/ afterun and basic enable conditions met:	< 20.00 sec = TRUE - = see sheet enable - tables	fail B conditions exists for 0.01 s monitor runs once per driving cycle with 0.01 s rate whenever enable conditions are met
		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 and basic enable conditions met:	= TRUE - = see sheet enable - tables	fail conditions exists for1 event monitor runs once per driving cycle 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 MIL Required Illum.
		Detects an interrupted supply voltage of the engine off time circuit (permanent battery voltage supply line to ECM)		= 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 B conditions exists for 3 s monitor runs 0.02 s rate whenever enable conditions are met
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 B conditions exists for 3 s monitor runs 0.02 s rate whenever enable conditions are met

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
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 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	В
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	В
			change in fuel volume in primary tank	<	0.80	I	Engine Running	=	TRUE	-	whenever enable	
			and change in fuel volume in secondary tank or	<	0.00	I	and fuel transfer pump active means	=	TRUE		conditions are met	
			Path 2: change in fuel volume in primary tank and change in fuel volume in accordance	<	0.80 0.00	I I	((filtered fuel volume in primary tank or	<	1638.30	I		
			change in fuel volume in secondary tank or	>=	0.00	I	filtered fuel volume in secondary tank	>	0.00	I		
			Path 3: change in fuel volume in primary tank and	>=	0.80	Ι	and time between activations of transfer pump and	>	32767.00	sec		
			change in fuel volume in secondary tank	<	0.00	I	fuel level zone 5 means					
							(filtered fuel volume in primary tank and	<	137.40	I		
							filtered fuel volume in secondary tank	>	0.00	I		
) vehicle speed and	<=	0.00	mph		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
) for time and	>	327.67	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time MIL Required 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 A conditions exist for 1 s monitor runs once per driving cycle during predrive with 1 s rate
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 A conditions exist for 1 s test performed continuously with 1 s rate
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 A conditions exist for 1 s test performed continuously with 1 s rate
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 A conditions exist for 1 s test performed continuously with 1 s rate

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 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
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 and 4WD-Lo active based on transmission	=	FALSE	-	Current Transmission Gear and Current Transmission Gear	≠	Park/Neutral	-	fail conditions exists for 0.05 s test performed continuously 0.02 s rate	В
			turbine speed, output shaft speed, and gear ratio				and Torque converter clutch open and Engine is Running and vehicle speed and accelerator pedal position and engine speed and engine speed and basic enable conditions met: and NO Pending or Confirmed DTCs:	= = ^ < ^ < > = =	FALSE TRUE 12.43 100.00 10.00 6000.00 1000.00 see sheet enable tables see sheet inhibit tables	- mph % rpm rpm -		
Reductant Delivery Performance monitor	P2BAA	Compared EWMA filtered pressure drop with the threshold	EWMA filtered pressure drop	<	24.80 I	kPa	Modeled SCR catalyst temperature Modeled SCR catalyst temperature Temperature gradient of SCR Temperature gradient of SCR for time Exhaust mass flow Exhaust mass flow (a) - (b)	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	199.96 -40.00 40.00 0.20 0.50 44.40 -0.30	°C °C/sec °C/sec g/sec g/sec g/sec g	fault exists for more than 1 event; monitor runs at 0.1 s once per trip	A

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(b) EWMA filtered pressure drop = calculated - (b) EWMA filter coefficient for Response to = 0.20 factor Step Change mode >= 3.00 count Maximum number of pressure drop per >= 3.00 count driving cycle in Response to Step Change mode = 8.00 count Total number of pressure drop = 8.00 count EWMA filter coefficient for stabilized = 0.20 factor Maximum number of pressure drop per >= 3.00 count Change mode Total number of pressure drop = 8.00 count WMA filter coefficient for stabilized = 0.20 factor mode Total number of pressure drop for = 1.00 count				1	1						
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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: = 0.20 factor Image mode = 0.20 factor Total number of pressure drop measurement for Response to Step Change mode = 8.00 count EWMA stabilized mode: = 0.20 factor Total number of pressure drop for = 1.00 count				1	1						
EWMA filter coefficient for Response to = 0.20 factor Step Change mode Maximum number of pressure drop per driving cycle in Response to Step >= 3.00 count Maximum number of pressure drop measurement for Response to Step Change mode = 8.00 count Total number of pressure drop measurement for Response to Step = 0.20 factor Change mode Total number of pressure drop = 8.00 count EWMA stabilized mode: EWMA filter coefficient for stabilized = 0.20 factor mode Total number of pressure drop for = 1.00 count				1	1	(b) EWMA filtered pressure drop	=		-		
Step Change mode >= 3.00 count 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 = 1.00 count				1	1						
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 = 1.00 count				1	1		=	0.20	factor		
driving cycle in Response to Step Change mode = 8.00 count Total number of pressure drop = 8.00 count measurement for Response to Step Change mode = 0.20 factor EWMA stabilized mode: = 0.20 factor mode Total number of pressure drop for = 1.00 count						Step Change mode					
driving cycle in Response to Step Change mode = 8.00 count Total number of pressure drop = 8.00 count measurement for Response to Step Change mode = 0.20 factor EWMA stabilized mode: = 0.20 factor mode Total number of pressure drop for = 1.00 count						Maximum number of pressure drop per	>=	3.00	count		
Change mode = 8.00 count Total number of pressure drop = 8.00 count measurement for Response to Step Change mode EWMA stabilized mode: = 0.20 factor EWMA filter coefficient for stabilized = 0.20 factor mode Total number of pressure drop for = 1.00 count											
Total number of pressure drop = 8.00 count measurement for Response to Step Change mode EWMA stabilized mode: EWMA filter coefficient for stabilized = 0.20 factor mode Total number of pressure drop for = 1.00 count				1	1						
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Change mode EWMA stabilized mode: EWMA filter coefficient for stabilized = 0.20 factor mode Total number of pressure drop for = 1.00 count				1	1						
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EWMA filter coefficient for stabilized = 0.20 factor mode Total number of pressure drop for = 1.00 count				1	1	EWMA stabilized mode:					
mode Total number of pressure drop for = 1.00 count							_	0.20	factor		
Total number of pressure drop for = 1.00 count				1	1		=	0.20	Idului		
								1.00	001/71		
Stabilized mode				1	1		=	1.00	count		
				1	1	stabilized mode					
				1	1						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	I	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 and basic enable conditions met:	=	TRUE see sheet enable tables	-	fail conditions exists for 5 s test performed continuously 0.01 s rate	В
CAN B BUS OFF	U0074	BUS B off monitoring	CAN B Bus-Off reported by CAN hardware	=	TRUE		ignition on and basic enable conditions met:	=	TRUE see sheet enable tables	-	fail conditions exists for 5 s test performed continuously 0.01 s rate	В
Lost Communications with Transmission Control Module	U0101	Detects loss of communication between ECM (on-board control unit) and TCM (transmission control module)	time since last message from transmission control module was received	>	0.18	Sec	ignition on for time and battery voltage and battery voltage and basic enable conditions met: and NO Pending or Confirmed DTCs:		TRUE 3.00 9.00 655.34 see sheet enable tables see sheet inhibit tables	- V V -	fail conditions exists for 10 s test performed continuously 0.01 s rate	В
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 and Bus off or error passive on CAN and Frame enabled. The EMC is authorized to read the frame and basic enable conditions met:	=	TRUE FALSE TRUE see sheet enable tables	-	test performed continuously at 0.02 s rate whenever enable conditions are met	В

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 Can Bus Initialized (CAN Bus is Active)	=	TRUE	-	fail conditions exists for more than 5 sec monitor runs	A
							consisting of: ignition	=	TRUE	-	with 0.1 s rate	
							for time battery voltage	> <	5.00 655.34	sec 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	
			within a number of message frames	=	9.00	counts	``````````````````````````````````````					
							consisting of: ignition for	=	TRUE	-		
							time battery voltage battery voltage	> < >	5.00 655.34 9.00	sec V 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	
			within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of: ignition for	=	TRUE	-		
							time battery voltage	> <	5.00 655.34	sec V		
							battery voltage	>	9.00	V		
		and protection value verification using a sliding	DLS3 Sliding Window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs with 1 s rate	
		window evaluation Check of error states	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)					
							consisting of: ignition for	=	TRUE	-		
							time battery voltage battery voltage	> < >	5.00 655.34 9.00	sec V V		
					_							

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	1	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	Special C
Module							for time and	>=	3.00	sec	performed continuously	
							battery voltage and	>=	9.00	V	0.01 s rate	
							battery voltage and	<=	16.00	V		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Engine Out NOx Sensor CAN	U029D	Engine out NOx sensor CAN message #1 frame not	Counts up when message frame is not received in the time out interval	>	5.00	counts	CAN Bus is Active	=	TRUE		fail conditions	A
Message #1		received after a calibrated number of times					Can Bus Initialized (CAN Bus is Active)				exists for more than 20 sec monitor runs	
							consisting of: ignition for	=	TRUE	-	with 0.005 s rate	
							time battery voltage	> <	5.00 655.34	sec V		
							battery voltage	>	9.00	v		
		CAN frame rolling counter and protection value	Sliding window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs whenever	
		verification using a sliding window evaluation Check of engine out NOx cor	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active)				enable conditions are met	
							consisting of: ignition	=	TRUE	-		
							for time	>	5.00	sec		
							battery voltage battery voltage	< >	655.34 9.00	V V		
		CAN frame rolling counter	Sliding window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE		monitor runs	
		and protection value verification using a sliding window evaluation									whenever enable conditions	
		Check of engine out NOx ser	within a number of message frames	=	9.00	counts	Can Bus Initialized (CAN Bus is Active) consisting of:				are met	
							ignition for	=	TRUE	-		
							time battery voltage	> <	5.00 655.34	sec V		
1		l	l				battery voltage	>	9.00	V		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Lo	Threshold ogic 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 Can Bus Initialized (CAN Bus is Active) consisting of:	=	TRUE	-	fail conditions exists for more than 20 sec monitor runs with 0.005 s	
							ignition for time battery voltage battery voltage	= ^ < >	TRUE 5.00 655.34 9.00	- Sec V V	rate	
		CAN frame rolling counter and protection value verification using a sliding window evaluation Check of engine out NOx ser	Sliding window error counter within a number of message frames	>=	8.00 9.00		CAN Bus is Active Can Bus Initialized (CAN Bus is Active)	=	TRUE	-	monitor runs whenever enable conditions are met	
							consisting of: ignition for time battery voltage battery voltage No pending or confirmed DTCs	II ^ V ^ II	TRUE 5.00 655.34 9.00 see sheet inhibit tables	- V V		
Engine Out NOx Sensor CAN Message #3		Engine out NOx sensor CAN message #3 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	5.00	counts	CAN Bus is Active Can Bus Initialized (CAN Bus is Active) consisting of: ignition	=	TRUE	-	fail conditions exists for more than 20 sec monitor runs with 0.005 s rate	
							for time battery voltage battery voltage	~ ~ ~	5.00 655.34 9.00	sec V V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation Check of engine out NOx ser	Sliding window error counter within a number of message frames	>=	8.00		CAN Bus is Active Can Bus Initialized (CAN Bus is Active)	=	TRUE	-	monitor runs whenever enable conditions are met	
							consisting of: ignition for	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold gic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							time battery voltage battery voltage No pending or confirmed DTCs	> < > =	5.00 655.34 9.00 see sheet inhibit tables	sec V V -		
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 Can Bus Initialized (CAN Bus is Active) consisting of: ignition for time battery voltage battery voltage	= > < >	TRUE 5.00 655.34 9.00	- sec V V	fail conditions exists for more than 20 sec monitor runs with 0.02 s rate	
		CAN frame rolling counter and protection value verification using a sliding window evaluation Check of engine out NOx ser	Sliding window error counter within a number of message frames	=			CAN Bus is Active Can Bus Initialized (CAN Bus is Active) consisting of: ignition for time battery voltage battery voltage No pending or confirmed DTCs	= > < > =	TRUE 5.00 655.34 9.00 see sheet inhibit tables	- sec V V -	monitor runs whenever enable conditions are met	
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 Can Bus Initialized (CAN Bus is Active) consisting of: ignition for time battery voltage battery voltage	=	TRUE 5.00 655.34 9.00	- Sec V V	fail conditions exists for more than 20 sec monitor runs with 0.1 s rate	
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 0	counts	CAN Bus is Active Can Bus Initialized (CAN Bus is Active)	Ξ	TRUE	-	fail conditions exists for more than 21 sec monitor runs	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold ogic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum
							consisting of: ignition for time battery voltage battery voltage	= ^ < >	TRUE 5.00 655.34 9.00	sec V V	with 0.005 s rate	
		CAN frame rolling counter and protection value verification using a sliding window evaluation Check of post catalyst NOx o	Sliding window error counter	=	8.00 9.00	counts	CAN Bus is Active Can Bus Initialized (CAN Bus is Active) consisting of: ignition for time battery voltage battery voltage No pending or confirmed DTCs	= =	TRUE 5.00 655.34 9.00 see sheet inhibit	- sec V V	monitor runs whenever enable conditions are met	
		CAN frame rolling counter and protection value verification using a sliding window evaluation Check of post catalyst NOx s	Sliding window error counter	=	8.00 9.00	counts	CAN Bus is Active Can Bus Initialized (CAN Bus is Active) consisting of: ignition for time battery voltage battery voltage	= = > < >	tables TRUE 5.00 655.34 9.00	- - Sec V V	monitor runs whenever enable conditions are met	
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	battery voltage No pending or confirmed DTCs CAN Bus is Active Can Bus Initialized (CAN Bus is Active) consisting of: ignition for time battery voltage battery voltage		9.00 see sheet inhibit tables TRUE 5.00 655.34 9.00	V - - sec V V	fail conditions exists for more than 21 sec monitor runs with 0.005 s rate	

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 Check of post catalyst NOx s	Sliding window error counter	, 	8.00 9.00		CAN Bus is Active Can Bus Initialized (CAN Bus is Active)	=	TRUE	-	monitor runs whenever enable conditions are met	
							consisting of: ignition for time battery voltage battery voltage No pending or confirmed DTCs	= > < > =	TRUE 5.00 655.34 9.00 see sheet inhibit	sec V V		
							No penaing of confirmed DTCs	=	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	
							consisting of: ignition for	=	TRUE	-	monitor runs with 0.005 s rate	
							time battery voltage battery voltage	> < >	5.00 655.34 9.00	sec V V		
		CAN frame rolling counter	Sliding window error counter	>=	8.00	counts	CAN Bus is Active	=	TRUE	-	monitor runs	
		and protection value verification using a sliding window evaluation Check of post catalyst NOx s	within a number of message frames	=	10.00	counts	Can Bus Initialized (CAN Bus is Active)				whenever enable conditions are met	
							consisting of: ignition for	=	TRUE	-		
							time battery voltage battery voltage No pending or confirmed DTCs	> < > =	5.00 655.34 9.00 see sheet inhibit tables	sec V V -		
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	
							Can Bus Initialized (CAN Bus is Active) consisting of: ignition	=	TRUE	-	more than 21 sec monitor runs with 0.02 s rate	
							for time battery voltage battery voltage	> < >	5.00 655.34 9.00	sec V V		

Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold .ogic and Valu	ie	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
	and protection value verification using a sliding window evaluation	Sliding window error counter	>=	8.00			=	TRUE	-	monitor runs whenever enable conditions are met	
						consisting of: ignition for time battery voltage battery voltage No pending or confirmed DTCs	= > < > =	TRUE 5.00 655.34 9.00 see sheet inhibit tables	- V V -		
	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 Can Bus Initialized (CAN Bus is Active) consisting of: ignition for	=	TRUE	-	fail conditions exists for more than 21 sec monitor runs with 0.1 s rate	
						time battery voltage battery voltage	> < >	5.00 655.34 9.00	sec V V		
U02A3			=	TRUE	-	Battery voltage (ECM) Ignition on for time Ignition on	>= > =	11.00 TRUE 1.20 TRUE	V - sec -	fault exists for more than 1.5 sec; monitor runs at 0.1 s	В
	Code	Code Description CAN frame rolling counter and protection value verification using a sliding window evaluation Check of post catalyst NOx set Post catalyst NOx sensor CAN message #5 frame not received after a calibrated number of times U02A3 PM Sensor Sensor Control Unit (SCU) signal timeout	Code Description Criteria CAN frame rolling counter and protection value verification using a sliding window evaluation Check of post catalyst NOx s Sliding window error counter Within a number of message frames within a number of message frames 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 U02A3 PM Sensor Sensor Control Unit (SCU) signal timeout SCU signal timeout CAN error (no message received)	Code Description Criteria L CAN frame rolling counter and protection value verification using a sliding window evaluation Check of post catalyst NOx s Sliding window error counter >= 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 > U02A3 PM Sensor Sensor Control Unit (SCU) signal timeout SCU signal timeout CAN error (no message received) =	Code Description Criteria Logic and Valu CAN frame rolling counter and protection value verification using a sliding window evaluation Check of post catalyst NOx s Sliding window error counter within a number of message frames >= 8.00 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 U02A3 PM Sensor Sensor Control Unit (SCU) signal timeout SCU signal timeout CAN error (no message received) = TRUE	Code Description Criteria Logic and Value CAN frame rolling counter and protection value verification using a sliding window evaluation Check of post catalyst NOx s Sliding window error counter within a number of message frames >= 8.00 counts Post catalyst NOx sensor CAN message #5 frame not received after a calibrated number of times Counts up when message frame is not received after a calibrated number of times > 25.00 counts U02A3 PM Sensor Sensor Control Unit (SCU) signal timeout SCU signal timeout CAN error (no message received) = TRUE -	Code Description Criteria Logic and Value Parameters Image: Code in the interval in	Code Description Criteria Logic and Value Parameters Image: Construct and protection value and protectin value and protectin value and protection value a	Code Description Criteria Logic and Value Parameters Conditions Amount Image: Construction value Image: C	Code Description Criteria Logic and Value Parameters Conditions A A A A A A A A CAN frame rolling counter and protection value verification using a sliding window waluation Check of post catalyst NOx s Sliding window error counter and protection value within a number of message frames a 9.00 counts CAN Bus is Active a TRUE - Check of post catalyst NOx sensor CoX message firme no received after a calibrated number of times Counts up when message frame is not received after a calibrated number of times > 25.00 counts CAN Bus is Active = TRUE - U0204 PM Sensor Sensor Control Netro of times Counts up when message frame is not received after a calibrated number of times > 25.00 counts CAN Bus is Active = TRUE - U0204 PM Sensor Sensor Control Received after a calibrated number of times Counts up when message frame is not received after a calibrated number of times SCU signal timeout CAN error (no message received) = TRUE - Can Bus Initialized (CAN Bus is Active consisting of: tor tor tor = TRUE - 665.34 <	Code Description Criteria Logic and Value Parameters Conditions Required A A A A A A A A A A CAN frame roling counter and protection value verification using a silding window error counter Check of post catalyst NOx s Silding window error counter are in the company of the catalyst NOx sensor Counts of the catalyst in the time out interval > 25.00 counts CAN Bus is Active battery voltage battery voltage battery voltage battery voltage = TRUE - fail conditions exists for trace the catalyst NOX sensor Counts up when message frame is not cecked in the time out interval > 25.00 counts consisting of: ignition in trace the catality at NOX sensor Counts up when message frame ois not cecked in the time out interval > 25.00 counts consisting of: ignition in tor = TRUE - fail conditions consisting of: ignition in tor U02024 PM Sensor Sensor Controtin CAN error <td< td=""></td<>

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG09	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 and	>	60	sec
			(a) - (b) with		1.8	°C
			(a) reference temperature (engine coolant temperature) captured during start and with	=	measured parameter	-
			(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 for	>	14.92	mph
			time	>	300	sec
			and engine speed (see Look-Up-Table #14) for	>	600 to 850	rpm
			time and	>	600	sec
			(a) - (b) with	>	4.5	°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) intake at temperature at start and with (b) minimum intake air temperature value for the comparison with the reference temperature during driving cycle)	=	measured parameter measured parameter	-
		Status of Sun Load Detection time	active under following condition (Vehicle speed for	>	14.92	mph
			time and engine speed (see Look-Up-Table #14) for time)	> > >	300 600 to 850 600	sec rpm sec
ECM Operating States		Engine Pre-Drive	processor operating normally ignition processor powerup boot initialization or key off bookkeeping cleanup (accessory, post-wake-up, pre-sleep)	= = =	TRUE OFF complete complete	- - -
		Engine Running (see Look-Up table #70)	ignition engine speed engine speed was at start	= >= >	ON 100 850	- rpm rpm
		Engine Post-Drive/ Afterun also includes "engine stopping" during engine spin down	processor operating normally ignition key off bookkeeping cleanup	= = =	TRUE OFF 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 (b) captured remaining diesel fuel volume under the following conditions 	=	25.26 measured parameter	% -
			(Vehicle speed time)	<= >	1.24 4	mph sec
			and (Vehicle speed time))	<= >	1.24 30	mph sec
			or at initialization of Diesel fuel level which means ECM Code-Clear of ECM Replacement occurred	=	TRUE	-
				_	INCL	
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 for time engine speed for time NO Pending or Confirmed DTCs:))	~ ~ ~ =	0.9 0.5 100 20 see sheet inhibit tables	- rpm sec -
		Upstream Nox Sensor Signal Ready or Upstream Nox SensorDewpoint Reached or Lambda signal from NOx sensor ready	following condition met for time: (Integrated heat quantity (see Look-Up-Table #1)	>	30 375 to 500	sec kJ
		Status of NOx signal of downstream NOx sensor) (following condition met for time:	~	30	Sec
			(Integrated heat quantity (see Look-Up-Table #2) NOx status signal received via CAN message (Please see the definition) for time	>= = >	0 to 350 TRUE 0.5	kJ - sec
			calculated lambda value based on air mass flow and injection quantity for time engine speed for time NO Pending or Confirmed DTCs:))	> > > =	0.9 0.5 100 20 see sheet inhibit tables	sec rpm sec
		Downstream Nox Sensor Signal Ready or	following condition met for time:	>	30	sec

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	Integrated heat quantity (see Look-Up-Table #2)	>=	0 to 350	kJ
		or				
		Lambda signal from NOx sensor ready				
		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	°Č
			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	500
) and	>	30	sec
			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 or NO Pending or Confirmed DTCs:	=	TRUE see sheet inhibit tables	
		Rail Pre-Control (Just after start)	Rail Control at ECU Start and engine speed and (rail pressure or (a) - (b) (a)Fuel Rail Pressure Setpoint (b)Maximum Rail Pressure for last 10ms)	н Ц <u>Д</u> V II II	TRUE 300 15000 5000 measured paramter measured paramter	- rpm kPa kPa -
		Rail Control - PCV Closed Loop Control Only PCV = Pressure Control Valve	(Rail Pressure Precontrol (Just after start) and Number of Crankshaft revolutions since entering Rail Pressure Precontrol) or (state machine rail pressure control transitioning pressure control valve mode and setpoint volume flow of the metering unit out of rail pressure control (see Look-Up-Table #6) or (Fuel system pressure and high pressure pump outlet	<	TRUE 10 TRUE 60000 to 224000	- revs - mm^3/rev 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 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) and (a) + (b) (see Look-Up-Table #7) (a)Torque Generating fuel injection quantity (b)Non-Torque generating fuel injection quantity	= < =	TRUE 12 to 400 calculated parametet calculated parametet	- mm^3/rev -
		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) (a)Torque Generating fuel injection quantity (b)Non-Torque generating fuel injection quantity (c) (see Look-Up-Table #7)		(c) + (d) calculated parametet calculated parametet 12 to 400	- - - mm^3/rev

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG09	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	(
		T P CV Closed Loop Conitor	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 or	=	TRUE	-

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

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG09	Defined by:	Enable Logic	Enable Values	Enable Units
			 (b) Effect of temperature on regenerated particle mass (see Look-Up-Table #5) (c) Basis value of produced soot mass flow dependent on actual soot mass (see Look-Up-Table #3) 	=	0 to 2.97 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) Reductant dosing is released Deactivation of dosing to execute the NOx Offset test (Please see the definition) since start for time gradient of exhaust gas temperature since start for time Average temperature inside the SCR catalyst: SCR catalyst wall temperature Vehicle speed engine speed NO Pending or Confirmed DTCs:		Metering Control TRUE FALSE 0.02 300 0.01 179.96 89.96 -0.62 400 see sheet inhibit tables	- - °C/sec °C °C °C mph rpm -
	Control System States	State of Reductant Pressure Control System: Standby State of Reductant Pressure Control System: No Pressure control	ignition Dwell time in the state of standby NO Pending or Confirmed DTCs: Old SCR control state (please see the definition) ignition Dwell time in the state of standby Dwell time in the state of standby NO Pending or Confirmed DTCs:	=	on 5 see sheet inhibit tables Stand by on 5 2 see sheet inhibit tables	- sec - sec sec -
						_

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	Old SCR control state (please see the definition)	=	NO Pressure	-
		System: Pressure control			Control	
			ignition	=	on 550	rom
			engine speed Dwell time in the state of no pressure control	> >=	2	rpm sec
			exhaust gas temperature Upstream SCR	>=	169.96	°C
			(-
			Reductant Defrost check (please see the definition) or	=	TRUE	-
			The component protection release of the heater control (please see the definition) or	=	TRUE	-
			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 and	<	50	%
			Reductant Pump Module Pressure	<	200	kPa
			/ Set-point duty cycle for Reductant dosing valve	=	100	%
			Set-point duty cycle for the Reductant Pump		40.00	%
			pressure Motor actuator			
			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	%
			Reductant Pump Module Pressure for time	>= >	200 0.5	kPa 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 Set-point duty cycle for Reductant dosing valve Set-point duty cycle for the Reductant Pump pressure Motor actuator NO Pending or Confirmed DTCs:	=	350 0% 80.00 see sheet inhibit tables	kPa % %
		State of Reductant Pressure Control System: Ventilation (substate of Pressure control)	SCR control state (please see the definition) Reductant Pump Module Pressure Dwell time in Pressure Build up substate system pressurizes in pressure buildup and ventilation states Set-point duty cycle for Reductant dosing valve Set-point duty cycle for the Reductant Pump pressure Motor actuator Dwell time in the sub state ventilation NO Pending or Confirmed DTCs: SCR control state (please see the definition)	> < =	Pressure Control 350 10 10 100 80.00 0.23 see sheet inhibit tables	- kPa sec counts % % sec -
		System: Metering control (substate of Pressure control)	Reductant Pump Module Pressure Set-point duty cycle for Reductant dosing valve NO Pending or Confirmed DTCs:	>=	Control 350 0 see sheet inhibit tables	kPa % -
		State of Reductant Pressure Control System: Pressure reduction	ignition dwell time in the state of pressure reduction Activation state of Reductant reverting valve power stage Set-point duty cycle for Reductant dosing valve Set-point duty cycle for the Reductant Pump pressure Motor actuator NO Pending or Confirmed DTCs:	= = = =	off 5 On 0 15.00 see sheet inhibit tables	- Sec - % %

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	Ignition on	=	TRUE	-
	for operation		engine speed	>	550	rpm
	Reductant Dosing Strategy	Status fill level decrease (please see the				
	based on DPF Fload	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		100	
			(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		TRUE	-
			(please see the definition) State of the defrosting check of pressure line	=	TRUE	-
			(please see the definition) State of the defrosting check of supply module		TRUE	-
			(please see the definition)		HIGE	
			(duration, for which the conditions for a hydraulic		1200	sec
			release reset of pressure line heater circuit are satisfied			
			ambient temperature	>	-4.04	°C
I	1	I	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 Release heater supply module)	> =	-4.04 FALSE	°C -
					_	_
		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 Reductant tank heat temperature at Standby state	< >	2147483647 -9.04	sec °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) Pressure line defrost timer	=	No Pressure Control 0	- sec
			or ignition engine speed (= >	on 550	sec rpm
			Pressure line defrost check in last driving cycle status of SCR control state (please see the definition)	= =	TRUE No Pressure Control	-
			Engine off Time NO Pending or Confirmed DTCs:	> =	0 TRUE	sec -
		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) Supply module defrost timer	=	No Pressure Control 0	- sec
			or ignition engine speed (= >	on 550	sec rpm
			Pressure line defrost check in last driving cycle status of SCR control state (please see the definition)	= =	TRUE No Pressure Control	-
			Engine off Time NO Pending or Confirmed DTCs:	< =	0 TRUE	sec -
		The component protection release of the heater control	Current time for heating / not heating of heater circuit 1 (tank) Reductant Defrost check (please see the definition)	>= =	0 to 299 FALSE	sec -
		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) status of reductant tank heater defrost	>= =	0 to 3276 FALSE	sec
			status of reductant tank heater temperature (please see the definition) State of the defrosting check of pressure line	=	FALSE	-
			(please see the definition) State of the defrosting check of supply module (please see the definition)	=	TRUE	-
			, or (ignition	=	on	sec
			engine speed Engine off Time State of the defrosting check of pressure line	> <= =	550 0 TRUE	rpm sec -
			(please see the definition) State of the defrosting check of supply module (please see the definition) and	=	TRUE	-

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 engine speed Engine off Time	= > <=	on 550 0	sec rpm sec
			State of the defrosting check of pressure line (please see the definition) State of the defrosting check of supply module	=	TRUE TRUE	-
			(please see the definition)	_	INOL	-
		Release of tank heater circuit	(_	
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16) or	>=	0 to 14400	sec
			Requested heating time for Reductant tank heater (see Look-Up-Table #17))	>=	0 to 3277	sec
			or ((Requested defrosting time for Reductant tank	>=	0 to 14400	sec
			heater (see Look-Up-Table #16) or	>=	01014400	360
			Requested heating time for Reductant tank heater (see Look-Up-Table #17))	>=	0 to 3277	sec
			and (Requested defrosting time for pressure line heater	>=	0 to 3276.7	sec
			(see Look-Up-Table #18) or Requested heating time for pressure line heater	>=	0 to 3276.7	sec
			(see Look-Up-Table #20))) 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) or	>=	0 to 14400	sec
			Requested heating time for Reductant tank heater (see Look-Up-Table #17)) and	>=	0 to 3277	Sec
			(Requested defrosting time for pressure line heater (see Look-Up-Table #18) or	>=	0 to 3276.7	sec
			Requested heating time for pressure line heater (see Look-Up-Table #20)) and	>=	0 to 3276.7	Sec
			(Requested defrosting time for supply module heater (see Look-Up-Table #19) or	>=	0 to 3276.7	sec
			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) or	>=	0 to 3276.7	sec
			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) or	>=	0 to 3276.7	sec
			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) or	>=	0 to 3276.7	sec
			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) or	>=	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
			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) or	>=	0 to 3276.7	Sec
			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) or	>=	0 to 3276.7	sec
			Requested heating time for supply module heater (see Look-Up-Table #21))) or ((>=	0 to 3276.7	sec
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec
			Requested heating time for Reductant tank heater (see Look-Up-Table #17)) and	>=	0 to 3277	Sec
			(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) or	>=	0 to 3276.7	sec
			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 160BDG09	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 battery voltage for time	>	100 11 2	V V sec
		Status of the battery voltage being in the valid working range for pressure line heater	battery voltage battery voltage for time	< > >	100 11 2	V V sec
		Status of Reductant Tank Heater Release	(
			status of reductant tank heater temperature (please see the definition) Waiting time after tank heater release expired)	=	TRUE 0	- sec
			or ((Waiting time before tank heater released	<	32767	sec
			started with status of reductant tank heater temperature (please see the definition))	=	FALSE	-
			and (status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired)) or	>	0	sec

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	=	TRUE	
			(please see the definition) Waiting time after tank heater release expired	>	0	sec
			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
	Reductant Tank Level System States and Status	status of Reductant tank level	Tank level > full (100%)	=	Full	-
	System States and Status		Warning (66.67%) < tank level < full (100%) Restriction (33.33%) < tank level < Warning (66.67%)	= =	OK Warning	-
			Empty < tank level < Restriction (33.33%) Tank level < = 0.1%	= =	Restriction 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) ignition on engine speed	>= =	1.00 TRUE 550	%/sec -
			Vehicle speed Vehicle speed time since engine started	> >= <=	6.22 (a) * (b)	rpm mph
			(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 or	=	TRUE	-
l		l	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) filter release for Reductant tank level calculation at ignition on on (Please see the definition) and with	>= =	1.00 TRUE	%/sec -
			(Frozen state is active during a certain warning level (please see the definition) and with	=	TRUE	-
			Reductant tank Temperature	>=	-100.04	°C
			or Reductant low warning level (Please see the	>=	0	level
			definition))))			
		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 and	<	32767	sec
			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	-
I	l	I	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	=	TRUE	-
			(please see the definition) 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	>=	0	-
			definition) 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) and with	>=	49	level
			() Raw Reductant tank level and with (>=	33.3	%
			(Remaining Reductant quantity (a) - (b): (a) Tank level for reserve mode (Restriction level) in [g]		(a) - (b) 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 and with /	>=	66.7	%
			Remaining Reductant quantity (a) - (b): (a) Tank level for reserve mode (Warning level) in [g]	< =	(a) - (b) 5279	g
			(b) Tank level threshold range below WARNING threshold for ignition on refill detection release)	=	1617	g
			or Raw Reductant tank level and with (>=	100	%
			Remaining Reductant quantity (a) - (b): (a) Tank level for reserve mode (Warning level) in	>= =	(a) - (b) 5279	g
			[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 or	=	Empty	-
			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) or	=	Warning	-

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) or	=	OK	-
			status of Reductant tank level (please see the definition))) or	=	Full	-
			() Captured Reductant tank level at last tank level change or	=	Warning	-
			Captured Reductant tank level at last tank level change) and	=	ОК	-
			(status of Reductant tank level (please see the definition)) or	=	Full	-
			(Captured Reductant tank level at last tank level	=	ОК	-
			change status of Reductant tank level (please see the definition)))	=	Full	-
		Engine on timer is expired	time since engine started	>=	(a) * (b)	sec
			and with		12 20	sec -
)(ignition	=	on	sec
			engine speed Vehicle speed)	> >=	550 6.22	rpm mph
			or (Vehicle speed	>=	6.22	mph
			NO Pending or Confirmed DTCs: for time))	= >	TRUE 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	-
			Reductant Refill enabling conditions reset timers	=	TRUE	-
)			
					_	
		Normal_Operation_OK: 0 decimal, normal operation	Reductant tank level	=	Full	-
			and with			
			Warning level	<=	49	-
			or (
			Previous warning level vehicle speed	> <=	49 98.75	- mph
))			
			or Reductant Quality state	>	0	-
					-	
		Morning Lough 4 desired Morning	Reductant tank level	<	Full	-
		Warning_Leve1: 1 decimal, Warning level 1				
			Remaining mileage and with	>	1558.75	miles
			(Warning level	<=	49	Warning
			or			level
			(Previous warning level	>	49	Warning
			vehicle speed		98.75	level mph
))	<=	96.75	трп
			and with Reductant Quality state	=	0	-
		Warning_Level2: 2 decimal, Warning	Reductant tank level	<	Full	-
		level 2	Remaining mileage		1558.75	miles
I	I	I	Remaining mileage	~-	1550.75	111163

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			level
			(Previous warning level	>	49	Warning level
			vehicle speed	<=	98.75	mph
)) and with Deducted Quality state		0	
			Reductant Quality state	=	0	-
					_	_
		Warning_Level3: 16 decimal, Warning level 3	Reductant tank level	<	Full	-
			Remaining mileage and with	>	855	miles
			(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 and with		855	miles
			(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 Remaining mileage and with	< <=	Full 628.75	- miles
			(Warning level	<=	49	Warning level
			or (Previous warning level	>	49	Warning
			vehicle speed))) or	<=	98.75	level mph
			(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)) and with	=	1	-

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 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	Warning level	=	144	Warning
		speed restriction severe	initialization phase after Reductant refill event is active and with	=	TRUE	level -
			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 Reductant tank Temperature		5 -9.04	sec °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 Reductant tank Temperature)	> <	14400 -11.04	sec °C
			or (Engine off Time time since the following conditions are met	<= <=	7200 7200	sec sec
			(status of reductant tank heater defrost Vehicle speed Status of urea tank as frozen (please see the definition)))	= > =	On or Defrost 6.22 TRUE	- mph -
	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) number of pressure build-up attempts	>=	64 2	- counts
			and (status of SCR control sub state (please see the definition) Reductant Pump Module Pressure Dwell time in Pressure Build up substate system pressurizes in pressure buildup and ventilation states Reductant Defrost check (please see the	= < > = =	Pressure Build up 350 10 10 TRUE	- kPa sec counts -
			definition))			_
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 for time	>	15 3	ppm sec
			Estimated SCR catalyst efficiency for time	>	0.3 3	factor 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	>	measured parameter	-
			downstream SCR catalyst 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 Filtered Upstream NOx mass flow	>= <=	10 500	mg/sec mg/sec
			Upstream Nox mass flow difference : (a) - (b) Upstream Nox mass flow difference : (a) - (b) and with (a) Filtered Upstream NOx mass flow (b) Filtered actual upstream NOx mass flow)	>= <=	0 500	mg/sec mg/sec
			Status of pre controlled dosing (please see the definition)	=	FALSE	-
			Difference between nominal and estimated Reductant	<	0.125	g
			Difference between nominal and estimated Reductant	>=	-0.5	g
			for time	>	5	sec
			HC load in SCR catalyst	<=	10	factor
			overall aging factor of the SCR catalyst for time	>= >	0 1	factor sec
			Temperature gradient of SCR Temperature gradient of SCR	>= <=	-1 1	°C/sec °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 Release of Reductant dosing	>= =	5 active	g -
			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 Reductant mass flow (see Look-Up-Table #8)	>	-0.05 0 to 0.04	g 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) (a) Filtered NOx mass flow downstream SCR measured by the sensor (b) Filtered and delayed NOx raw emission mass flow upstream of SCR	< = =	0 measured parameter measured parameter	g/sec - -
		Departmention of the size of the second to the				
		Deactivation of dosing to execute the NOx Offset test	SCR catalyst temperature SCR catalyst temperature time	> < >	400.06 999.96 60	°C °C sec
			and Currently dosed Reductant mass flow time	<= >	0.005 30	g/sec sec
			and Feed ratio (a) / ((b) * (c)) (a) Currently dosed Reductant mass flow	<= =	0.1 measured parameter	ratio -
			(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 time	= >	calculated parameter 10	- sec
			and Estimated current Reductant load time	<= >	0.3 10	g sec
		Release plausibility of Reductant Load	Release plausibility timer active or	>=	600	sec
			Release plausibility timer active Integrated NOx raw emission since fill level adaptation and plausibility have been locked	>= >=	50 2	sec 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 (b) Maximum Reductant Dosing quantity	=	measured parameter calculated	-
					parameter	
			or (a) - (b) (a) Reductant Desired value)	> =	0 calculated	_
			(b) Reductant Dosing quantity limitation due to	=	parameter calculated	_
			frozen tank		parameter	
					_	
		Request for pre controlled dosing				
		1	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 (b) Upper hysteresis threshold for filtered exhaust- gas mass flow, dependent on thermal ageing 	=	1 5040.00	factor g/sec
			and Filtered NOx mass flow upstream SCR (a) Correction factor for the upper hysteresis threshold for filtered exhaust-gas mass flow, dependent on HC- contamination SCR	> =	(a) * (b) 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) Lower hysteresis threshold for engine temperature	< =	(a) + (b) 105.06	- °C
			(b) Offset for lower hysteresis switch on threshold for engine temperature Engine coolant temperature	=	50 108.06	K ℃
			and	>	108.00	C
			ambient pressure (a) Upper hysteresis threshold for environment pressure	> =	(a) + (b) 74.5	- kPa
			(b) Offset for upper hysteresis switch on threshold for environment pressure or	=	65.0	kPa
			ambient pressure and	<	74.0	kPa
			Intake air temperature (a) Lower hysteresis switch on threshold for inlet air temperature	> =	(a) + (b) -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	>=	209.96	°C
			controlled mode		200.00	°C
			Selected temperature used for locking pre controlled mode	<=	309.96	C
			controlled mode			
			engine operation in normal mode	=	TRUE	-
			SCR Nox Catalyst Efficiency check was performed	=	FALSE	-
			this drive cycle		-	
			Incorrect Reductant Composition check was	=	FALSE	-
			performed this drive cycle		TOUE	
			NO Pending or Confirmed DTCs:	=	TRUE	-
)			
			((
			(k) + (l) + (m)	>	75	
			(k) = (a) * (b)			
			(a) entry condition for pre controlled dosing at sea	=	0 to 100	-
			level (see Look-Up-Table #13) (b) Altitude multiplier factor for sea level	_	manurad	
			(b) Allitude multiplier factor for sea lever	=	measured paramter	-
					paramer	
			(I) = (c) * (d) * (e)			
			(c) entry condition for online dosing at Mid level	=	0 to 100	-
			(see Look-Up-Table #12)			
			(d) Multiplier to Mid Level enable speed load map	=	1	factor
			(e) Altitude multiplier factor for medium altitude	=	measured	
				-	paramter	-
					paramen	
			(m) = (f) * (g) * (h)			
			(f) Entry condition for online dosing at Hi level (see	=	0 to 100	-
			Look-Up-Table #11)			
			(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	-
)			
I						

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 ice detection by tank temperature difference:	=	TRUE	
			(a) filtered current tank temperature	<= =	-0.14 measured	°C -
			(b) tank temperature captured at the beginning of current monitoring cycle))	=	paramter measured paramter	-
			or (a) - (b) (a) filtered current tank temperature	<= =	-0.14 measured paramter	°C -
			(b) tank temperature captured at the beginning of current monitoring cycle	=	measured paramter	-
			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	-
		1	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	-
			start tank temperature of current monitoring cycle from EEPROM (see definition)	=	paramter measured paramter	-
			Engine off Time	<=	2000	sec
			This monitor was complete in the last driving cycle	=	FALSE	
			ice detection by tank temperature difference:		0.4.4	
			(a) - (b) (a) filtered current tank temperature	> =	-0.14 measured	°C
				-	paramter	
			(b) tank temperature captured at the beginning of	=	measured	-
			current monitoring cycle		paramter	
		State of Reductant injection valve	(1			
		Component Protection	((
			status of SCR control sub state (please see the	=	Metering	-
			definition)		control	
			and with (
			, , , , , , , , , , , , , , , , , , ,			
			PM Filter Regeneration	=	not active	-
			Modeled Reductant injection valve tip temperature	>	100.96 to	°C
			based on its coil temperature (see Look-Up-Table		114.96	
			#15)			
			or			
			(PM Filter Regeneration		o otivo	
			Reluctant dosing valve modeled temperature	= >	active 19.96	°C
			· · · · · · · · · · · · · · · · · · ·			-
))			
			or (
			status of SCR control sub state (please see the	¥	Metering	-
			definition)		control	
			and with (
I	l	I	PM Filter Regeneration	=	not active	I

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)) or		100.96 to 114.96	C
			(PM Filter Regeneration Modeled Reductant injection valve tip temperature based on its coil temperature)))	>	active 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.			

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 Commanded Fuel	>	1000 4	rpm mm3/rev	Crank Position Pedal Position 1 & 2	P0335,P0336, P0016 P2122, P2123, P2138, P2127, P2128
		Overlong Idle	Engine Speed Vehicle Speed Accelerator Pedal Above conditions true for Time Function of EGR Temperature (see Look-Up-Table #22)	< = = =	1500 0 0 0 to 150	rpm mph % sec	Crank Position Transmission output speed sensor Pedal Position 1 & 2 EGR Gas Temperature 1 Engine off timer	P0335, P0336, P0016 P0722, P0721 P2122, P2123, P2138, P2127, P2128 P040C, P040D, P040F 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, P0070, P007C, P02E0, P02EB, P02E3, P122F, P02E2, P122E, P122C, P02E9, P02E8, P0046, P0047, P0045, P0048, P0047,			
		Error exhaust gas recirculation valve	DTC Pending or Confirmed	=	P0406, P0405	-		
		Engine Brake Status	DFCO Active Vehicle Speed	= >	TRUE 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 or Engine Running	= <	Active 30	- sec	Crank Position Engine off timer	P0335,P0336, P0016 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 Exhaust Brake	=	TRUE Not Active	-	Engine off timer	P02610
		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 Engine Coolant Temperature	< >	875 60	rpm °C	Crank Position Engine Coolant Temperature Sensor	P0335,P0336, P0016 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 Transmission not in Reverse		200 TRUE	°C		
			DPF Regeneration	=	FALSE	-		
Fuel Balance Control States	Closed Loop	Command Fuel Quantity	injection quantity injection quantity (see Look-Up-Table #31)	≥ ≤	8 200 to 380	mm^3/rev mm^3/rev	Pedal Position 1 & 2 Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128 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)-	rpm	Crank Position	P0335,P0336, P0016
		Lingino opoca	ongine opeca range r	_	250 to (Look-Up-Table	ipin	of an k F oshion	
					#91) - 150 2750 to 2850			D0005 D0000 D0040
			engine speed range 2	=	2750 to 2850	rpm	Crank Position	P0335,P0336, P0016
		No Active System Errors	No DTC Pending OR Active	=	P0341, P0340, P0336, P0335, P2146, P2149, P2152, P2155, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P1224, P1227, P1242, P1247, P1233, P1236, P1239, P122A	-		
	InActive	Command Fuel Quantity	injection quantity Range 1 or	<	6	mm^3/rev	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
			injection quantity Range 2	>	(Look-Up-Table #31) + 20	mm^3/rev	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
		Engine Speed	Engine Speed Range 1	<	(Look-Up-Table #91)- 250	rpm	Crank Position	P0335,P0336, P0016
			or Engine Speed Range 2	>	2850	rpm	Crank Position	P0335,P0336, P0016

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 distance fuel soot	시 시 시	70,200 802 325 44	sec miles liters grams	Delta Pressure Sensor	P2610 P0722, P0721 P2122, P2123, P2138, P2127, P2128 P2453, P2454, P2455
		DOC inlet temperature	upstream DOC temperature upstream DOC temperature for time	~ ~ ~	620 230 0.5	C C s	EGT 1 EGT 1	P0545, P0546, P20E2, P2080, P2428 P0545, P0546, P20E2, P2080
		DPF inlet temperature	DPF upstream temperature DPF upstream temperature for time	~ ~ ~	750 230 0.5	C C s	EGT 3 EGT 3	P242D, P242C, P242D, P113A, P242B, P2428 P242D, P242C, P242D, P113A, P242B
	Open Loop	Regen demand	time distance fuel soot	시 시 시	70,200 802 325 44	s miles liters grams	Delta Pressure Sensor	P2459, P2463 P2459, P2463 P2459, P2463 P2453, P2454, P2455
		DOC inlet temperature	upstream DOC temperature for time	<u>/</u>	230 0.5	C s	EGT 1	P0545, P0546, P20E2, P2080
		DPF inlet temperature	DPF upstream temperature or DPF upstream temperature for time	>≓ <= ≥	750 230 0.5	C C s	EGT 3 EGT 3	P242D, P242C, P242D, P113A, P242B, P2428 P242D, P242C, P242D, P113A, P242B
		No Active System Errors	No DTC Pending OR Active	=	P2084, P10CE, P10CD P20CE, P20CB, P20CD P10CC, P0420, P2463, P2033, P2032			
		Exhaust flow rate	exhaust flow rate	≥	13.89	g/sec	Mass Air Flow Sensor	P0101, P0102, P0103
Intake Manifold Pressure	Intake Manifold Pressure Control is enabled	Manifold Pressure controller is active continuously with exceptions for Pending & Confirmed DTCs & under following conditions						
		Manifold Pressure Closed Loop	Manifold pressure dependent on Engine Speed, Commanded Fueling, EGR, and BARO pressure (see Look-Up-Table 25 - 30)				Crank Position Pedal Position 1 & 2	P0335,P0336, P0016 P2122, P2123, P2138, P2127, P2128
		Working Range (Manifold Pressure Open Loop)		¥	Manifold Pressure Closed Loop			

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 Transmission Gear Engine Coolant Pressure Ratio (Manifold Pressure / Barometric Pressure) Modelled Exhaust Gas Pressure / Manifold Pressure Air Mass Engine Speed Gradient Engine Torque Demand Gradient	~ <	Not Active R, 1, 2 -20 130 1.85 0.65 333.33 500 -720	- °C ratio g/sec rpm / sec Nm / sec	Transmission Range Switch Engine Coolant Temperature Sensor Barometric Pressure Manifold Absolute Pressure Sensor Mass Air Flow Sensor Crank Position Pedal Position 1 & 2	P0706, P0708 P0128, P0117, P0118, P008F P2228, P2229, P0106 P0107, P0108, P0106 P0102, P0103, P0101 P0335, P0336, P0016 P2122, P2123, P2138, P2127, P2128
		Exhaust Brake	DFCO Active Vehicle Speed	= >	TRUE 12.42	- mph	Transmission output speed sensor	P0722, P0721
		Exhaust Pressure Control	Start Up Engine Coolant Temperature Intake Air Temperature Engine Coolant PTO Transmission Gear State Brake Pressed Engine Speed Vehicle Speed No DTC Pending OR Active	<	80 4 66 Not Active P, N Not Active 1300 15.53 P0571, P0118, P0117, P0336, P0335, P2123, P2128, P2122, P2127, P007D, P007C	°C °C rpm mph	Engine Coolant Temperature Sensor Intake Air Temperature 2 Engine Coolant Temperature Sensor Park Neutral Switch Brake Pedal Position Sensor Crank Position Transmission output speed sensor	P0128, P0117, P0118, P008F P0097, P0098, P111C P0128, P0117, P0118, P008F P0851, P0852 P057D, P057C, P0335, P0336, P0016 P0722, P0721
Inner Loop - Reneration Temperature Control	Closed Loop	DPF Regeneration demand Active	time distance fuel soot	2	70,200 802 325 44	s miles liters grams	Delta Pressure Sensor	P2459, P2463 P2459, P2463 P2459, P2463 P2453, P2454, P2455
		DOC inlet temperature	upstream DOC temperature upstream DOC temperature for time	~ ~ ~	650 100 0.5	C C s	EGT 1 EGT 1	P0545, P0546, P20E2, P2080, P2428 P0545, P0546, P20E2, P2080
		No Active System Errors	No DTC Pending OR Active	-	P0420, P2463	_		
	Open Loop	DPF Regeneration demand Active	time distance fuel soot	≥	70,200 802 325 44	s miles liters grams	Delta Pressure Sensor	P2459, P2463 P2459, P2463 P2459, P2463 P2453, P2454, P2455

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

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 or	>=	50	%		
			Reductant Pump Module Pressure for time)	>=	200 0.5	kPa sec	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			Reductant Pump Module Pressure Set-point duty cycle for Reductant dosing valve Set-point duty cycle for the Reductant Pump pressure		350 0% 80.00	kPa % %	Reductant Pump Pressure Sensor Reductant Injector Reductant Pump	P204C, P204D, P204B P1048, P2048, P1049, P2049, P2047, P202E P1043, P1044, P208B, P208A, P208D
			Motor actuator 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 Dwell time in Pressure Build up substate system pressurizes in pressure buildup and ventilation states	>	350 10 10	kPa sec counts	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			Set-point duty cycle for Reductant dosing values Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	100 80.00	% %	Reductant Injector Reductant Pump	P1048, P2048, P1049, P2049, P2047, P202E P1043, P1044, P208B, P208A, P208D
			Dwell time in the sub state ventilation NO Pending or Confirmed DTCs:	< =	0.23 see sheet inhibit tables	sec -		
		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 Set-point duty cycle for Reductant dosing valve NO Pending or Confirmed DTCs:	>= =	350 0 see sheet inhibit tables	kPa % -	Reductant Pump Pressure Sensor Reductant Injector	P204C, P204D, P204B P1048, P2048, P1049, P2049, P2047, P202E
		State of Reductant Pressure Control System: Pressure reduction	ignition	=	off	-		
			dwell time in the state of pressure reduction Activation state of Reductant reverting valve power stage	< =	5 On	sec -	Reductant Pump Reverting Valve	P20A2, P1046, P20A3, P20A0, P20A1
			Set-point duty cycle for Reductant dosing valve Set-point duty cycle for the Reductant Pump pressure Motor actuator		0 15.00	% %	Reductant Injector Reductant Pump	P1048, P2048, P1049, P2049, P2047, P202E P1043, P1044, P208B, P208A, P208D
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
	SCR Engine State required	SCR Engine State	Ignition on	=	TRUE			
	for operation		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) State of the defrosting check of supply module (please see the definition)	=	TRUE	-		
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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
			duration, for which the conditions for a hydraulic release reset of pressure line heater circuit are satisfied	<=	1200	sec		
			ambient temperature Release heater pressure line	> =	-4.04 FALSE	°C -	Intake Air Temperature 2	P0097, P0098, P111C
			and duration, for which the conditions for a hydraulic release reset of supply module heater circuit are satisfied	<=	1200	sec		
			ambient temperature Release heater supply module	> =	-4.04 FALSE	°C -	Intake Air Temperature 2	P0097, P0098, P111C
)					
		Status of reductant tank heater	status of reductant tank heater temperature (please					
		temperature	see the definition) Reductant tank heat temperature at Standby state	>	-0.04	°C	Reductant Tank Temperature Sensor	P205D, P205C, P205B
			or Engine off Time Reductant tank heat temperature at Standby state		2147483647 -9.04	sec °C	Reductant Tank Temperature Sensor	P205D, P205C, P205B
					_	_		
		State of the defrosting check of pressure	State of the defrosting check of pressure line (please					
		line	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) Pressure line defrost timer	= =	No Pressure Control 0	- sec		
			or ignition engine speed	= >	on 550	sec rpm	Crank Position	P0335,P0336, P0016
			(Pressure line defrost check in last driving cycle	=	TRUE			
			status of SCR control state (please see the definition) Engine off Time	= >	No Pressure Control 0	- sec		
			NO Pending or Confirmed DTCs:	=	TRUE	-		
		State of the defrosting check of supply	State of the defrosting check of supply module					
		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) Supply module defrost timer	=	No Pressure Control 0	- sec		
			or ignition	= >	on 550	sec	Crank Position	P0335,P0336, P0016
			engine speed (Pressure line defrost check in last driving cycle		TRUE	rpm -	oranici Osluon	
			status of SCR control state (please see the definition)	=	No Pressure Control	-		
			Engine off Time NO Pending or Confirmed DTCs:		0 TRUE	sec		
		The component protection release of the	Current time for beating / not beating of beater signifit	>=	0 to 299	Sec		
		The component protection release of the heater control	Current time for heating / not heating of heater circuit 1 (tank)					
			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	>=	0 to 3276	sec		
			(tank) status of reductant tank heater defrost	=	FALSE			
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-		
-								•

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	=	TRUE	-		
			see the definition)					
			or					
			ignition	=	on 550	sec	Creek Desition	D0225 D0226 D0016
			engine speed Engine off Time	> <=	0	rpm sec	Crank Position	P0335,P0336, P0016
			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 Engine off Time	>	550 0	rpm sec	Crank Position	P0335,P0336, P0016
			State of the defrosting check of pressure line (please see	=	TRUE	-		
			the definition) State of the defrosting check of supply module (please	=	TRUE	-		
			see the definition)					
			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
		Deleges of texts bester sizes it						
		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	>=	0 to 3277	sec		
			Look-Up-Table #17)					
			,					
			((
			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	>=	0 to 3277	sec		
			Look-Up-Table #17)					
			and					
			Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 3276.7	sec		
			Requested heating time for pressure line heater (see Look		0 to 2076 7			
			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	>=	0 to 3277	Sec		
			Look-Up-Table #17)					
) and					
			(Requested defrosting time for supply module heater (see	>=	0 to 3276.7	sec		
			Look-Up-Table #19) or					
			Requested heating time for supply module heater (see Look-Up-Table #21)	>=	0 to 3276.7	sec		
			LOOK-OP-1 ADIE #21)					
			or					
			((Requested defrosting time for Reductant tank heater (see	>=	0 to 14400	sec		
I		l	Look-Up-Table #16)				l	I

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	(>=	0 to 3276.7			
			Requested defrosting time for pressure line heater (see Look-Up-Table #18) or	>=	0 10 3276.7	sec		
			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	-		
		Deleges of teach baster size it	,					
		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					
I	I	I	I (I	I I

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) or	>=	0 to 3276.7	sec		
			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) or	>=	0 to 3276.7	sec		
			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) or		0 to 14400	Sec		
			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) or		0 to 3276.7	sec		
			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	>=	0 to 3276.7	sec		
			Look-Up-Table #19) or Requested heating time for supply module heater (see		0 to 3276.7	sec		
			Look-Up-Table #21))) 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 for time	>	11 2	V sec		
		Status of the battery voltage being in the valid working range for pressure line heater	battery voltage	<	100	V		
			battery voltage for time	>	11 2	V sec		
		Status of Reductant Tank Heater						
		Release	(

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	=	TRUE	-		
			the definition) Waiting time after tank heater release expired	>	0	sec		
)					
			or					
			((
			Waiting time before tank heater released	<	32767	Sec		
			started with status of reductant tank heater temperature (please see	=	FALSE			
			the definition)					
) 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	>	32767	sec		
			started with			360		
			status of reductant tank heater temperature (please see	=	FALSE			
			the definition)					
			and					
) status of reductant tank heater temperature (please see	=	TRUE			
			the definition)					
			Waiting time after tank heater release expired	>	0	sec		
))					
					_	_		
	Reductant Tank Level	status of Reductant tank level	Tank level > full (100%)	=	Full			
	System States and Status		Warning (66.67%) < tank level < full (100%)	=	OK			
			Restriction (33.33%) < tank level < Warning (66.67%)	=	Warning	-		
			Empty < tank level < Restriction (33.33%) Tank level <= 0.1%		Restriction Empty			
				-	Empty	-		
		Status of Reductant tank level reset	(_			
		when refilling is detected (please see the	(
			(time since potential Reductant refill detection is set		12	sec		
		when refilling is detected (please see the	(time since potential Reductant refill detection is set and with		12	sec		
		when refilling is detected (please see the	and with (Derivation of the PT1 filtered level signal (DT1)	>=	1.00	sec %/sec		
		when refilling is detected (please see the	and with (Derivation of the PT1 filtered level signal (DT1) ignition on	>= =	1.00 TRUE	%/sec	Crank Desition	P0226 P0226 - D0146
		when refilling is detected (please see the	and with (Derivation of the PT1 filtered level signal (DT1) ignition on engine speed Vehicle speed) = = >)=	1.00 TRUE 550 6.22		Crank Position Transmission output speed sensor	P0335,P0336, P0016 P0722, P0721
		when refilling is detected (please see the	and with () Derivation of the PT1 filtered level signal (DT1) ignition on engine speed Vehicle speed time since engine started	>= > >= >	1.00 TRUE 550 6.22 (a) * (b)	%/sec - rpm mph		P0335,P0336, P0016 P0722, P0721
		when refilling is detected (please see the	and with Derivation of the PT1 filtered level signal (DT1) ignition on engine speed Vehicle speed time since engine started (a) Time period for a positive slope to detect refueling	>= -> -> = -> -> = =	1.00 TRUE 550 6.22 (a) * (b) 12	%/sec - rpm mph sec		P0335,P0336, P0016 P0722, P0721
		when refilling is detected (please see the	and with (Derivation of the PT1 filtered level signal (DT1) ignition on engine speed Vehicle speed time since engine started (a) Time period for a positive slope to detect refueling (b) Factor for the extension of the detection time for refueling	, , , , , , , , , , , , , , , , , , ,	1.00 TRUE 550 6.22 (a) * (b) 12 20	%/sec - rpm mph sec factor		P0335,P0336, P0016 P0722, P0721
		when refilling is detected (please see the	and with (Derivation of the PT1 filtered level signal (DT1) ignition on engine speed Vehicle speed time since engine started (a) Time period for a positive slope to detect refueling (b) Factor for the extension of the detection time for	, , , , , , , , , , , , , , , , , , ,	1.00 TRUE 550 6.22 (a) * (b) 12	%/sec - rpm mph sec		P0335,P0336, P0016 P0722, P0721
		when refilling is detected (please see the	and with (Derivation of the PT1 filtered level signal (DT1) ignition on engine speed Vehicle speed time since engine started (a) Time period for a positive slope to detect refueling (b) Factor for the extension of the detection time for refueling	, , , , , , , , , , , , , , , , , , ,	1.00 TRUE 550 6.22 (a) * (b) 12 20	%/sec - rpm mph sec factor		P0335,P0336, P0016 P0722, P0721
		when refilling is detected (please see the	and with Derivation of the PT1 filtered level signal (DT1) ignition on engine speed Vehicle speed time since engine started (a) Time period for a positive slope to detect refueling (b) Factor for the extension of the detection time for refueling since the following conditions met: Falling edge of ignition or		1.00 TRUE 550 6.22 (a) * (b) 12 20 TRUE TRUE	%/sec - rpm mph sec factor -		P0335,P0336, P0016 P0722, P0721
		when refilling is detected (please see the	and with () Derivation of the PT1 filtered level signal (DT1) ignition on engine speed Vehicle speed time since engine started (a) Time period for a positive slope to detect refueling (b) Factor for the extension of the detection time for refueling since the following conditions met: (, , , , , , , , , , , , , , , , , , ,	1.00 TRUE 550 6.22 (a) * (b) 12 20 TRUE	%/sec rpm mph sec factor 		P0335,P0336, P0016 P0722, P0721
		when refilling is detected (please see the	and with Derivation of the PT1 filtered level signal (DT1) ignition on engine speed Vehicle speed time since engine started (a) Time period for a positive slope to detect refueling (b) Factor for the extension of the detection time for refueling since the following conditions met: (Falling edge of ignition or Reductant Refill enabling conditions reset timers)))	, , , , , , , , , , , , , , , , , , ,	1.00 TRUE 550 6.22 (a) * (b) 12 20 TRUE TRUE	%/sec rpm mph sec factor 		P0335,P0336, P0016 P0722, P0721
		when refilling is detected (please see the	and with Derivation of the PT1 filtered level signal (DT1) ignition on engine speed Vehicle speed time since engine started (a) Time period for a positive slope to detect refueling (b) Factor for the extension of the detection time for refueling since the following conditions met: Falling edge of ignition or Reductant Refill enabling conditions reset timers))) or	×	1.00 TRUE 550 6.22 (a) * (b) 12 20 TRUE TRUE TRUE	%/sec - rpm mph sec factor - -		P0335,P0336, P0016 P0722, P0721
		when refilling is detected (please see the	and with () Derivation of the PT1 filtered level signal (DT1) ignition on engine speed Vehicle speed time since engine started (a) Time period for a positive slope to detect refueling (b) Factor for the extension of the detection time for refueling since the following conditions met: () Falling edge of ignition or Reductant Refill enabling conditions reset timers))) or time since potential Reductant refill detection is set	×	1.00 TRUE 550 6.22 (a) * (b) 12 20 TRUE TRUE	%/sec rpm mph sec factor 		P0335.P0336, P0016 P0722, P0721
		when refilling is detected (please see the	and with Derivation of the PT1 filtered level signal (DT1) ignition on engine speed Vehicle speed time since engine started (a) Time period for a positive slope to detect refueling (b) Factor for the extension of the detection time for refueling since the following conditions met: Falling edge of ignition or Reductant Refill enabling conditions reset timers))) or time since potential Reductant refill detection is set and with	X = ^ X X = = = = X	1.00 TRUE 550 6.22 (a) * (b) 12 20 TRUE TRUE TRUE	%/sec - rpm mph sec factor - -		P0335,P0336, P0016 P0722, P0721
		when refilling is detected (please see the	and with () Derivation of the PT1 filtered level signal (DT1) ignition on engine speed Vehicle speed time since engine started (a) Time period for a positive slope to detect refueling (b) Factor for the extension of the detection time for refueling since the following conditions met: () Falling edge of ignition or Reductant Refill enabling conditions reset timers)))) or time since potential Reductant refill detection is set and with () Derivation of the PT1 filtered level signal (DT1)	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1.00 TRUE 550 6.22 (a)*(b) 12 20 TRUE TRUE TRUE TRUE 8	%/sec - rpm mph sec factor - -		P0335,P0336, P0016 P0722, P0721
		when refilling is detected (please see the	and with Derivation of the PT1 filtered level signal (DT1) ignition on engine speed Vehicle speed time since engine started (a) Time period for a positive slope to detect refueling (b) Factor for the extension of the detection time for refueling since the following conditions met: Falling edge of ignition or Reductant Refill enabling conditions reset timers))) or time since potential Reductant refill detection is set and with	X = ^ X X = = = = X	1.00 TRUE 550 6.22 (a) * (b) 12 20 TRUE TRUE TRUE	%/sec - rpm mph sec factor - - -		P0335,P0336, P0016 P0722, P0721
		when refilling is detected (please see the	and with Derivation of the PT1 filtered level signal (DT1) ignition on engine speed Vehicle speed time since engine started (a) Time period for a positive slope to detect refueling (b) Factor for the extension of the detection time for refueling since the following conditions met: (Falling edge of ignition or Reductant Refill enabling conditions reset timers (time since potential Reductant refill detection is set and with (Derivation of the PT1 filtered level signal (DT1) filter release for Reductant tank level calculation at ignition	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1.00 TRUE 550 6.22 (a)*(b) 12 20 TRUE TRUE TRUE TRUE 8	%/sec - rpm mph sec factor - - -		P0335,P0336, P0016 P0722, P0721

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	-		
			(please see the definition) 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) and	=	TRUE	-		
			((ambient temperature	>=	-100.04	°C	Intake Air Temperature 2	P0097, P0098, P111C
			status of reductant tank heater temperature (please see	=	FALSE	-		10001, 10000, 11110
			the definition)			sec		
			Waiting time before tank heater released and	<	32767			
			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 and	>=	32767	sec		
			status of reductant tank heater temperature (please see	=	TRUE	-		
			the definition) 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
)					
			filter release for Reductant tank level calculation at ignition	=	TRUE	-		
			on on (Please see the definition)					
		Status of Filter release for reductant tank level calculation						
			Reductant tank Temperature or	>=	-100.04	°C	Reductant Tank Temperature Sensor	P205D, P205C, P205B
			Reductant low warning level (Please see the definition) NO Pending or Confirmed DTCs:	>= =	0 TRUE	-		
			Frozen state is active during a certain warning level		TRUE	-		
			(please see the definition)	=	TRUE	-		
		Filter release for Reductant tank level	ignition	=	on	·		
		calculation at Ignition on	Engine on timer is expired (please see the definition)	=	FALSE	-		
			Vehicle speed Reductant low warning level (Please see the definition)	>= >=	0.62 49	mph level	Transmission output speed sensor	P0722, P0721
			and with					
			Raw Reductant tank level	>=	33.3	%		
			and with (
			Remaining Reductant quantity (a) - (b): (a) Tank level for reserve mode (Restriction level) in [g]	< =	(a) - (b) 2614	g		
	l	I		l		-		I I

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) Tank level for reserve mode (Warning level) in [g]	< =	(a) - (b) 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 ((-) (1-)			
			Remaining Reductant quantity (a) - (b): (a) Tank level for reserve mode (Warning level) in [g]	>= = =	(a) - (b) 5279 1617	g		
			(b) Tank level threshold range below WARNING threshold for ignition on refill detection release	=	1617	g		
))					
		Status of Refill detection of Reductant	Status of Refill detection of Reductant tank (please see					
		tank	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	-		
))					
			() () Captured Reductant tank level at last tank level change	=	Warning			
				-	warning	-		
			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	=	ОК	-		
			status of Reductant tank level (please see the definition)	=	Full	-		
))					
		Engine on timer is expired	time since engine started	>=	(a) * (b)	sec		
		I	l	l	12	sec	l	I I

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
			and with		20	•		
			((ignition	=	on	sec		
			engine speed	>	550 6.22	rpm	Crank Position	P0335,P0336, P0016 P0722, P0721
			Vehicle speed)	>=	0.22	mph	Transmission output speed sensor	P0722, P0721
			or (
			Vehicle speed NO Pending or Confirmed DTCs:	>= =	6.22 TRUE	mph	Transmission output speed sensor	P0722, P0721
			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	-		
	Warning States	normal operation	and with					
			Warning level	<=	49	-		
			or (
			Previous warning level vehicle speed	> <=	49 98.75	- mph	Transmission output speed sensor	P0722, P0721
))					
			or Reductant Quality state	>	0	-		
			-					
		Warning_Leve1: 1 decimal, Warning	Reductant tank level	<	Full			
		level 1	Remaining mileage	>	1558.75	miles		
			and with (
			Warning level	<=	49	Warning level		
			or			10101		
			Previous warning level	>	49	Warning		
			vehicle speed	<=	98.75	level 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 and with	<=	1558.75	miles		
) Warning level	<=	49	Warning		
			or			level		
			Previous warning level	>	49	Warning		
			vehicle speed	<=	98.75	level	Transmission output speed sensor	P0722, P0721
)) and with	~-	55.15	трп	rianamaaan ouput apeeu aenaul	
			and with Reductant Quality state	=	0	-		
I	I							

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	-		
		ievel 3	Remaining mileage and with	>	855	miles		
			(Warning level	=	2	Warning level		
			or Warning level	=	16	Warning level		
) and with initialization phase after Reductant refill event is active Reductant Quality state	= =	TRUE 0	-		
						_		
		Warning_Level4: 32 decimal, Warning	Reductant tank level	<	Full	-		
		level 4	Remaining mileage and with	<=	855	miles		
			(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 Remaining mileage	< <=	Full 628.75	- miles		
			and with (Warning level	<=	49	Warning		
			or (10	level		
			Previous warning level	>	49	Warning level		
			vehicle speed))) or	<=	98.75	mph	Transmission output speed sensor	P0722, P0721
			(Warning level	=	48	Warning		
			initialization phase after Reductant refill event is active		TRUE	level		
))	_	HIGE	-		
			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		
			Failed Reductant system pressure build up		1	level		
)) and with					
I	I	1	Reductant Quality state	=	0	-	l	I I

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	Warning level	=	112	Warning		
		speed restriction aggressive	initialization phase after Reductant refill event is active	=	TRUE	level		
			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 and with	=	TRUE	-		
			Reductant Quality state	=	0			
		Warning_Level14: 176 decimal, Vehicle	Warning level	=	176	Warning		
		speed restriction final	initialization phase after Reductant refill event is active	=	TRUE	level		
			and with Reductant Quality state	=	0			
					_	-		
	Reductant frozen System States	Frozen state is active during a certain warning level	ignition	=	On	-		
	States		for time Reductant tank Temperature	> <=	5 -9.04	sec °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 Vehicle speed	= >	On or Defrost 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 Dwell time in Pressure Build up substate	< >	350 10	kPa sec	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			system pressurizes in pressure buildup and ventilation states	>=	10	counts		

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)

P0101	AFS	_rAirThresL	.o_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								
	120 240	0.8 0.8	0.8 0.8	0.8 0.8	0.8 0.8	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								
	380	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8								
P2199	Air_t	DiffMaxHiT	AFS_CUF	R													
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
P10CF	Air_t	DiffMaxHiT	CACDs_C	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
P040F	Air_t	DiffMaxHiT	EGRCIr2E	Ds_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
P2199	Air_t	DiffMaxLoT	AFS_CUI	R													
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
P10CF	Air_t	DiffMaxLoT	CACDs_0	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
P040F	Air_t	DiffMaxLoT	EGRClr2I	Ds_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
P0401	AirC	tl_facEnvPr	esMinDvt	_CUR													
Ambient Pressure (kPa)		70	75	80	82.5	87.5	90	97.5	100								

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

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

11 P0400

AirCtl_mMaxDvtPwr_MAP

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

12 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

13 P2138

APP_uSync_CUR

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

14 P057B

Brk_facEWMASlowTest_CUR

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

15 P008F

CEngDsT_tDiffMaxHi_CUR

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

Table no.	Fault Codes	Label (Internal N	<i>l</i> lanufact	turer Re	ference)												
16	P008F	CEngDsT_tDiffM	axLo_CU	JR													
	Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	17999	18000	28799	28800	30000	32767
	Delta Temperature (°C)	999	999	999	999	999	999	999	999	999	999	999	999	999	20	20	20
17	P0336	EpmCrS_facGap	PlausHig	gh_CA													
	-	8 5	5.8125	3.375	3.375												
18	P0336	EpmCrS_facIncF	PlausHigh	n_CA													
	-	2 1	.8125	1.5	1.5												
19	P02CD, P02CF, P02D1, P02D3, P02D5, P02D7, P02D9, P02DB	ETClb_pRailSet_	CA														
	Rail Pressure Setpoint (kPa)	30000	70000	90000													
20	P02CD, P02CF, P02D1, P02D3, P02D5, P02D7, P02D9, P02DB	ETClb_tiET_MA>															
	Injector Energizing Time (usec)	670.8	384.4	353.2													
21	P01CD, P01CF, P01D1, P01D3, P01D5, P01D7, P01D9, P01DB	ETClb_tiETFbOfs	sMax_CA	A													
	Injector Energizing Time (usec)	16	12	10													
22	P01CD, P01CF, P01D1, P01D3, P01D5, P01D7, P01D9, P01DB	ETClb_tiETFbOfs															
	Injector Energizing Time (usec)	16	12	10													
23	P144B	ETCtl_stPOpCtV	·														
	Injection Qty (mm^3/rev) / Engine Speed (rpm)	750	000	2250	2000												
		0 0	900 1 1 1 0	2250 1 1 1 0	3000 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

25 P24A0

ETCtlHCl_stPOpCtVHClLopMaxInjMs_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	700	900	2250	3000
	0 0	1	1	1
4	0 0	1	1	1
16	0 0	1	1	1
20	0 0	1	1	1

26 P24A1

ETCtlHCI_stPOpCtVHCILopMinInjMs_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	700	900	2250	3000
	0 0	1	1	1
4	0 0	1	1	1
16	0 0	1	1	1
200	0 0	1	1	1

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

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

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

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)	999 999 999 999 999 999 999 999 999 999 999 999 999 999 999 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
	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 0.6 0.95 1 0.95 0.9
	P0483	
	Intake Air Temperature (°C) factor (-)	-8.04 -7.04 -0.04 9.96 14.96 19.96 44.96 69.96 99.96 0 0.6 0.62 0.7 0.8 1 1 0.9
36	P0495	FanCtl_nDiaHiSpd_CUR
	Fan Drive Speed (rpm) Fan Speed (rpm)	400 1200 1500 1600 1800 2000 2400 2800 3200 3600 4000 4400 4800 5200 5600 6000 6800 400 1200 1450 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 0.005 0.0055 0.006 0.011 0.011 0.011 0.011 0.011 0.0115 0.0105 0.0105 0.0105 0.0115 0.011 0.0115
	Clutch Fluid Vol (L)	0.005 0.0055 0.006 0.011 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
	P0263, P0266, P0269, P0272, P0275, P0278, P0281, P0284	
	ECT (°C) / Inj. Qty (mm^3/rev)	0 8 52 76 448 464 472 480
	-40.04 103.96	0 0 -48 -68 -68 -68 -68 -68 0 0 -48 -68 -68 -68 -68 -68
	103.90	
	105.96	

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	I 0	0	48	68	68	68	68	68
103.9	6 0	0	48	68	68	68	68	68
104.9	6 0	0	48	68	68	68	68	68
105.9	6 0	0	48	68	68	68	68	68
106.9	6 0	0	48	68	68	68	68	68
107.9	6 0	0	48	68	68	68	68	68
109.9	6 0	0	48	68	68	68	68	68
134.9	6 0	0	48	68	68	68	68	68

43 P0171, P0172, P026C, P026D

FMO_facObsvrCmpnProtnRels_MAP

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

44 P026D

FMO_qFISysThresMax_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

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 Codes47P0171

Label (Internal Manufacturer Reference)

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
84	99.609375	99.609	99.609	99.609	99.609	99.609	99.609	99.609
88	11.71875	11.719	11.719	11.719	11.719	11.719	11.719	11.719
200	11.71875	11.719	11.719	11.719	11.719	11.719	11.719	11.719
300	11.71875	11.719	11.719	11.719	11.719	11.719	11.719	11.719
400	11.71875	11.719	11.719	11.719	11.719	11.719	11.719	11.719
500	11.71875	11.719	11.719	11.719	11.719	11.719	11.719	11.719
600	11.71875	11.719	11.719	11.719	11.719	11.719	11.719	11.719
700	11.71875	11.719	11.719	11.719	11.719	11.719	11.719	11.719

Table no.	Fault Codes	Label (Interna	I Manufac	turer Re	ference)				
55	P0606	MoFInjQnt_tiZ	FCETMax	_CUR					
	Rail Pressure (kPa)	20000	30400	70400	90400	120000	120800		
	Energizing Time (us)	500	500	300	256	50	50		
56	P0606	MoFInjQnt_tiZ	FCETMin_	CUR					
	Rail Pressure (kPa)	20000	30400	70400	90400	120000	120800		
	Energizing Time (us)	-500	-500	-300	-256	-50	-50		
57	P0606	MoFOvR_nEn	gStrtThres	_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
58	P0606 Engine Speed (rpm)	MoFOvR_tiLim	ET_CUR	2040	4000				
	Energizing Time (us)	6000	6000	200	200				
59	P2263 Environmental Pressure (kPa) factor (-)	PCR_facMaxU 70 0.900024	IndrBstDvt 75 0.9	_CUR 80 0.95	85 0.95	<u>90</u> 1	95	100 1	<u>112.5</u> 1
60	P0234	PCR_facPres	DvtCorMin <u></u>	_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
61	P0299	PCR_pMaxDv	_						
	Injection Qty (mm^3/rev) / Engine Speed (rpm)	0	1300	1500	1600	1800	2000	2500	3000
	140		21 24	19 22	19 22	20 22.5	25 25	25 25	25 25
	200		24	22	22	22.5	25	25	25 25
	240	++	30	28	25	22.5	27.5	27.5	27.5
	280		33	31	31	27.5	28	28	28
	320		36	34	34	30	30	30	30
	360		36	35	35	35	35	35	35
	400	40	40	40	40	40	40	40	40

Table no.Fault Codes62P0234

Label (Internal Manufacturer Reference)

PCR_pMinDvt_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)		0	1500	1600	1700	1800	2000	2500	3000
	40	-10	-10	-10	-10	-10	-11.7	-27	-31.5
	60	-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
	100	-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 Codes69P0088	Label (Internal Manufacturer Reference) Rail_pMeUnDvtMin_CUR
Engine Speed (rpm) Rail Pressure (kPa)	580 630 -80000 -18000
70 P128E	Rail_pMeUnFltMin_CUR
Engine Speed (rpm) Rail Pressure (kPa)	580 630 0 15000
71 P0087	Rail_pPCVDvtMax_CUR
Engine Speed (rpm) Rail Pressure (kPa)	580 630 80000 11000
72 P128E	Rail_pPCVFltMin_CUR
Engine Speed (rpm) Rail Pressure (kPa)	580 630 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	C
60	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	(
80	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	(
120	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	(
160	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	(
200	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	(
200.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	C
204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	C
240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	C

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

P20EE		Label (Interna SCRChk_mEs			lerencej						
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		
P20EE		SCRChk_mEs	stNH3LdN	lin_CUR							
SCR Temperature (°C)		249.96		264.96	269.96	279.96	289.96				
Ammonia Load (g)		0.75	0.65	0.55	0.45	0.35	0.25	0.15	0.05		
P20EE		SCRChk_mNI	H3LdD∨t№	lax_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		
P20EE		SCRChk mNI									
		SCRChk_mNI		_							
SCR Temperature (°C) Ammonia Load (g)		249.96 -0.5		269.96 -0.45	279.96 -0.4	289.96	299.96 -0.1	309.96 -0.1	319.96 -0.1		
P11CC		SCRChk_rNO	xDiffThres	BasMinU	s_GMAP						
P11CC Injection Qty (mm^3/rev) / Engine Speed (rpm)		1100	1199	1200	1400	1600	1800	2000	2001	2200	:
	40	1100 -1	1199 -1		1400	-1	1800 -1 -1	2000 -1 -1	2001 -1 -1	2200 -1 -1	
	40 60 79.6	1100 -1 -1 -1 -1	1199 -1 -1 -0.5358	1200 -1 -1 -0.5358	1400 -1 -1 -0.5233	-1 -1 -0.4972	-1 -1 -0.549	-1 -1 -0.4863	-1	-1 -1 -1	
	40 60 79.6 80	1100 -1 -1 -1 -1 -1	1199 -1 -1 -0.5358 -0.5358	1200 -1 -1 -0.5358 -0.5358	1400 -1 -1 -0.5233 -0.5233	-1 -1 -0.4972 -0.4972	-1 -1 -0.549 -0.549	-1 -1 -0.4863 -0.4863	-1 -1 -0.4863 -0.4863	-1 -1 -1 -1	
	40 60 79.6 80 120	1100 -1 -1 -1 -1 -1 -1	1199 -1 -0.5358 -0.5358 -0.5674	1200 -1 -0.5358 -0.5358 -0.5674	1400 -1 -0.5233 -0.5233 -0.5975	-1 -1 -0.4972 -0.4972 -0.5458	-1 -1 -0.549 -0.549 -0.5417	-1 -1 -0.4863 -0.4863 -0.5541	-1 -0.4863 -0.4863 -0.5541	-1 -1 -1 -1 -1	
	40 60 79.6 80	1100 -1 -1 -1 -1 -1	1199 -1 -0.5358 -0.5358 -0.5674 -0.5092	1200 -1 -0.5358 -0.5358 -0.5674 -0.5092	1400 -1 -1 -0.5233 -0.5233	-1 -1 -0.4972 -0.4972	-1 -1 -0.549 -0.549	-1 -0.4863 -0.4863 -0.5541 -0.5643	-1 -1 -0.4863 -0.4863	-1 -1 -1 -1	
	40 60 79.6 80 120 160 200 200.04	1100 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	1199 -1 -0.5358 -0.5358 -0.5674 -0.5092 -0.5237 -0.5237	1200 -1 -0.5358 -0.5358 -0.5674	1400 -1 -0.5233 -0.5233 -0.5975 -0.5607 -0.561 -0.561	-1 -0.4972 -0.4972 -0.5458 -0.5867 -0.5796 -0.5796	-1 -0.549 -0.549 -0.5417 -0.5824	-1 -0.4863 -0.4863 -0.5541 -0.5643 -0.5643 -0.5643	-1 -0.4863 -0.4863 -0.5541 -0.5643 -0.5643	-1 -1 -1 -1 -1 -1 -1 -1 -1	
	40 60 79.6 80 120 160 200 200.04 204	1100 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	1199 -1 -0.5358 -0.5358 -0.5674 -0.5092 -0.5237 -0.5237 -1	1200 -1 -0.5358 -0.5358 -0.5674 -0.5092 -0.5237 -0.5237 -1	1400 -1 -0.5233 -0.5233 -0.5975 -0.5607 -0.561 -0.561 -0.561 -1	-1 -0.4972 -0.4972 -0.5458 -0.5867 -0.5796 -0.5796 -1	-1 -0.549 -0.549 -0.5417 -0.5824 -0.5466 -0.5466 -1	-1 -0.4863 -0.4863 -0.5541 -0.5643 -0.5643 -0.5643 -0.5643 -1	-1 -0.4863 -0.4863 -0.5541 -0.5643 -0.5643 -0.5643 -0.5643 -1	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1	
	40 60 79.6 80 120 160 200.04 200.04 204 240	1100 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	1199 -1 -0.5358 -0.5358 -0.5674 -0.5092 -0.5237 -0.5237 -1 -1 -1	1200 -1 -0.5358 -0.5358 -0.5674 -0.5092 -0.5237 -0.5237 -1 -1 -1	1400 -1 -0.5233 -0.5233 -0.5975 -0.5607 -0.561 -0.561 -1 -1 -1	-1 -0.4972 -0.4972 -0.5458 -0.5867 -0.5796 -0.5796	-1 -0.549 -0.549 -0.5417 -0.5824 -0.5466 -0.5466	-1 -0.4863 -0.4863 -0.5541 -0.5643 -0.5643 -0.5643	-1 -0.4863 -0.4863 -0.5541 -0.5643 -0.5643 -0.5643	-1 -1 -1 -1 -1 -1 -1 -1 -1	
Injection Qty (mm^3/rev) / Engine Speed (rpm)	40 60 79.6 80 120 160 200.04 200.04 204 240	1100 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	1199 -1 -0.5358 -0.5358 -0.5674 -0.5092 -0.5237 -0.5237 -1 -1 -1	1200 -1 -0.5358 -0.5358 -0.5674 -0.5092 -0.5237 -0.5237 -1 -1 -1	1400 -1 -0.5233 -0.5233 -0.5975 -0.5607 -0.561 -0.561 -1 -1 -1	-1 -0.4972 -0.4972 -0.5458 -0.5867 -0.5796 -0.5796 -1	-1 -0.549 -0.549 -0.5417 -0.5824 -0.5466 -0.5466 -1	-1 -0.4863 -0.4863 -0.5541 -0.5643 -0.5643 -0.5643 -0.5643 -1	-1 -0.4863 -0.4863 -0.5541 -0.5643 -0.5643 -0.5643 -0.5643 -1	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1	
Injection Qty (mm^3/rev) / Engine Speed (rpm)	40 60 79.6 80 120 160 200.04 200.04 204 240	1100 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	1199 -1 -1 -0.5358 -0.5358 -0.5674 -0.5092 -0.5237 -0.5237 -1 -1 -1 -1	1200 -1 -0.5358 -0.5358 -0.5674 -0.5092 -0.5237 -0.5237 -1 -1 -1	1400 -1 -0.5233 -0.5233 -0.5975 -0.5607 -0.561 -0.561 -1 -1 -1	-1 -0.4972 -0.4972 -0.5458 -0.5867 -0.5796 -0.5796 -1	-1 -0.549 -0.549 -0.5417 -0.5824 -0.5466 -0.5466 -1	-1 -0.4863 -0.4863 -0.5541 -0.5643 -0.5643 -0.5643 -0.5643 -1	-1 -0.4863 -0.4863 -0.5541 -0.5643 -0.5643 -0.5643 -0.5643 -1	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1	
Injection Qty (mm^3/rev) / Engine Speed (rpm)	40 60 79.6 80 120 160 200.04 204 240	1100 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 SCRChk_stE> -0.04	1199 -1 -0.5358 -0.5358 -0.5674 -0.5092 -0.5237 -1 -1 -1 chTempRl 88.96 1	1200 -1 -0.5358 -0.5358 -0.5674 -0.5092 -0.5237 -0.5237 -1 -1 sUsPlaus	1400 -1 -0.5233 -0.5233 -0.5975 -0.5607 -0.561 -0.561 -1 -1 -1	-1 -0.4972 -0.4972 -0.5458 -0.5867 -0.5796 -0.5796 -1	-1 -0.549 -0.549 -0.5417 -0.5824 -0.5466 -0.5466 -1	-1 -0.4863 -0.4863 -0.5541 -0.5643 -0.5643 -0.5643 -0.5643 -1	-1 -0.4863 -0.4863 -0.5541 -0.5643 -0.5643 -0.5643 -0.5643 -1	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1	

Table no.	Fault Codes
83	P20EE

Label (Internal Manufacturer Reference)

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

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

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

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

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
6	5 850	800	735	735	735	735	675	600
7	0 850	800	735	735	735	735	675	600
7	5 850	800	735	735	735	735	675	600
8	0 850	800	735	735	735	735	675	600
8	5 850	800	735	735	735	735	675	600
9	0 834	790	720	720	720	720	660	600
9	5 834	790	720	720	720	720	660	600
10	0 834	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, ZFC_stGearRls_CA P01CF, P01CC, P01CE, P01D8, P01DA, P01D2, P01D4, P01D6, P01D0

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, ZFC_tiCldCham_CUR P01CF, P01CC, P01CE, P01D8, P01DA, P01D2, P01D4, P01D6, P01D0

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

Table no. Status or State

Label (Internal Manufacturer Reference)

1 Status of NOx signal of upstream NOx sensor

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			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

DewDet_wThresLSU0_MAP

2 Status of NOx signal of downstream NOx sensor DewDet_wThresLSU1_MAP

ECT at Start (°C) / Modeled Exhaust Wall Temp (°C) 19.96 89.96 109.96 -40.14 -30.04 -20.04 -10.04 -0.04 39.96 59.96 -40.14 -30.04 -20.04 -10.04 -0.04 9.96 19.96 39.96 59.96 79.96

Status thermal regeneration active

PFltLd_dmSotSimRgnBas_CUR

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

4 Status thermal regeneration active

PFltLd_facO2SimRgn_MAP

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

Table no.Status or State5Status thermal regeneration active

7

Label (Internal Manufacturer Reference)

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

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

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

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

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

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
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
2800		1	1	1	1	1	1	1	1	1	1	1
3100	1	1	1	1	1	1	1	1	1	1	1	1

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

12 Request for pre controlled dosing

SCRFFC_stNQntCurrMid_MAP

Engine Speed (rpm) / Injection Qty. (mm^3/rev)	26	34	40	48	54	64	80	102	120	180	200	200.4
800	2	2	2	2	3	10	10	10	10	10	10	10
1200	10	10	10	10	10	10	10	10	10	10	10	10
1400	10	10	10	10	10	10	10	10	10	10	10	10
1475	10	10	10	8	7	4	4	2	2	2	2	10
1700	10	10	10	8	7	4	2	2	2	2	2	10
2000	10	10	10	8	7	4	2	2	2	2	2	10
2200	10	10	8	6	4	2	2	2	2	2	2	1(
2400	10	10	8	6	4	2	2	2	2	2	2	10
2600	10	8	6	4	3	2	2	2	2	2	2	10
2800	10	8	5	4	3	2	2	2	2	2	2	10
3000	10	8	5	4	3	2	2	2	2	2	2	10
3200	10	8	7	5	4	4	4	4	4	4	5	10

13 Request for pre controlled dosing

SCRFFC_stNQntCurrSeaLvI_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

Table no.	Status or State
14	Engine Running

Label (Internal Manufacturer Reference)

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_tUDosVIvCoPrActv_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)

AirCtl_tiDbShOffExtdIdl_MAP

22 EGR Closed Loop - Overlong Idle Time Delay

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

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 (°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 (°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									

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									

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									

31 FBC Closed Loop Fuel Quantity

FBC_qGvrnThresMax_CUR

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

P0101 - Mass Air Flow Sensor Performance P0402 - Exhaust Gas Recirculation P2403 - Exhaust Gas Recirculation Performance P0402 - Exhaust Gas Recirculation P2403 - Exhaust Gas Recirculation P2404 - Exhaust Gas Recirculation P2403 - Exhaust Gas Recirculatio	Active DTC				Inhibited DTCs					
PNRF PNRF <th< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>•</th></th<>										•
Const Grain Outcode Understand Float Participants Post Participan										
Control Constructive Voltage P006: To Concentry E1/19: 1000-0014/2 Outlettexin Porter to control Porter to control <th>Control Circuit</th> <th>Overboost</th> <th>Underboost</th> <th>Flow Insufficient</th> <th>Flow Excessive</th> <th></th> <th></th> <th></th> <th></th> <th></th>	Control Circuit	Overboost	Underboost	Flow Insufficient	Flow Excessive					
Outcode Undersonal Pair Indersonal										
ProDE ProDE <th< th=""><th></th><th></th><th></th><th>P0401 - Exhaust Gas Recirculation Flow Insufficient</th><th></th><th></th><th></th><th></th><th></th><th></th></th<>				P0401 - Exhaust Gas Recirculation Flow Insufficient						
Note: File Point - House tage Root lange Poin	P006E - Turbocharger Boost High	P0234 - Turbocharger Engine		P0401 - Exhaust Gas Recirculation						
Option Clock if By Values Order Cools Flow Excessive Performance Performance Performance Performance Part Excessive Performance Part Excessive						P2510 - ECM Power Relay Circuit	1			
Stemacy Clocal Low Voltage Ownchool Underboard Prove Insufficient Prove Insufficient Prove Insufficient Prove Insufficient Sensor 1 Performance Sensor 1 Performance Sensor 2 Performance Sensor 3 Performance Sensor 3 Performance Sensor 3 Performance Sensor 4 Performance										_
Sense Clock High Voltage Out-cod Underboard Flow Insufficient Flow Excessive Sensor 1 Performance Sensor 3 Performance Sensor 4 Performance 9000F - English Amplitude (CD) Fueld POID Flow Insufficient P200F - English Amplitude (CD) Fueld POID Flow English Amplitude (CD) Fueld Point - English Amplitude (CD) Fueld (
PD02F Englished AF Provides P1001 Mass AF Provides P200F Englished AF Provides										
Sensor 2 Forduit Low Sensor 2 Performance Sensor 2 Performance Sensor 4 Performance Sensor 4 Performance Period - Estatual Temperature	P008F - Engine Coolant Temperature (ECT)-Fuel					·	·	•		
P0006 Product Temperature Sensor 2 Performance P2004 - Exhaust Temperature Sensor 2 Performance P2004 - Exhaust Temperature Sensor 2 Performance P2004 - Exhaust Temperature Sensor 2 Performance P2005 - Exhaust Temperature Sensor 2 Performance P2006 - Exhaust Temperature Sensor 2 Performance P2008 - Exhaust Temperature Sensor 2 Performance P2028 - Exhaust Temperature										
P0002-FreeIng Pressure Regulator 1 High Control Fight Votage P2510 - ECM Power Relay Circuit Participance P2510 - ECM Power Relay Circuit Participance P2510 - ECM Power Relay Circuit Participance P2010 - Exhaust Case Recirculation Flow Insufficient P1120 - NOX Sensor Performance - Signal Hugh Each Votage P2020 - Exhaust Temperature Sensor 1 Performance P2020 - Exhaust Temperature Sensor 2 Performance P2020 - Exhaust Temperature Sen	P0098 - Intake Air Temperature	P2080 - Exhaust Temperature	P2084 - Exhaust Temperature	P242B - Exhaust Temperature	P246F - Exhaust Temperature	1				
P0101 - Mass Air Flow Sensor Performance P0402 - Exhaust Gas Recirculation Poto - Exhaust Gas Recirculation Performance P0202 - Lexiaust Gas Recirculation P0202 - Exhaust Gas Recirculation P2002 - Exhaust Gas Recirculation P2002 - Exhaust Gas Recirculation P2002 - Exhaust Gas Recirculation P2002 - Exhaust Gas Recirculation P2002 - Exhaust Gas Recirculation P2002 - Exhaust Gas Recirculation P2002 - Exhaust Gas Recirculation P2002 - Exhaust Gas Recirculation P2002 - Exhaust Gas Recirculation P2002 - Exhaust Gas Recirculation P2002 - Exhaust Gas Recirculation P2002 - Exhaust Gas Recirculation P2002 - Exhaust Gas Recirculation P2003 - Exhaust Gas Recirculation P2002 - Exhaust Gas Recirculation P2003 - Exhaust Gas Recirculation P2002 - Exhaust Gas Recirculation P2003 - Exhaust Gas Recirculation P2002 - Exhaust Gas Recirculation P2003 - Exhaust Gas Recirculation P2003 - Exhaust Gas Recirculation P2003 - Exhaust Gas Recirculation P2003 - Exhaust Gas Recirculation P2003 - Exhaust Gas Recirculation P2003 - Exhaust	P00CA - Fuel Pressure Regulator 1 High Control Circuit High	P2510 - ECM Power Relay Circuit	Sonor 2 Fondmands	Control of Portormando						
P2459 - Dises/ Particulate Filter Regeneration Frequency P2467 - Exhaust Temperature Sensor 4 Performance P2467 - Exhaust Temperature Low P2467 - Exhaust Temperature hightion Control At Limit - Flow Too hightion P0102 - Mass Air Flow Sensor P0243 - Turbocharger Engine Overboost P0243 - Turbocharger Engine Underboost P0401 - Exhaust Gas Recirculation Flow Insufficient P2080 - Exhaust Temperature Sensor 1 Performance P2084 - Exhaust Temperature Sensor 2 Performance P2428 - Exhaust Temperature Sensor 3 Performance P2428 - Exhaust Temperature Sensor 4 Performance P248				Signal High Bank 1 Sensor 1	Signal Low Bank 1 Sensor 1					P2453 - Diesel Particulate Filter Differential Pressure Sensor Performance
Clicuit Low Performance Overboost Underboost Flow Insufficient Flow Insufficient Flow Insufficient Flow Insufficient Provide States Sensor 2 Performance Sensor 2 Performance Sensor 4 Performance Sensor 4 Performance Sensor 4 Performance Sensor 4 Performance Provide States		Regeneration Frequency	Sensor 4 Performance	Injection Control At Limit - Flow Too Low	Injection Control At Limit - Flow Too High					
Circuit High Performance Overboost Underboost Flow Insufficient Flow Excessive Sensor 1 Performance Sensor 2 Performance										P246F - Exhaust Temperature Sensor 4 Performance
Pressure Sensor Performance Performance Overboost Underboost Flow Insufficient Flow Excessive P0107 - Manifold Absolute Pressure (MAP) Sensor Circuit Low Voltage P0106 - Manifold Absolute Pressure P2428 - Exhaust Temperature Pressure (MAP) Sensor Circuit High Voltage P0106 - Manifold Absolute Pressure P2428 - Exhaust Temperature Pressure (MAP) Sensor Circuit High Voltage P0106 - Manifold Absolute Pressure P2428 - Exhaust Temperature Sensor 3 Performance P0208 - Exhaust Temperature Sensor 3 Performance P0208 - Exhaust Temperature Sensor 3 Performance P2263 - Turbo B Performance P0208 - Exhaust Temperature Sensor 3 Performance P2208 - Exhaust Temperature Sensor 3 Performance P2208 - Exhaust Temperature Sensor 3 Performance P2263 - Turbo B Performance P0108 - Manifold Absolute Pressure (MAP) Sensor Circuit High Voltage P0106 - Manifold Absolute Pressure Sensor 3 Performance P024 - Turbocharger Engine Underboost P0401 - Exhaust Gas Recirculation Flow Insufficient P0402 - Exhaust Gas Recirculation										P246F - Exhaust Temperature Sensor 4 Performance
P0107 - Manifold Absolute Pressure (MAP) Sensor Creating Low Voltage P0101 - Mass Air Flow Sensor Performance P0106 - Manifold Absolute Pressure Sensor Performance P0234 - Turbocharger Engine Overboost P0401 - Exhaust Gas Recirculation Flow Insufficient P0402 - Exhaust Gas Recirculation Flow Insufficient P0402 - Exhaust Gas Recirculation Flow Excessive P0208 - Exhaust Temperature Sensor 1 Performance P2084 - Exhaust Temperature Sensor 2 Performance P2084 - Exhaust Temperature Sensor 2 Performance P2084 - Exhaust Temperature Sensor 4 Performance P2084 - Exhaust Gas Recirculation Flow Insufficient P0401 - Exhaust Gas Recirculation Flow Insufficient P0402 - Exhaust Gas Recirculation Flow Insufficient								·		· · · · · · · · · · · · · · · · · · ·
Low Voltage P2428 - Exhaust Temperature Sensor 3 Performance P2426 - Exhaust Temperature Sensor 4 Performance P2426 - Exhaust Temperature Sensor 4 Performance P2426 - Exhaust Temperature Sensor 4 Performance P2023 - Turbo Charger Engine Underboost P0401 - Exhaust Gas Recirculation Flow Insufficient P0402 - Exhaust Gas Recirculation Flow Excessive P2020 - Exhaust Temperature Sensor 1 Performance P2023 - Turbo Charger Engine Overboost P0401 - Exhaust Gas Recirculation Flow Insufficient P0402 - Exhaust Gas Recirculation Flow Excessive P2020 - Exhaust Temperature Sensor 1 Performance P2028 - Exhaust Temperature Sensor 4 Performance P2028 - Exhaust Temperature Sensor 4 Performance P2028 - Exhaust Gas Recirculation Flow Insufficient P0401 - Exhaust Gas Recirculation Flow Excessive P2028 - Exhaust Temperature Sensor 1 Performance P2028 - Exhaust Temperature Sensor 4 Performance P2028 - Exhaust Gas Recirculation Flow Excessive P2028 - Exhaust Temperature Sensor 3 Performance P2028 - Exhaust Temperature Sensor 4 Performance P2028 - Exhaust Gas Recirculation Flow Excessive P2028 - Exhaust Temperature Sensor 4 Performance P2028 - Exhaust Temperat	P0107 - Manifold Absolute									P2263 - Turbo Boost System 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 Underboost P0401 - Exhaust Gas Recirculation Flow Insufficient P0402 - Exhaust Gas Recircu	Low Voltage					·		·		·
High Voltage P242B - Exhaust Temperature Sensor 3 Performance P246F - Exhaust Temperature Sensor 4 Performance P246F - Exhaust Temperature P266F - Exhaust Temperature Sensor 4 Performance P246F - Exhaust Temperature P266F - Exhaust Temperature P267F - Ex										P2263 - Turbo Boost System Performance
	High Voltage				•	•	•	•	•	·
	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	(EGR) Temperature Sensor 1-2	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
					(EGR) Temperature Sensor 1-2					P246F - Exhaust Temperature Sensor 4 Performance
P0106 - Manifold Absolute Pressure P0191 - Fuel Rail Pressure Sensor P0234 - Turbocharger Engine Overboost P0233 - 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 P0278 - Cly 6 Balance System P0278 - Cly 6 Balance System P0279 - Cly 4 Balance System P0275 - Cly 5 Balance System P0278 - Cly 6 Balance Sys					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
P011r - Engine Coolant 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 1 Misfire Detected P0303 - Cylinder 2 Misfire Detected P0303 - Cylinder 4 Misfire Detected P0305 - Cylinder 1 Misfire Detected P0305 - Cylinder 3 Misfire Detected P0305 - Cylinder 4 Misfire Detected P0305 - Cylinder 1 Misfire Detected P0305 - Cylinder 3 Misfire Detected P0305 - Cylinder 4 Misfire Detected P0305 - Cylinder 1 Misfire Detected P0305 - Cylinder 3 Misfire Detected P0305 - Cylinder 4 Misfire Detected P0305 - Cylinder 3 Misfire Detected P0305 - Cylinder 3 Misfire Detected P0305 - Cylinder 4 Misfire Detected P0305 - Cylinder 3 Misfire Detected P0305 - Cylinder 3 Misfire Detected P0305 - Cylinder 4 Misfire Detected P0305 - Cylinder 3 Misfire Detected </th <th></th> <th></th> <th></th> <th>P0299 - Turbocharger Engine</th> <th>ě</th> <th></th> <th>P0302 - Cylinder 2 Misfire Detected</th> <th>P0303 - Cylinder 3 Misfire Detected</th> <th></th> <th>P0305 - Cylinder 5 Misfire Detected</th>				P0299 - Turbocharger Engine	ě		P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected		P0305 - Cylinder 5 Misfire Detected
	Temperature Sensor Circuit Low	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected			P0506 - Idle Speed Low	P0507 - Idle Speed High		P2084 - Exhaust Temperature Sensor 2 Performance
P242B - Exhaust Temperature Sensor 3 Performance Sensor 4 Performance										

PDB1: Split in temperature Public intervalue Pu	Active DTC				Inhibited DTCs					
Appendix discription Applic Optic Discription Applic Opti					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
Parts Parts <th< td=""><td></td><td>P0281 - Cly 7 Balance System</td><td>P0284 - Cly 8 Balance System</td><td></td><td>P0300 - Engine Misfire Detected</td><td>P0301 - Cylinder 1 Misfire Detected</td><td>P0302 - Cylinder 2 Misfire Detected</td><td>P0303 - Cylinder 3 Misfire Detected</td><td>P0304 - Cylinder 4 Misfire Detected</td><td>P0305 - Cylinder 5 Misfire Detected</td></th<>		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
Index of generation Regarding Registering Registering Registering Registering Registering Registering Registering Registering Registering Registering Registering Registering Registering Registering Registering Registering Registering Registering Resistering Registering Resistering	Temperature Sensor Circuit High	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected			P0506 - Idle Speed Low	P0507 - Idle Speed High		P2084 - Exhaust Temperature Sensor 2 Performance
Transmission for the formation of the fo										
Number Network PMOI-1 and Insignation PMOI-1 register Simplify Factor Perform PMOI-1 regist	Temperature Below Thermostat Regulating Temperature									
NUM-1 milling signal fage lage 1 sing lage				P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High					
VII/12 - Full Targeting lass 1 as and 1 Signal (us dass 1 as and 1) Signal (us dass 1 as and 1) PUID - Cylind 2 (up dass 1 ap and 1) PUID - Cylind 2 (up dass 1) PUID - Cylind 2 (up da	P0171 - Fuel Trim System Lean	Signal High Bank 1 Sensor 1	Signal Low Bank 1 Sensor 1							
Phile - Full - Equation Advanced Reacted	P0172 - Fuel Trim System Rich	Signal High Bank 1 Sensor 1	Signal Low Bank 1 Sensor 1							
Non-Advanced Non-Advanced<		Retarded	Advanced	Retarded	Advanced	Retarded	Advanced	Retarded		P01D3 - Cylinder 5 Injection Timing Retarded
PIRIS - Figure Series	1 Circuit Low	Advanced	Retarded	Advanced	Retarded	Advanced	Retarded	Advanced		-
Name Name Name Name Name Name Name Name 1913: Fail Rel Rel Res Performance		Retarded	Advanced	Retarded	Advanced	Retarded	Advanced	Retarded		P01D3 - Cylinder 5 Injection Timing Retarded
Observation Option Op	1 Circuit High									
Name Operation Partial control Partia control Partial contro	Sensor Circuit Low	Performance								
Dibugge Below Degrange Prife - Legrange Transmission Option Control Grant Prife - Legrange Transmission Prife - Legrange Transmission <th< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></th<>										
$ \begin{array}{ $	Dropped Below Diagnostic									
$\frac{1}{Advanced}} \frac{1}{Advanced} \frac{1}{Advanced}} \frac{1}{Advanced} \frac{1}{Advanced} \frac{1}{Advanced}} \frac{1}{Advanced} \frac{1}{Advanced} \frac{1}{Advanced}} \frac{1}{Advanced} $		P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich							P01D1 - Cylinder 4 Injection Timing Retarded
P0202 - Injector 2 Control CircuitP0172 - Fuel Trim System RickP016B - Cylinder 1 Injection Timing RetardedP01CC - Cylinder 1 Injection Timing RetardedP01CD - Cylinder 3 Injection Timing RetardedP01D0 - Cy	P0201 - Injector 1 Control Circuit									P01DA - Cylinder 8 Injection Timing Advanced
$P_{0202-1 light of 1} V_{1} V_{1} usin link system leak of 0/12 - lua link system leak of 0$		P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High							
$\frac{1}{2} \frac{1}{2} \frac{1}$		P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich							P01D1 - Cylinder 4 Injection Timing Retarded
P0203 - Injector 3 Control Circut P0172 - Fuel Trim System Rich P0128 - Cylinder 1 Injection Timing P012C - Cylinder	P0202 - Injector 2 Control Circuit									P01DA - Cylinder 8 Injection Timing Advanced
$P023 - Injector 3 Control Circut $ $\frac{P017 - Fuel Trim System Lean}{P0203 - Injection Triming} P012 - Cylinder 1 Singetion Triming} P012 - Cylinder 1 Singetion Triming} P012 - Cylinder 1 Singetion Triming P01$		P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High							
Public 3 Control Cliff Advanced Advanced Retarded Advanced Advanced Retarded Advanc		P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich							P01D1 - Cylinder 4 Injection Timing Retarded
P0204 - Injector 4 Control Circuit P0172 - Fuel Trim System Lean P0172 - Fuel Trim System Rich P018 - Cylinder 1 Injection Timing Retarded P012 - Cylinder 2 Injection Timing Retarded P012 - Cylinder 3 Injection Timing Retarded <td>P0203 - Injector 3 Control Circuit</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>P01DA - Cylinder 8 Injection Timing Advanced</td>	P0203 - Injector 3 Control Circuit									P01DA - Cylinder 8 Injection Timing Advanced
P0204 - Injector 4 Control Circuit P0102 - Vuile I rum System Rich Retarded Advanced Advanced Advanced Retarded Retarded <t< td=""><td></td><td>P026C - Injection Quantity Too Low</td><td>P026D - Injection Quantity Too High</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>		P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High							
PD204+ injection 4 control clicului Advanced Retarded		P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	Retarded	Advanced	Retarded		Retarded	Advanced	P01D1 - Cylinder 4 Injection Timing Retarded
P0172 - Fuel Trim System Lean P0172 - Fuel Trim System Rich P0172 - Fuel Trim System Rich P012 - Cylinder 1 Injection Timing P012 - Cylinder 1 Injection Timing P012 - Cylinder 2 Injection Timing P012 - Cylinder 2 Injection Timing P012 - Cylinder 3 Injection Timing P012 - Cylinder 3 Injection Timing P012 - Cylinder 3 Injection Timing P012 - Cylinder 4 Injection Timing P012 - Cylinder 4 Injection Timing P012 - Cylinder 4 Injection Timing P012 - Cylinder 5 Injection Timing P012 - Cylinder 6 Injection Tim	P0204 - Injector 4 Control Circuit									P01DA - Cylinder 8 Injection Timing Advanced
P0171 - Fuel Imm System Lean P0172 - Fuel Imm System Rich Retarded Advanced Retarded		P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High							
Advanced Retarded Advanced Retarded Advanced Retarded Advanced A		P0171 - Fuel Trim System Lean		Retarded	Advanced	Retarded	Advanced	Retarded	Advanced	P01D1 - Cylinder 4 Injection Timing Retarded
P026C - Injection Quantity Too Low P026D - Injection Quantity Too High	P0205 - Injector 5 Control Circuit									P01DA - Cylinder 8 Injection Timing Advanced
		P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High							

Active DTC				Inhibited DTCs					
	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
P0206 - Injector 6 Control Circuit	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	, la va nood	Rolardoù	Taranoou	riolandod	, la valiood	Notardoa	Autorod
	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
P0207 - Injector 7 Control Circuit	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced			P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced		
	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	Advanced	Relation	Advanced	Relatived	Advanced	Netarded	Advanced
	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
P0208 - Injector 8 Control Circuit	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded	P01D4 - Cylinder 5 Injection Timing Advanced		P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded		P01D9 - Cylinder 8 Injection Timing Retarded	
	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	Advanced	Relaided	Auvanceu	Relatived	Advanced	Relaideu	Auvanceu
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	1						
P026C - Injection Quantity Too	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	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	P0401 - Exhaust Gas Recirculation	P0402 - Exhaust Gas Recirculation	Signal Low Bank T Sensor T	1					
Performance	Flow Insufficient	Flow Excessive		1	D122D Dissel latelys Air Flow	1	1	1	1
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	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	P0234 - Turbocharger Engine	P0299 - Turbocharger Engine	P0401 - Exhaust Gas Recirculation	P0402 - Exhaust Gas Recirculation	P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning	P2080 - Exhaust Temperature	P2084 - Exhaust Temperature	P242B - Exhaust Temperature	P246F - Exhaust Temperature
Position Sensor Circuit High P02EB - Intake Air Flow Valve	Overboost	Underboost	Flow Insufficient	Flow Excessive	Limit P122D - Diesel Intake Air Flow	Sensor 1 Performance	Sensor 2 Performance	Sensor 3 Performance	Sensor 4 Performance
Control Motor Current Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	Position Sensor Exceeded Learning Limit				
P0335 - Crankshaft Position Sensor Circuit	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circui High	t 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 Circui High	t 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			•	•	4		
P0341 - Camshaft Position Sensor Performance	P0191 - Fuel Rail Pressure Sensor Performance	P0315 - Crankshaft Position System Variation Not Learned							
P0400 - Exhaust Gas Recirculation (EGR) Flow	P11CB - NOx Sensor Performance -	P11CC - NOx Sensor Performance -	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too]				
Incorrect	Signal High Bank 1 Sensor 1	Signal Low Bank 1 Sensor 1	Low	, High			I	P249D - Closed Loop Reductant	P249E - Closed Loop Reductant
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	Injection Control At Limit - Flow Too	
P0402 - Exhaust Gas	P11CB - NOx Sensor Performance -	P11CC - NOx Sensor Performance -	P2080 - Exhaust Temperature	P2084 - Exhaust Temperature	P242B - Exhaust Temperature	P2459 - Diesel Particulate Filter	P246F - Exhaust Temperature	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too	P249E - Closed Loop Reductant
Recirculation Flow Excessive P0405 - Exhaust Gas	Signal High Bank 1 Sensor 1	Signal Low Bank 1 Sensor 1	Sensor 1 Performance	Sensor 2 Performance	Sensor 3 Performance	Regeneration Frequency	Sensor 4 Performance	Low	High
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	P0401 - Exhaust Gas Recirculation	P0402 - Exhaust Gas Recirculation	P049D - EGR Control Position Not	P2080 - Exhaust Temperature	P2084 - Exhaust Temperature	P242B - Exhaust Temperature	P246F - Exhaust Temperature	1	
Circuit High	Flow Insufficient	Flow Excessive	Learned	Sensor 1 Performance	Sensor 2 Performance	Sensor 3 Performance	Sensor 4 Performance]	
P040C - Exhaust Gas Recirculation (EGR) Temperature	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2								
Sensor 2 Circuit Low Voltage	Correlation	1							

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	Control Onioun Choup C	Control Circuit Circup 1	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		-		

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 P2084 - Exhaust Temperature	P0234 - Turbocharger Engine Overboost P242B - Exhaust Temperature	P0299 - Turbocharger Engine Underboost P246F - Exhaust Temperature	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
P2229 - Barometric Pressure	Sensor 2 Performance P0106 - Manifold Absolute Pressure	Sensor 3 Performance P0234 - Turbocharger Engine	Sensor 4 Performance P0299 - Turbocharger Engine	P0401 - Exhaust Gas Recirculation	P0402 - Exhaust Gas Recirculation	P11CB - NOx Sensor Performance -	P11CC - NOx Sensor Performance -	P2002 - Diesel Particulate Filter	P2080 - Exhaust Temperature
Sensor Circuit High P2263 - Turbo Boost System	Sensor Performance P0101 - Mass Air Flow Sensor	Overboost P0106 - Manifold Absolute Pressure	Underboost P0234 - Turbocharger Engine	Flow Insufficient P0299 - Turbocharger Engine	Flow Excessive P0401 - Exhaust Gas Recirculation	Signal High Bank 1 Sensor 1 P0402 - Exhaust Gas Recirculation	Signal Low Bank 1 Sensor 1	(DPF) Low Efficiency	Sensor 1 Performance
Performance	Performance	Sensor Performance	Overboost	Underboost	Flow Insufficient	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					

Active DTC				Inhibited DTCs					
P22A7 - NOx Heater Performance	P249D - Closed Loop Reductant	P249E - Closed Loop Reductant							
Bank 1 Sensor 2	Injection Control At Limit - Flow Too	Injection Control At Limit - Flow Too High							
P2413 - Exhaust Gas			P249D - Closed Loop Reductant	P249E - Closed Loop Reductant	1				
Recirculation (EGR) System	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	Injection Control At Limit - Flow Too	Injection Control At Limit - Flow Too					
Performance	olghar ligh bank i concorr	olgital Eon Barik i Conbor i	Low	High	1				
P242C - Exhaust Gas Temperature (EGT) Sensor 3	P2428 - Exhaust Gas High	P242B - Exhaust Temperature	P246F - Exhaust Temperature						
Circuit Low Voltage	Temperature	Sensor 3 Performance	Sensor 4 Performance						
P242D - Exhaust Gas	P2428 - Exhaust Gas High	P242B - Exhaust Temperature	P246F - Exhaust Temperature						
Temperature (EGT) Sensor 3 Circuit High Voltage	Temperature	Sensor 3 Performance	Sensor 4 Performance						
P2453 - Diesel Particulate Filter									
Differential Pressure Sensor	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			
Performance P2454 - Diesel Particulate Filter			P2455 - Diesel Particulate Filter		(), i				
Differential Pressure Sensor	P2002 - Diesel Particulate Filter	P2453 - Diesel Particulate Filter Differential Pressure Sensor	Differential Pressure Sensor Circuit	P2459 - Diesel Particulate Filter					
Circuit Low Voltage	(DPF) Low Efficiency	Performance	High Voltage	Regeneration Frequency					
P2455 - Diesel Particulate Filter	P2002 - Diesel Particulate Filter	P2453 - Diesel Particulate Filter	P2454 - Diesel Particulate Filter	P2459 - Diesel Particulate Filter					
Differential Pressure Sensor Circuit High Voltage	(DPF) Low Efficiency	Differential Pressure Sensor Performance	Differential Pressure Sensor Circuit Low Voltage	Regeneration Frequency					
P245A - Exhaust Gas	P0401 - Exhaust Gas Recirculation	P0402 - Exhaust Gas Recirculation	P140A - EGR Cooler BY Pass	P2080 - Exhaust Temperature	P2084 - Exhaust Temperature	P242B - Exhaust Temperature	P246F - Exhaust Temperature	P2510 - ECM Power Relay Circuit	
Recirculation (EGR) Cooler	Flow Insufficient	Flow Excessive	Position Sensor Exceded Learning	Sensor 1 Performance	Sensor 2 Performance	Sensor 3 Performance	Sensor 4 Performance	Performance	
Bypass Valve Control Circuit P2463 - Diesel Particulate Filter -	P2002 - Diesel Particulate Filter		Limit		I			l	l
Soot Accumulation	(DPF) Low Efficiency								
P2470 - Exhaust Gas	P2428 - Exhaust Gas High	P246F - Exhaust Temperature							
Temperature (EGT) Sensor 4 Circuit Low Voltage	Temperature	Sensor 4 Performance							
P2471 - Exhaust Gas			1						
Temperature (EGT) Sensor 4	P2428 - Exhaust Gas High Temperature	P246F - Exhaust Temperature Sensor 4 Performance							
Circuit High Voltage P2493 - EGR Cooler BY Pass		P0402 - Exhaust Gas Recirculation							
P2493 - EGR Cooler BY Pass Position Sensor Performance	P0401 - Exhaust Gas Recirculation Flow Insufficient	Flow Excessive							
P2494 - EGR Cooler BY Pass	P0234 - Turbocharger Engine	P0299 - Turbocharger Engine	P0401 - Exhaust Gas Recirculation	P0402 - Exhaust Gas Recirculation	P140A - EGR Cooler BY Pass	P2080 - Exhaust Temperature	P2084 - Exhaust Temperature	P242B - Exhaust Temperature	P246F - Exhaust Temperature
Position Sensor Circuit Low	Overboost	Underboost	Flow Insufficient	Flow Excessive	Position Sensor Exceded Learning	Sensor 1 Performance	Sensor 2 Performance	Sensor 3 Performance	Sensor 4 Performance
					P140A - EGR Cooler BY Pass				
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	Position Sensor Exceded Learning	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
, , , , , , , , , , , , , , , , , , ,	Overboost	Underboost	riow maunicient	TIOW EXCESSIVE	Limit	Genaor I'r enormance	Genaol 2 Tenomance	Sensor ST enormance	Genaor 4 r enormance
P249D - Closed loop Reductant Injection Control at Limit-Flow too	P20EE - SCR Nox Catalyst								
high	Efficiency Below Threshold Bank 1								
P249E - Closed loop Reductant	P20EE - SCR Nox Catalyst	1							
Injection Control at Limit-Flow too	Efficiency Below Threshold Bank 1								
P2564 - Turbocharger Boost	Doool Tababaa Fasta	Doord Television Ferris	P0401 - Exhaust Gas Recirculation	P0402 - Exhaust Gas Recirculation	1				
Control Position Sensor Circuit	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	Flow Insufficient	Flow Excessive					
Low P2565 - Turbocharger Boost		-							
Control Position Sensor Circuit	P0234 - Turbocharger Engine	P0299 - Turbocharger Engine	P0401 - Exhaust Gas Recirculation	P0402 - Exhaust Gas Recirculation					
High	Overboost	Underboost	Flow Insufficient	Flow Excessive					
P2598 - Turbocharger Boost	P0101 - Mass Air Flow Sensor								
Control Position Sensor "A" Circuit	P0101 - Mass Air Flow Sensor Performance								
Range/Performance - Stuck Low		J							
P2599 - Turbocharger Boost	Dorod Mary Martine C	1							
Control Position Sensor "A" Circuit	P0101 - Mass Air Flow Sensor Performance	1							
Range/Performance - Stuck High									
U0073 - CAN A BUS OFF	P0851 - Park/Neutral Position (PNP)	P0852 - Park/Neutral Position (PNP)							
U0101 - Lost Communications	Switch Circuit Low Voltage	Switch Circuit High Voltage							
With Transmission Control	P0851 - Park/Neutral Position (PNP) Switch Circuit Low Voltage	P0852 - Park/Neutral Position (PNP) Switch Circuit High Voltage							
System	Switch Circuit Low Voltage	Switch Circuit nigh voltage							

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

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						
	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
Fuel Level less than 15%	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		P128E - Fuel Rail Pressure Performance				

DTC			Additional Basic Enable Conditions				
		engine is not in standby state (standby		engine is not in ready state (which is active	1		
P0016 - Crankshaft to Camshaft Correlation	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	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)	e f	
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)	t f	
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)	f		_	
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)	t t	
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 not in ready state (which is active when the ignition is on or following a stall of the engine)	f	
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)	t	
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 o 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 o 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 o 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 o 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)	f	
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)	e e	

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)	f							
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 P0266 - Cly 2 Balance System P0269 - Cly 3 Balance System	Power Take-Off (PTO) is not engaged Power Take-Off (PTO) is not engaged 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					
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570			Additional Basic Enable Conditions						
P0272 - Cly 4 Balance System	Power Take-Off (PTO) is not engaged		Additional Basic Enable Conditions		-				
P0275 - Cly 5 Balance System	Power Take-Off (PTO) is not engaged								
	Power Take-Off (PTO) is not engaged Power Take-Off (PTO) is not engaged								
	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) engine is not in ready state (which is active								
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) engine is not in ready state (which is active								
P0307 - Cylinder 7 Misfire Detected	when the ignition is on or following a stall of the engine) engine is not in ready state (which is active								
P0308 - Cylinder 8 Misfire Detected	when the ignition is on or following a stall of the engine)	engine is not in standby state (standby	.	engine is not in ready state (which is active	1				
P0335 - Crankshaft Position Sensor Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	state occurs after ECM initialization or following after-run) engine is not in standby state (standby	Engine is running which means the engine speed is greater than 600 to 850 rpm	when the ignition is on or following a stall of the engine) engine is not in ready state (which is active					
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 not in standby state (standby	Engine is running which means the engine speed is greater than 600 to 850 rpm	when the ignition is on or following a stall of the engine) engine is not in ready state (which is active					
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 not in standby state (standby	Engine is running which means the engine speed is greater than 600 to 850 rpm	when the ignition is on or following a stall of the engine) engine is not in ready state (which is active					
P0341 - Camshaft Position Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	state occurs after ECM initialization or following after-run) engine is not in standby state (standby	Engine is running which means the engine speed is greater than 600 to 850 rpm	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)	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	J				

DTC			Additional Basic Enable Conditions						
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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 $$3 \ensuremath{s}$$	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is ac when the ignition is on or following a sta the engine)
P0401 - Exhaust Gas Recirculation	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	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 engi speed is greater than 600 to 850 rpm
Flow Insufficient	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 engi speed is greater than 600 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)	f		-	
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 o 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 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 o the engine)	þ f
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 o the engine)	t f
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							
P0629 - Fuel Pump Relay Control Circuit High	battery voltage is above 11 V for at least 3s	1						
P062F - Control Module Long Term Memory Performance	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	<u> </u>						
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 $$3 \ensuremath{s}$						

DTC			Additional Basic Enable Conditions					
510	engine is not in standby state (standby				-			
0672 - Glow Plug 2 Control Circuit	state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
	engine is not in standby state (standby							
0673 - Glow Plug 3 Control Circuit	state occurs after ECM initialization or	battery voltage is above 11 V for at least						
Should be a second second	following after-run)	36						
	engine is not in standby state (standby	battery voltage is above 11 V for at least						
0674 - Glow Plug 4 Control Circuit	state occurs after ECM initialization or	3s						
	following after-run)							
0675 - Glow Plug 5 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or	battery voltage is above 11 V for at least						
0675 - Glow Flug 5 Control Circuit	following after-run)	3s						
	engine is not in standby state (standby							
0676 - Glow Plug 6 Control Circuit	state occurs after ECM initialization or	battery voltage is above 11 V for at least 3s						
	following after-run)	35						
	engine is not in standby state (standby	battery voltage is above 11 V for at least						
0677 - Glow Plug 7 Control Circuit	state occurs after ECM initialization or	3s						
	following after-run)							
0678 - Glow Plug 8 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or	battery voltage is above 11 V for at least						
control clow ring o control clicuit	following after-run)	3s						
	engine is not in standby state (standby							
0697 - 5 Volt Reference 3 Circuit	state occurs after ECM initialization or	battery voltage is above 11 V for at least 3s						
	following after-run)	35						
	engine is not in standby state (standby	battery voltage is above 11 V for at least						
P06A3 - 5 Volt Reference 4 Circuit	state occurs after ECM initialization or following after-run)	3s						
	engine is not in standby state (standby							
06D2 - 5 Volt Reference 5 Circuit	state occurs after ECM initialization or	battery voltage is above 11 V for at least						
Should be should	following after-run)	3s						
P0700 - Transmission Control	engine is not in standby state (standby		l de la constante de					
Module Requested Malfunction	state occurs after ECM initialization or							
Indicator Lamp Illumination	following after-run)							
0851 - Park/Neutral Position (PNP)	engine is not in standby state (standby state occurs after ECM initialization or							
Switch Circuit Low Voltage	state occurs after ECM initialization or following after-run)							
	engine is not in standby state (standby							
0852 - Park/Neutral Position (PNP)	state occurs after ECM initialization or							
Switch Circuit High Voltage	following after-run)							
			engine is not in standby state (standby	Engine Run Time greater than 10 seconds		engine is not in ready state (which is active		
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	state occurs after ECM initialization or	(engine speed greater than 600 to 850 rpm	Engine is running which means the engine speed is greater than 600 to 850 rpm	when the ignition is on or following a stall of		
Control Circuit Low Voltage	engine speed greater than 0 rpm)		following after-run)	to indicate the engine is running)	speed is greater than 600 to 850 rpm	the engine)		
							1	
P1044 - Reductant Pump High	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm	Engine is running which means the engine	engine is not in ready state (which is active when the ignition is on or following a stall of			
Control Circuit High Voltage	Engine speed greater than 000 to 050 ipm	following after-run)	to indicate the engine is running)	speed is greater than 600 to 850 rpm	the engine)			
		,						7
P1048 - Reductant Injector High	Engine not in afterrun mode (defined as		engine is not in standby state (standby	battery voltage is above 11 V for at least	Engine Run Time greater than 10 seconds	Engine is running which means the engine	engine is not in ready state (which is active	
Control Circuit Low Voltage	engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	state occurs after ECM initialization or	3s	(engine speed greater than 600 to 850 rpm	speed is greater than 600 to 850 rpm	when the ignition is on or following a stall of	
2			following after-run)		to indicate the engine is running)	specero grouter man coo to 500 ipin	the engine)	1
			engine is not in standby state (standby		Engine Run Time greater than 10 seconds		engine is not in ready state (which is active	1
P1049 - Reductant Injector High	Engine not in afterrun mode (defined as	Engine speed greater than 600 to 850 rpm	state occurs after ECM initialization or	battery voltage is above 11 V for at least	(engine speed greater than 10 seconds (engine speed greater than 600 to 850 rpm	Engine is running which means the engine	when the ignition is on or following a stall of	
Control Circuit High Voltage	engine speed greater than 0 rpm)	angine spool grouter than ood to boo ipin	following after-run)	3s	to indicate the engine is running)	speed is greater than 600 to 850 rpm	the engine)	1
		ensine is not is standbu state (-+ ++			5 · · · · 8/	1	5 ,	1
P10CC - Exhaust Aftertreatment	Engine not in afterrun mode (defined as	engine is not in standby state (standby state occurs after ECM initialization or	battery voltage is above 11 V for at least	Engine is running which means the engine				
uel Injector Control Circuit Shorted	engine speed greater than 0 rpm)	following after-run)	3s	speed is greater than 600 to 850 rpm				
P10CD - Exhaust Aftertreatment	Engine not in afterrun mode (defined as	engine is not in standby state (standby	battery voltage is above 11 V for at least	Engine is running which means the engine	1			
Fuel Injector High Control Circuit	engine not in afterrun mode (defined as engine speed greater than 0 rpm)	state occurs after ECM initialization or	Dattery voltage is above 11 v tor at least	speed is greater than 600 to 850 rpm				
Low Voltage	Grigene apeeu greater triair o (pfil)	following after-run)	56	spool is greater than out to 350 lplit	4			
P10CE - Exhaust Aftertreatment	Engine not in afterrun mode (defined as	engine is not in standby state (standby	battery voltage is above 11 V for at least	Engine is running which means the engine				
Fuel Injector High Control Circuit High Voltage	engine speed greater than 0 rpm)	state occurs after ECM initialization or following after-run)	3s	speed is greater than 600 to 850 rpm				
P10D0 - Reductant Injector		tollowing alter-runy	engine is not in standby state (standby		engine is not in ready state (which is active	1		
Temperature - Exhaust Gas	Engine not in afterrun mode (defined as	Engine speed greater than 600 to 850 rpm	state occurs after ECM initialization or	Engine is running which means the engine	when the ignition is on or following a stall of			
Temperature 2 Correlation	engine speed greater than 0 rpm)		following after-run)	speed is greater than 600 to 850 rpm	the engine)	J		
111F - Fuel Temperature Sensor 1	Engine not in afterrun mode (defined as		engine is not in standby state (standby	Engine is running which means the engine	engine is not in ready state (which is active	1		
Fuel Temperature Sensor 2 Not	engine not in arterrun mode (derined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	state occurs after ECM initialization or	speed is greater than 600 to 850 rpm	when the ignition is on or following a stall of			
Plausible	5		following after-run)		the engine)	4		
113A - Exhaust Gas Temperature	Engine not in afterrun mode (defined as	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or	Engine is running which means the engine	engine is not in ready state (which is active when the ignition is on or following a stall of			
Sensors 3-4 Not Plausible	engine speed greater than 0 rpm)	Engine speed greater than out to 850 rpm	following after-run)	speed is greater than 600 to 850 rpm	the engine)			
Censols 3-4 NOL Flausible		1	rolowing and rolly		and original			1
		I	an also be much to also allowed as a first of the the					
P11A6 - HO2S Performance -	Engine not in afterrun mode (defined as	Engine speed greater than 600 to 950 mm	engine is not in standby state (standby	Manufacturer Enable Counter is zero (value	battery voltage is above 11 V for at least	Engine Run Time greater than 10 seconds	Engine is running which means the engine	engine is not in ready state (which is active
	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	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 -			engine is not in standby state (standby	Manufacturer Enable Counter is zero (value		Engine Run Time greater than 10 seconds		engine is not in ready state (which is active	
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	state occurs after ECM initialization or following after-run)	of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	(engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	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
olgital nigri balik i oensor i	Engine is running which means the engine speed is greater than 600 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
Signal Low Bank 1 Sensor 1	Engine is running which means the engine speed is greater than 600 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	engine is not 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) engine is not in ready state (which is active								
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) engine is not in standby state (standby								
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		I		I	I	I	1
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)								

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 enging speed is greater than 600 to 850 rpm
P140D - Exhaust Gas Recirculation	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 P140E - Exhaust Gas Recirculation	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
(EGR) Motor Control Circuit 2 High Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run) engine is not in standby state (standby	battery voltage is above 11 V for at least 3s							
P140F - Exhaust Gas Recirculation (EGR) Motor Current Performance P144B - Closed Loop Diesel	state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s					1		
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		I					
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 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)				
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 reductant 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 o the engine)	

DTC			Additional Basic Enable Conditions					
Die				1			1	1
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 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 reductant tank temperature is >= -7°C				
P208D - Reductant Pump Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine 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	Engine not in afterrun mode (defined as		engine is not in standby state (standby	Engine is running which means the engine	engine is not in ready state (which is active	3			
Control Circuit High Voltage	engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	state occurs after ECM initialization or following after-run)	speed is greater than 600 to 850 rpm	when the ignition is on or following a stall of the engine)	f			
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	<u> </u>	_			
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)	f			
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)	e f			
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)	s Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	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	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)	e battery voltage is above 11 V for at least 3s	Status of the Reductant Tank is not Frozer 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
Efficiency Below Threshold Bank 1	engine is not in ready state (which is active when the ignition is on or following a stall o the engine)	e f							
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 o 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 o the engine)		

DTC			Additional Basic Enable Conditions					
21AF - 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)	
21B0 - 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)
2200 - 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)	⁹ battery voltage is above 11 V for 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)	⁹ battery voltage is above 11 V for 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)	a battery voltage is above 11 V for 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)
2205 - 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 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 not in ready state (which is active when the ignition is on or following a stall of the engine)
220A - 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						
220B - 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						
221C - 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)
221D - 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)
221E - 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)
221F - 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)	
	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	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	origino opeca greater than o ipiny							
	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						
0.0			engine is not in standby state (standby	Manufacturer Enable Counter is zero (value		Engine Run Time greater than 10 seconds		engine is not in ready state (which is active	
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	state occurs after ECM initialization or following after-run)	of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	(engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	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 o the engine)	f			
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 o the engine)	¢ f			
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 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 not in ready state (which is active when the ignition is on or following a stall o the engine)		•		

DTC			Additional Basic Enable Conditions						
Dic		1	engine is not in standby state (standby	1	1	1			
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	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 njection 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 activ when the ignition is on or following a stall o 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 activ when the ignition is on or following a stall o 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	battery voltage is above 11 V for at least						-		
Heater Control Circuit P24B6 - Particulate Matter Sensor Heater Control Circuit High Voltage	3s 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								
Performance 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)								

	DTC			Additional Basic Enable Conditions				
P2	693 - 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				
	01 - Lost Communications With ransmission 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				
	06 - 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				
	DE - 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)
U02	A3 - 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)
ι	1029D - 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			
L	1029E - 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			

Component / System	Fault Code Master	Monitor Strategy Description	Primary Malfunction Signal and Criteria		Threshold Value		Secondary Parameters	Enable Condition	Time Required	MIL IIIum.
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	< (= C = 0		A 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	В
RAM error		Compariarson of read write values	Read write values match	=	NO		Module power	On	inner loop: 200 ms total time: 3200 ms	В
EEPROM error		Checksum error between calculated and stored values	Checksums match	=	NO		Module power	On	inner loop: 200 ms total time: 3200 ms	В
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	В
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	В
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	^ V	2.3 300	volts	glow plugs are commanded Battery voltage at GPCM GP current GP current P0671,P0672, P0675, P0676 Battery voltage at GPCM stable for 30ms	= On > 6 volts > 6 amps < 60 amps = Not set < 2 volts	total time: 9000 ms Path2: inner loop: 10000 ms total time	В
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		13000 inner loop: 2000 ms total time: 5000 ms	В
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 > 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	В
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	В

Component / System	Fault Code Master	Monitor Strategy Description	Primary Malfunction Signal and Criteria		Threshold Value	Secondary Parameters	Enable Condition	Time Required	MIL IIIum.
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	> > > 60 (by	25 amps 640 msec hardware protection (time varies amps with temperature)) 0 volts	Battery voltage at the GPCM	> 6 volts	inner loop: 6000 ms total time: 9000 ms	В
			Path 4: (DC/DC Booster voltage - GPCM battery voltage)	=	±3 volts	Battery voltage at the GPCM	= 8 to 14 volts		
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	В
glow plug open	P0671-P0678		Glow Plug Current and Voltage at glow plug pin	< 4.25 and > 6.0	A and 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	В
glow plug short		Electronic circuitry determines a fault exists on GP circuit	Path 1: Glow Plug Current Path 2: Hardware over current	> 60 > 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 >= 4.25	Ohm A	Battery voltage at GPCM glov plugs are commanded on over temperature condition over voltage condition abs[Battery supply at GPCM - IGN voltage GPCM]	= on > 7.0 volts = on = false false < 7.0 volts	inner loop:	
Glow plug low resistance		Electronic circuitry determines a fault exists on GP circuit	Glow Plug Resistance	< 250	mOh	n 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 <u>not</u> 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 > 2000 > 3000	ms ms ms	Ignition 1 battery voltage at GPCM	> 3.9 volts > 7.0		?
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 = ON	A	DTCs not active Path1 IAH Commanded and Battery Voltage at IAH OR Path2 IAH Commanded	P0640, P154B, P154D, P154C, P165B = ON > 8.6 volts = OFF	inner loop: 650 ms total time: 3650 ms	В
Intake Air (IA) Heater Voltage Signal Circui	t 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 < 6.9 > 6.9 < 16.0 > 9.5	Volt Volt Volt 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	В

16 OBDG09 Glow Plug Control Module (GPCM) Summary Tables	5
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Component / System	Fault Code Master	Monitor Strategy Description	Primary Malfunction Signal and Criteria		Threshold Value		Secondary Parameters		Enable Condition		Time Required	MIL IIIum.
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	v v	20 A 0.9 Volt		DTC's are not set IAH Commanded Battery Voltage at IAH GPCM Ignition voltage	= > >=	P154B, P154D, P0640, P0154A ON 6.9 6.9	Volt Volt	inner loop: 5000 ms total time: 8000 ms	В
			or PATH2: IAH current IAH voltage signal feedback to GPCM	v v	20 A 0.9 Volt		or DTC's are not set IAH Commanded Battery Voltage at IAH GPCM Ignition voltage	= > >=	P154B, P154D, P0640, P0154A ON 6.9 6.9	Volt Volt		
			or PATH3:IAH current signal feedback to GPCM or	>	4.96 Volt		or IAH Command or	=	off			
			PATH 4:IAH grid current IAH heater grid calculated resistance	^ ^	20 A 500 mOh	hm	DTC's are not set IAH Commanded Battery Voltage at IAH	= >	P154B, P154D, P0640, P0154A ON 8.0	Volt		
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"	< ,	-20 °C +20 °C		DTC's are not set IAH Commanded Battery Voltage at IAH Engine General Status (engine sensor info) IntakeAirtemperature message from ECM		P154B, P0640, P0154A, P154C, P166B ON 11.0 valid valid		650ms (internal) + 75% failure over 4 seconds.	В
			or PATH2:IAH temperature signal feedback line or	=	Open		or IAH Commanded active test function	=	OFF ON			
			PATH3: IAH temperature signal feedback line	>	4.96 Volt		or DTC's are not set IAH Commanded Battery Voltage at IAH	= ^ <	P154B, P0640, P0154A, P154C, P166B ON 6.0 15.0	Volts Volts		
			PATH4; IAH temperature signal feedback line or		short to B+ or		IAH Commanded		OFF			
			PATH5: IAH temperature signal feedback line		short to ground		IAH Commanded		OFF			
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.	В
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	= > = =			650ms (internal) + 75% failure over 4 seconds.	В

Component / System	Fault Code Master	Monitor Strategy Description	Primary Malfunction Signal and Criteria		Threshold Value	Secondary Parameters		Enable Condition	1	Time Required	MIL IIIum.
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	< 6.0	Volt	GPCM Ignition voltage	>	9.0	Volt Volt	inner loop: 1000 ms total time: 4000 ms	
			PATH 2: (IGN - Voltage supply to GPCM) or	> +/-5	Volt	GPCM Voltage supply GPCM Ignition Voltage or	> >	6.0 4.0	Volt Volt		
			PATH 3: (ECM reported voltage via CAN - Voltage supply to GPCM)	> +/-3	Volt	GPCM supply voltage Engine speed	^ ^	6 10< rpm >400	Volt		
Glow Plug Module Secondary Circuit	P163D	Electronic GPCM circuitry determines serveral signal voltage	Path 1: Key state (Ign 1)	= OFF		Path 1 glow plug activation request from ECM	>	ON		inner loop:	<u> </u>
Giow Plug Module Secondary Circuit	1 1032	levels to GPCM are out of range	or	- 011		or	-	or		1000 ms total time: 4000 ms	
			Path 2: Electronic circuitry determines voltage at glow plug pin or	> 6.0	Volt	Path 2 GP commanded	=	Off			
			Path 3: [GPCM ground - GP ground]	> 1.5	Volts	or Path 3 GP commanded DTCs not set	=	or ON P0671,P0675			
						IAH dutycycle	=	0 or 100	%		
Glow Plug Module Overtemperature	P163E	ECM monitors serial data from GPCM for P163E Error Message indicating GPCM detects GPCM overtemperature	GPCM Temperature	> 85	℃	GMLAN signal "coolant temperature" Conditions PATH1 P16AD	< =	60 True	°C	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 and > 3.0	A and Volt	DTCs not set: reductan heater commanded: GPCM temperature GPCM battery supply voltage	= v >	P20BB ON 123 7.0	°C 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	> 21	А	reductan heater commanded: GPCM temperature GPCM supply voltage KL30	= < >	ON 123 7.0	°C Volt Volt	inner loop: 1000 ms total time: 1500 ms	
			or	or		or	or	or	or		
			Path 2: load at output (detected by hardware) Path 3: hardware over current Path 4: hardware over temperature condition	< 47 > 27 > 175	mOhm A °C	reductan heater commanded: GPCM temperature GPCM supply voltage KL30	= < >	ON 123 7.0	°C Volt		
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 battlery	hardware (power stage) determines voltage at reductant heater output pin	> V _{batt} - 0.8	3 Volt	reductan heater commanded:	=	OFF		inner loop: 2000 ms total time: 2500 ms	1
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 and > 3.0	A and Volt	DTCs not set: reductan heater commanded: GPCM temperature GPCM battery supply voltage	<	P20BF ON 123 7.0	°C Volt	inner loop: 3440 ms total time: 3940 ms	

Component / System	Fault Code Master	Monitor Strategy Description	Primary Malfunction Signal and Criteria		Threshold Value	Secondary Parameters	Enable Condition	Time Required	MIL IIIum.
Reductant Heater 2 Control Circuit Low Voltage	P20BF	ECM monitors serial data from GPCM for P20BF Error Message indicating GPCM detects reductant heater output shorted to ground or an overload condition	Path 1: Reductant Heater Plug Current	> 21	A	reductan heater commanded: GPCM temperature GPCM supply voltage KL30	= ON °C < 123 Volt > 7.0 Volt		
			or	or		or	or or or		
			Path 2: load at output (detected by hardware) Path 3: hardware over current Path 4: hardware over temperature condition	< 47 > 27 > 175	mOhm A °C	reductan heater commanded: GPCM temperature GPCM supply voltage KL30	= ON < 123 °C > 7.0 Volt		
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 and > 3.0	A and 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	> 21	A	reductan heater commanded: GPCM temperature GPCM supply voltage KL30	= ON °C < 123 Volt > 7.0 Volt		
			or Path 2: load at output (detected by hardware) Path 3: hardware over current Path 4: hardware over temperature condition	or < 47 > 27 > 175	mOhm A *C	or reductan heater commanded: GPCM temperature GPCM supply voltage KL30	or or or = ON < 123 °C > 7.0 Volt		
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	> 5.0	Volt	status DC/DC booster	 OFF, power up procedure has started after reset 	inner loop: 5000 ms total time: 5500 ms	
			PATH 2: DC/DC booster output current duration or	> 5.0 > 10	A ms	status DC/DC booster or	= ON		
			PATH 3: DC/DC booster output current duration	> 37.5 > 20	A µs	status Dc/DC booster	= ON		
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	> 5.0	Volt	status DC/DC booster	 OFF, power up procedure has started after reset 	inner loop: 5000 ms total time: 5500 ms	
			PATH 2: DC/DC booster output current duration	> 5.0 > 10	A ms	or status DC/DC booster or	or = ON or		
			or PATH 3: DC/DC booster output current duration	> 37.5 > 20	A µs	or status Dc/DC booster	or = ON		

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

Component / System	Fault Code Master	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Secondary Parameters		Enable Condition		Time Required	MIL IIIum.
Intake Air Heater Temperature Sensor Circuit High Voltage		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 Intake Air Temperature (GMLAN) and DTC P154D or	, , , , , , , , , , , , , , , , , , ,		°C	inner loop: 655 ms total time: 1155 ms	
					IAH Run Time and IAH PWM and Intake Air Temperature (GMLAN) and DTC P154D	~ ~ ~ =	120 90 -35 not set	sec % °C		
			PATH2: IAH temperature sensor voltage	> IAH Battery Voltage* 146/512 V	or Intake Air Temperature (GMLAN) and DTC P154D	> =	25 not set	°C		
					(Engine Off Timer (GMLAN) or Intake Air Temperature (GMLAN)) and (IAH Run Time or	<	-7 120	hours ℃ sec		
					IAH PWM or Intake Air Temperature (GMLAN) and (Engine Coolant Temperature (GMLAN) and Engine Run Time) and DTC P154D	~ ~ ~ ~	90 -35 60 40 not set	% °C °C sec		