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 Camshaft Correlation	P0016	Detects a shift of the camshaft angle by monitoring the average offset angle.	average value of camshaft offset OR	<	-20.00	•	Engine backward rotation detected	=	FALSE	-	fail conditions exists for more than 2 events	В
			average value of camshaft offset	>	20.00	degrees	NO pending or confirmed DTCs and	=	see sheet inhibit tables	-	test performed continuously	
							Ignition ON and	=	TRUE	-	0.01 s rate	
							basic enable conditions met:	=	see sheet enable tables	-		
Turbocharger Boost Control Position Not Learned	P003A	Detects in range vane position errors during a vane sweep initiated to learn minimum and maximum vane position values.	Path 1:				injection quantity	>=	0.00	mm^3/rev	fail conditions exists for 0.01 s monitor runs	В
			mean offset learned value at fully closed	<	68.01	%	and				once per trip with 0.01 s	
			valve position or mean offset learned value at fully closed	>	95.61	%	injection quantity and	<=	100.00	mm^3/rev	rate whenever enable	
		The Open Position of the Turbocharger is learned	valve position	Ē		70	accelerator pedal position and	<=	0.10	%	conditions are met	
		prior to the Closed Position					Engine Speed	>=	500.00	rpm		
							and Engine Speed	<=	760.00	rpm		
							and Vehicle speed	>=	0.00	mph		
							and Vehicle speed	<=	3.11	mph		
							and Battery voltage	>=	10.00	V		
							and engine coolant temperature	>=	71.96	°C		
							and engine coolant temperature	<=	130.06	°C		
							and Barometric pressure and	>=	65.00	kPa		
							and Barometric pressure and	<=	110.00	kPa		
							time since start and	>	10.08	sec		
							Engine is Idling and	=	TRUE	-		
							Rich idle regeneration and	=	inactive	-		

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters		Conditions		Required	Illum.
					Rich idle (see closed loop enable condition for details) and	=	inactive	-		
					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 and	>=	5.54	%		
					mean offset learned value at fully open valve position	<=	36.94	%		
					and valve closed and	=	TRUE			
					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 0.01 s	
			position		injection quantity and	<=	100.00	mm^3/rev	monitor runs once per trip	
					accelerator pedal position and	<=	0.10	%	with 0.01 s rate	
					Engine Speed and	>=	500.00	rpm	whenever enable	
					Engine Speed and	<=	760.00	rpm	conditions are met	
					Vehicle speed and	>=	0.00	mph	die met	
					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	-		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Lo	ogic and Value		Parameters		Conditions		Required	Illum.
							Rich idle (see closed loop enable condition for details) and	=	inactive	-		
							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 and	=	TRUE			
							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 3: mean offset learned value at fully open	<	5.54	%	injection quantity and	>=	0.00	mm^3/rev	fail conditions	
			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	
			valve position				accelerator pedal position	<=	0.10	%	once per trip with 0.01 s	
							and Engine Speed and	>=	500.00	rpm	rate whenever enable	
							Engine Speed and	<=	760.00	rpm	conditions are met	
							Vehicle speed and Vehicle speed	>= <=	0.00 3.11	mph mph		
							and Battery voltage	>=	10.00	V		
							and engine coolant temperature and	>=	71.96	°C		
							engine coolant temperature and	<=	130.06	°C		
							Barometric pressure and Barometric pressure	>= <=	65.00 110.00	kPa kPa		
							and time since start	>	10.08	sec		
							and Engine is Idling and	=	TRUE	-		
							Rich idle regeneration and	=	inactive	-		

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters Rich idle (see closed loop enable	=	Conditions inactive		Required	Illum.
					condition for details)	-	mactive			
					and		541.05			
					Adaption is finished for this driving cycle	=	FALSE	-		
					and					
					valve Open	=	TRUE	-		
					and turbocharger offset adaption timer	>=	0.60	sec		
					and		0.00	000		
					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			
			Path 4: time taken to learn the mean offset	> 30.00 sec	injection quantity and	>=	0.00	mm^3/rev	fail conditions	
			learned value at fully open valve position	> 30.00 sec	and				exists for	
									0.01 s	
					injection quantity	<=	100.00	mm^3/rev	monitor runs	
					and accelerator pedal position	<=	0.10	%	once per trip with 0.01 s	
					and				rate	
					Engine Speed and	>=	500.00	rpm	whenever	
					Engine Speed	<=	760.00	rpm	enable conditions	
					and				are met	
					Vehicle speed and	>=	0.00	mph		
					Vehicle speed	<=	3.11	mph		
					and			-		
					Battery voltage and	>=	10.00	V		
					engine coolant temperature	>=	71.96	°C		
					and					
					engine coolant temperature and	<=	130.06	°C		
					Barometric pressure	>=	65.00	kPa		
					and					
					Barometric pressure and	<=	110.00	kPa		
					time since start	>	10.08	sec		
					and					
					Engine is Idling and	=	TRUE	-		
					Rich idle regeneration	=	inactive	-		
					and					
					Rich idle (see closed loop enable condition for details)	=	inactive	-		
					and					
					Adaption is finished for this driving cycle	=	FALSE	-		
					and					
					anu					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							and turbocharger offset adaption timer and turbocharger offset adaption timer and No Pending or Confirmed DTCs and basic enable conditions met:	>= >= =	0.60 0.15 see sheet inhibit tables see sheet enable tables	sec sec -		
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)	Ξ	Open Circuit:≥ 200 K Ω impedance between ECU pin and load	-	battery voltage for time and starter is active cranking No Pending or confirmed DTCs and basic enable conditions met:	>	3.00 FALSE see sheet inhibit tables see sheet enable tables	V sec -	fail conditions exists for 3 s monitor runs with 0.01 s rate whenever enable conditions are met	В
		Boost Control low side	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match and the IC maximum temperature has been exceeded IC Tempeature	>	150.00	°C	battery voltage for time and starter is active cranking No Pending or confirmed DTCs and basic enable conditions met:	> = =	11.00 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	
Turbocharger Boost Control Circuit Low Voltage	P0047	Diagnoses the Turbocharger Boost Control low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	=	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	-	battery voltage for time and starter is active cranking	>	11.00 3.00 FALSE	V sec	fail conditions exists for 3 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.
					No Pending or confirmed DTCs and basic enable conditions met:	=	see sheet inhibit tables see sheet enable tables	-		
Turbocharger Boost Control Circuit High Voltage	P0048	Diagnoses the Turbocharger Boost Control low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between signal and controller power	- battery voltage for time and starter is active cranking No Pending or confirmed DTCs and basic enable conditions met:	> = =	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 )	<ul> <li>Short to power: ≤ 0.5 Ω impedance between signal and controller power</li> </ul>	<ul> <li>battery voltage</li> <li>for time and starter is active cranking No Pending or confirmed DTCs</li> </ul>	>	11.00 3.00 FALSE see sheet inhibit tables	V sec	fail conditions exists for 0.1 s monitor runs with 0.1 s rate whenever enable conditions are met	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		reshold and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							and basic enable conditions met:	=	see sheet enable tables			
CAC Temperature Sensor Circuit Low Voltage	P007C	Detects a CAC temperature sensor circuit short to ground.	CAC downstream temperature sensor voltage same as downstream CAC temperature	~	0.11 150	∨ °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
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	∨ °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		rail pressure deviation from set point calculated out of difference between desired and actual value (see Look-Up- Table #68)	> 1100	0 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)	> 1100	0 to 80000	kPa	( state machine rail pressure control equal to pressure control valve or	=	TRUE	-	fail conditions exists for 8 s monitor runs with 0.02 s rate whenever	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Join	Godd		Unional Contenta		state machine rail pressure control equal coupled pressure control (rail pressure 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 - = see sheet enable - tables = FALSE - = see sheet inhibit - tables	enable conditions are met	
Fuel Rail Pressure [FRP] Too High	P0088		rail pressure deviation from set point calculated out of difference between desired and actual value (see Look-Up- Table #69)	< -80000 to -18000 kPa	current injection quantity and state machine rail pressure control equal to metering unit control mode and basic enable conditions met: and metering unit actuator test active and NO Pending or Confirmed DTCs:	<ul> <li>&gt; 8.00 mm^3</li> <li>= TRUE -</li> <li>see sheet enable - tables</li> <li>= FALSE -</li> <li>= see sheet inhibit - tables</li> </ul>	rev 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	< -18000.00 kPa	( state machine rail pressure control equal to pressure control valve or state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve) ) and basic enable conditions met: and NO Pending or Confirmed DTCs:	= TRUE -	fail conditions exists for 8 s monitor runs with 0.02 s rate whenever enable conditions are met	

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
Engine Coolant Temperature (ECT)-Fuel Temperature Not Plausible	P008F	Detects a biased ECT or fuel temperature by comparing start-up temperatures between the two sensors.	Path 1:  (a) - (b)  (see Look-Up-Table #15)	>	100.00	°C	minimum engine-off time and	>=	28800.00	Sec	fail conditions exists for 0.2 s monitor runs once per trip	В
			where ( (a) captured engine coolant	=	measured	-	ambient temperature and	>	-60.04	°C	with 0.2 s rate whenever	
			temperature at start and (b) captured fuel temperature at start	=	parameter measured parameter	-	Engine Running for time	= >	TRUE 0.00	- sec	enable conditions are met	
			) or		parameter		and 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			
			(a) captured engine coolant	=	measured	-	and and and a conditions met:	=	see sheet enable tables	-		
			temperature at start and		parameter		NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			(b) captured fuel temperature at start	=	measured parameter	-						
			and  (a) - (b)  (see Look-Up-Table #16) where	>	20.00	°C						
			(a) captured engine coolant temperature at start and	=	measured parameter	-						
			(b) captured fuel temperature at start and	=	measured parameter	-						
			( block heater detected (see parameter definition)	=	FALSE	-						
Fuel Pressure	P0090	Diagnoses the Fuel	Voltage low during driver off state	=	Open Circuit:≥		battery voltage	>	11.00	V	fail	A
Regulator 1 Control Circuit/Open		Pressure Regulator 1 low side driver circuit for circuit faults.	(indicates open circuit)		200 K Ω impedance between ECU pin and load		for				conditions exists for 1 monitor runs with 0.01 s rate	
							time and	>	3.00	sec	whenever enable	
							starter is active cranking for time	=	FALSE 3.00	- sec	conditions are met	
							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.
					Basic enable conditions met	=	see sheet enable tables	-		
		Diagnoses the Fuel Pressure Regulator 1 low side driver circuit for circuit faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage	>	11.00	V	fail conditions exists for 1 monitor runs with 0.01 s	A
					time and	>	3.00	sec	rate whenever enable	
					starter is active cranking for time	=	FALSE 3.00	- sec	conditions are met	
					and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					and Basic enable conditions met	=	see sheet enable tables	-		
Fuel Pressure Regulator 1 Control Circuit Low	P0091	Diagnoses the Fuel Pressure Regulator 1 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	<ul> <li>Short to ground: - ≤ 0.5 Ω impedance between signal and controller ground</li> </ul>	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 0.75s monitor runs with 0.01 s rate whenever enable conditions are met	A
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	>	11.00	V	fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							and starter is active cranking for time and NO Pending or Confirmed DTCs: and Basic enable conditions met	= > = =	FALSE 3.00 see sheet inhibit tables see sheet enable tables	- sec -	are met	
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	∨ ℃	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
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	~	4.93 -52	∨ ℃	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

e	fail conditions exists for 0.1 s	A
e	conditions exists for 0.1 s	A
	monitor runs with 0.1 s rate	
00 sec	whenever enable	
SE -	conditions are met	
00 sec		
et inhibit - es		
t enable - es		
JE -	fail	В
E	conditions exists for 5 s test performed continuously 0.1 s rate	
et inhibit - es		
IF	fail	В
e	conditions exists for 5 s test	В
	continuously 0.1 s rate	
et inhibit - es		
es et inl		conditions exists for 5 s test performed continuously able - 0.1 s rate

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		shold nd Value	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Humidity Sensor Circuit Low	P00F4	Detects a low duty cycle signal from the humidity sensor, indicating an OOR low condition on the humidity sensor circuit	Path1: Humidity Sensor Duty Cycle same as relative humidity		00 % 0.00 %	Engine Running (please see the definition) and following conditions for time: battery voltage battery voltage and basic enable conditions met: and no pending or confirmed DTCs	=	1.00 11.00 655.34 see sheet enable tables see sheet inhibit tables	sec V V -	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	В
		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.		= TR	IUE - IUE - IUE -	Engine Running (please see the definition) and following conditions for time: battery voltage battery voltage and basic enable conditions met: and no pending or confirmed DTCs	=	TRUE 1.00 11.00 655.34 see sheet enable tables see sheet inhibit tables	- V -	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	
Humidity Sensor Circuit High	P00F5	Detects a high duty cycle signal from the humidity sensor, indicating an OOR high condition on the humidity sensor circuit	Path 1: Humidity Sensor Duty Cycle same as relative humidity		.00 % 00 %	Engine Running (please see the definition) and following conditions for time: battery voltage battery voltage and	= > > < <	1.00 11.00 655.34	- sec V V	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold ogic and Valu	9	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	-		
		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.					Engine Running (please see the definition)	=	TRUE		fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	
			Internal ECM PWM circuit high voltage and ECM PWM circuit maximum period detected or Internal ECM PWM period not received	=	TRUE TRUE TRUE	-	and following conditions for time: battery voltage and basic enable conditions met: and	> < =	1.00 11.00 655.34 see sheet enable tables	sec V V		
							no pending or confirmed DTCs	=	see sheet inhibit tables	-		
Humidity Sensor Circuit Intermittent / Erratic	P00F6	The humidity signal performance monitor monitors the humidity signal delta in a defined time interval. The sum of these signal delta's over a number of time intervals is compared to a threshold.	Cumulative Humidity Sensor signal delta	>=	50.00	%	Engine Running (please see the definition)	=	TRUE	-	fail conditions exists for 4 out of 5 windows (x out of y), test is performed continuously with 0.1 s	В
			accumulated over a defined time interval same as	>	5.00	counts	and basic enable conditions met:	=	see sheet enable tables	-	rate	
			accumulated over time	>	0.13	sec	and no pending or confirmed DTCs	=	see sheet inhibit tables	-		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value	)	Parameters		Conditions		Required	Illum.
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) - (b)	-	and				whenever enable conditions	
			<ul> <li>(a) engine load dependent MAP for calculating lower threshold (see Look- Up-Table #1) and with</li> </ul>	=	0.75 to 0.8	ratio	engine coolant temperature and	>=	-20.04	°C	are met	
			(b) air temperature dependent correction factor curve	=	0	factor	engine coolant temperature	<=	129.96	°C		
			or measured air mass flow signal	>	(c) + (b)	-	and					
			with (c) Engine load dependent MAP for calculating higher threshold	=	1.2	ratio	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	=	TRUE	-		
							for time since start	>	90.00	sec		
							) and control value of the throttle valve and	>=	-400.00	%		
							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 )	>	3.00	sec		
							and injection quantity and	<=	300.00	mm^3/rev		
							air pressure in the induction volume and	<=	280.00	kPa		
							engine speed and	>=	625.00	rpm		
							engine speed and	<=	1500.00	rpm		
							intake air temperature and	>=	-7.04	°C		
							intake air temperature	<=	51.96	°C		
							basic enable conditions met:	=	see sheet enable tables	-		
I		l	I I				and					ļ

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	-		
Mass Air Flow (MAF) Sensor Circuit High Voltage	P0102	Detects low frequency readings on the MAF circuit, indicating an OOR low condition on the MAF circuit	signal period of air mass flow sensor (MAF)	>	881.00	USEC	ignition on	=	TRUE	-	fail conditions exists for 3 s	A
			same as air mass flow	<	14.04	g/sec	and basic enable conditions met: and NO Pending or Confirmed DTCs:	=	see sheet enable tables see sheet inhibit tables	-	0.01 s rate whenever enable conditions are met	
Mass Air Flow (MAF) Sensor	P0103	Detects high frequency readings on the MAF circuit,	PWM period too long	=	TRUE		ignition on	=	TRUE	·	fail conditions	A
Circuit Low Voltage		indicating an OOR high condition on the MAF circuit	or signal period of air mass flow sensor (MAF) same as air mass flow	<	50.00 7354.80	usec g/sec	and basic enable conditions met: and NO Pending or Confirmed DTCs:	=	see sheet enable tables see sheet inhibit tables	-	exists for 3 s monitor runs 0.01 s rate whenever enable conditions are met	
Manifold Absolute Pressure (MAP) Sensor	P0106	BARO sensor by comparing MAP readings to the BARO	Path 1:				engine coolant temperature	>	-3549.94	°C	fail conditions exists for 5 s	В
Performance		sensor	(a) - (b) or	<	-15.00	kPa	and current injection quantity and	<	1308.00	mm^3/rev	monitor runs with 0.01 s rate whenever	
			Path 2: (a) - (b) where	>	15.00	kPa	actuator position of throttle valve and turbo charger (VNT) wiping is active (see parameter definition)	<=	327.67 FALSE	% -	enable conditions are met	
			(a) MAP sensor measured pressure	=	measured parameter	-	and (					
			(b) BARO sensor measured pressure	=	measured parameter	-	engine speed and	>=	0.00	rpm		
							engine speed ) and vehicle speed	<=	100.00 3.11	rpm mph		
							and basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold .ogic and Valu	e	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Manifold Absolute Pressure (MAP) Sensor Circuit Low Voltage	P0107	Detects low voltage readings on the MAP circuit, indicating an OOR low condition on the MAP circuit	Path 1:				engine synchronization completed	=	TRUE	-	fail conditions exists for 5 s test performed	A
			( sensor voltage of manifold absolute pressure same as	<	0.91	V	which means number of crankshaft revolutions and	>=	4.00	revs	continuously 0.01 s rate	
			manifold absolute pressure	<	44.9	kPa	crankshaft reference mark detected (reference mark is the 2 missing teeth in the 50-2 tooth-wheel configuration)	=	TRUE	-		
			and actuator position of throttle valve )	<=	20.00	%	and basic enable conditions met:	=	see sheet enable tables	-		
			or Path 2: (									
			sensor voltage of manifold absolute pressure same as manifold absolute pressure and	<	0.38 -0.3	V kPa						
			actuator position of throttle valve )	>	20.00	%						
Manifold Absolute Pressure (MAP) Sensor Circuit High Voltage	P0108	Detects high voltage readings on the MAP circuit, indicating an OOR high condition on the MAP circuit	sensor voltage of manifold absolute pressure	>	4.75	V	engine synchronization completed	=	TRUE	·	fail conditions exists for 5 s test	A
			same as manifold absolute pressure	>	371.3	kPa	which means number of crankshaft revolutions and crankshaft reference mark detected	>= =	4.00 TRUE	revs -	performed continuously 0.01 s rate	
							(reference mark is the 2 missing teeth in the 50-2 tooth-wheel configuration) and					
							basic enable conditions met:	=	see sheet enable tables	-		
	_							_		_		_

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Valu	ue	Parameters		Conditions		Required	Illum.
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)	=	TRUE	-	fail conditions exists for 0.1 s test performed continuously	В
			same as humidity temperature	>	145.96	ond °C	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 -	with 0.1 s	
		circuit driver detects either a duty cycle which has not been received or the maximum period has been exceeded, indicating short low condition on the humidity sensor circuit.	Internal ECM PWM circuit low voltage and	=	TRUE		Engine Running (please see the definition) and following conditions for time:	=	TRUE 1.00	- sec	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	
			ECM PWM circuit maximum period detected or Internal ECM PWM period not received	=	TRUE	-	battery voltage and basic enable conditions met: and no pending or confirmed DTCs	>	11.00 655.34 see sheet enable tables see sheet inhibit tables	V V -		
Intake Air Temperature Sensor 1 Circuit High	P0113	Detects a high PWM period from the humidity temperature sensor, indicating an OOR high condition on the humidity temperature sensor circuit	Path 1: Humidity Temperature sensor period same as humidity temperature	>	10.00 -60.00	centisec ond °C	Engine Running (please see the definition) and following conditions for time: battery voltage battery voltage and basic enable conditions met: and no pending or confirmed DTCs	= ^ > > < =	1.00 11.00 655.34 see sheet enable tables see sheet inhibit tables	sec V V -	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	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 high condition on the humidity sensor circuit.	Path 2: Internal ECM PWM circuit high voltage and ECM PWM circuit maximum period detected or Internal ECM PWM period not received		TRUE TRUE TRUE	- -	Engine Running (please see the definition) and following conditions for time: battery voltage battery voltage and basic enable conditions met: and no pending or confirmed DTCs		TRUE 1.00 11.00 655.34 see sheet enable tables see sheet inhibit tables	- Sec V V -	fail conditions exists for 0.1 s test performed continuously with 0.1 s rate	
Engine Coolant Temperature (ECT) Sensor Circuit Low Voltage	P0117	Detects low voltage readings on the ECT circuit, indicating an OOR low condition on the ECT circuit	voltage of engine coolant temperature sensor same as engine coolant temperature	~	0.51	∨ °C	ignition on and basic enable conditions met:	=	TRUE see sheet enable tables	-	fail conditions exists for 15 s test performed continuously 0.2 s rate	Α
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	∨ °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

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
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)	and	>=	59.96	°C	and	=	FALSE	-	fail conditions exists for 0.2 s monitor runs once per trip with 0.2 s rate whenever	В
			measured engine coolant temperature	<	49.96	°C	time since start and	<	1440.00	sec	enable conditions	
		Low Region Engine Temperature at start < 31 degC AND ambient air temperature <= 10 degC.					measured engine coolant temperature and	>=	-53.04	°C	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	<	0.50	%		
							when: ( accelerator pedal value	<=	10.01	%		
							and vehicle speed	<=	9.94	mph		
							and engine speed )	<=	750.00	rpm		
							and diagnostic performed in current dc and	=	FALSE	-		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
								-		_		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
		Detects a stuck open thermostat by comparing actual engine coolant heat up profile to an expected modeled heat up profile. The targets are dependant on start up conditions (high and low regions)		>=	81.96	℃	engine pre drive	=	FALSE	-		
			and measured engine coolant temperature	<	70.96	°C	and time since start	<	1440.00	sec		
		High region Engine Temperature at start < 52 degC AND ambient air temperature > 10 degC					and measured engine coolant temperature and	>=	-53.04	°C		
							captured value of coolant temperature during start and (	<=	51.96	°C		
							ambient temperature	>	-7.04	°C		
							ambient temperature ) and	<	59.96	°C		
							ambient temperature (used for high region determination) and	>	9.96	°C		
							engine idle time ratio which is defined by ( idle time divided by time since start ) where idle time is incremented when:	<	0.50	%		
							( accelerator pedal value and	<=	10.01	%		
							vehicle speed and	<=	9.94	mph		
							engine speed )	<=	750.00	rpm		
							and diagnostic performed in current dc and	=	FALSE	-		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
HO2S Bank 1 Sensor 1 Circuit Low	P0131	Detects an out of range low fault of the upstream NOx sensor lambda signal	Upstream NOx sensor lambda signal received via CAN	<	-150.00	counts	Valid upstream NOx signal from CAN is received (no NOx sensor communication failures)	=	TRUE	-	fault exists for more than 3 sec;	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Joten	0000		Uniteria		(-150 counts = 1100 Lambda = ~27 %O2)		Engine Running (see parameter definition) for time (required for the NOx sensor to give valid response) and basic enable conditions met:	=	20.00 see sheet enable tables	- sec -	monitor runs at 0.1 s when enable conditions are met	inum.
HO2S Bank 1 Sensor 1 Circuit High	P0132	Detects an out of range high fault of the upstream NOx sensor lambda signal	Upstream NOx sensor lambda signal received via CAN	>	1550.00 (1550 counts = 0.65 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	v	-150.00 (-150 counts = 1100 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
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 (1550 counts = 0.65 Lambda = - 0.1178 %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.
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		<	2.00	sec	global enable condition:				fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions	В
			with O2 concentration of the sensor	<=	(( 0.2095 - (a) ) * (b) ) + (a)	factor	Engine speed Engine speed	> <	600.00 4000.00	rpm rpm	are met	
			where		(b)) (a)		Battery voltage	>	11.00	V		
			(a) modeled O2 in waiting-injection	=	modeled O2	factor	Ambient Air Pressure	>=	74.80	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	>=	-7.04	°C		
							Ambient Air Temperature	<=	124.96	°C		
							Engine operation mode	=	normal	-		
							Post injection Oxygen Concentration Signal	=	inactive active	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							Communication with NOx Sensor	=	active	-		
							Exhaust Gas Temperature	>=	-0.04	°C		
							Exhaust Gas Temperature	<=	1299.96	°C		
							Additional enable conditions for transitioning state machine from inactive state to stable operation state: following conditions for time: modeled O2 signal (based on injection quantity, air mass and fuel	> <	1.80 0.12	sec -		
							density) Fuel Injection Quantity	>	120.00	mm^3/rev		
							Engine speed	>	600.00	rpm		
							Additional enable conditions for transitioning state machine from stable operation state to wait-Injection falling state:					
							Fuel Injection Quantity with a) Measured and stored Fuel	< =	a+b measured	-		
							Injection Quantity at start of diagnosis		parameter			
							<ul> <li>b) Decline of Injection Quantity from stored fuel quantity at start of diagnosis</li> <li>and</li> </ul>	>=	18.00	mm^3/rev		
							Fuel Injection Quantity with	>	a-b	-		
							<ul> <li>a) Measured and stored Fuel Injection Quantity at start of diagnosis</li> </ul>	=	measured parameter	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters		Enable Conditions		Time	MIL Illum.
System	Code	Description	Gineria		<ul> <li>b) Decline of Injection Quantity from stored fuel quantity at start of diagnosis</li> </ul>	>=	18.00	mm^3/rev	Required	mum.
					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	>=	0.00	%		
					and actual valve position of exhaust-gas recirculation	<=	80.00	%		
					and within the time fuel injection falling below	<	1.05	sec		
					Fuel Injection Quantity and Fuel Injection Quantity	<	4.00 a+b	mm^3/rev		
					with a) Measured Minimum Fuel Injection Quantity b) Maximum fluctuation of Injection Quantity	= =<	measured parameter 16.00	- mm^3/rev		
					Additional enable conditions for transitioning state machine from overrun	-	_	_		
					state to delay state: actual valve position of exhaust-gas recirculation	>=	0.00	%		
					and actual valve position of exhaust-gas recirculation	<=	80.00	%		
					Deviation from maximum O2 concentration during overrun	<	0.06	-		
					Additional enable conditions for transitioning from delay state to diagnostic completion state:					

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters actual valve position of exhaust-gas recirculation	>=	Conditions 0.00	%	Required	Illum.
					and actual valve position of exhaust-gas recirculation	<=	80.00	%		
					Deviation from maximum O2 concentration during overrun	<	0.06	-		
Fuel Trim System Lean	P0171	Monitors the fuel mass observer correction quantity.	Fuel mass observer emission correction quantity (see Look-Up Table #41)	<= -164.4 to -46.12 mm^3/ ev	(Status of the Observer function's lambda-signal	=	TRUE		fail conditions	В
		Detects if the correction quantity exceeds the feedback limit.	, , <b>.</b> ,						exists for 12 s monitor runs	
		ieeuback iimit.			means (				with 0.02 s rate	
					lambda signal from NOx sensor ready (see parameter definition) fuel system is in fuel cut off (see	=	TRUE FALSE	-	whenever enable conditions	
					parameter definition) Particulate Filter Regeneration Mode	=	FALSE	-	are met	
					(( 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 )) AND	>	1.00	sec		
					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 Normal Injection Mode	<= >= =	199.96 64.96 TRUE	°C °C		
					Barometric pressure Ambient temperature	= >= >=	74.80 -7.04	- kPa °C		
					NO Pending or Confirmed DTCs: basic enable conditions met:	=	see sheet inhibit tables see sheet enable	-		
						_	tables			
Fuel Trim System Rich	P0172	Monitors the fuel mass observer correction quantity. Detects if the correction quantity exceeds the	Fuel mass observer emission correction quantity (see Look-Up Table #46)	>= 46.12 to 164.64 mm^3/ ev	r (Status of the Observer function's lambda-signal	=	TRUE		fail conditions exists for 12 s	В

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Lo	gic and Value		Parameters		Conditions		Required	Illum.
							means ( lambda signal from NOx sensor ready (see parameter definition) fuel system is in fuel cut off (see	=	TRUE FALSE	-	with 0.02 s rate whenever enable	
							parameter definition) Particulate Filter Regeneration Mode	=	FALSE	-	conditions are met	
							(( 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 Normal Injection Mode	<= >= =	199.96 64.96 TRUE	°C °C -		
							Barometric pressure Ambient temperature NO Pending or Confirmed DTCs:	>= >= =	74.80 -7.04 see sheet inhibit	kPa ℃ -		
							basic enable conditions met:	=	tables see sheet enable tables	-		
Fuel pump Temperature Sensor 1 Circuit Low	P0182	Detects low voltage readings in the fuel pump temperature sensor 1 circuit, indicating an OOR low condition on the fuel pump temperature sensor 1 circuit	voltage of fuel temperature sensor 1	<	0.60	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously 0.2 s rate	В
			same as fuel temperature	^	59	°C	and basic enable conditions met:	=	see sheet enable tables			

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System Fuel pump Temperature	<b>Code</b> P0183	Description Detects high voltage readings in the fuel pump	Criteria voltage of fuel temperature sensor 1	>	Logic and Value 4.71	V	Parameters ignition on	=	Conditions TRUE	-	Required fail conditions	B B
High		temperature sensor 1 circuit, indicating an OOR high condition on the fuel pump temperature sensor 1 circuit	same as fuel temperature	<	-50.04	°C	and basic enable conditions met:	=	see sheet enable tables		exists for 5 s test performed continuously 0.2 s rate	
	_					_		_		_		_
Fuel Rail Pressure [FRP] Sensor Performance	P0191		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 means	=	TRUE	-	with 0.01 s rate whenever enable	
							( counter for successful adaption	>	0	counts	conditions are met	
							or counter for the successful calculation of the adaptation and	>	9.00	counts		
							( engine speed and	>	400.00	rpm		
							engine speed )	<	1000.00	rpm		
							and vehicle speed and	<=	1.86	mph		
							( state machine rail pressure control equal to pressure control valve	=	TRUE	-		
							or state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-		
							) and basic enable conditions met:	=	see sheet enable tables			
					_	-		-		-		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria	1	Logic and Value	)	Parameters		Conditions		Required	Illum.
		Detects a biased sensor by determining the FRP sensor voltage to be in the correct range for atmospheric pressure at engine off and with sufficient pressure bleed-off time.					engine post drive/ afterun	=	TRUE	-	all conditions exists for more than 30 monitor runs once per driving cycle with 0.01 s	
			rail pressure sensor voltage or rail pressure sensor voltage	<	0.35 0.65	V V	and fuel temperature and	>	-0.04	°C	rate whenever	
			)	2	0.05	v	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 number of fault measurements during	>	30.08 10.00	sec counts		
							engine postdrive/ afterun and		10.00	Counts		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:		see sheet inhibit tables	-		
Fuel Rail Pressure [FRP] Sensor Circuit Low	P0192	Detects low voltage readings on the FRP circuit, indicating an OOR low condition on the FRP circuit	rail pressure sensor voltage same as	v	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
			rail pressure	<	0	kPa	and and and a conditions met:	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Fuel Rail Pressure [FRP] Sensor Circuit High	P0193	Detects high voltage readings on the FRP circuit, indicating an OOR high condition on the FRP circuit	rail pressure sensor voltage	>	4.81	V	ignition on	=	TRUE	-	fail conditions exists for 0.2 s monitor runs	A
			same as				and				with 0.01 s	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
			rail pressure	~	220000.00	kPa	basic enable conditions met: and NO Pending or Confirmed DTCs:	=	see sheet enable tables see sheet inhibit tables	-	rate whenever enable 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 and with (b) offset of the maximum filtered	=	384.4	usec	fuel temperature and fuel temperature	>= <=	0.06 79.96	°C		
			energizing time ) ) for rail pressure point	=	70000.00	kPa	and engine temperature and battery voltage and	>	49.96 10.00	°C V		
							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	< <	150.00 0.05	kPa %		
							and Fuel system status and	=	Fuel cut off	-		
							( engine speed and	>	(b) - (a)	-		
							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	L	Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							and with (c) gear specific maximum engine speed	=	1850.00	rpm		
							/ and current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1) 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	-		
				-				-				
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. 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)	-	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				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		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Oyotom	ooue	Description	ontonu	Logio and Faldo	and intake manifold pressure	>	75.00	kPa	Required	indin.
					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	<	(a) + (c)	-		
					with (a) value of engine speed	=	30.00	rpm		
					and with (b) gear specific minimum engine	=	950.00	rpm		
					speed and with					
					(c) gear specific maximum engine 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	<	5000.00	kPa		
					calculated out of difference between desired and actual value		0000.00	in u		
					for		0.10			
					time and	>		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 7 Injection Timing Retarded	P01D7	Monitors the correction values for the energizing	(		environmental temperature	>	-7.04	°C	fail conditions	В
		time of each cylinder. A correction value for the							exists for more than	
		energizing time is learned for each cylinder at a							0.01 s monitor runs	
		calibrated rail pressure operating point.							with 0.01 s rate	
		Detects a fault when the corrected energizing time	corrected energizing time for the rail pressure calibration points and cylinder 7	> (a) - (b) -	and				whenever enable	
		exceeds the allowed limit.							conditions	
1	l	l	1						are met	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
			( 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		
				-	10000.00	Νü	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 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	-		
1		l	I				and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 8 Injection Timing Retarded	P01D9	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point. 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)	-	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 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 intake manifold pressure	>= > <	5 to 30 75.00 150.00	sec kPa kPa		
							and accelerator pedal position and Fuel system status and	< =	0.05 Fuel cut off	кга % -		
							( engine speed and	>	(b) - (a)	-		
							engine speed with (a) value of engine speed	< =	(a) + (c) 30.00	-		
							and with (b) gear specific minimum engine	=	950.00	rpm rpm		
							speed and with (c) gear specific maximum engine speed )	=	1850.00	rpm		
							and with (c) gear specific maximum engine	=	1850.00	rpm		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-	Required	Illum.
							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		
							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	P01D1	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 4	>	(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 )	<=	79.96	°C		
			) )				and					
			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	-	10.00	v		
							means time since last combustion (see Look- Up-Table #94)	>=	5 to 30	sec		
							and intake manifold pressure and	>	75.00	kPa		
							and intake manifold pressure and	<	150.00	kPa		
							accelerator pedal position	<	0.05	%		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Log	gic and Value		Parameters and		Conditions		Required	Illum.
							Fuel system status and	=	Fuel cut off	-		
							( engine speed and	>	(b) - (a)	-		
							engine speed with	<	(a) + (c)	-		
							<ul> <li>(a) value of engine speed and with</li> </ul>	=	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 5 Injection	P01D3	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	corrected energizing time for the rail pressure calibration points and cylinder 5	>	(a) - (b)	-	and				conditions exists for more than 0.01 s monitor runs with 0.01 s rate whenever enable	
		exceeds the allowed limit.	( with				( fuel temperature	>=	0.06	°C	conditions are met	
			(a) maximum injection energizing time	=	384.4	usec	and	>=	0.00	C		
		l	and with				fuel temperature	<=	79.96	°C		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value	)	Parameters		Conditions		Required	Illum.
				=		usec kPa		> >= > < <		℃ V sec kPa kPa %		
							Fuel system status and ( engine speed and engine speed with (a) value of engine speed and with (b) gear specific minimum engine speed and with (c) gear specific maximum engine speed	= > = = =	(b) - (a) (a) + (c) 30.00 950.00 1850.00	- - rpm rpm		
							) and current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1) and vehicle speed and rail pressure deviation from set point calculated out of difference between desired and actual value for time and no gear change is occurred and 4 wheel mode and basic enable conditions met:		0 to 1 0.00 5000.00 0.10 TRUE FALSE see sheet enable	- mph kPa sec - -		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary	_	Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
Cylinder 6 Injection Timing Retarded	P01D5	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point. 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)	-	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					
			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-	>=	5 to 30	sec			
							Up-Table #94) 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 and	>	(b) - (a)	-		
							engine speed with	<	(a) + (c)	-		
							<ul> <li>(a) value of engine speed and with</li> </ul>	=	30.00	rpm		
							<ul> <li>(b) gear specific minimum engine speed and with</li> </ul>	=	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		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
- Oystenn	Coue	Description	Unteria		Logic and value		rail pressure deviation from set point calculated out of difference between desired and actual value for time	<	0.10	kPa	Required	inum.
							and no gear change is occurred	=	TRUE	-		
							and 4 wheel mode		FALSE			
							and	=		-		
							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 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)		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
			(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) and	>=	5 to 30	sec		
							intake manifold pressure and	>	75.00	kPa		
							intake manifold pressure and	<	150.00	kPa		
							and accelerator pedal position and	<	0.05	%		
							and Fuel system status and	=	Fuel cut off	-		
							( engine speed	>	(b) - (a)	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Lo	Threshold ogic and Value	•	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							and 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 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 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
			( with				( fuel temperature	>=	0.06	°C		
			<ul> <li>(a) minimum injection energizing time and with</li> <li>(b) offset of the minimum filtered</li> </ul>	=	107.2 47.2	usec usec	and fuel temperature )	<=	79.96	°C		
			)				and					
			) for rail pressure point	_	70000.00	kPa	engine temperature and	>	49.96	°C		
			ian pressure point	=	10000.00	кГd	battery voltage	>	10.00	V		

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters and		Conditions		Required	Illum.
					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		
					<ul> <li>(b) gear specific minimum engine speed and with</li> </ul>	=	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		
					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: and	=	see sheet enable tables	-		
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Culinder 2 Injection	P01CE	Monitors the correction			opviropmontal temporaturo		-7.04	°C	fail	В
Cylinder 2 Injection Timing Advanced	FUICE	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	conditions exists for more than 0.01 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 falls below the allowed limit.	corrected energizing time for the rail pressure calibration points and cylinder 2	<	(a) + (b)	-	and				whenever enable conditions are met	
			( with (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 ) and	<=	79.96	°C		
			) for rail pressure point	=	70000.00	kPa	engine temperature and	>	49.96	°C		
				-	70000.00	κια	battery voltage	>	10.00	V		
							and combustion chamber is not cold off means current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	>=	5 to 30	sec		
							and intake manifold pressure 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)	-		
							<ul> <li>(a) value of engine speed and with</li> </ul>	=	30.00	rpm		
							<ul> <li>(b) gear specific minimum engine speed and with</li> </ul>	=	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	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	-		
Cylinder 7 Injection Timing Advanced	P01D8	corrected energizing time falls below the allowed limit.	( corrected energizing time for the rail pressure calibration points and cylinder 7 ( with (a) minimum injection energizing time and with (b) offset of the minimum filtered energizing time ) for rail pressure point	(a) + (b) 107.2 47.2 70000.00	- usec kPa	environmental temperature and ( fuel temperature 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- Up-Table #94) and intake manifold pressure and intake manifold pressure and accelerator pedal position and Fuel system status and ( engine speed and with (b) gear specific minimum engine speed and with (c) gear specific maximum engine speed		-7.04 0.06 79.96 49.96 10.00 5 to 30 75.00 150.00 0.05 Fuel cut off (b) - (a) (a) + (c) 30.00 950.00 1850.00	°C °C °C V sec kPa kPa % - - rpm rpm	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	1	Threshold Logic and Value	e	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							and current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1)	=	0 to 1	-		
							and vehicle speed	>	0.00	mph		
							and rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa		
							for time	>	0.10	sec		l
							and no gear change is occurred	=	TRUE	-		l
							and 4 wheel mode	=	FALSE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 8 Injection	P01DA	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 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) 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			_		
			for rail pressure point	=	70000.00	kPa	engine temperature and	>	49.96	°C		
							battery voltage	>	10.00	V		l
							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		l
							and intake manifold pressure	<	150.00	kPa		l
							and accelerator pedal position	<	0.05	%		I

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria	L	ogic and Value.	•	Parameters		Conditions		Required	Illum.
							and Fuel system status and	=	Fuel cut off			
							( engine speed and	>	(b) - (a)	-		
							engine speed with	<	(a) + (c)	-		
							<ul> <li>(a) value of engine speed and with</li> </ul>	=	30.00	rpm		
							<ul> <li>(b) gear specific minimum engine speed and with</li> </ul>	=	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	=	TRUE	-		
							and 4 wheel mode and	=	FALSE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
							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									conditions exists for more than 0.01 s monitor runs with 0.01 s	
		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				rate whenever enable conditions are met	
			( with (a) minimum injection energizing time	=	107.2	usec	fuel temperature and	>=	0.06	°C		
			and with (b) offset of the minimum filtered	=	47.2	usec	fuel temperature	<=	79.96	°C		
			energizing time )				and					

System         Code         Description         Criteria         Logic and Value         Parameters         Condition           Image: System         Image: System <th>°C</th> <th>Required</th> <th>Illum.</th>	°C	Required	Illum.
rail pressure point = 70000.00 kPa and battery voltage > 10.00			
battery voltage > 10.00	V		
hee			
combustion chamber is not cold off means time since last combustion (see Look- Up-Table #94)	) sec		
and intake manifold pressure > 75.00	kPa		
and intake manifold pressure < 150.00	) kPa		
and accelerator pedal position < 0.05	%		
and Fuel system status = Fuel cut and	off -		
( engine speed > (b) - (a and	) -		
engine speed < (a) + (a) + (a) + (b)	- (		
(a) value of engine speed = 30.00 and with	rpm		
(b) gear specific minimum engine = 950.00 speed	) rpm		
and with (c) gear specific maximum engine = 1850.0 speed	0 rpm		
/ and current gear (see Look-Up-Table #93) = 0 to 1 (diagnostic enabled when equal to 1)	-		
and vehicle speed > 0.00 and	mph		
rail pressure deviation from set point < 5000.0 calculated out of difference between desired and actual value for	0 kPa		
time > 0.10	sec		
no gear change is occurred = TRUE	-		
4 wheel mode = FALSE and	-		
basic enable conditions met: = see sheet et tables			
and NO Pending or Confirmed DTCs: = see sheet in tables			

Component /	Fault	Monitor Strategy	Primary Malfunction	_	Threshold	_	Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
Cylinder 5 Injection Timing Advanced	P01D4	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at a calibrated rail pressure operating point.	(				environmental temperature	>	-7.04	℃	fail conditions exists for more than 0.01 s monitor runs with 0.01 s rate	В
			corrected energizing time for the rail pressure calibration points and cylinder 5 (	<	(a) + (b)	-	and (				whenever enable conditions are met	
			with (a) minimum injection energizing time	=	107.2	usec	fuel temperature and	>=	0.06	°C		
			and with (b) offset of the minimum filtered energizing time	=	47.2	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 means	>	10.00	V			
							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 and	>	(b) - (a)	-		
							engine speed with	<	(a) + (c)	-		
							<ul> <li>(a) value of engine speed and with</li> </ul>	=	30.00	rpm		
							<ul> <li>(b) gear specific minimum engine speed and with</li> </ul>	=	950.00	rpm		
							(c) gear specific maximum engine speed ) and	=	1850.00	rpm		
							current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1) and	=	0 to 1	-		
							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.
Jystelli	Code	Description	Ginella		Logic and value		rail pressure deviation from set point calculated out of difference between desired and actual value	<	5000.00	kPa	Required	mum.
							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 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	=	107.2	11000	( fuel temperature and	>=	0.06	°C		
			<ul> <li>(a) Infinition injection energizing time and with</li> <li>(b) offset of the minimum filtered energizing time</li> <li>)</li> </ul>	=	47.2	usec usec	fuel temperature ) and	<=	79.96	°C		
			) for rail pressure point	=	70000.00	kPa	engine temperature and	>	49.96	°C		
				-	70000.00	κιά	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 and	>	(b) - (a)	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
System	Code	Description	Gnieria		Logic and value	;	engine speed with	<	(a) + (c)	-	Requirea	mum.
							(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 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		
			(a) minimum injection energizing time and with (b) offset of the minimum filtered energizing time	=	47.2	usec	fuel temperature )	<=	79.96	°C		
			)				and		10			
			for rail pressure point	=	70000.00	kPa	engine temperature and battery voltage	>	49.96 10.00	°C V		
							, ,		10.00	v		
I		I	I I				and	I			1 1	

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Lo	ogic and Value		Parameters combustion chamber is not cold off		Conditions		Required	Illum.
							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	-		
							l engine speed and	>	(b) - (a)	-		
							engine speed with	<	(a) + (c)	-		
							(a) value of engine speed and with	=	30.00	rpm		
							<ul> <li>(b) gear specific minimum engine speed and with</li> </ul>	=	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: and	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Coolant Temperature Dropped Below Diagnostic Monitoring Temperature	P01F0	Detects a stuck open thermostat by monitoring for a decrease of the engine coolant temperature below the OBD monitoring threshold during normal	engine coolant temperature	<	70.96	°C	engine pre drive	=	FALSE	-	fail conditions exists for 0.2 s monitor runs with 0.2 s	В
i omporature		operating conditions	for fault counter which is equivalent to fault time	>= >=	200.00 40.00	- sec	and ambient temperature	>=	-7.04	°C	rate whenever enable	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	(	Enable Conditions		Time Required	MIL Illum.
					and engine coolant temperature at least once in driving cycle and instantaneous fuel consumption (low- pass filtered) and basic enable conditions met: and NO Pending or Confirmed DTCs:		70.96 6.00 sheet enable tables sheet inhibit tables	°C liters / hr -	conditions are met	
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)	<ul> <li>Open Circuit:≥ - 200 K Ω impedance between ECU pin and load</li> </ul>	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)	<ul> <li>Open Circuit:2 - 200 K Ω impedance between ECU pin and load</li> </ul>	Engine Running (see parameter definition)	=	TRUE		fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Control Circuit	P0203	Diagnoses the Fuel Injector Cylinder #3 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit:≥ - 200 K Ω impedance between ECU pin and load	Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
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)	<ul> <li>Open Circuit:≥ - 200 K Ω impedance between ECU pin and load</li> </ul>	Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 5 Control Circuit	P0205	Diagnoses the Fuel Injector Cylinder #5 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	<ul> <li>Open Circuit:≥</li> <li>200 K Ω</li> <li>impedance</li> <li>between ECU pin</li> <li>and load</li> </ul>	Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Control Circuit	P0206	Diagnoses the Fuel Injector Cylinder #6 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	<ul> <li>Open Circuit:≥ -</li> <li>200 K Ω</li> <li>impedance</li> <li>between ECU pin</li> <li>and load</li> </ul>	Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 7 Control Circuit	P0207	Diagnoses the Fuel Injector Cylinder #7 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	<ul> <li>Open Circuit:≥ -</li> <li>200 K Ω</li> <li>impedance</li> <li>between ECU pin</li> <li>and load</li> </ul>	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)	<ul> <li>Open Circuit:2 - 200 K Ω impedance between ECU pin and load</li> </ul>	Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Turbocharger/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)	<	(d*e*f)	-	(				fail conditions exists for 10 s	В
		concluon	with (d) The lower threshold pressure (see Look-Up-Table #62)	=	-31.5 to -10	kPa	VNT turbocharger offset adaptation active - in order to compensate sensor drift and valve aging, the valve is closed and opened fully once in a driving cycle during engine idling, the read positions for opening and closing are averaged and used for the calculation of offset drift of the valve	=	FALSE	-	with 0.02 s rate whenever enable conditions are met	
			<ul><li>(e) correction factor (see Look-Up- Table #60)</li><li>(f) ECB valve based lower limit</li></ul>	=	0.699951 to 1 1.00	factor factor	and VNT turbocharger wiping is active	=	FALSE			
			correction factor				- 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 means	=	TRUE	-		
							increase of engine speed and	<	35.00	rpm/s		
							injection Quantity injection Quantity and engine Speed	>= <= >=	132.00 480.00 1450.00	mm^3/rev mm^3/rev rpm		
							engine Speed and	<=	2000.00	rpm		
							working range of boost pressure is in closed-loop means (	=	TRUE	-		
							engine speed and	>	1200.00	rpm		
							injection quantity ) NO Pending or Confirmed DTCs	> =	20.00 see sheet inhibit	mm^3/rev -	conditions exists for 10 s monitor runs with 0.02 s rate whenever enable conditions are met	
							) for time	>	tables 2.00	sec		
							and Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
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) with	>	(a*b*c)	-	( VNT turbocharger offset adaptation	=	FALSE		fail conditions exists for 10 s monitor runs with 0.02 s	В
			<ul><li>(a) the upper limit (see Look-Up- Table #61)</li><li>(b) Correction factor (see Look-Up-</li></ul>	=	19 to 40 1 to 1.099976	kPa	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				rate whenever enable conditions are met	
			Table #97) (c) ECB valve based upper limit	=	1.00	factor	VNT turbocharger wiping is active	=	FALSE			
			correction factor				<ul> <li>in order to prevent soot accumulation</li> <li>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</li> </ul>					
							and injection quantity is stable	=	TRUE			
							means increase of injection quantity	<	40.00	(mm^3/rev) /s		
							and engine speed is stable means	=	TRUE	-		
							increase of engine speed and	<	35.00	rpm/s		l
							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		l

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:	=	see sheet enable tables	-		
Cylinder 1 Balance System	P0263	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s rate	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:	~ ~ ½	52.00 380.00 39.96 0.00 590.00 3000.00 186.45 see sheet enable	mm^3/rev mm^3/rev °C kpa rpm rpm mph	whenever enable conditions are met	
							and NO Pending or Confirmed DTCs:	=	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	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)	A II II II	(c) * (b) -68 to 0 0.95 0 to 68	- 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:	∧v∦ ∦∧v∜ ⊫ ⊨	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	

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary	_	Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value	)	Parameters		Conditions		Required	Illum.
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	v	(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	ev factor	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 m^3/rev °C kpa rpm rpm mph -	rate whenever enable conditions are met	
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)	V A II II II	(a) * (b) (c) * (b) -68 to 0 0.95 0 to 68	ev factor	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 °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 /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
Cylinder 5 Balance System	P0275	The amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC) exceeds the threshold	fuel balance correction quantity	<	(a) * (b)	-	fuel balance control in closed loop (see closed loop conditions document for details)	=	TRUE	-	fail conditions exists for 30 s monitor runs with 0.01 s	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 vehicle 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 m^3/rev °C kpa rpm rpm mph -	rate whenever enable conditions are met	
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 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 current commanded injection quantity engine coolant temperature ambient pressure engine speed vehicle 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 /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value	)	Parameters		Conditions		Required	Illum.
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	v	(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	ev factor	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 8 Balance System	P0284	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 factor	fuel balance control in closed loop (see closed loop conditions document for details) 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:	= > < > < = =	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 /	Fault	Monitor Strategy	Primary Malfunction	-	Threshold	_	Secondary	_	Enable		Time	MIL
System	Code	Description	Criteria		ic and Value		Parameters		Conditions		Required	Illum.
CAC Efficiency Below Threshold	P026A	Detects insufficient charge- air cooler efficiency. The efficiency is calculated out of temperature upstream of the charge air cooler, temperature downstream of the charge air cooler and ambient temperature.	filtered charge-air cooler efficiency	<	0.25	-	vehicle speed	>=	31.08	mph	fail conditions exists for 30 S monitor runs once per driving cycle with 100 ms rate whenever enable conditions are met	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) with (a) boost pressure downstream compressor and with	>= >=	13.89 55.5 to 277.78 69.96 129.96 1.22 measured parameter	g/sec g/sec °C °C -		
							(b) ambient pressure and	=	measured parameter	-		
							control value of the throttle valve control value of the throttle valve and	>= <=	-400.00 5.00	% %		
							(a) - (b) with	>=	50.00	°C		
							<ul> <li>(a) charge air cooler upstream</li> <li>temperature</li> <li>and with</li> <li>(b) modeled ambient air temperature</li> </ul>	=	measured parameter measured	-		
							and injection quantity	>=	parameter 80.00	mm^3/rev		
							injection quantity ambient pressure	<= >	480.00 74.80	mm^3/rev kPa		
							modeled ambient air temperature and	>	-7.04	°C		
							basic enable conditions met: and	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Injection Quantity Too Low	P026C	Monitors the fuel mass observer correction quantity. Detects if the correction quantity exceeds the emissions limit.	Unlimited fuel mass observer correction quantity - emission control correction quantity	<=	-32.00	mm^3/r ev	((Status of the Observer function's lambda-signal means (	=	TRUE	-	fail conditions exists for 12 s monitor runs with 0.02 s rate	В

Component /	Fault	Monitor Strategy	Primary Malfunction	Т	hreshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria		ic and Value	Parameters		Conditions		Required	Illum.
- Cycloni		2000.1911011				lambda signal from NOx sensor ready (see parameter definition)	=	TRUE	-	whenever	
						fuel system is in fuel cut off (see	=	FALSE	-	enable conditions	
						parameter definition) Particulate Filter Regeneration Mode	=	FALSE	-	are met	
						(( fraction of total fuel injected that is	=	1	-		
						involved in combustion (Fuel Mass fo Combustion / Total fuel injected) or	r				
						calculated EGR rate	>=	0	-		
						))	>	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	>=	64.96	°C		
						Normal Injection Mode (not in DPF regeneration)	=	TRUE	-		
						Barometric pressure	>=	74.80	kPa		
						Ambient temperature	>=	-7.04	°C		
						Vehicle speed NO Pending or Confirmed DTCs:	< =	1.86 see sheet inhibit tables	mph		
						) AND (					
						Engine speed AND	<=	1040	rpm		
						Engine speed	>=	448	rpm		
						AND NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
						) basic enable conditions met:	=	see sheet enable tables	-		
	Dagas	Manitana dha 6 shuuru			0.1.00			70112		( "	_
Injection Quantity Too High	P026D	Detects if the correction	Unlimited fuel mass observer correction quantity - emission control correction quantity (see look up table #44)	>=	8 to 30 mm^ ev	/r ((Status of the Observer function's lambda-signal	=	TRUE	-	fail conditions exists for 12	В
		quantity exceeds the emissions limit.								s monitor runs	
						means (				with 0.02 s rate	

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary	_	Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters		Conditions		Required	Illum.
					lambda signal from NOx sensor ready	=	TRUE	-	whenever	
					(see parameter definition)				enable	
					fuel system is in fuel cut off (see	=	FALSE	-	conditions	
					parameter definition)				are met	
					Particulate Filter Regeneration Mode	=	FALSE	-	allo mot	
					((					
					fraction of total fuel injected that is	=	1	-		
					involved in combustion (Fuel Mass for					
					Combustion / Total fuel injected)					
					or					
					calculated EGR rate	>=	0	-		
					)		-			
					, for time	>	1.00	sec		
					))	-	1.00	000		
					AND					
					Controller status of the observer	=	TRUE	-		
					means	-	INCL			
					(					
					Load dependent release state	=	0 to 1	-		
					(see look up table #48)	_	0101			
					AND					
					Component Protection release state	>	0 to 1	-		
						>	0101	-		
					(see look up table #43)					
					)					
					) engine coolant temperature		199.96	°C		
						<=		°C		
					engine coolant temperature	>=	64.96	-		
					Normal Injection Mode (not in DPF	=	TRUE	-		
					regeneration)		74.00	1-D-		
					Barometric pressure	>=	74.80	kPa		
					Ambient temperature	>=	-7.04	°C		
					Vehicle speed	<	1.86	mph		
					NO Pending or Confirmed DTCs:	=	see sheet inhibit			
							tables			
					)					
					AND					
					(					
					Engine speed	<=	1040	rpm		
					AND					
					Engine speed	>=	448	rpm		
					)					
					AND					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit	-		
					,		tables			
					)					
					basic enable conditions met:	=	see sheet enable	-		
				1			tables			
						_				

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
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 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 1	>	(a) - (b)	-	and				monitor runs with 0.01 s rate 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		
			and with (b) offset of the maximum filtered energizing time (see Look-Up-Table #21)	=	10 to 16	usec	fuel temperature )	<=	79.96	°C		
			)				and					
			) OR (				engine temperature and	>	49.96	°C		
			corrected energizing time for the rail pressure calibration points and cylinder 1	<	(a) + (b)	-	battery voltage	>	10.00	V		
			<ul> <li>( with</li> <li>(a) minimum injection energizing time and with</li> <li>(b) offset of the minimum filtered energizing time (see Look-Up-Table #22)</li> </ul>	=	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	=	950.00	rpm		
							and with (c) gear specific maximum engine speed	=	1850.00	rpm		
							) and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
- Cystom	-0046		on Norra				current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1) and vehicle speed	=	0 to 1	- mph	noquirou	mann
							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 2 Injection	P02CF	Monitors the correction	(	-	_	-	environmental temperature	>	-7.04	°C	fail	В
Timing Reached Feedback Limit		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 2	>	(a) - (b)		and				conditions exists for more than 0.5 s monitor runs with 0.01 s rate whenever enable conditions 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 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 2	<	(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	=	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		
			#22) )				and intake manifold pressure	>	75.00	kPa		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria for		Logic and Value		Parameters and		Conditions		Required	Illum.
			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)	-		
							<ul><li>(a) value of engine speed and with</li></ul>	=	30.00	rpm		
							<ul> <li>(b) gear specific minimum engine speed and with</li> </ul>	=	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		
							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: and	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 7 Injection Timing Reached Feedback Limit	P02D9	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point. 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)	-	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				( fuel temperature	>=	0.06	°C	are met	

Component /	Fault	Monitor Strategy	Primary Malfunction	_	Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
			<ul> <li>(a) maximum injection energizing time</li> <li>(see Look-Up-Table #20)</li> <li>and with</li> <li>(b) offset of the maximum filtered</li> <li>energizing time (see Look-Up-Table #21)</li> </ul>	=	353.2 to 670.8 10 to 16	usec usec	and fuel temperature )	<=	79.96	°C		
			) ) OR				and engine temperature	>	49.96	°C		
			(				and	,	49.90	C		1
			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 (b) offset of the minimum filtered	=	107.2 10 to 16	usec usec	and combustion chamber is not cold off means time since last combustion (see Look-	>=	5 to 30	sec		
			energizing time (see Look-Up-Table #22)	=	101016	usec	Up-Table #94) and	>=	5 10 50	Sec		
			) for				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	<	0.05	%		
							and Fuel system status and /	=	Fuel cut off	-		
							( engine speed and	>	(b) - (a)	-		l
							engine speed with	<	(a) + (c)	-		l
							(a) value of engine speed and with	=	30.00	rpm		
							<ul> <li>(b) gear specific minimum engine speed and with</li> </ul>	=	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	>	0.00	mph		l
							and rail pressure deviation from set point calculated out of difference between desired and actual value for	<	5000.00	kPa		
							time and	>	0.10	sec		l
							no gear change is occurred and	=	TRUE	-		l
							4 wheel mode and	=	FALSE	-		1

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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 ( with	>	(a) - (b)	-	environmental temperature and ( fuel temperature	>	-7.04	℃ ℃	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	В
			<ul> <li>(a) maximum injection energizing time (see Look-Up-Table #20) and with</li> <li>(b) offset of the maximum filtered energizing time (see Look-Up-Table #21)</li> </ul>	=	353.2 to 670.8 10 to 16	usec usec	and fuel temperature ) and	<=	79.96	°C		
			) OR ( corrected energizing time for the rail pressure calibration points and cylinder 8	<	(a) + (b)	-	engine temperature and battery voltage	>	49.96 10.00	°C V		1
			( 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) and	>=	5 to 30	Sec		
			) for rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	kPa	intake manifold pressure and intake manifold pressure	> <	75.00 150.00	kPa kPa		1
							and accelerator pedal position and Fuel system status	< =	0.05 Fuel cut off	% -		1
							and ( engine speed and	>	(b) - (a)	-		1
							engine speed with (a) value of engine speed and with	< =	(a) + (c) 30.00	- rpm		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters (b) gear specific minimum engine speed	=	Conditions 950.00	rpm	Required	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 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 #21)	=	10 to 16	usec	fuel temperature )	<=	79.96	°C		
			)				and					
			) OR				engine temperature	>	49.96	°C		
			( corrected energizing time for the rail pressure calibration points and cylinder 4	<	(a) + (b)	-	and battery voltage	>	10.00	V		
			( with				and					

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
			<ul> <li>(a) minimum injection energizing time and with</li> <li>(b) offset of the minimum filtered energizing time (see Look-Up-Table #22)</li> </ul>	=	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 and	>	75.00	kPa		
			rail pressure point (see Look-Up-Table #19)	=	30000 to 90000	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) value of engine speed	< =	(a) + (c) 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) 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 basic enable conditions met:	=	FALSE see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
Cylinder 5 Injection Timing Reached Feedback Limit	P02D5	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point.	(				environmental temperature	>	-7.04	°C	fail conditions exists for more than 0.5 s monitor runs with 0.01 s rate	В
		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		
			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	>	49.96	°C		
			( corrected energizing time for the rail pressure calibration points and cylinder 5	<	(a) + (b)	-	and 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		
			) ) 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		
							<ul> <li>(b) gear specific minimum engine speed and with</li> </ul>	=	950.00	rpm		
							(c) gear specific maximum engine speed )	=	1850.00	rpm		
1			I I				and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
- Oyotom	0000						current gear (see Look-Up-Table #93) (diagnostic enabled when equal to 1) and	=	0 to 1	-	lingunou	
							vehicle speed and	>	0.00	mph		1
							rail pressure deviation from set point calculated out of difference between desired and actual value for	<	5000.00	kPa		
							time and	>	0.10	sec		1
							no gear change is occurred and	=	TRUE	-		1
							4 wheel mode and	=	FALSE	-		
							and and and a conditions met:	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
	_				_				_			
Cylinder 6 Injection Timing Reached Feedback Limit	P02D7	Monitors the correction values for the energizing time of each cylinder. A correction value for the energizing time is learned for each cylinder at three different rail pressure operating point. 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	>	-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 #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	=	107.2 10 to 16	usec usec	and combustion chamber is not cold off means time since last combustion (see Look-	>=	5 to 30	sec		
			energizing time (see Look-Up-Table #22)				Up-Table #94) and intake manifold pressure	>	75.00	kPa		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria for		Logic and Value		Parameters and		Conditions		Required	Illum.
			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)	-		
							<ul><li>(a) value of engine speed and with</li></ul>	=	30.00	rpm		
							<ul> <li>(b) gear specific minimum engine speed and with</li> </ul>	=	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		
							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: 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				fuel temperature	>=	0.06	°C		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
			<ul> <li>(a) maximum injection energizing time</li> <li>(see Look-Up-Table #20)</li> <li>and with</li> <li>(b) offset of the maximum filtered</li> <li>energizing time (see Look-Up-Table #21)</li> </ul>	=	353.2 to 670.8 10 to 16	usec	and fuel temperature )	<=	79.96	°C		
			) ) OR				and engine temperature	>	49.96	°C		
			(				and		10100	Ū		
			corrected energizing time for the rail pressure calibration points and cylinder 3	<	(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	<	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		
							<ul> <li>(b) gear specific minimum engine speed and with</li> </ul>	=	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		
							and rail pressure deviation from set point calculated out of difference between desired and actual value for	<	5000.00	kPa		
							tor 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	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	-		
Intake Air Flow Valve Control Circuit	P02E0	Diagnoses the Throttle Valve low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	■ Open Circuit:≥ - 200 K Ω impedance between ECU pin and load	battery voltage for time and starter is active cranking for time and Throttle Valve Actuator Solenoid Control Circuit and basic enable conditions met and NO Pending or Confirmed DTCs:	>	11.00 3.00 FALSE 3.00 ACTIVE see sheet enable tables see sheet inhibit tables	V sec - -	fail conditions exists for 7ss monitor runs with 0.005 s rate whenever enable conditions are met	В
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage for time and starter is active cranking for time and Throttle Valve Actuator Solenoid Control Circuit and basic enable conditions met and NO Pending or Confirmed DTCs:	> = > = =	11.00 3.00 FALSE 3.00 ACTIVE see sheet enable tables see sheet inhibit tables	V sec - -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
System	Code	Description	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		for time	>	3.00	V	fail conditions exists for 3 s monitor runs with 0.005 s rate	mum.
					and starter is active cranking	>	FALSE	Sec	whenever enable conditions	
					for time and	>	3.00	sec	are met	
					Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
					and basic enable conditions met and	=	see sheet enable tables	-		
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Intake Air Flow Valve Control Circuit 1 Low Voltage	P02E2	Diagnoses the Throttle Valve low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	<ul> <li>Short to ground: - ≤ 0.5 Ω impedance between signal and controller ground</li> </ul>	battery voltage	>	11.00	V	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 time	=	FALSE 3.00	sec		
					and Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE	-		
					and basic enable conditions met	=	see sheet enable tables	-		
					and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
						_				
Intake Air Flow Valve Control Circuit 1 High Voltage	P02E3	Diagnoses the Throttle Valve low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	<ul> <li>Short to power: - ≤ 0.5 Ω impedance between signal and controller power</li> </ul>	battery voltage	>	11.00	V	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold ogic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							for time and starter is active cranking for time and Throttle Valve Actuator Solenoid Control Circuit and basic enable conditions met and NO Pending or Confirmed DTCs:	> = > = =	3.00 FALSE 3.00 ACTIVE see sheet enable tables see sheet inhibit tables	sec - -	enable conditions are met	
Throttle Valve Actuator (TVA) Position Sensor Performance	P02E7	Detects in range TVA position errors by comparing the difference between desired and actual TVA position.	throttle valve control deviation calculated out of difference between desired and actual value 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	=	TRUE see sheet enable tables FALSE	-	fail conditions exists for 5 s test performed continuously 0.005 s rate	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Lo	Threshold	•	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Diesel Intake Air Flow Position Sensor Circuit High Voltage	P02E9	Detects high voltage readings on the throttle valve position sensor circuit, indicating an OOR high condition on the throttle valve position sensor circuit	measured throttle valve position value via sensor	>	94.99	%	ignition on	=	TRUE		fail conditions exists for 5 s test performed continuously 0.005 s rate	A
							and basic enable conditions met and	=	see sheet enable tables	-		
							no sensor supply error and	=	TRUE	-		
							SENT frame correctly received and	=	FALSE	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Intake Air Flow	P02EB	Electronic out-put driver	The ECM detects that the commanded				battery voltage	>	11.00	V	fail	В
Valve Control Motor Current Performance		circuitry determines circuit	the control circuit do not match.				for time and starter is active cranking for time and Throttle Valve Actuator Solenoid Control Circuit and basic enable conditions met and NO Pending or Confirmed DTCs:	> = > = =	3.00 FALSE 3.00 ACTIVE see sheet enable tables see sheet inhibit tables	sec sec - -	conditions exists for 2 s monitor runs with 0.005 s rate whenever enable conditions are met	
Engine Misfire Detected	P0300	Indicates engine has experienced more than one cylinder misfiring	angular acceleration of the crankshaft and	<	-1.40	s^(2)	( Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for 0.02 ms monitor runs with 0.02 s	В
			evaluated crankshaft revolutions with	>=	(a) * (b)	-	and engine speed	>	448.00	rpm	rate whenever	

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

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable	_	Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
System	Code	Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.	(a) number of crankshaft revolutions per block (see general description document for details) and with (b) number of test blocks	=	20.00 20.00	e counts		< < = = > < > < < = = < = = < = = < = = < = <	Conditions 1560.00 200.00 calculated parameter measured parameter 12.00 400.00 39.96 1.86 10.00 TRUE TRUE 140.00 see sheet enable tables	rpm - - mm^3/rev mm^3/rev mph sec - - - counts - -	Kequired	
Cylinder 2 Misfire Detected	P0302	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)	( Engine Running (see parameter definition)	=	TRUE		fail conditions exists for 0.02 ms monitor runs with 0.02 s rate whenever enable conditions are met	В

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
			evaluated crankshaft revolutions with (a) number of crankshaft revolutions	>=	(a) * (b) 20.00	- counts	and engine speed	>	448.00	rpm		
			per block (see general description 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		
							<ul> <li>(a) actual desired idle speed</li> <li>and with</li> </ul>	=	calculated parameter	-		
							(b) engine speed	=	measured parameter	-		
							( current injection quantity and	>	12.00	mm^3/rev		
							current injection quantity ) and	<	400.00	mm^3/rev		
							engine coolant temperature and	>=	39.96	°C		
		Calculates angle acceleration after an injection event for the cylinder under test and					vehicle speed and	<=	1.86	mph		
		compares it to the minimum threshold.					time since start and	>=	10.00	sec		
							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: and	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 3 Misfire Detected	P0303	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all cly are rotating at after a combustion event.	angular acceleration of the crankshaft	<	-1.40	s^(2)	(				fail conditions exists for 0.02 ms monitor runs with 0.02 s rate whenever	В

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Valu	е	Parameters		Conditions		Required	Illum.
			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 ) and	<	1560.00	rpm		
							((a) - (b)) with	<	200.00	rpm		
							(a) actual desired idle speed and with	=	calculated parameter	-		
							(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 and	>=	39.96	°C		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum					vehicle speed and	<=	1.86	mph		
		threshold.					time since start and	>=	10.00	sec		
							deletion of error memory (Mode\$4) not executed since last check of the monitoring conditions and	=	TRUE	-		
							adaptation value for tooth wheel has been learned and	=	TRUE	-		
							and 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	-		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
Cylinder 4 Misfire Detected	P0304	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all 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 ) and	<	1560.00	rpm		
							(a) - (b)  with	<	200.00	rpm		
							(a) actual desired idle speed and with	=	calculated parameter	-		
							(b) engine speed and	=	measured parameter	-		
							( current injection quantity and	>	12.00	mm^3/rev		
							current injection quantity ) and	<	400.00	mm^3/rev		
							engine coolant temperature and	>=	39.96	°C		
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.					vehicle speed and	<=	1.86	mph		
							time since start and	>=	10.00	sec		
							deletion of error memory (Mode\$4) not executed since last check of the monitoring conditions and	=	TRUE	-		
							adaptation value for tooth wheel has been learned and	=	TRUE	-		
							number of detected misfires and basic enable conditions met:	>	140.00 see sheet enable	counts		
							and	=	tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Valu	e	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Cylinder 5 Misfire Detected	P0305	Detects cylinder misfire. The minimum average angle acceleration is calculated every 2 rotations and represents the average angle acceleration that all 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	>=	(a) * (b) 20.00	- counts	and engine speed and	>	448.00	rpm		
			per block (see general description document for details)	_	20.00	counts						
			and with (b) number of test blocks	=	20.00	counts	engine speed ) and	<	1560.00	rpm		
							(a) - (b)  with	<	200.00	rpm		
							<ul> <li>(a) actual desired idle speed</li> <li>and with</li> </ul>	=	calculated parameter	-		
							(b) engine speed	=	measured parameter	-		
							( current injection quantity and	>	12.00	mm^3/rev		
							current injection quantity )	<	400.00	mm^3/rev		
							and engine coolant temperature and	>=	39.96	°C		
		Calculates angle					vehicle speed and	<=	1.86	mph		
		acceleration after an injection event for the cylinder under test and										
		compares it to the minimum threshold.					time since start	>=	10.00	sec		
							and deletion of error memory (Mode\$4) not executed since last check of the monitoring conditions	=	TRUE	-		
							and adaptation value for tooth wheel has been learned and	=	TRUE	-		
							number of detected misfires and	>	140.00	counts		
							basic enable conditions met: and	=	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.
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cylinder 6 Misfire Detected	P0306	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 and evaluated crankshaft revolutions with (a) number of crankshaft revolutions per block (see general description document for details) and with (b) number of test blocks	<	-1.40 (a) * (b) 20.00 20.00	s^(2) - counts counts	( Engine Running (see parameter definition) and engine speed and ( (a) - (b)] with (a) actual desired idle speed and with (b) engine speed and ( current injection quantity and current injection quantity ) and engine coolant temperature and vehicle speed	= > < = = > < =	TRUE 448.00 1560.00 200.00 calculated parameter measured parameter 12.00 400.00 39.96 1.86	- rpm rpm - - mm^3/rev mm^3/rev mm^3/rev	fail conditions exists for 0.02 ms monitor runs with 0.02 s rate whenever enable conditions are met	В
		Calculates angle acceleration after an injection event for the cylinder under test and compares it to the minimum threshold.					and time since start and deletion of error memory (Mode\$4) not executed since last check of the monitoring conditions and adaptation value for tooth wheel has	>= =	10.00 TRUE TRUE	sec -		
							been learned and number of detected misfires and	>	140.00	counts		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	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 7 Misfire Detected	P0307	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 and evaluated crankshaft revolutions with (a) number of crankshaft revolutions per block (see general description document for details) and with (b) number of test blocks	-1.40 (a) * (b) 20.00 20.00	s^(2) - counts counts	( Engine Running (see parameter definition) and engine speed and engine speed ) and [(a) - (b)] with (a) actual desired idle speed and with (b) engine speed and with (b) engine speed and ( current injection quantity and engine coolant temperature and vehicle speed and time since start and deletion of error memory (Mode\$4) not executed since last check of the monitoring conditions and adaptation value for tooth wheel has been learned and		TRUE 448.00 1560.00 200.00 calculated parameter measured parameter 12.00 400.00 39.96 1.86 1.86	- rpm rpm - - mm^3/rev mm^3/rev mm^3/rev mmh sec -	fail conditions exists for 0.02 ms monitor runs with 0.02 s rate whenever enable conditions are met	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold ogic and Value	•	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							number of detected misfires and basic enable conditions met: and NO Pending or Confirmed DTCs:	> = =	140.00 see sheet enable tables see sheet inhibit tables	counts - -		
Cylinder 8 Misfire Detected	P0308	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 and evaluated crankshaft revolutions with (a) number of crankshaft revolutions per block (see general description document for details) and with (b) number of test blocks	<	-1.40 (a) * (b) 20.00 20.00	s^(2) - counts counts	( Engine Running (see parameter definition) and engine speed and engine speed ) and [(a) - (b)] with (a) actual desired idle speed and with (b) engine speed and ( current injection quantity and current injection quantity ) and engine coolant temperature and vehicle speed and time since start and deletion of error memory (Mode\$4) not		TRUE 448.00 1560.00 200.00 calculated parameter measured parameter 12.00 400.00 39.96 1.86	- rpm rpm - - mm^3/rev mm^3/rev mm^3/rev mph sec	fail conditions exists for 0.02 ms monitor runs with 0.02 s rate whenever enable conditions are met	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold ogic and Value	2	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Joint	0000		United at				adaptation value for tooth wheel has been learned and number of detected misfires and basic enable conditions met: and NO Pending or Confirmed DTCs:	= > =	TRUE 140.00 see sheet enable tables see sheet inhibit tables	- counts -		
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
	when the memory within the ECM. Once the wheel completed once	Wheel learn only occurs when the memory is cleared within the ECM. Once the wheel learn is completed once, the wheel learn values are stored					engine speed engine speed	> <	900 2700	rpm rpm	monitor runs with 1 s rate whenever enable conditions are met	
		within the EEPROM					fuel balance wheel learn values stored in EEPROM	=	FALSE			
							Inhibit Status ( no inhibiting faults ) ( No pending or stored DTC )	=	see sheet inhibit tables	-		
										_		_
Crankshaft Position [CKP] Sensor Circuit	P0335	Detects crankshaft sensor circuit failure by monitoring for valid signals from CKP sensor while CMP sensor is also sending valid signals	ECM has detected reference mark on the crankshaft	=	FALSE	-	Ignition ON	=	TRUE	-	fail conditions exists for more than 6 events monitor runs	A
			number of crankshaft rotations not detected	>=	6.00	counts		=	FALSE	-	with 0.1 s rate whenever	
							( engine speed and	>=	400.00	rpm	enable conditions are met	
							synchronization completed which means	=	TRUE	-	die mot	
							number of crankshaft revolutions and	>=	4.00	revs		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Valu	e	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							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 or	=	0	mph		
							vehicle speed and	>	16	mph		
							engine speed )	>	200.00	rpm		
							and basic enable conditions met:	=	see sheet enable tables	-		
Crankshaft Position Sensor Performance	P0336	Detects implausible crankshaft sensor operation by detecting incorrect crank sensor signal patterns.	number of disturbances in crankshaft signal	>=	10.00	counts	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for 0.1 s monitor runs	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	-	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) or	>	1.5 to 2	ratio						
			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	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position [CMP] Sensor Performance	P0341	Detects implausible camshaft sensor operation by detecting incorrect cam sensor patterns	number of camshaft edges	> 4 counts	ECM has detected reference mark on the crankshaft 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	В
Glow Plug/Heater P0381 ndicator 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 conditions exists for 0.2 s monitor runs with 0.01 s rate whenever enable conditions are met	В
		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	g/rev 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)		TRUE 80.00 0.25 35.00 0.99 FALSE 0.8 to 1.2	(mm^3/rev) /sec sec rpm/sec sec - g/rev	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.
					-		and Engine speed Engine speed	<= >=	1900.00 480.00	rpm rpm		
							and Torque generating commanded engine fuel injection quantity	<=	120.00	mm^3/rev		
							Torque generating commanded engine fuel injection quantity	>=	20.00	mm^3/rev		
							and set point valve position of exhaust-gas recirculation and	>	5.00	%		
							throttle position	<	5.00	%		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							) for time	>=	3.00	sec		
Exhaust Gas Recirculation(EGR ) Flow Excessive	P0402	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 whenever	В
			with (a) Maximum Controller Deviation	=	0.32 to 1.12	g/rev	EGR controller is active and	=	TRUE	-	enable conditions	
			(see Look-Up-Table #10) ( 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	are met	
							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 and	>=	160.00	mm^3/rev		
							and basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					) for time	>=	1.50	sec		
Exhaust Gas Recirculation (EGR) Motor Control Circuit	P0403	Diagnoses the EGR Valve low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	<ul> <li>Short to ground: - &lt; 0.5 Ω impedance between signal and controller ground</li> </ul>	EGR Solenoid Control Circuit	=	ACTIVE	-	fail conditions exists for 7 s monitor runs with 0.005 s rate whenever	В
				and offset learning for EGR valve is completed	=	TRUE	-	enable conditions are met		
				and battery voltage for	>	11.00	V			
					time and	>	3.00	sec		
					starter is active cranking for time	=	FALSE 3.00	- sec		
					and basic enable conditions met:	=	see sheet enable	-		
					and NO Pending or Confirmed DTCs:	=	tables see sheet inhibit tables	-		
			The ECM detects that the commanded		EGR Solenoid Control Circuit	=	ACTIVE		fail	В
			state of the driver and the actual state of the control circuit do not match.		and offset learning for EGR valve is	=	TRUE	-	conditions exists for 3 s monitor runs with 0.005 s	В
					completed and battery voltage	>	11.00	V	rate whenever enable	
					for time and	>	3.00	sec	conditions 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			

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold ogic 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 OCR high condition on the EGR position circuit	raw voltage of EGR actuator position sensor same as EGR actuator position	>	4.80	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 ) 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 same as EGR sensor 2 temperature	~	0.46	v °C	( 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	> < > > <	0.00 199.96 -60.04 20.00 -100.00 200.00	sec °C kPa %	fail conditions exists for 5 s monitor runs 0.05 s rate whenever enable conditions are met	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		eshold and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
					 		Engine Running (see parameter definition) and	=	TRUE	-		
							( valve position of EGR cooler bypass and	>	-100.00	%		
							valve position of EGR cooler bypass and	<	200.00	%		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Gas	P040D	Detects high voltage	EGR temperature sensor 2 voltage	>	4.84	V	(				fail	В
Recirculation(EGR ) Temperature Sensor A Circuit High Voltage		readings on the EGR temperature cooler circuit, indicating an OOR high condition on the EGR cooler temperature 2 circuit									conditions exists for 5 s monitor runs 0.05 s rate whenever	
			same as EGR sensor 2 temperature	<	-50	°C	time since engine start and	>	0.00	sec	enable conditions	
			EGR Sensor 2 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 and	>	-100.00	%		
							set point valve position of exhaust-gas recirculation	<	200.00	%		
							/ and Engine Running (see parameter definition)	=	TRUE	-		
							and current injection quantity and	>	0.00	mm^3/rev		
							( valve position of EGR cooler bypass	>	-100.00	%		
							and valve position of EGR cooler bypass )	<	200.00	%		
							) for time and	>	0.00	sec		
							basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
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:		Ĩ		minimum engine-off time	>=	28800.00	sec	fail conditions exists for 0.1 s monitor runs with 0.1 s	В
			<ul> <li>(a) - (b) (see Look-Up-Table #4)</li> <li>with         <ul> <li>(a) captured EGR sensor 2</li> <li>temperature at start</li> </ul> </li> </ul>	> =	100.00 measured parameter	°C -	and ambient temperature and	>	-60.04	°C	rate whenever enable conditions	
			and with (b) captured EGR sensor 1	=	measured	-	Engine Running (see parameter definition) for	=	TRUE	-	are met	
			temperature at start or		parameter		time and	>	0.00	sec		
			Path 2:				engine post drive/ afterun and	=	FALSE			
			(a) - (b)  (see Look-Up-Table #4) with	<=	100.00	°C	diagnostic performed in current dc and	=	FALSE			
			(a) captured EGR sensor 2 temperature at start and with	=	measured parameter	-	basic enable conditions met: and	=	see sheet enable tables	-		
			(b) captured EGR sensor 1 temperature at start and	=	measured parameter	-	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			<ul> <li>(a) - (b)  (see Look-Up-Table #7)</li> <li>with</li> <li>(a) captured EGR sensor 2</li> </ul>	>	20.00 measured	°C -						
			temperature at start and with (b) captured EGR sensor 1 temperature at start and	=	parameter measured parameter	-						
			( status of block heater (see parameter definition) or	=	FALSE	-						
			status of sun-load detection (see parameter definition) ) )	=	FALSE	-						
					_	-			_	_		
Exhaust Gas Recirculation(EGR ) Temperature Sensor B Circuit Low Voltage	P041C	Detects low voltage readings on the EGR cooler temperature circuit, indicating an OOR low condition on the EGR cooler temperature 1 circuit	voltage of EGR temperature sensor 1	<	0.46	V					fail conditions exists for 5 s monitor runs 0.05 s rate whenever enable	В
			same as EGR sensor 1 temperature	>	220	°C	time since engine start and	>	0.00	sec	conditions are met	
					-	-	engine coolant temperature and	<	199.96	°C		
							ambient temperature and	>	-60.04	°C		
1		I	l				ambient pressure	>	20.00	kPa	I	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold gic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							and ( set point valve position of exhaust-gas recirculation	>	-100.00	%		
							and set point valve position of exhaust-gas recirculation	<	200.00	%		l
							and Engine Running (see parameter definition) and	=	TRUE	-		l
							( valve position of EGR cooler bypass and	>	-100.00	%		I
							valve position of EGR cooler bypass )	<	200.00	%		I
							) and basic enable conditions met:	=	see sheet enable tables	-		l
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		1
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 are met	1
						0	engine coolant temperature and	>	-60.04	°C	are met	1
							ambient temperature and	>	-60.04	°C		I
							ambient pressure and	>	20.00	kPa		I
							set point valve position of exhaust-gas recirculation and	>	-100.00	%		1
							set point valve position of exhaust-gas recirculation	<	200.00	%		I
							and Engine Running (see parameter definition) and	=	TRUE	-		l
							current injection quantity and	>	0.00	mm^3/rev		I
							( valve position of EGR cooler bypass and	>	-100.00	%		1
							valve position of EGR cooler bypass )	<	200.00	%		I

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: and NO Pending or Confirmed DTCs:	> =	0.00 see sheet enable tables see sheet inhibit tables	sec - -		
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 -	( 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 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 simulated heat quantity in oxidation catalyst and particulate filter regeneration and no reset condition for evaluation is active therefore ( regeneration was not aborted to assure that HC conversion was not disturbed and evaluation took place one time step before (to ensure P0420 has not already completed) ) and	>	140.00 0.00 0.00 TRUE TRUE FALSE	g g/sec kJ - -	fail conditions exists for more than 0.1 seconds monitor runs once per driving cycle with 0.1 s rate whenever enable conditions are met	B

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria	L	Logic and Value	)	Parameters there has been sufficient HC integrated in order to evaluate the monitor conversion efficiency. means	=	Conditions TRUE	-	Required	Illum.
							( particulate filter regeneration	=	TRUE	-		
							and measured temperature upstream of the oxidation catalyst and	>	249.96	°C		
							( engine speed and	>	700.00	rpm		
							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) or	<	140.00	g		
							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	P0461	Detects an error in the primary fuel tank sensor	(a) - (b)	>=	100.00	miles	Engine Running	=	TRUE	-	fail conditions	В
Performance		performance by comparing the decrease of the fuel level for a certain driven mileage to a threshold.									exists for 0.02 s monitor runs 0.02 s rate whenever	
			with (a) total vehicle distance	=	measured parameter	-	for time	>=	60.00	sec	enable conditions are met	
			and with (b) change in mileage	=	calculated parameter	-	and fuel transfer pump active	=	FALSE	-		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
			and (c) - (d) with (c) maximum volume of fuel reached	<	4.00 measured	I	means ( filtered fuel volume in primary tank (fuel volume is calculated by converting the measured fuel level (%) to volume based on the calibratable fuel tank maximum capacity) and	>	1638.35	I		
			(c) maximum volume of ruer reached in primary tank during driving cycle and with (d) minimum volume of fuel reached	=	parameter	-	filtered fuel volume in secondary tank	<	0.00	I		
			in primary tank during driving cycle	_	parameter		time and	>=	0.00	sec		
							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	T		
							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	I		
							filtered fuel volume in secondary tank	<=	0.00	I		
							and basic enable conditions met: and	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	-	see sheet inhibit tables	-		
SRC low for fuel level sensor of primary tank	P0462	Detects low voltage readings in the fuel level primary tank sensor circuit,	voltage of fuel level sensor 1	<	0.20	V	ignition on	=	TRUE	-	fail conditions exists for 24	В
		indicating an OOR low condition on the fuel level sensor circuit					and basic enable conditions met:	=	see sheet enable tables	-	s test performed continuously 0.1 s rate	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		reshold and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
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	and	on on	=	TRUE see sheet enable tables		fail conditions exists for 24 s test performed continuously 0.1 s rate	В
Exhaust Gas Recirculation (EGR) Position Sensor Performance	P046C	position errors by comparing desired EGR position to actual EGR valve position	controller deviation of EGR valve calculated out of difference between desired and actual value or controller deviation of EGR valve calculated out of difference between desired and actual value	>=	5.00 %	and offset cycle and Engin and duty c and batter and EGR <sup>1</sup> and NO Po and	ne Running cycle of the Intake Air Heater output ery voltage ? Valve ? Valve Jammed	= = X = =	FALSE TRUE TRUE 5.00 11.00 ACTIVE FALSE see sheet inhibit tables see sheet enable tables	- - % - - -	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	L	Threshold _ogic and Value	)	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Cooling Fan Speed Output Circuit	P0480	This diagnostic checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.				battery voltage	>	11.00	V	fail conditions exists for 3 s test	В
							for time and	>	3.00	sec	performed continuously 0.02 s rate	
							starter is active cranking for	=	FALSE	-		
							time and	>	3.00	sec		
							ignition on	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
				_		_		_		_		
		This diagnostic checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.				battery voltage	>	11.00	V	fail conditions exists for 1 s test	
							for time	>	3.00	sec	performed continuously 0.02 s rate	
							and starter is active cranking	=	FALSE	-		
							for time	>	3.00	sec		
							and ignition on	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable			
								_	tables			
Ocalian For	D0.402	Detects incluity to control			500.00				00.00	0/	4-11	
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	>=	500.00	rpm	and Commanded fan speed	>=	999.00	rpm	120 s monitor runs with 0.1 s	
			or fan speed difference between actual and commanded value, unfiltered	<=	-500.00	rpm	and (				rate whenever enable	
			or fan speed difference between actual and commanded value, unfiltered	>=	500.00	rpm	fan input speed means	<	5320.00	rpm	conditions are met	
							Fan input speed is calculated by the engine speed * the pulley ratio and					

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters		Conditions 400.00		Required	Illum.
					fan input speed means Fan input speed is calculated by the engine speed * the pulley ratio )	>	400.00	rpm		
					and engine coolant temperature and	>	69.96	°C		
					fan drive speed rate of change and	<	2000.00	rpm		
					fan speed weight factor calculated out of	>	0.59	factor		
					( (a) * (b) * (c) * (d) with (a) factor based on input shaft	=	0 to 1	factor		
					stability (see Look-Up-Table #32) and with (b) factor based on intake air	=	0 to 1	factor		
					temperature (see Look-Up-Table #35) 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)	<ul> <li>Short to ground: -</li> <li>≤ 0.5 Ω</li> <li>impedance</li> <li>between signal</li> <li>and controller</li> <li>ground</li> </ul>	EGR Solenoid Control Circuit	=	ACTIVE		fail conditions exists for 3 s monitor runs with 0.005 s rate whenever	В
					and battery voltage for	>	11.00	V	enable conditions are met	
					time	>	3.00	sec		
					and starter is active cranking for	=	FALSE	-		
					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.
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: $\leq 0.5 \Omega$ 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	B
							and battery voltage for	>	11.00	V	enable conditions are met	
							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	-		
					_				_			
Cooling Fan Speed High	P0495	Detects a locked fan. When fan speed control solenoid is off, the fan speed should follow accessory drive input speed plus some slip.	fan speed (see Look-Up-Table #36)	~	400 to 1500	rpm	fluid volume in Clutch (see Look-Up- Table #37)	<	0.005 to 0.0115	Ι	fail conditions exists for 0.02 s monitor runs with 0.1 s	В
			for Error counter	>=	800.00	counts	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.				rate whenever enable conditions are met	
			equivalent to 80 sec				or Maximum allowed clutch pump out time when	>=	600 to 65534	sec		
							input fan speed means Fan input speed is calculated by the engine speed * the pulley ratio	>	1500.00	rpm		
							and					
							PWM of fan driver output and	<=	45.00	%		
							Commanded fan speed )	<	600.00	rpm		
							and ambient pressure	>	55.00	kPa		
							and intake air temperature	>	-40.04	°C		
							and time since engine off and (	>	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.
					Engine Running for time } and basic enable conditions met:	= >	TRUE 0.00 see sheet enable tables	- sec -		
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.			offset learning is active	=	TRUE	-	fail conditions exists for 0.005 s monitor runs with 0.005 s rate	В
		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 position is read for learn.	<ul> <li>(a) - (b)</li> <li>with</li> <li>(a) maximum learned offset value for EGR valve and with</li> <li>(b) minimum learned offset value for EGR valve</li> <li>or</li> </ul>	> 30.00 % = measured - parameter - = measured - parameter	- engine coolant temperature and	~=	5.06	℃ ℃	whenever enable conditions are met	
		The maximum and minimum learned offset refers to the maximum and minimum learned values of the 3 learns performed within total learn procedure.	Path 2: ( learned offset value for EGR valve in the present driving cycle or learned offset value for EGR valve in the present driving cycle	> 23.33 % < -23.33 %	EGR sweep has ended - no movement in EGR valve	×= <=	10.00 655.34 TRUE	V V		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	•	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
			)		•		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 and	=	TRUE	-		
							engine was running during last driving cycle	=	TRUE	-		
							means engine running during last driving cycle	=	TRUE	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
					_	_			_	_		
		Detects a jammed EGR valve during opening or closing the valve.	Path 1:				Path 1:				fail conditions exists for	
		g	EGR valve stuck during opening means (	=	TRUE	-	EGR valve is opening or Path 2:	=	TRUE	-	0.005 s monitor runs with 0.005 s	
			(a) + (b) with	>=	20.01	%	EGR valve is closing and	=	TRUE	-	rate whenever	l
			(a) position of EGR valve	=	measured parameter	-	engine post drive/ afterun	=	TRUE	-	enable conditions	l
			and with (b) learned offset value of EGR valve in the previous driving cycle	=	measured parameter	-	and offset learning active	=	TRUE	-	are met	
			or (a) - (c)	<=	0.01	%	and basic enable conditions met:		see sheet enable tables	-		
			with (a) position of EGR valve	=	measured parameter	-						
			and with (c) position of EGR valve of previous process cycle (refers to last measured valve position in the previous raster calculation)	=	measured parameter	-						
			) for time or	>	5.00	sec						
			Path 2: EGR valve stuck during closing means	=	TRUE	-						
			( position of EGR valve with	<=	(a) * (b)	-						

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold	_	Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value	•	Parameters		Conditions		Required	Illum.
			(a) reference position of the EGR	=	measured	-						
			valve in open position		parameter							
			and with		0 = 0	<i>c</i>						
			(b) factor for EGR valve close	=	0.50	factor						
			position or									
			(c) - (d)	>	0.02	%						
			with		0.02	70						
			(c) position of EGR valve	=	measured	-						
					parameter							
			and with									
			(d) position of EGR valve of previous	=	measured	-						
			process cycle (refers to last		parameter							
			measured valve position in the previous raster calculation)									
			for									
			time	>	5.00	sec						
e Speed Too	P0506	Detects an idle speed	engine speed	<	maximum value		Engine Running	=	TRUE	-	fail	В
N		governor that is unable to	3		of (a) OR (b - (b		5 5				conditions	
		achieve the desired idle			* c))						exists for 20	
		speed and the idle speed is									S	
		too low									monitor runs	
			with		200.00		and				with 0.1 s	
			<ul> <li>(a) minimum engine speed and with</li> </ul>	=	300.00	rpm	( engine coolant temperature	>	-7.04	°C	rate whenever	
			(b) minimum idle speed set point (see	=	calculated	-	and		-7.04	C	enable	
			table #91 for commanded) minimum		parameter						conditions	
			idle speed								are met	
			and with				engine coolant temperature	<	129.96	°C		
			(c) factor for calculation of engine	=	24.00	%	)					
			speed interval									
							and idle speed controller active	=	TRUE			
							active when	=	INUE	-		
							TCC not in lock up and when the					
							commanded pedal torque is less than					
							idle governor torque					
							and					
							vehicle speed	<	1.86	mph		
							and no other torque demanding function	=	TRUE	-		
							active	-	INUL	-		
							means					
							no torque demand based on					
							accelerator pedal input					
							and					
							set point torque of the speed controller	>	0	NM		
							and measured engine speed	>	300.00	rpm		
							and	-	300.00	ipin		
							basic enable conditions met:	=	see sheet enable	-		
									tables			
							and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Idle Speed Too High	P0507	Detects an idle speed governor that is unable to achieve the desired idle speed and the idle speed is too high.	engine speed	>	minimum value of (a) <b>OR</b> (b + (b * c))		Engine Running and	=	TRUE	-	fail conditions exists for 20 s monitor runs with 0.1 s	В
			<ul> <li>(a) maximum engine speed</li> <li>and with</li> <li>(b) minimum idle speed set point (see table #91 for commanded) minimum</li> <li>idle speed</li> </ul>	=	2500.00 calculated parameter	rpm -	( engine coolant temperature and	>	-7.04	°C	rate whenever enable conditions are met	
			and with (c) factor for calculation of engine speed interval	=	24.00	%	engine coolant temperature ) and	<	129.96	°C		
							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	<	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 measured engine speed	>	0 300.00	NM rpm		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Cooling Fan	P0526		Path 1:				engine speed	>	550.00	rpm	fail	В
Cooling Fan Speed Sensor Circuit		circuit for electrical integrity during operation.	period is too long to measure and	>	0.21	sec	and {				conditions exists for 3 s monitor runs with 0.020 s	
			( current state of the signal received from fan is low	=	TRUE	-	( PWM of fan driver output	>=	45.00	%	rate whenever enable	
			) or				and Commanded fan speed ) for	>=	0.00	rpm	conditions are met	
			Path 2:				time	>	30.00	sec		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
			period is too long to measure and ( current state of the signal received from fan is high	> =	0.21 TRUE	sec -	or vehicle speed for time	< >	203.65 327.67	mph sec		
			)				} and basic enable conditions met: and	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Gas Temperature (EGT) Sensor 1 Circuit Low Voltage	emperature readings on the EGT 1 GT) Sensor 1 circuit, indicating an OOR ircuit Low low condition on the EGT	voltage of the temperature sensor upstream of oxidation catalyst	<	0.65	V	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables		fail conditions exists for 3 s monitor runs 0.050 s rate	В	
			same as temperature upstream of oxidation catalyst	<	-50	°C	for time and	>	0.00	sec	whenever enable conditions	
							ignition on and	=	TRUE	-	are met	
							basic enable conditions met:	=	see sheet enable tables			
Exhaust Gas Temperature (EGT) Sensor 1 Circuit Low Voltage	P0545	Detects low voltage readings on the EGT 1 circuit, indicating an OOR low condition on the EGT circuit	voltage of the temperature sensor upstream of oxidation catalyst	<	0.65	V	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	fail conditions exists for 3 s monitor runs 0.050 s rate	В
			same as temperature upstream of oxidation catalyst	<	-50	°C	for time	>	0.00	sec	whenever enable conditions	
							and ignition on and	=	TRUE	-	are met	
							basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Temperature (EGT) Sensor 1 Circuit High Voltage	P0546	Detects high voltage readings on the EGT 1 circuit, indicating an OOR high condition on the EGT 1 circuit	voltage of the temperature sensor upstream of oxidation catalyst same as	>	2.21	V	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables		fail conditions exists for 3 s monitor runs 0.050 s rate whenever	В
			temperature upstream of oxidation catalyst	>	1000	°C	and	>	0.00	sec	enable conditions are met	
1	l	l	l				ignition on	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions		MIL Illum.
					and basic enable conditions met:	= see sheet enable - tables		
Idle Control System	P054E	Quantity Threshold - Fuel Quantity Lower Than Expected	( Current injection quantity with Current gear and minimum expected injection quantity (see Look-Up Table #96) and factor for calculating the minimum threshold out of the reference map )	< minimum mm^3/r expected injection quantity (map) * factor for calculating the minimum threshold out of the reference map # Neutral = 46.0 to 161.6 mm^3/r ev = 0.50 factor	( Current gear AND Vehicle speed AND Particulate filter regeneration AND Engine speed AND Engine speed AND Engine coolant temperature AND Idle speed controller all for time ) AND Fluctuation range of engine speed AND Fluctuation range of engine speed AND Basic enable conditions met	=       unchanged       -         <=       1.86       mph         =       not active         <=       1040.00       rpm         >=       448.00       rpm         >=       448.00       rpm         >       -20.04       °C         =       active       -         >       5.00       sec         <       16383.50       rpm         =       see sheet enable       -	fail conditions exists for 15 S monitor runs 0.2 s rate whenever enable conditions are met	В
	P054F	Quantity Threshold - Fuel Quantity Higher Than Expected	Current injection quantity with Current gear and	< maximum mm <sup>A</sup> 3/r expected ev injection quantity (map) * factor for calculating the maximum threshold out of the reference map ≠ Neutral	( Current gear AND Vehicle speed	= unchanged - <= 1.86 mph	fail conditions exists for 15 S monitor runs 0.2 s rate whenever enable conditions are met	В

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		gic and Value		Parameters		Conditions		Required	Illum.
			maximum expected injection quantity (see Look-Up-Table #50) and factor for calculating the maximum threshold out of the reference map )	=	1.50	mm^3/r ev factor		= >= > = >	not active 1040.00 448.00 -20.04 active 5.00 16383.50 see sheet enable	rpm rpm °C - sec rpm -		
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:	-	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	
Cruise Control "On" Signal	P0565	If the Cruise ON switch is continuously applied for greater than a calibratable time	Set Switch CAN message value "Cruise On"	=	5	-	ignition on and input circuit active and basic enable conditions met and NO Pending or Confirmed DTCs:	=	TRUE TRUE see sheet enable tables see sheet inhibit tables		fail conditions exists for 20s monitor runs with 0.005 s rate whenever enable conditions are met	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time MIL Required Illum.
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 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 Special ( 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	= TRUE -	fail Special C conditions exists for 90 s monitor runs with 0.005 s rate
					input circuit active and basic enable conditions met and	= TRUE - = see sheet enable - tables	whenever enable conditions are met
					NO Pending or Confirmed DTCs:	= see sheet inhibit - tables	
Cruise Control "Cancel" Signal	P056C	Cruise Control CANCEL switch state indicates problem with the circuit, by remaining in the high / active state for a calibrated period of time	Set Switch CAN message value "CANCEL"	= 6 -	ignition on	= TRUE -	fail Special ( conditions exists for 20s monitor runs with 0.005 s rate
					and input circuit active and basic enable conditions met	= TRUE - = see sheet enable - tables	whenever enable conditions are met
					and NO Pending or Confirmed DTCs:	= see sheet inhibit - tables	
Cruise Control Input Circuit	P0575	Cruise control CAN communication monitoring	amount of errors in consecutive frames with	>= 3.00 counts	ignition on and	= TRUE -	fail Special C conditions exists for

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold	_	Secondary		Enable		Time	MIL
System	Code	Description	Criteria number of consecutive frames	=	Logic and Valu 10.00	counts	Parameters input circuit active and basic enable conditions met and NO Pending or Confirmed DTCs:	=	Conditions TRUE see sheet enable tables see sheet inhibit tables	-	Required 0.005 s monitor runs with 0.005 s rate whenever enable conditions are met	Illum.
Brake Pedal Position Sensor "A" Circuit Range/Performanc e	P057B		EWMA filtered test result based on the difference of  (a) - (b)  where	<=	0.40	factor	following conditions for time:	>	4	sec	monitor runs 0.02 s rate whenever enable conditions are met	A
			<ul> <li>(a) maximum analog brake sensor raw voltage during test</li> <li>(b) minimum analog brake sensor raw voltage during test where</li> <li>difference of the brake sensor voltage corresponds to a corrected value of</li> </ul>	=	calculated parameter calculated parameter 0 to 1	V V factor	ignition on and starter is active cranking for	=	TRUE	-		
			(see Look-Up-Table #14)				time and battery voltage for time ) and gear has been in Park during this driving cycle full test has not been completed this driving cycle gear selector currently not in Park	> > > = =	3.00 11.00 3.00 TRUE TRUE TRUE	sec V sec - -		
							vehicle speed accelerator pedal position 1 and No Pending or Confirmed DTCs: and basic enable conditions met:	>= < =	4.35 5.00 see sheet inhibit tables see sheet enable tables	mph % -		
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	=	TRUE	-	fail conditions exists for 0.5 s monitor runs 0.01 s rate	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	F	Time Required	MIL Illum.
					No Pending or Confirmed DTCs: and basic enable conditions met:	= see sheet inhibit tables = see sheet enable tables	- v	whenever enable conditions are met	
Brake Pedal Position Sensor	P057D	Brake pedal position sensor voltage above a threshold	Brake pedal position sensor voltage	> 4.75 V	ignition on	= TRUE	-	fail	A
"A" Circuit High		Voltage above a threshold for a calibrated period of time indicating an OOR high			and No Pending or Confirmed DTCs: and basic enable conditions met:	= see sheet inhibit tables = see sheet enable tables	ex 0 - v	sonations sists for 0.5 s onitor 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 = TRUE = see sheet enable tables = see sheet inhibit tables	- wi - vi	fail conditions exists for 20s onitor runs ith 0.005 s rate whenever enable conditions are met	Special C
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	- wi - vi	fail conditions exists for 2.5s onitor runs ith 0.005 s rate whenever enable conditions are met	Special C

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
ROM Memory Fault	P0601	Detects a fault in the ROM memory	ECM detects multiple errors in the ROM- memory by comparing a calculated checksum with a check word	= TRUE -	engine post drive/ afterun	=	TRUE	-	fail conditions exists for 0.01 s test performed once per drive cycle during afterrun	A
Control Module Not Programmed	P0602	Detects if the ECM is programmed.	ECM not programmed	= TRUE -	ignition on and engine pre drive	=	TRUE	-	fail conditions exists for 0.01 s test performed once per driving cycle during ECU initialization	A
Control Module Internal Performance	P0606	Monitors and detects the improper operation of the ECM. This is accomplished by monitoring the output of various hardware modules within the ECM and by creating parallel redundant calculations of critical engine management system parameters. These redundant calculations are compared to the respective values of the primary function or to fixed limits to evaluate the monitoring path. A failure of these monitoring paths would for example be caused by a corrupt RAM cell leading to an implausible value for a parameter.	SPI communication, data transfer lost faults detected in the SPI communication IC internal	= TRUE	ignition on and basic enable conditions met: ignition on and basic enable conditions met: and NO Pending or Confirmed DTCs:	= = \$6	TRUE tables TRUE tables tables tables tables	-	fail conditions exists for 0.5 s test performed continuously 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	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Valu	e	Secondary Parameters		Enable Conditions		Time Required	MII IIIu
					10				70115			
			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	= >=	TRUE 2.00	- counts	fail conditions exists for 0.08s monitor runs	
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	once per trip during pre drive at least twice every 0.08s rate whenever enable conditions are met	
			(a) - (b)	>	50.00	usec	programmed energizing time for fuel	=	TRUE		fail	
			with (a) parallel redundant calculation of	=	calculated	-	injection has been read back means programmed energizing time for fuel	>=	0	-	conditions exists for at least 0.05 s	
			energizing time for fuel injection and with (b) parallel redundant calculation of programmed energizing time for fuel injection	=	parameter calculated parameter	-	injection and measured energizing time for fuel injection has been read back	=	TRUE	-	monitor runs with 0.01 s rate whenever enable	
			njouon				means measured energizing time for fuel injection	>=	0	-	conditions are met	
							and engine speed	>	1200.00	rpm		
							and rail pressure	>	20000.00	kPa		
							and engine test active via diagnosis tester and	=	FALSE	-		
			Path 1:				engine speed	>	1200.00	rpm	fail	
			( parallel redundant calculation of angle for pilot injection 1 quantity or	<	-32.98	degrees	and engine test active via diagnosis tester	=	FALSE	-	conditions exists for at least 0.05 s monitor runs	

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria parallel redundant calculation of angle for	>	Logic and Valu 102.99	degrees	Parameters		Conditions			Illum.
			plane reconcern calculation of angle for pilot injection 1 quantity ) or Path 2:	>	102.99	degrees					rate whenever enable conditions	
			( parallel redundant calculation of angle for main injection quantity or	<	-32.98	degrees					are met	
			parallel redundant calculation of angle for main injection quantity ) or Path 3:	>	43.53	degrees						
			( parallel 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 <b>Path 4:</b> (									
			parallel redundant calculation of angle for post injection quantity 2 or	<	-83.00	degrees					whenever enable	
			parallel redundant calculation of angle for post injection quantity 2 )	>	43.53	degrees						
			or Path 5: (									
			parallel redundant calculation of angle for post injection quantity 3 or	<	-83.00	degrees						
			parallel redundant calculation of angle for post injection quantity 3 )	>	0.00	degrees						
			( parallel redundant calculation of energizing times of the correction value for pilot injection quantity (see Look-Up-	<	-500 to -50	usec	redundant engine speed calculation and	>=	1200.00	rpm	conditions exists for at	
			Table #56) or parallel redundant calculation of energizing times of the correction value	>	50 to 500	usec	engine test active via diagnosis tester	=	FALSE	-	monitor runs with 0.04 s rate	
			for pilot injection quantity (see Look-Up- Table #55) )								conditions	
			parallel redundant calculation of post injection 2 quantity	>	130.00	mm^3	engine test active via diagnosis tester	=	FALSE		conditions	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							change in injection operation mode requested	-	TRUE		least 0.4 s monitor runs with 0.04 s rate whenever enable conditions are met	
			parallel redundant calculation of	>	200 to 6000	US	fuel system is in fuel cut off	=	TRUE		fail	
			averaged torque creating energizing time per cylinder (see Look-Up-Table #58)				(see parameter definition line #189)				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 (					
							pedal position or redundant calculation of pedal position	=	0	%		
							for time ) and	= >	0.02	% Sec		
							( redundant engine speed calculation after start detected and	>	120.00	rpm		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Valu	le	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Gystem	0000	Description	Until				redundant engine speed calculation at start (see Look-Up-Table #57) )	>	840 to 1120	rpm	Required	munt.
							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 or	>=	7.50	mm^3	and engine test is active via diagnosis tester	=	FALSE	-	least 0.2 s monitor runs with 0.04 s rate whenever	
			parallel redundant calculation of averaged wave correction quantity for post injection 2 or	>=	7.50	mm^3					enable conditions are met	
			parallel redundant calculation of averaged wave correction quantity for post injection 3	>=	7.50	mm^3						
			(								fail	
			rail pressure	<=	16000.00	kPa	parallel redundant calculation of voltage of rail pressure sensor	<	0.19	V	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	>	0.21	sec	whenever enable	
							and parallel redundant calculation of injections active and	=	TRUE	-	conditions are met	
							redundant engine speed calculation and	>	1000.00	rpm		
							engine test active via diagnosis tester and	=	FALSE	-		
							conditions for level one signal range check fault detection are met	=	TRUE	-		
			internal supply voltage	<	4.2	V	ignition on	=	TRUE	-	fail	
			or internal supply voltage	>	5.25	V					conditions exists for 0.05 s test performed continuously 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 Illun
			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 0.10 TRUE	V sec	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	-	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	-	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable conditions are met	
			WDA (watch dog) shut off because of corrupt question-and-answer communication	=	TRUE	-	ignition on and WDA (watch dog) line active and shut off path test active	=	TRUE TRUE FALSE	-	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Lo	Threshold ogic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
											enable conditions are met	
			the actual response time from processor is not equal to the requested response- time	=	TRUE	-	ignition on and NO Pending or Confirmed DTCs:	=	TRUE see sheet inhibit tables	-	fail conditions exists for more than 0.08 s monitor runs at least twice every 0.08 s rate whenever enable conditions are met	
			redundant, independent algorithm for plausibility fault of accelerator pedal signal for safety reasons: 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	>	0.29 0.95	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	>	1.45	V						
			voltage accelerator pedal 2 ) or Path 2:  (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	>	1.45 0.41 0.95	V V V						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			and ( voltage accelerator pedal 1 or voltage accelerator pedal 2 )	<= <=	1.45 1.45	V V				
			no response to an injection request processor internal	=	TRUE	-	ignition on and NO Pending or Confirmed DTCs:	= TRUE = see sheet inhibit tables	- fail conditions exists for more than 0.08 s monitor runs at least twice every 0.08 s rate whenever enable conditions are met	
			no response to shut-off path test processor internal	=	TRUE	-	ignition on and NO Pending or Confirmed DTCs:	= TRUE = see sheet inhibit tables	- fail conditions exists for more than 0.523 monitor runs at the 0.01 s rate whenever enable	
			no response to hardware activation request processor internal	=	TRUE		ignition on and NO Pending or Confirmed DTCs:	= TRUE = see sheet inhibit tables	- fail conditions exists for more than 0.437 monitor runs at least twice every 0.08 s rate whenever enable	
			no response from processor operative system processor internal	=	TRUE	-	ignition on and NO Pending or Confirmed DTCs:	= TRUE = see sheet inhibit tables	fail conditions exists for more than 0.08 s monitor runs at least twice every 0.08 s rate	

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

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	L	Threshold ogic and Value	9	Secondary Parameters		Enable Conditions		Time Required	
			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 3.50	V	ignition on and battery voltage and basic enable conditions met:	-	TRUE 8.00 see sheet enable tables	- V -	fail conditions exists for 0.5 S monitor runs with 0.01 s rate whenever enable conditions are met	
			redundant filtered supply voltage to injector chip 2 or redundant filtered supply voltage to injector chip 2	~	3.10 3.50	V	ignition on and battery voltage and basic enable conditions met:		TRUE 8.00 see sheet enable tables	- V -	fail conditions exists for 0.5 s monitor runs with 0.01 s rate whenever enable conditions are met	
			internal injector driver chip 1 error IC internal	=	TRUE	-	Engine Running and basic enable conditions met:	=	TRUE see sheet enable tables	-	fail conditions exists for more than 0.1 s	

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

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
											exists for more than 533 events test performed continuously with 0.01 s	
			security torque limitation request due to implausible rail pressure request	=	TRUE	-	ignition on	=	TRUE		fail conditions exists for more than 533 events test performed continuously with 0.01 s	
			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) 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.
			(d) torque of surge damper control	=	calculated parameter	-						
			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 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.	H	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

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	<del>)</del>	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Control Module Analog to Digital Performance	P060B	Redundant electronic ECM circuitry determines if ADC is correctly converting signals within the correct time periods.	voltage at ADC test voltage input or voltage at ADC test voltage input	~ ~	4.73	V	ignition on	=	TRUE	-	fail conditions exists for at least 0.15 s test performed continuously 0.01 s	A
			<ul> <li>(a) - (b)</li> <li>with <ul> <li>(a) voltage accelerator pedal signal 2 at internal ADC and with</li> <li>(b) voltage accelerator pedal signal 2 at external ADC</li> </ul> </li> </ul>	∧ = = =	0.16 measured parameter measured parameter	V V V	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 events V 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	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	e	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
											continuously 0.01 s	
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	-	and engine synchronization	=	TRUE	-	enable	
			and with (b) engine speed	=	parameter measured	-	engine synchronization completed which means	=	TRUE	-	are met	
					parameter		number of crankshaft revolutions and	>=	4.00	revs		
							crankshaft reference mark detected (reference mark is the 2 missing teeth	=	TRUE	-		
							in the 50-2 tooth-wheel configuration) and basic enable conditions met:	=	see sheet enable tables	-		
Control Module	P062F		EEPROM sector reports faults				ignition on	=	TRUE		fail	A
Long Term Memory Performance		is read for a check sum error and flags if a fault is found.	regarding:								conditions exists for 0.01 s	
			unable to erase or change whole EEPROM sector or	=	TRUE	-	and basic enable conditions met:	_	see sheet enable	-	test performed continuously	
			read order is not successfully accomplished for more than amount of blocks	=	3	counts			tables		at the 0.01 s 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

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	-	performed continuously 0.01s rate	
5 Volt Reference 2 Circuit	P0651	Sensor supply voltage circuitry determines if faults related to maintaining the voltage level exist.	sensor supply voltage 2	<=	4.6	V	ignition on and basic enable conditions met:	=	TRUE see sheet enable tables	-	fail conditions exists for 0.1 s test performed continuously 0.01s rate	A
5 Volt Reference 3 Circuit	P0697	Sensor supply voltage circuitry determines if faults related to the voltage level present at the sensor supply voltage exist.		<=	4.6	V	ignition on and basic enable conditions met:	=	TRUE see sheet enable tables		fail conditions exists for 0.1 s test performed continuously 0.01s rate	A
5 Volt Reference 4 Circuit	P06A3	Sensor supply voltage circuitry determines if faults related to the voltage level present at the sensor supply voltage exist.		<=	4.6	V	ignition on and basic enable conditions met:	-	TRUE see sheet enable tables		fail conditions exists for 1.0 s test performed continuously 0.01s rate	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions		Time Required	MIL Illum.
5 Volt Řeference 5 Circuit	P06D2	Sensor supply voltage circuitry determines if faults related to the voltage level present at the sensor supply voltage exist.	sensor supply voltage 5	<= 4.6 V	ignition on and basic enable conditions met:	= TRUE = see sheet enable tables	-	fail conditions exists for 0.1 s test performed continuously 0.01s rate	В
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)	<ul> <li>Open Circuit:≥ - 200 K Ω impedance between ECU pin and load</li> </ul>	circuit active at low current and ignition on and	= TRUE	-	fail conditions exists for 2 s monitor runs with 0.01 s rate whenever enable conditions are met	B (No MIL)
					ECU Initialization tasks in progress for	= FALSE	-		
					time and	> 1.00	sec		
					ECU Shutdown tasks in progress for	= FALSE	-		
					time and	> 1.00	sec		
					Battery voltage for time	> 10.50	V		
					ume and basic enable conditions met:	> 3.00 = see sheet enable tables	sec -		
			Voltage high during driver on state (indicates short to power)	Short to power: - ≤ 0.5 Ω impedance between signal and controller power	lamp is commanded off and ignition on	= TRUE	-	fail conditions exists for 2 s monitor runs with 0.01 s rate whenever enable conditions	B (No MIL)
					and ECU Initialization tasks in progress for	= FALSE	-	are met	
					time and	> 1.00	sec		

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters		Conditions		Required	Illum.
					ECU Shutdown tasks in progress for time and Battery voltage	= >	FALSE 1.00 10.50	- sec V		
					for time	>	3.00	sec		
					and basic enable conditions met:	=	see sheet enable tables	-		
		Diagnoses the Malfunction Indicator Lamp (MIL) low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	<ul> <li>Short to ground: -</li> <li>≤ 0.5 Ω</li> <li>impedance</li> <li>between signal</li> <li>and controller</li> <li>ground</li> </ul>	circuit active at low current	=	TRUE	-	fail conditions exists for 3 s monitor runs with 0.01 s rate	B (No MIL)
					and ignition on and	=	TRUE	-	whenever enable conditions	
					ECU Initialization tasks in progress for time	=	FALSE	-	are met	
					and ECU Shutdown tasks in progress	>	1.00 FALSE	sec		
					for time	>	1.00	sec		
					and Battery voltage	>	10.50	V		
					for time and	>	3.00	sec		
					basic enable conditions met:		see sheet enable tables			
Transmission Control Module (TCM) Requested	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	A (No MIL)
MIL Illumination		MIL			for time and	>	0.25	sec	test performed continuously	
					new message is received via CAN and	=	TRUE	-	0.5 s rate	
					basic enable conditions met	=	see sheet enable tables	-		
					and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables			

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters		Conditions		Required	Illum.
Park/Neutral Position (PNP) Switch Circuit Low Voltage	P0852	Detects low voltage condition on the PNP circuit by comparing the ECM sensed input to the broadcasted state from the TCM over GMLAN serial data	GMLAN Message for PNP position indicates park neutral and disagrees with ECM (on-board control unit) sensed position based on PNP switch inputs to ECM	= TRUE -	(				fail conditions exist for more than 3000 events monitor runs with 0.01 s	В
		data			battery voltage and	>=	11.00	V	rate whenever	
					battery voltage	<=	655.34	V	enable	
					and engine speed and (	<=	7000.00	rpm	are met	
					selected gear position is park	=	TRUE	-		
					selected gear position is neutral	=	TRUE	-		
					and basic enable conditions met: and	= se	e sheet enable tables	-		
					NO Pending or Confirmed DTCs:	= se	ee 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	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 and	=	TRUE	-		
					ignition on and	=	TRUE	-		
					basic enable conditions met:	= se	e sheet enable tables	-		
					and NO Pending or Confirmed DTCs:	= se	ee sheet inhibit tables	-		
Reductant Pump High Control Circuit Low Voltage	P1043	Diagnoses the Ruductant Pump Motor high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	Short to ground: - ≤ 0.5 Ω impedance between signal and controller ground	ECU initialization tasks in progress	=	FALSE	-	fail conditions exists for 3 s monitor runs with 10 msec rate whenever	A

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable Conditions		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters time	>	1.00	sec	Required enable	Illum.
					and				conditions	
					battery voltage for	>	11.00	V	are met	
					time	>	3.00	sec		
					and battery voltage	<	655.34	V		
					for		2.00			
					time and	>	3.00	sec		
					( battery voltage correction factor (please	>	0.00	factor		
					see the parameter definition (please see	>	0.00	Tactor		
					the parameter definition and					
					battery voltage correction factor (please	<	4.00	factor		
					see the parameter definition (please see the parameter definition					
					)					
					for time	>	3.00	sec		
					and			300		
					basic enable conditions met:	=	see sheet enable tables	-		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Pump High Control	P1044	Diagnoses the Ruductant Pump Motor high side	Voltage high during driver off state (indicates short to power)	= Short to power: ≤ - 0.5 Ω impedance	ECU initialization tasks in progress	=	FALSE	-	fail conditions	А
Circuit High		driver circuit for circuit	(indicates short to power )	between signal					exists for 3 s	
Voltage		faults.		and controller power					monitor runs with 10	
				power					msec rate	
					for time	>	1.00	sec	whenever enable	
					and				conditions	
								V	are met	
					battery voltage for	>	11.00	v	aromot	
					for time	>	3.00	sec	uro mot	
					for time and	>	3.00			
					for time and battery voltage for	> <	3.00 655.34	sec V		
					for time and battery voltage	>	3.00	sec		
					for time and battery voltage for time and (	> < >	3.00 655.34 3.00	sec V sec		
					for time and battery voltage for time	> <	3.00 655.34	sec V		
					for time and battery voltage for time and ( battery voltage correction factor (please see the parameter definition and	> < > >	3.00 655.34 3.00 0.00	sec V sec factor		
					for time and battery voltage for time and ( battery voltage correction factor (please see the parameter definition	> < >	3.00 655.34 3.00	sec V sec		
					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 )	> < > >	3.00 655.34 3.00 0.00	sec V sec factor		
					for time and battery voltage for time and ( battery voltage correction factor (please see the parameter definition and battery voltage correction factor (please	> < > >	3.00 655.34 3.00 0.00	sec V sec factor		
					for time and battery voltage for time and ( battery voltage correction factor (please see the parameter definition and battery voltage correction factor (please see the parameter definition ) for	> > > <	3.00 655.34 3.00 0.00 4.00	sec V sec factor factor		

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	-		
Reductant Purge Valve High Control Circuit High Voltage	P1046	Diagnoses the Reductant Purge Valve high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power )	=	Short to power: ≤ 0.5 Ω impedance between signal and controller power	·	ECU initialization tasks in progress	=	FALSE	-	fail conditions exists for 3 s monitor runs with 10 msec rate	В
							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	<	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 Injector High Control Circuit Low Voltage	P1048		Voltage low during driver on state (indicates short to ground)	=	Short to ground: $\leq 0.5 \Omega$ 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	>	ground 1.60	Amps	for time	>	1.00	sec	whenever enable	
					1.00	Ampo	and battery voltage	>	11.00	V	conditions are met	
							for time	>	3.00	sec	are met	
							and battery voltage	<	655.34	V		
							for time	>	3.00	sec		
							and (					

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters battery voltage correction factor (please	>	Conditions 0.00	factor	Required	Illum.
							see the parameter definition and battery voltage correction factor (please see the parameter definition	<	4.00	factor		
							) for time and basic enable conditions met:	>	3.00 see sheet enable	sec		
							and NO Pending or Confirmed DTCs:	=	tables see sheet inhibit	_		
	_								tables	_		_
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	>	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	-		
Fuel Rail Pressure Performance	P1089	Measured rail pressure is checked against desired rail pressure to detect high rail pressure deviations in fuel cut-off	rail pressure deviation from set point calculated as the absolute value of difference between desired and actual value as an enable condition for injection timing correction learning	>	5000.00	kPa	rail pressure control commanded during injection timing correction learning phase	=	TRUE	-	fail conditions exists for 720 crank revolutions	В

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 limiting rail pressure set point for time and basic enable conditions met:	= > =	see sheet inhibit tables 2.00 see sheet enable tables	- sec -	monitor runs with 0.02 s rate whenever enable conditions are met	
Exhaust Aftertreatment Fuel Injector Control Circuit Shorted	P10CC	Diagnoses the Exhaust Aftertreatment Fuel Injector low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between signal and controller power	engine pre drive	=	FALSE	-	fail conditions exists for more than 5 events monitor runs with 0.1 s rate	В
					time and	>	1.00	sec	whenever enable	
					battery voltage for	>	11.00	V	conditions are met	
				time and	>	3.00	sec	aremet		
					starter is active cranking for	=	FALSE	-		
					time	>	3.00	sec		
					and Diesel dosing valve: fuel injection	=	ACTIVE	-		
					and basic enable conditions met:	=	see sheet enable tables	-		
						_		_		
Exhaust Aftertreatment Fuel Injector High Control Circuit Low Voltage	P10CD	Electronic out-put driver circuitry determines circuit integrity on the diesel dosing valve control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		for	=	FALSE	-	fail conditions exists for more than 30 events monitor runs	В
					time and	>	1.00	sec	with 0.1 s rate	
					battery voltage for	>	11.00	V	whenever enable	
					time and	>	3.00	sec	conditions are met	
					starter is active cranking for	=	FALSE	-		
					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.
Exhaust Aftertreatment Fuel Injector High Control Circuit High Voltage	P10CE	Diagnoses the Exhaust Aftertreatment Fuel Injector high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power )		Short to power: $\leq 0.5 \Omega$ impedance between signal and controller power		engine pre drive	=	FALSE	-	fail conditions exists for more than 30 events monitor runs with 0.1 s	В
							for time and	>	1.00	sec	rate whenever enable	
							battery voltage for	>	11.00	V	conditions are met	
							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	-		
Charge Air Cooler Temperature Sensor Performance	P10CF	Detects a biased charge air cooler temperature sensor downstream or charge air cooler temperature sensor upstream by comparing the respective values at startup.	Path 1:				minimum engine-off time	>=	28800.00	sec	fail conditions exists for 0.1 s monitor runs once per trip with 0.1 s	В
			(a) - (b)  (see Look-Up-Table #3) with (a) captured charge air cooler	>	100.00 measured	°C -	and ambient temperature and	>	-60.04	°C	rate whenever enable conditions	
			downstream temperature at start and with (b) captured charge air cooler upstream temperature at start	=	parameter measured parameter	-	engine speed (see Look-Up-Table #3) for	>	530 to 870	rpm	are met	
			upstream temperature at start		parameter		time and	>	0.00	sec		
			or Path 2:				engine post drive/ afterun and	=	FALSE	-		
			(  (a) - (b)  (see Look-Up-Table #3)	<=	100.00	°C	diagnostic performed in current dc and	=	FALSE	-		
			with		100100	U	basic enable conditions met:	=	see sheet enable tables	-		
			(a) captured charge air cooler downstream temperature at start and with	=	measured parameter	-	and NO Pending or Confirmed DTCs:	=	see sheet inhibit	-		
			(b) captured charge air cooler upstream temperature at start and	=	measured parameter	-			tables			
			(a) - (b)  (see Look-Up-Table #6) with	>	27.00	°C						
			(a) captured charge air cooler downstream temperature at start and with	=	measured parameter	-						

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
			(b) captured charge air cooler upstream temperature at start and	=	measured parameter	-						
			status of block heater (see parameter definition)	=	FALSE	-						
			status of sun-load detection (see parameter definition) )	=	FALSE	-						
					_				_			
Reductant Injector Temperature - Exhaust Gas Temperature 2 Correlation	P10D0	Detects an implausible SCR dosing valve coil temperature by comparing the temperature with a reference temperature	(a) - (b)  (see Look-Up-Table #90)	>	30 to 3276.7	°C	ignition on	=	TRUE	-	fail conditions exists for 0.1 s monitor with	В
			with				and				0.1 s rate	
			<ul> <li>(a) dosing valve coil temperature</li> <li>[ Calculated coil temperature = 20degC</li> <li>+ (((measured Coil resistance/coil temp</li> <li>@ 20degC)-1) / temp coefficient of</li> <li>copper) ]</li> <li>and with</li> </ul>	=	calculated parameter	°C	state of selective catalytic reduction system	=	STANDBY or NO PRESSURE CONTROL	-	whenever enable conditions are met	
			(b) oxidation catalyst downstream temperature	=	measured parameter	°C	and active heating phase for dosing valve	=	FALSE	-		
							valve already activated within this driving cycle and	=	FALSE	-		
							battery voltage	>	11.00	V		
							and ambient temperature and	>=	-60.04	°C		
							and engine run time and	<	10.00	sec		
							and 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	-		
							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	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Exhaust Gas Temperature Sensors 3-4 Not Plausible	P113A	Detects biased urea catalyst temperature sensor by comparing the urea catalyst temperature sensor to the particulate filter temperature sensor after an engine off soak time		>	30.00	°C	minimum engine-off time	>=	28800.00	SEC	fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever enable	В
			with ( (a) captured temperature downstream of the urea catalyst at start	=	measured parameter	°C	and Engine Running for	=	TRUE	-	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:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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 PM temperature with 3 reference sensors after cold start)		>	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
			where reference temperatures (a) DOC downstream temperature	=	measured	-	means Raw value of start temperature of	>=	-40.00	°C		
			(b) SCR downstream temperature	=	parameter measured	-	particulate sensor Particulate sensor can be reached via	=	TRUE	-		
			(c) DPF downstream temperature	=	parameter measured	-	CAN Barometric pressure	>	75	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	=	TRUE	-		
							Shut-off time of the particulate sensor control unit	>	21600	sec		
							Temperature range check of the reference sensors is set	=	TRUE	-		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
							means					
							( Temperature ofter Ovi Catelyst		-40.04	°C		
							Temperature after Oxi-Catalyst and	>=	-40.04	C		
							Temperature after Oxi-Catalyst	<=	79.96	°C		
							Temperature after SCR-Catalyst	>=	-40.04	°Č		
							and			-		
							Temperature after SCR-Catalyst	<=	79.96	°C		
							Temperature after particulate filter	>=	-40.04	°C		
							and		70.00			
							Temperature after particulate filter	<=	79.96	°C		
							)					
HO2S	P11A6	Compare the pressure	Pressure compensated O2 concentration	>	(a) + (b)	factor	engine speed	<	1800	rpm	fail	В
Performance -		compensated O2									conditions	
Signal High During		concentration sensor signal									exists for	
Moderate Load		with a threshold									more than 2	
Bank 1 Sensor 1			where				engine speed		550	rom	event	
			(a) Filtered calculated O2 concentration	=	Please see the	factor	commanded fuel injection quantity	> <	240.00	rpm mm^3/rev	monitor runs with 0.1 s	
			based on injection quantity, air mass	-	general	lactor	commanded ruer injection quantity		240.00	11111 0/101	rate	
			and fuel density		description for						whenever	
			2		details of this						enable	
					calculated O2						conditions	
					concentration						are met	
			(b) Positive O2 concentration margin	=	0.04	factor	Inner combusted quantity	>	88.00	mm^3/rev		
							Air mass per cylinder	<	3.96	g/rev		
							Air mass per cylinder	>	1.98 TRUE	g/rev		
							Status of binary lambda signal valid for time	= >	0.50	- sec		
							oxidation catalyst upstream temperature	<	999.96	°C		
									000.00	Ŭ		
							oxidation catalyst upstream temperature	>	99.96	°C		
							integrated air mass since all other	>	2.5	g		
							release conditions are fulfilled for O2					
							plausibility					
							battery voltage	>	11.00	V		
							Fuel volume in fuel tank Deceleration fuel cut-off	> =	-1638.40 FALSE	-		
							Injection active	=	TRUE	-		
							calculated oxygen concentration	<=	(a) + (b)	factor		
							calculated oxygen concentration	>=	(a) - (b)	factor		
							where		() ()			
							(a) Oxygen concentration is captured	=	measure variable	factor		
							at the moment when the above					
							steady state conditions are met					
							(b) toleronge renge of colouists d		0.02	faatar		
							(b) tolerance range of calculated Oxygen concentration	=	0.02	factor		
							for time	>	0.10	sec		
							Engine operation mode (Please see the	=	normal operation	-		
							definition)	-				
							engine speed	<	4500.00	rpm		
							engine speed	>	600.00	rpm		
							ambient temperature	<	122.96	°C		
							ambient temperature	>	-45.04	°C		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							ambient pressure ambient pressure NO Pending or Confirmed DTCs:	< > =	110.00 74.80 see sheet inhibit	kPa kPa -		
							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 (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	engine speed commanded fuel injection quantity	> <	550 240.00	rpm mm^3/rev	monitor runs with 0.1 s rate whenever enable conditions are met	
			(b) Positive O2 concentration margin	=	0.04	factor	Inner combusted quantity Air mass per cylinder Air mass per cylinder Status of binary lambda signal valid for time oxidation catalyst upstream temperature	> < > = > <	88.00 3.96 1.98 TRUE 0.50 999.96	mm^3/rev g/rev g/rev - sec °C		
						oxidation catalyst upstream temperature	>	99.96	°C			
						integrated air mass since all other release conditions are fulfilled for O2	>	2.5	g			
						plausibility battery voltage Fuel volume in fuel tank Deceleration fuel cut-off Injection active calculated oxygen concentration	> = = <=	11.00 -1638.40 FALSE TRUE (a) + (b)	V I - factor			
							calculated oxygen concentration where (a) Oxygen concentration is captured at the moment when the above steady state conditions are met	>=	(a) - (b) measure variable	factor 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 ambient temperature	< > <	4500.00 600.00 122.96	rpm rpm °C		
							ambient temperature ambient pressure ambient pressure NO Pending or Confirmed DTCs:	> < > =	-45.04 110.00 74.80 see sheet inhibit	°C kPa kPa -		
							basic enable conditions met:	=	table see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
HO2S Performance - Signal High During Moderate Load	P11AF	Compare the pressure compensated O2 concentration sensor signal with a threshold	Pressure compensated O2 concentration	>	(a) + (b)	factor	engine speed	<	1800	rpm	fail conditions exists for more than 2	В
Bank 1 Sensor 2			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 concentration	factor	engine speed commanded fuel injection quantity	> <	550 240.00	rpm mm^3/rev	event monitor runs with 0.1 s rate whenever enable conditions	
			(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	~ < ~ = ~ < ~ ~	88.00 3.96 1.98 TRUE 0.50 999.96 99.96 2.5	mm^3/rev g/rev - sec °C °C g	are met	
							plausibility 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	> = = >= =	11.00 -1638.40 FALSE TRUE (a) + (b) (a) - (b) measure variable	V I - factor factor factor		
							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 ambient temperature ambient pressure ambient pressure NO Pending or Confirmed DTCs: basic enable conditions met:		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	factor sec - rpm rpm °C °C kPa kPa - -		
HO2S Performance - Signal Low During Moderate Load Bank 1 Sensor 2	P11B2	Compare the pressure compensated O2 concentration sensor signal with a threshold	Pressure compensated O2 concentration	<	(a) - (b)	factor	engine speed	<	1800	rpm	fail conditions exists for more than 2 event	В

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
			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 0.05	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 calculated oxygen concentration 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 ambient temperature ambient pressure ambient pressure NO Pending or Confirmed DTCs: basic enable conditions met:	^ < ^ < > < < < < < < < < < < < < < < <	88.00 3.96 1.98 TRUE 0.50 999.96 2.5 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	mm^3/rev g/rev g/rev - sec °C g V I - factor factor factor factor factor factor c c kPa kPa - -	are met	
HO2S Current Performance Bank 1 Sensor 1	P11B4	Compares the ratio of valid lambda signal time to total time with a threshold	ratio of valid lambda signal time to total time: (a) / (b)	<	0.50	ratio	NOx sensor's heater temperature has reached the set point	=	TRUE	-	fail conditions exists for more than	В
			where (a) time for which valid lambda signal received over CAN (b) total time for which diagnosis is enabled	=	measured parameter calculated parameter	-	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	> = = =	2.00 TRUE 0.1 to 10 measured parameter	sec - factor -	36 sec monitor runs with 0.02 s rate whenever enable conditions are met	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold gic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							(b) Filtered reciprocal lambda for time NO Pending or Confirmed DTCs: basic enable conditions met:	= = =	calculated parameter 5.00 see sheet inhibit tables see sheet enable tables	- sec -		
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	ratio - -	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
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 ( Status of NOx signal of upstream NOx sensor (please see the definition) Normal Mode (Particulate Filter Regeneration not active) for time ambient pressure ambient pressure ambient temperature (( filtered modeled NOx concentration percent positive deviation filtered modeled NOx concentration percent negative deviation for time ) )) for time	>= = = >= >= >= >= >= >= >= >= >= >= >=	5.00 TRUE TRUE 15.00 75.00 106.00 -7.04 37.96 0.05 0.05 0.05 2.00 2.00	sec - - kPa kPa °C °C - - sec sec	fault exists for more than 1 event; monitor runs at 0.1 s once per trip	В

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
oystern	Coue	Description	Unterla		Logic and value				30.00		Requireu	mam.
							time since start	>		sec		
							Engine Coolant Temperature	>=	68.96	°C		
							Engine Coolant Temperature	<=	129.96	°C		
							Exhaust gas temperature range at	>0	0 to 1	factor		
							Upstream NOx sensor (see Look-Up-					
							Table #81)					
							Fuel Injection pattern (see Look-Up-	=	0 to 58	pattern		
							Table #82)	-	0 10 50	pattern		
							1 able #62)					
									24 = pilot 1 main			
									56 = pilot 2, pilot			
									1, main			
									58 = pilot 2, pilot			
									1, main, post 2			
									26 = pilot 1 main,			
									post 2			
									0 = all off			
									(overrun)			
							Vehicle speed	>=	37.29	mph		
							for time	>	1.00	sec		
							Enable range for the plausibility check of	≠0	0 to 1	factor		
								70	0101	laciol		
							Upstream NOx sensor (see Look-Up-					
							Table #74)					
							for time	>	0.00	sec		
							Air mass per cylinder	>=	0.00	g/rev		
							Air mass per cylinder	<=	5.40	g/rev		
							for time	>	5.00	sec		
							actual valve position of exhaust-gas	>=	0.00	%		
								/-	0.00	70		
							recirculation					
							actual valve position of exhaust-gas	<=	100.00	%		
							recirculation					
							for time	>	0.50	sec		
							filtered modeled NOx-concentration	>=	0.00	ppm		
							upstream of the SCR					
							filtered modeled NOx-concentration	<=	1650.00	0000		
								<=	1030.00	ppm		
							upstream of the SCR					
							for time	>	0.50	sec		
							Diagnostic has not completed this driving	=	FALSE	-		
							cycle					
							NO Pending or Confirmed DTCs	=	see sheet inhibit	-		
							<b>3 </b>		tables			
							basic enable conditions met:	=	see sheet enable			
								-		-		
							ς		tables			
							)					
NOx Sensor	P11CC	Compares the averaged	Averaged relative NOx concentration	<	(a) * (b)	-	for averaging time with the following	>=	5.00	sec	fault exists	В
Performance -		relative deviation of the	deviation				secondary parameters fulfilled				for more	
Signal Low Bank 1		measured NOx sensor									than 1 event;	
Sensor 1		concentration from the									monitor runs	
		modeled NOx concentration									at 0.1 s once	
		against the averaged									per trip	
		threshold										
			(a) Table for the base value of the	=	-1 to -0.486328	-	(					
				=	-1 to -0.486328	-	(					
			lower plausibility limit (see Look-Up-	=	-1 to -0.486328	-	(					
			lower plausibility limit (see Look-Up- Table #80)				(	_	TRUE			
			lower plausibility limit (see Look-Up-	=	-1 to -0.486328 1	-	( Status of NOx signal of upstream NOx sensor (please see the definition)	=	TRUE	-		

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters		Conditions		Required	Illur
					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	>=	-7.04	°C		
					ambient temperature	<=	37.96	°Č		
					((	~-	57.50	0		
					filtered modeled NOx concentration	<=	0.05	_		
						<=	0.05	-		
					percent positive deviation					
					filtered modeled NOx concentration	>=	0.05	-		
					percent negative deviation					
					for time	>	2.00	sec		
					)					
					))					
				1	for time	>	2.00	sec		
				1	time since start	>	30.00	sec		
				1	Engine Coolant Temperature	>=	68.96	°C		
				1	Engine Coolant Temperature		129.96	°C		
				1		<=				
				1	Exhaust gas temperature range at	>0	0 to 1	factor		
				1	Upstream NOx sensor (see Look-Up-					
					Table #81)					
					Fuel Injection pattern (see Look-Up-	=	0 to 58	pattern		
				1	Table #82)					
					<i>'</i>		24 = pilot 1 main			
							56 = pilot 2, pilot			
							1, main			
							58 = pilot 2, pilot			
							1, main, post 2			
							26 = pilot 1 main,			
							post 2			
							0 = all off			
							(overrun)			
					Vehicle speed	>=	37.29	mph		
					for time	>	1.00	sec		
						>	1.00	Sec		
						10	0.1.4	6		
					Enable range for the plausibility check of	≠0	0 to 1	factor		
					Upstream NOx sensor (see Look-Up-					
				1	Table #75)					
				1	for time	>	0.00	sec		
				1	Air mass per cylinder	>=	0.00	g/rev		
				1	Air mass per cylinder	<=	5.40	g/rev		
				1	for time	>	5.00	sec		
				1	actual valve position of exhaust-gas	>=	0.00	%		
						>=	0.00	70		
					recirculation					
					actual valve position of exhaust-gas	<=	100.00	%		
				1	recirculation					
				1	for time	>	0.50	sec		
				1	filtered modeled NOx-concentration	>=	0.00	ppm		
				1	upstream of the SCR					
					filtered modeled NOx-concentration	<=	1650.00	ppm		
				1		~-	1000.00	Phili		
				1	upstream of the SCR		0.50			
				1	for time	>	0.50	sec		
				1	Diagnostic has not completed this driving	=	FALSE	-		
				1	cycle					
				1	NO Pending or Confirmed DTCs	=	see sheet inhibit	-		
					<b>U</b>					
							tables			
					basic enable conditions met:	=	tables see sheet enable	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Valu	e	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							)					
NOx Sensor Current Performance Bank 1 Sensor 1	P11DB	Detects a failure of the feedback performance of upstream NOx sensor	Ratio of invalid upstream NOx sensor status time count (invalid time / total time)	>	0.50	ratio	Sufficient number of valid and invalid NOx status time (sum of valid and invalid NOx status for diagnostic determination)	>=	18.00	sec	fail conditions exists for more than	В
							and Engine Running (see parameter definition)	=	TRUE	-	36 sec monitor runs with 0.02 s	
							for time (required for the NOx sensor to give valid response) and	>	20.00	sec	rate whenever enable	
							Upstream 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	> >=	45.00 11.00	sec V		
							battery voltage SCR upstream temperature	<= >=	655.34 94.96	∨ °C		1
							SCR upstream temperature	>= <=	3003.56	°C		1
							Engine Running (see parameter definition)	=	TRUE	-		
							for time (required for the NOx sensor to give valid response) and	>	20.00	sec		
							Lambda signal is in steady state condition (see Look-Up-Table #28)	<=	0.1 to 10	-		
							for time	>=	5.00	sec		
							Inhibit Status ( no inhibiting faults ) ( No pending or stored DTC ) basic enable conditions met:	=	see sheet inhibit tables see sheet enable	-		
									tables			
NOx Sensor	P11DC	Detects a failure of the	Ratio of valid to invalid downstream NOx	>	0.50	ratio	Sufficient number of valid and invalid	>=	18.00	sec	fail	В
Current Performance Bank1 Sensor 2		feedback performance of downstream NOx sensor	sensor status time count				downstream NOx sensor status time (sum of valid and invalid NOx status for diagnostic determination) and				conditions exists for more than 36 sec	
							Engine Running (see parameter definition)	=	TRUE	-	monitor runs with 0.02 s	
							for time (required for the NOx sensor to give valid response)	>	20.00	sec	rate whenever	
							and Downstream NOx sensor detects a lean A/F mixture	=	TRUE	-	enable conditions are met	
							and Valid NOx signal from CAN is received (no NOx sensor communication failures)	=	TRUE	-		
							or following conditions for time:	>	120.00	sec		I

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters		Conditions		Required	Illum.
					battery voltage battery voltage	>= <=	11.00 655.34	V V		
					SCR downstream temperature SCR downstream temperature	>= <=	94.96 3003.56	°C ℃		
					Engine Running (see parameter definition) for time (required for the NOx sensor to give valid response)	=	TRUE 20.00	- sec		
					and Downstream Lambda signal is in steady state condition (   measured lambda signal - filtered lambda signal   ) (see Look-Up-Table #27)	<=	0.2 to 3.2	-		
					for time Inhibit Status ( no inhibiting faults ) ( No pending or stored DTC )	>= =	5.00 see sheet inhibit tables	sec -		
					basic enable conditions met:	=	see sheet enable tables	-		
Injector 1 Control Circuit Shorted	P1224	Diagnoses the Injector Cylinder #1 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	= Short to ground: - ≤ 0.5 Ω impedance between signal and controller ground	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Injector 2 Control Circuit Shorted	P1227	Diagnoses the Injector Cylinder #2 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	= Short to ground: - ≤ 0.5 Ω impedance between signal and controller ground	Engine Running (see parameter definition)	=	TRUE	-	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Thresh Logic and		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
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 g ≤ 0.5 impeda between and cont grour	round: - Ω nce signal roller	Engine Running (see parameter definition)	-	TRUE		fail conditions exists for morie 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 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
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 or throttle valve control deviation calculated out of difference between desired and actual value	< -10.0 > 10.0		throttle valve controller bypass is active and throttle valve is driven to a mechanical stop and Engine Coolant Temperature and offset learning for the throttle valve was successful in the previous driving cycle and	= = <	FALSE FALSE 199.96 TRUE	- - - -	fail conditions exists for 10.05 s monitor runs once per driving cycle with 0.005 s rate whenever enable conditions are met	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold ogic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
System	Code	Description	Criteria		ogic and value		basic enable conditions met and NO Pending or Confirmed DTCs:	=	see sheet enable tables see sheet inhibit tables	-	Requirea	num.
		Detects implausible learned offset values.	Path 1: learned throttle valve offset position at open or closed position or learned throttle valve offset position at open or closed position or Path 2: difference between the maximum and minimum positions learned at closed position or Path 3: difference between the maximum and minimum positions learned at open position	<	-20.00 20.00 30.00 30.00	%	( engine temperature and engine temperature ) and ( battery voltage and battery voltage and Throttle Valve is not frozen consisting of: ( Engine Coolant Temperature or if Engine Coolant Temperature then Engine Coolant Temperature then Engine Coolant Temperature for time ) and engine speed and engine post drive/ afterun and basic enable conditions met		4.96 130.06 8.00 655.34 5.06 5.06 6.06 10.00 0 TRUE see sheet enable	°C °C V V °C °C sec rpm -	fail conditions exists for 0.005 s monitor runs once per driving cycle with 0.005 s rate whenever enable conditions are met	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Intake Air Flow Valve Control Circuit 2 Low Voltage	P122E	Diagnoses the Throttle Valve high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	= Short to ground: - ≤ 0.5 Ω impedance between signal and controller ground	battery voltage for time	>	11.00	V	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	В
					and and Throttle Valve Actuator Solenoid Control Circuit	=	ACTIVE			
					and Open Load Diagnosis active and basic enable conditions met	=	FALSE see sheet enable tables			
Intake Air Flow Valve Control Circuit 2 High Voltage	P122F	Diagnoses the Throttle Valve high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power )	= Short to power: ≤ - 0.5 Ω impedance between signal and controller	battery voltage	>	11.00	V	fail conditions exists for 3 s monitor runs	В
Ĵ				power	for time and	>	3.00	Sec	with 0.005 s rate whenever enable conditions are met	
					and Throttle Valve Actuator Solenoid Control Circuit and	=	ACTIVE			
					Open Load Diagnosis active and basic enable conditions met	=	FALSE see sheet enable tables	-		
Injector 4 Control Circuit Shorted	P1233	Diagnoses the Injector Cylinder #4 high side driver	Voltage low during driver on state (indicates short to ground)	= Short to ground: - $\leq 0.5 \Omega$	Engine Running (see parameter definition)	=	TRUE	-	fail conditions	A
		circuit for circuit faults.		impedance between signal and controller ground					exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							are met	
Injector 5 Control Circuit Shorted	P1236	Diagnoses the Injector Cylinder #5 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)		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	- m	fail conditions exists for more than 0.04 s nonitor 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	n v	fail conditions exists for more than 0.04 s nonitor runs with 0.01 s rate whenever enable conditions are met	A
Fuel Pressure Regulator 2 High Control Circuit Low Voltage	P125A	Diagnoses the Fuel Rail Pressure Regulator #2 high side driver circuit for circuit faults.	Voltage low during driver on state (indicates short to ground)	= Short to ground: - ≤ 0.5 Ω impedance between signal and controller ground	battery voltage for time and NO Pending or Confirmed DTCs: and ignition on and	<ul> <li>&gt; 11.00</li> <li>&gt; 3.00</li> <li>= see sheet inhibit tables</li> <li>= TRUE</li> </ul>	e: n v	fail conditions xists for 0.5 s nonitor 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 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 )	<ul> <li>Short to power: ≤ 0.5 Ω impedance between signal and controller power</li> </ul>	-	( 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)		kPa	state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve) and basic enable conditions met: and NO Pending or Confirmed DTCs:	-	TRUE see sheet enable tables see sheet inhibit tables	-	fail conditions exists for 2 s monitor runs with 0.02 s rate whenever enable conditions are met	A
			rail pressure (see Look-Up-Table #72)	< 0 to 15000	kPa	state machine rail pressure control equal to pressure control valve and basic enable conditions met: and NO Pending or Confirmed DTCs:	=	TRUE see sheet enable tables see sheet inhibit tables	-		

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

	Path 2:         Pilot Injection 1 is prohibited due to collision (overlap) with Main Injection and Pilot Injection 2 (see general description or         Path 3:         Injector circuit or activation errors (set point deviation) occurred when the injector was being energized for Pilot or         Path 4:         Pilot Injection 2 is prohibited due to	-	TRUE	-	and engine coolant temperature and engine coolant temperature	~	16.00 71.00	ා ා		
	Injector circuit or activation errors (set point deviation) occurred when the injector was being energized for Pilot or Path 4: Pilot Injection 2 is prohibited due to	-	TRUE	-						1
	Pilot Injection 2 is prohibited due to									1
	exceeding the allowed number of injections (see general description for details) or	=	TRUE							
	Path 5: Pilot Injection 2 is prohibited due to collision (overlap) with Pilot Injection 1 (see general description for details) or	-	TRUE	-						
	Path 6: Injector circuit or activation errors (set point deviation) occurred when the injector was being energized for Pilot or	=	TRUE							l
	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							l
		Pilot Injection 2 is prohibited due to collision (overlap) with Pilot Injection 1 (see general description for details) or Path 6: Injector circuit or activation errors (set point deviation) occurred when the injector was being energized for Pilot or Path 7: Injector circuit or activation errors (set point deviation) occurred when the injector was being energized for Main or Path 8: Post Injection 2 is prohibited due to exceeding the allowed number of injections (see general description for	Pilot Injection 2 is prohibited due to collision (overlap) with Pilot Injection 1 (see general description for details)       =         or       Path 6: Injector circuit or activation errors (set point deviation) occurred when the injector was being energized for Pilot or       =         Path 7: Injector circuit or activation errors (set point deviation) occurred when the injector vas being energized for Pilot or       =         Path 7: Injector circuit or activation errors (set point deviation) occurred when the injector was being energized for Main or       =         Path 8: Post Injection 2 is prohibited due to exceeding the allowed number of injectors (see general description for details)       =	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 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 injectons (see general description for details)       = TRUE	Pilot Injection 2 is prohibited due to collision (overlap) with Pilot Injection 1 (see general description for details) or       = TRUE -         Path 6: Injector circuit or activation errors (set point deviation) occurred when the injector was being energized for Pilot or       = TRUE -         Path 7: Injector circuit or activation errors (set point deviation) occurred when the injector was being energized for 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 -	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 vas 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       -         Or       Path 8:       =       TRUE       -         Path 8:       Post Injection 2 is prohibited due to exceeding the allowed number of injections (see general description for details)       =       TRUE       -	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 Pilot or       = TRUE -         Path 7:       Injector circuit or activation errors (set point deviation) occurred when the injector was being energized for Main or       = TRUE -         or       Path 7:       Injector 2 is prohibited due to exceeding the allowed number of injector was being energized for Main or       = TRUE -         Path 8:       Post Injection 2 is prohibited due to exceeding the allowed number of injectors (see general description for details)       = TRUE -	Pilot Injection 2 is prohibited due to collision (overlap) with Pilot Injection 1 (see general description for details) or Path 6: Injector vacuut or activation errors (set point deviation) occurred when the injector was being energized for Pilot or Path 7: Injector vicuit or activation errors (set point deviation) occurred when the injector was being energized for Pilot or Path 7: Path 7: Injector vicuit or activation errors (set point deviation) occurred when the injector was being energized for Main or Path 8: Post Injection 2 is prohibited due to exceeding the allowed number of injections (see general description for details) Path 8:	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 = TRUE   or Path 7: Injector circuit or activation errors (set point deviation) occurred when the injector or activation errors (set point deviation) occurred when the injector was being energized for Pilot = TRUE   or 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	Pilot hjection 2 is prohibited due to collision (overlap) with Pilot hjection 1 (see general description for or = TRUE   Path 6: Injector circuit or activation errors (set point deviation) occurred when the rnjector was being energized for Pilot or = TRUE   Path 7: Injector circuit or activation errors (set point deviation) occurred when the rnjector was being energized for Pilot or = TRUE   Path 7: Injector circuit or activation errors (set point deviation) occurred when the rnjector was being energized for Pilot or = TRUE   Path 7: Injector activation errors (set point deviation) occurred when the rnjector was being energized for Main or = TRUE   Path 8: Post Injection 2 is prohibited due to exceeding the allowed number of 

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
			Path 9:         Post Injection 2 is prohibited due to collision (overlap) with Main Injection and Post Injection 1 (see general description 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	= > > >	ACTIVE 11.00 3.00 FALSE 3.00	- V sec - sec	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	В
							and basic enable conditions met:	=	see sheet enable tables	-		
Exhaust Gas Recirculation Slow Response- Increasing Flow	P140B	Detects a negative slow response by comparing expected system dynamics with actual value	average negative gradient of the air mass - calculated by accumulating control deviation (deviation between desired and actual value) over a sampling time and dividing result by sampling time	>	0.25	g/rev	( 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	> > = > = > >= > >= >	74.80 69.96 TRUE 2.00 TRUE 0.00 FALSE 5.00	kPa °C - sec - sec - sec rpm	fail conditions exists for 15 S monitor runs with 0.1s rate whenever enable conditions are met	В

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary	_	Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters		Conditions		Required	Illum.
					Engine speed	<=	2000.00	rpm		
					and injection quantity	>=	100.00	mm^3/rev		
					injection quantity	>= <=	260.00	mm^3/rev		
					and		200.00			
					desired delta air mass flow	>	-0.10	g/sec		
					desired delta air mass flow	<	-0.01	g/sec		
					and					
					difference of the air mass	<	0	g/rev		
					and NO Pending or Confirmed DTCs:	=	see sheet inhibit			
					NO Pending of Commed DTCs.	-	tables	-		
					)		145105			
					for time	>	0.20	sec		
					and					
					basic enable conditions met:	=	see sheet enable	-		
							tables			
Exhaust Gas	P140C	Detects a positive slow	average positive gradient of the air mass	>= 0.25 g/rev	(				fail	В
Recirculation Slow		response by comparing	- calculated by accumulating control	0	`				conditions	
Response-		expected system dynamics	deviation (deviation between desired and						exists for 15	
Decreasing Flow		with actual value	actual value) over a sampling time and						S	
			dividing result by sampling time						monitor runs	
							74.00	LD-	with 0.1s	
					ambient pressure and	>	74.80	kPa	rate	
					engine coolant temperature	>	69.96	°C	whenever enable	
					and		05.50	Ŭ	conditions	
					EGR control is in closed loop	=	TRUE	-	are met	
					for time	>	2.00	sec		
					and					
					EGR control is active	=	TRUE	-		
					for time	>	0.00	sec		
					and exhaust gas system regeneration mode	=	FALSE	-		
					for time	>	5.00	sec		
					and		0.00	000		
					Engine speed	>=	1300.00	rpm		
					Engine speed	<=	2000.00	rpm		
					and					
					injection quantity	>=	100.00	mm^3/rev		
					injection quantity and	<=	260.00	mm^3/rev		
					desired delta air mass flow	>	0.01	g/sec		
					desired delta air mass flow	<	0.10	g/sec		
					and			,		
					difference of the air mass	>	0	g/rev		
					and					
					NO Pending or Confirmed DTCs:	=	see sheet inhibit	-		
					\		tables			
					) for time	>	0.20	sec		
					and	-	0.20	300		
					basic enable conditions met:	=	see sheet enable	-		
							tables			

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

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							time and basic enable conditions met:	>	3.00 see sheet enable tables	sec -		
Closed Loop Diesel Particulate Filter (DPF) Regeneration Control At Limit - Stage 1 Temperature Too Low	P144B	temperature. Actual inner controller ratio and temperature readings are compared to desired controller ratio and temperature values as an indication of an insufficient exhaust gas temperature.	commanded control value of the inner control loop of the temperature controller	>=	0.99	-	current engine operating point is suitable for monitoring deviation of exhaust gas temperature control - depending on engine speed and injection quantity (see Look-Up-Table #23)	=	0 to 1	-	fail conditions exists for 200 s monitor runs with 0.1 s rate whenever enable conditions are met	В
			and deviation from the temperature set point for inner control loop (	>	maximum 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 maximum deviation	=	100.00 100	°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		
							temperature before oxidation catalyst and temperature after particulate filter for activated post injection ) and	<	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 basic enable conditions met:	>	1.00 see sheet enable	sec		
							and		tables			

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

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Particulate Matter Sensor Signal Message Counter Incorrect	P1472	PM Sensor Sensor Control Unit (SCU) diagnostic data length CAN error or PM Sensor SCU received invalid data from ECM	SCU diagnostic signal data length CAN error (no message received)	=	TRUE		Battery voltage (ECM) Ignition on for time	>= = >	11.00 TRUE 1.20	V - sec	fault exists for more than 1.4 sec; monitor runs at 0.1 s when enable conditions are met	В
							Ignition on	-	TRUE	-		
Particulate Matter Sensor Electrode Supply Circuit Low Input	P1475	Range check high when IDE: supply voltage is on during PM-measurement. Note that a successive sensor regeneration is needed to check whether the current has been caused by soot on the IDE.	measured voltage for IDE current (SCU internal value)	>=	4.10	V	Particulate sensor is in the "measurement" state when failure occurs	=	TRUE	-	fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	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) for time	>=	4.10	V	Particulate sensor is in the "standby" state means Particulate sensor is not in the "measure" or "regeneration" state Battery voltage (ECM) Supply voltage is off Ignition on for time	= >= = >	TRUE TRUE 11.00 TRUE 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 /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value	•	Parameters		Conditions		Required	Illum.
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 OR Sensor sensitivity calibration factor OR	= <	TRUE 0.75 1.25	-	SCU is in the state "ready" means Battery voltage (ECM)	= >=	TRUE 11.00	- V		
			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	= >=	FALSE 2.00	- sec						
Particulate Matter Sensor Circuit Range/Performanc e	P147B	PM Sensor bypass current rationality check	Measured particulate sensor Interdigital Electrode (IDE) current after sensor regeneration	>	5.00	μA	PM Sensor temperature 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 - Sec	fault exists for more than 5 sec; monitor runs at 0.1 s when enable conditions are met	В

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
Particulate Matter	P1488	The PM sensor protection	accumulated change in heater voltage	<	100.00	%	Accumulated change in exhaust gas	>	30	m / sec	fault exists	В
Sensor Heater		tube monitor uses the					velocity			,	for more	
Control Circuit		cooling effect of exhaust									than 0.1 sec;	
Range/Performanc		gas flow inside protection									monitor runs	
e		tube during protection									at 0.1 s once	
Ũ		heating, to ensure the									per trip	
		exhaust gas is reaching the									por trip	
		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)										
		stream)										
			with				(					
			accumulated change in heater voltage	=	((a) / (b)) * (100)		Absolute, filtered and temperature	>	0.8	m / sec ^2		
			accumulated enange in neater reliage		((a), (b)) (100)		compensated exhaust gas acceleration	-	0.0	, 0000 2		
			where				and					
			(a) change in the heater voltage	=	measured	-	Absolute, filtered and temperature	<	6.51	m / sec ^2		
			(d) change in the neater vehage		parameter		compensated exhaust gas acceleration		0.01	, 0000 2		
			and with		parameter							
			(b) minimum change in the heater	=	0.4	V	for time	>	0.9	sec		
			voltage	_	0.4	•		-	0.0	000		
			Voltago				Diagnosis by the local unit is released	=	TRUE	-		
							means					
							(					
							PM sensor temperature	>	190.00	°C		
							and	-	100.00	0		
							PM sensor temperature	<	210.00	°C		
									210.00	Ũ		
							/ Time has elapsed since diagnosis by	>=	15	sec		
							the local unit is released	~-	10	300		
							Protection heating is active	=	TRUE	-		
							means	-	INCL			
							PM sensor heater target temperature	=	200	°C		
							PM sensor dewpoint achieved	=	FALSE	-		
							Initialization values have been	=	TRUE	-		
							transferred (i.e. CAN communication with	-	INCL	-		
							ECM established)					
							Sensor temperature at engine start	>	-10.04	°C		
							and	-	10.04	Ũ		
							Sensor temperature at engine start	<	249.96	°C		
							Exhaust gas temperature	>	-10.04	°C		
							and	-	10.04	Ŭ		
							Exhaust gas temperature	<	179.96	°C		
							PM sensor temperature start	>	-10.04	°C		
							temperature	-		Ŭ		
							and					
							PM sensor temperature start	<	99.960	°C		
							temperature		55.500	0		
							Battery voltage (ECM)	>=	11.00	V		
									11.00	v		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System TCM Engine	Code P150C	Description Detects implausible engine	Criteria Path 1:		Logic and Value		Parameters	=	Conditions TRUE		Required fail	Illum. A
Speed Request Signal Message Counter Incorrect	F 150C	speed request information received from the TCM	( number of messages with rolling count / protection value errors detected with	>=	7.00	-	ignition on and basic enable conditions met: and	=	see sheet enable tables	-	conditions exists for 0.01 s test performed continuously 0.01 s	A
			number of consecutive frames ) or Path 2:	=	12.00	-	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	0.013	
			( internal calculated checksum value for transmission is not equal the received value and	=	TRUE							
			number of fault results ) or	>	15.00	-						
			Path 3: time since last frame with valid protection value was received from transmission	>	0.08	sec						
Cruise Control Switch Data Integrity	P155A	Cruise switch status indicates "indeterminate" switch state for calibrated period of time.	Set Switch CAN message value "Indeterminate"	=	0	-	ignition on	=	TRUE	-	fail conditions exists for 15.5s	Special C
							input circuit active and basic enable conditions met	=	TRUE see sheet enable	-	monitor runs with 0.005 s rate whenever	
							and NO Pending or Confirmed DTCs:	_	tables see sheet inhibit	_	enable conditions	
									tables	_	are met	
Validation Error in messages received in Power Take Off frame	P1591	Rolling counter and protection value evaluation of the power take off frame	number of messages with validation errors	>=	4.00	counts	ignition on	=	TRUE	-	Once the fault is reported there will be	Special C
			in the last number of messages (sliding window) received PTO frames	=	10.00	counts	for time and	>=	3.00	sec	no debouncing of the DFC	
							Bus off or error passive on CAN and basic enable conditions met:	=	FALSE see sheet enable	-	until ignition key state changes	
							and		tables		from 0 to 1. monitor runs	

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	with 0.005 s rate	
Throttle Sensor Communication Circuit Low Voltage	mmunication readings on t cuit Low valve sensor Itage circuit, indica low condition	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	
					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 P16 Communication Circuit High /oltage	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	
					and basic enable conditions met	= see sheet enable - tables		
					and no sensor supply error and	= TRUE -		
					NO Pending or Confirmed DTCs:	= see sheet inhibit - tables		
Throttle Sensor Communication Circuit	P16A2	Detects an error in the throttle sensor communication.	throttle valve position sensor communication circuit disturbed due to noise or wrong CRC (cyclic redundancy check)	= TRUE -	ignition on	= TRUE -	fail conditions exists for 8 s test	В
Performance			ureuk)		and basic enable conditions met	= see sheet enable - tables	performed continuously 0.005 s rate	
					and no sensor supply error	= TRUE -		
					<sup>and</sup> NO Pending or Confirmed DTCs:	= see sheet enable - tables		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
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 and	=	FALSE	-	s monitor runs with 0.005 s	
							Bus off or error passive on CAN and )	=	FALSE	-	rate whenever	
							and basic enable conditions met and	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					_			_	_			
Particulate Filter Efficiency Below Threshold Bank 1	ficiency Below filter efficiency using	Path1:				Particulate sensor is in the "measurement" state when failure occurs	=	TRUE	-	fault exists for more than 1 event; monitor runs	В	
		,	measured and filtered interdigital electrode(IDE) current	>	12	uA	which means				at 0.1 s when enable	
			measured and filtered interdigital electrode(IDE) current when	<	41	uA	Sensor regeneration complete	=	TRUE	-	conditions are met	
			integrated reciprocal of the predicted trigger time	< =	1		PM sensor dewpoint reached (please see the definition)	=	FALSE	-	once per trip	
			or				DPF regeneration not active Calculated soot particles mass based on sensor flow resistance	>=	TRUE 0	- g		
							Calculated soot particles mass based on sensor flow resistance	<=	300	g		
			Path2: measured interdigital electrode(IDE) current	>=	41	uA	( Exhaust gas velocity at particulate sensor position	>=	0	m/sec		
							Exhaust gas velocity at particulate sensor position	<=	50	m/sec		
			then Integrated reciprocal of the predicted trigger time when	<=	1		for Duration for exhaust gas velocity	>=	5	sec		
			waiting time for particulate sensor regeneration has elapsed	=	60	sec	) (					
							Exhaust gas pressure Exhaust gas pressure	>= <=	75.0 135	kPa kPa		
			Note: Two sensor regeneration performed following Path 2 test to confirm sensor not electrically shorted (see general description for flowchart process for Path 2)				for					
							Duration for exhaust gas pressure	>=	10	sec		
							( Exhaust gas temperature Exhaust gas temperature	>= <=	89.960 399.960	℃ ℃		
							for Duration for exhaust gas temperature	>=	5	sec		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Lo	Threshold ogic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							) ( Engine running ( NOx concentration in exhaust gas Meander temperature of particulate sensor ) NOx concentration in exhaust gas	=	TRUE 200 249.960 1500	- °C 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 (	=	TRUE	-	ignition on and basic enable conditions met:	=	TRUE see sheet enable tables	•	fail conditions exists for 5 s test performed continuously 1 s rate	В

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
			( 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 ( ( measured tank level sensor 3	=	(0.0 to 1.7) (1.71 to 3.56) (0.0 to 1.7)	V V V	and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	whenever enable conditions are met	
			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	=	(1.71 to 3.56)	V						
			<pre>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 ) )</pre>	=	(.0.6 cm )	V						
Reductant Level Sensor 1 Circuit Low	P203C	CAN message: Discrete level sensor level 1 short to ground error	Reductant Tank Level 1 Error Status ( tank level sensor 1 voltage directly measured after a test impulse was applied )	= <	1 (0.17)	·	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
Reductant Level Sensor 1 Circuit High	P203D	Path 1: CAN message: Discrete level sensor 1 open load error	Reductant Tank Level 1 Error Status ( measured tank level sensor 1 voltage after 1.5 ms since a test impulse was applied )	=	3 ( 3.56 )	- V	ignition on battery voltage	=	TRUE 8	- V	fail conditions exists for more than 3 sec. monitor runs with 1 s rate whenever enable	A

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 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 basic enable conditions met:	>	8 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)	<ul> <li>Open Circuit:Σ 200 K Ω impedance between ECU pin and load</li> </ul>	-	ECU initialization task in progress for time and battery voltage for time and battery voltage for time and ( battery voltage correction factor (please see the parameter definition and battery voltage correction factor (please see the parameter definition and battery voltage correction factor (please see the parameter definition ) for time and No Pending or confirmed DTCs and basic enable conditions met:		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 factor factor sec -	fail conditions exists for 3 s monitor runs with 10 msec rate whenever enable conditions are met	A

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

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Lo	gic and Value	ł.	Parameters		Conditions		Required	Illum.
							battery voltage correction factor (please see the parameter definition and battery voltage correction factor (please see the parameter definition ) for time and No Pending or confirmed DTCs and basic enable conditions met:	> <	0.00 4.00 3.00 See sheet inhibit tables see sheet enable	factor factor sec -		
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	and status of SCR control state (please see the definition) and State of the defrosting check of pressure line (please see the definition) and ambient pressure and ambient temperature and NO Pending or Confirmed DTCs: and basic enable conditions met:	<= = = > = =	tables 0.00 No Pressure Control TRUE 0.00 -30.04 see sheet inhibit tables see sheet enable tables	% - kPa ℃ -	fail conditions exists for more than 0.6 sec monitor runs with 0.01 s rate whenever enable conditions are met	A
Reductant Pump Pressure Sensor Circuit Low	P204C	Measured reductant pump pressure sensor signal low voltage	Reductant pump pressure sensor signal same as: reductant pump pressure	<	0.41	V kPa	ignition on NO Pending or Confirmed DTCs: basic enable conditions met:	=	TRUE see sheet inhibit tables see sheet enable tables	-	fail conditions exists for more than 0.4 sec. monitor runs with 0.01 s rate whenever enable	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Reductant Pump Pressure Sensor Circuit High	P204D	Measured reductant pump pressure sensor signal high voltage	Reductant pump pressure sensor signal same as: reductant pump pressure	>	4.80 800.00	V	basic enable conditions met:	=	TRUE see sheet inhibit tables see sheet enable tables	-	redured fail conditions exists for morter than 0.4 sec. monitor runs with 0.01 s rate whenever enable conditions are met	A
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) AND status byte in substate PRESSUREBUILDUP 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:		PRESSURE BUILDUP RUNNING TRUE 0.00 -30.04 20 10.00 0.23 COMPONENT PROTECTION see sheet inhibit tables see sheet enable tables	- °C counts sec - -	fail conditions exists for 1 event monitor runs with 0.1 s rate whenever enable conditions are met	A
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) where (a) Reductant tank temperature	>	34.96 measured parameter	℃	ignition on status of SCR control state (please see the definition) Engine off Time	= = >	TRUE No Pressure control 28800.00	- - Sec	fail conditions exists for more than 0.5 sec monitor runs with 0.01 s rate whenever enable conditions are met	В

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria (b) fuel temperature	=	Logic and Value measured parameter	-	Parameters         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:	> <= = = = =	Conditions 6.00 6.96 measured parameter measured parameter measured parameter see sheet inhibit tables see sheet enable tables	sec °C - - - -	Required	Illum.
		Path 2: OR The temperature difference between reductant tank temperature and diesel fuel temperature are compared to a lower threshold after sufficient engine-off duration	where (a) Reductant tank temperature	< =	-35.04 measured parameter	°C -	ignition on status of SCR control state (please see the definition) Engine off Time time since start	= = > > >	TRUE No Pressure control 28800.00 6.00	- - sec sec	fail conditions exists for more than 0.5 sec monitor runs with 0.01 s rate whenever enable conditions are met	
			(b) fuel temperature	=	measured parameter		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:	<= = = =	6.96 measured parameter measured parameter see sheet inhibit tables see sheet enable tables	°C - - - -		
Reductant Tank Temperature Sensor Circuit Low	P205C	Detects an out of range low reading of the Reductant Tank Temperature Sensor via CAN Message	Raw value of the CAN message for the Reductant Tank Temperature Corresponds to a temperature of Corresponds to a resistance of Corresponds to a voltage of	< <= >= >=	0x001 -55.0 1200 5.0	hex ℃ kOhm V	basic enable conditions met: and No rolling count or protection value errors. (sliding window errors) in the CAN frame	=	see sheet enable tables TRUE		fault exists for more than 3 sec; monitor runs at 1 s 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 Tank Temperature Sensor Circuit High	P205D	Detects an out of range high reading of the Reductant Tank Temperature Sensor via CAN Message or an invalid (initialization) value of the Reductant Tank Temperature CAN message	Raw value of the CAN message for the Reductant Tank Temperature	>	0x3FE 1022	hex dec	basic enable conditions met:	=	see sheet enable tables	-	fault exists for more than 6 sec; monitor runs at 1 s whenever enable conditions	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						
Secondary Fuel Sensor Performance	P2066	Detects an error in the secondary fuel tank sensor performance by comparing the decrease of the fuel level for a certain driven mileage to a threshold.	(a) - (b)	<	100.00	miles	Engine Running	=	TRUE		fail conditions exists for 0.02 s monitor runs 0.02 s rate	В
			with (a) total vehicle distance	=	measured parameter	-	for time	>=	60.00	sec	whenever enable conditions	
			and with (b) change in mileage	=	measured parameter	-	and diagnosis tester	=	FALSE	-	are met	
			and (c) - (d) with (c) maximum volume of fuel reached in	< =	4.00 measured	 -	and 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 filtered fuel volume in secondary tank	>	0.00	Ι	filtered fuel volume in secondary tank for	<	0.00	Ι		
							time and cumulative transfer pump on time in	>	0.00	sec sec		
							current ignition cycle ) and fuel level zone 1 means (					
							, filtered fuel volume in primary tank and filtered fuel volume in secondary tank	>=	137.40 0.00	I		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							and basic enable conditions met: and NO Pending or Confirmed DTCs:	=	see sheet enable tables see sheet inhibit tables	-		
SRC low for fuel level sensor of secondary tank	P2067	Detects low voltage readings in the fuel level secondary tank sensor circuit, indicating an OOR low condition on the fuel level sensor circuit	voltage of fuel level sensor 2	<	0.20	V	ignition on and basic enable conditions met:	=	TRUE see sheet enable tables		fail conditions exists for 24 s test performed continuously 0.2 s rate	В
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 Temperature Sensor 1 Performance	P2080	Detects a fault in the exhaust temperature sensor 1 performance by comparing the heat quantity on the sensor position to a threshold.	integrated heat quantity of exhaust gas temperature sensor 1 or integrated heat quantity of exhaust gas temperature sensor 1 with (a) exhaust gas mass flow and with (b) factor and with (c) heat capacity and with (d) factor	<	(a) / (b) * (c) / (d) * (e) * (f) (a) / (b) * (c) / (d) * (e) * (g) calculated parameter 3.60 1050.00 1000	- - J/Kg/°C kW/°C	exhaust-gas temperature sensor 1	= > > <	FALSE 1500.00 327.00 -60.04 1999.96	sec sec °C °C	fail conditions exists for 5 times monitor runs with 0.1 s rate whenever enable conditions are met	В

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
			and with (e) correction factor for heat flow quantity depending on exhaust gas mass flow for temperature sensor 1	=	1.00	factor	and 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		100.00		engine operation point suitable for diagnostic (see Look-Up-Table #29)	=255	0 to 255	-		
			<ul> <li>(g) maximum permissible temperature deviation for exhaust gas temperature sensor 1</li> </ul>	=	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		
							and engine has been in normal mode for time	>=	1.00	sec		
							or engine has been in exhaust warm-up mode for time and	>=	1.00	sec		
							and basic enable conditions met:	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Exhaust Temperature Sensor 2 Performance	P2084	Detects a fault in the exhaust temperature sensor 2 performance by comparing the heat quantity on the sensor position to a threshold.		<	(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 2	>	(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	=	3.60	g/sec	(					
			and with (c) heat capacity and with	=	1050.00	J/Kg/°C	exhaust-gas temperature sensor 2 and exhaust-gas temperature sensor 2	> <	-60.04 1999.96	°C ℃		
			(d) factor	=	1000	kW/°C			1000.00	U		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria	1 1	Logic and Value		Parameters		Conditions		Required	Illum.
			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	=	-100.00	°C	for time and	=	5.00	sec		
			sensor 2 and with		100.00	°C	engine operation point suitable for diagnostic (see Look-Up-Table #29) for	=	0 to 255			
			(g) maximum permissible temperature deviation for exhaust gas temperature sensor 2	=	100.00	-0			0.05			
				1			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		
							and engine has been in normal mode for time	>=	1.00	sec		
							or engine has been in exhaust warm-up mode for time and	>=	1.00	sec		
							and basic enable conditions met:	=	see sheet enable tables	-		
							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.		<	(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	=	3.60	g/sec	(					
			and with (c) heat capacity and with	=	1050.00	J/Kg/°C	exhaust-gas temperature sensor 3 and exhaust-gas temperature sensor 3	> <	-60.04 1999.96	°C °C		
1		I	(d) factor	=	1000	kW/°C				5		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
System	Code	Description	and with		Logic and value		and		Conditions		Required	mum.
			(e) correction factor for heat flow quantity depending on exhaust gas mass flow for temperature sensor 3	=	1.00	factor	change in exhaust-gas temperature sensor 3	<	7.00	°C		
			and with (f) minimum permissible temperature	=	-100.00	°C	for time and	=	5.00	sec		
			deviation for exhaust gas temperature sensor 3 and with				engine operation point suitable for diagnostic (see Look-Up-Table #29)	=	0 to 255	-		
			(g) maximum permissible temperature deviation for exhaust gas temperature sensor 3	=	100.00	°C	for					
				1			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		
							or engine has been in exhaust warm-up mode for time and	>=	1.00	sec		
							and basic enable conditions met:	=	see sheet enable tables	-		
							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	>	(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	=	3.60	g/sec	and (					
			and with (c) heat capacity	=	1050.00	J/Kg/°C		>	-60.04	°C		
			and with (d) factor	=	1000	kW/°C	exhaust-gas temperature sensor 4 )	<	1999.96	°C		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
			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 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 (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				time	>=	0.05	sec		
							and					
							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		
							or engine has been in exhaust warm-up mode for time and	>=	1.00	sec		
							and basic enable conditions met:	=	see sheet enable tables	-		
							NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Pump	P208A	Diagnoses the Reductant	Voltage low during driver off state	=	Open Circuit:≥	-	ECU Initialization task in progress	=	FALSE	-	fail	A
Control Circuit		Pump Motor low side driver circuit for circuit faults.	(indicates Open circuit)		200 K Ω impedance between signal and controller ground						conditions exists for 6.2 s monitor runs with 10 msec rate whenever	
							for time and	>	1.00	sec	enable conditions are met	
							battery voltage for	>	11.00	V		
							time and	>	3.00	sec		
							battery voltage	<	655.34	V		

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary	Enable			Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters		Conditions		Required	Illum.
					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: and	=	see sheet enable tables	-		
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		ECU Initialization task in progress	=	e	fail conditions exists for 0.01 s		
					time and	>	1.00	sec	monitor runs with 0.01 sec rate whenever enable conditions	
					battery voltage for	>	11.00	V		
					time and	>	3.00	sec		
					battery voltage for	<	655.34	V	are met	
					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 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 motoh	the reductant pump motor						for more than 0.3 s; monitor runs	
		control circuit do not match.							at 0.1 s whenever	

16 OBDG08 ECM Summary 1	Fables (LGH/LML Common)
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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.
System	Code	Description	timer for functional acknowledgement of the reductant pump motor		sec	Reductant Pump Warm-up status where the Warm-up state is defined as:	=	FALSE	-	enable conditions are met	mum.
						( No Pressure control state (please see the definition)	=	TRUE	-		I
						SCR Engine State (please see the definition)	=	ON	-		I
						Remaining defrosting time of the tank	>	0	sec		1
						Remaining defrosting time of the tank	<=	120.00	sec		l
						OR Reductant Defrost check (please see the definition) ))	=	TRUE	-		l
						( ambient temperature	>	-30.04	°C		1
						) basic enable conditions met:	=	see sheet enable tables	-		l
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)	<ul> <li>Short to power: ≤ 0.5 Ω impedance between signal and controller power</li> </ul>	-	ECU Initialization task in progress	=	FALSE	-	fail conditions exists for 3 s monitor runs with 10 msec rate whenever	A
						for time and	>	1.00	sec	enable conditions are met	I
						battery voltage for time	>	11.00	V		I
						and battery voltage	> <	3.00 655.34	sec V		I
						for time and	>	3.00	sec		l
						( battery voltage correction factor (please see the parameter definition	>	0.00	factor		l
						and battery voltage correction factor (please see the parameter definition )	<	4.00	factor		l
						for time and	>	3.00	sec		1
						basic enable conditions met: and	=	see sheet enable tables	-		I

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Reductant Purge Valve Control Circuit	P20A0	Diagnoses the Reductant Purge Valve low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	<ul> <li>= Open Circuit:≥ -</li> <li>200 K Ω</li> <li>impedance</li> <li>between ECU pin</li> <li>and load</li> </ul>	ECU Initialization task in progress	=	FALSE	-	fail conditions exists for 3 s monitor runs with 10	A
					for time and	>	1.00	sec	msec rate 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		
					basic enable conditions met:	=	see sheet enable tables	-		
					and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
							_	_		_
Reductant Purge Valve Performance	P20A1	This diagnostic checks the Reductant Purge valve performance during operation by detecting a lack of reduction of the reductant pressure	Difference between reductant pump pressure at beginning and end of pressure reduction state	< 50.00 kPa	(				fault exists for more than 1 event monitor runs with 100 ms rate	A
					Reductant Dosing System state pressure reduction	=	TRUE	-	whenever enable	
					Reductant Dosing System pump relative pressure to initiate test	>=	350.00	kPa	conditions are met	
					) AND ((					
					Time attempting to reduce dosing pressure	>=	5.00	sec		
					Reductant Dosing System pump relative pressure after attempting to reduce pressure	>	50.00	kPa		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters		able ditions	Time Required	MIL Illum.
					) OR Reductant Dosing System pump relative pressure after attempting to reduce pressure ) ( ambient pressure ambient temperature ) NO Pending or Confirmed DTCs basic enable conditions met:	<= 50 > 0 > -10 = see sh ta = see she	0.00 kPa 0.00 kPa 0.04 °C et inhibit - oles et enable - oles		
Reductant Purge Valve Control Circuit Low Voltage			Voltage low during driver off state (indicates short-to-ground)	<ul> <li>Short to ground: - &lt; 0.5 Ω impedance between signal and controller ground     </li> </ul>	ECU Initialization task in progress for time and battery voltage for time and battery voltage for time and ( battery voltage correction factor (please see the parameter definition and battery correction factor (please see the parameter definition and battery correction factor (please see the parameter definition A D D D D D D D D D D D D D D D D D D D	> 1 > 1 > 3 < 65 > 3 > 0 < 4 > 3 = see she ta = see she	LSE - .00 sec .00 V .00 sec 5.34 V .00 sec .00 factor .00 factor .00 sec et enable oles .00 -	fail conditions exists for 2 s monitor runs with 10 msec rate whenever enable conditions are met	

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters		Conditions		Required	Illum.
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)	<ul> <li>Short to power: - ≤ 0.5 Ω impedance between signal and controller power</li> </ul>	ECU Initialization task in progress	=	FALSE	-	fail conditions exists for 3 s monitor runs with 10 msec rate whenever	A
					for time and	>	1.00	sec	enable 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	-		
	<b>B</b> 0000						541.05		6.13	
Exhaust Aftertreatment Fuel Injector Control Circuit	P20CB	Electronic output driver circuitry determines circuit integrity on the exhaust aftertreatment fuel injector control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		engine pre drive	=	FALSE	-	fail conditions exists for more than 30 events monitor runs with 0.1 s	В
					time battery voltage	>	1.00 11.00	sec V	rate whenever	
					for time and	>	3.00	sec	enable conditions are met	
					starter is active cranking for	=	FALSE	-	aremet	
					time and	>	3.00	sec		
					basic enable conditions met:	=	see sheet enable tables	-		
					and basic enable conditions met:	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria			shold nd Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
				-						_			
Exhaust Aftertreatment Fuel Injector Performance	P20CC	Detects high exhaust temperatures in order to protect the engine	oxidation catalyst downstream temperature - oxidation catalyst upstream temperature	>	3	00	°C	(				fail conditions exists for 180 s	A
			OR					oxidation catalyst upstream temperature change	<	50.00	°C	test performed	
			particulate filter downstream temperature - SCR downstream temperature	>	3	00	°C	for time	>	10.00	sec	continuously 0.1 s rate	
								) AND (					
								time since last successful regeneration )	>	900.00	sec		
								AND					
								Normal Mode (Particulate Filter Regeneration not active) OR	=	TRUE	-		
								Exhaust Gas Temperature (Active) Management Mode	=	TRUE	-		
								for time	>	300.00	sec		
								AND					
								( time since the end of the last tip cleaning request of the Exhaust Aftertreatment Fuel Injector HCI tip cleaning is performed to prevent the nozzle of the HCI from sticking shut or building deposits that may effect its flow. During tip cleaning, the injector is operating at a higher injection frequency (100 Hz) with 30% duty cycle for a duration less than two seconds. HCI tip cleaning is requested at 30%, 50% and 75% of soot loading level on the DPF when the following conditions are also met: HCI Injector is not currently activated SCR Catalyst downstream temperature	> = <	300.00 TRUE 499.96	sec ∙ ℃		
								SCR Catalyst downstream temperature	>	179.96	°C		
								DOC Upstream Temperature	>	219.96	°C		
								Engine Speed	>	500	rpm		
								Vehicle Speed Exhaust Mass Flow	>	3.10 72.00	mph g/sec		
								) AND 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	Ena Condi		Time Required	MIL Illum.
Exhaust Aftertreatment Fuel Injector Control Circuit Low Voltage	P20CD	Electronic out-put driver circuitry determines circuit integrity on the exhaust aftertreatment fuel injector control circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		engine pre drive 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:	= FAL > 1.0 > 11.0 > 3.0 = FAL > 3.0 = FAL = See shee tabl = INAC <sup>*</sup> = see shee tabl	0 sec 00 V 0 sec SE - 0 sec t enable - es TIVE - t enable -	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 Iow side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	<ul> <li>Short to power: - ≤ 0.5 Ω impedance between signal and controller power</li> </ul>	engine pre drive for time battery voltage for time and starter is active cranking for time and basic enable conditions met: and basic enable conditions met:	= FAL > 1.0 > 111 > 3.0 = FAL > 3.0 = see shee tabl = see shee tabl	0 sec 00 V 0 sec SE - 0 sec t enable - es t enable -	fail conditions exists for more than 30 events monitor runs with 0.1 s rate whenever enable conditions are met	В

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value	•	Parameters		Conditions		Required	Illum.
Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P20E2	Detects biased exhaust temperature sensors by comparing the upstream and downstream oxidation catalyst temperature sensors after a calibrated engine off soak time	Path 1:  (a) - (b)  (see Look-Up-Table #30)	>	100.00	°C	minimum engine-off time and	>=	28800.00	SEC	fail conditions exists for 0.050 s monitor runs with 0.050 s rate whenever enable	В
			with (a) captured oxidation catalyst downstream temperature at start and with (b) captured oxidation catalyst	=	measured parameter measured	-	ambient temperature and Engine Running (see parameter definition) for	>	-60.04 TRUE	°C -	conditions are met	
			upstream temperature at start as reference temperature or Path 2:		parameter		time and	>	0.00	sec		
			(  (a) - (b)  (see Look-Up-Table #30) with (a) captured oxidation catalyst	<=	100.00 measured	°C -	engine post drive/ afterun and diagnostic performed in current dc and	=	FALSE	-		
			downstream temperature at start and with (b) captured oxidation catalyst	=	parameter measured	-	basic enable conditions met: and	=	see sheet enable tables	-		
			upstream temperature at start as reference temperature and		parameter		NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			<ul> <li>(a) - (b)  (see Look-Up-Table #31)</li> <li>with</li> <li>(a) captured oxidation catalyst</li> <li>downstream temperature at start</li> <li>and with</li> </ul>	> =	30.00 measured parameter	°C -						
			(b) captured oxidation catalyst upstream temperature at start as reference temperature and	=	measured parameter	-						
			status of block heater	=	FALSE							
Reductant Pressure Too Low	P20E8	Compare Reductant tank pressure with lower thresholds under metering control	Reductant Pump Module Pressure	<	400.00	kPa					fail conditions exists for more than 60.0 s	A

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	e	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							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:	= = > > > = =	Metering control Running 1.00 0.00 -30.04 see sheet inhibit tables see sheet enable tables	- kPa °C -	monitor runs with 0.1 s rate whenever enable conditions are met	
Reductant System Performance Bank 1	P20E9	Path 1: Compare Reductant tank pressure with upper threshold under metering control	Reductant Pump Module Pressure	>	650.00	kPa	status of SCR control sub state (please see the definition) 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:		Metering control Running 1.00 0.00 -30.04 see inhibit tables see sheet enable tables	- sec kPa °C - -	fail conditions exists for more than 10 s monitor runs with 0.1 s rate whenever enable conditions are met	A
		Path 2: Or Reductant tank pressure high	Unfiltered Reductant Pump Module Pressure	>=	795.00	kPa	ambient pressure ambient temperature basic enable conditions met:	∧ ∧ II	0.00 -30.04 see sheet enable tables	kPa ℃ -	fail conditions exists for more than 1 s 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 threshold value	EWMA filtered delta SCR catalyst efficiency of (a) - (b) where (a) measured SCR catalyst efficiency (b) offset-corrected modeled SCR catalyst efficiency: (b) = ( ( c) * (d) * (e) ) + (f) where	<	0.00 calculated parameter calculated parameter	factor factor factor	NO Pending or Confirmed DTCs: for time Status of NOx signal of upstream NOx sensor (please see the definition) for time	= > = >	see sheet inhibit tables 300.00 TRUE 60.00	- sec - sec	fail conditions exists for more than 1 event monitor runs with 0.01 s rate whenever enable conditions	A

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	•	Parameters		Conditions		Required	Illum.
			(c) SCR modeled NOx conversion	calculated	factor	Status of NOx signal of downstream	=	TRUE	-	are met	
			efficiency	parameter		NOx sensor (please see the definition)					
			(d) correction map dependent on SCR	1.00	factor	for time	>	60.00	sec		
			catalyst temperature and upstream NOx								
			mass flow								
			(e) correction map dependent on SCR	1.00	factor						
			catalyst temperature and exhaust mass								
			flow								
			(f) Offset threshold (see Look-Up-Table	-0.3 to -0.1	factor	(					
			#100)								
						Release of dosing strategy (please see	=	TRUE	-		
						the definition)					
						for time	>=	(a) + (b)	sec		
						<ul><li>(a) Turn on delay time 1 of status</li></ul>		330.00	sec		
						metering strategy					
						(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)	sec		
						(a) Debounce time after pre controlled	>	0.50	sec		
						dosing over					
						(b) delay time the status of disabling	>	80.00	sec		
						SCR Efficiency monitoring					
						or					
						integrated upstream NOx	>=	3276.70	g		
						)					
						(					
						Status of pre controlled dosing (please	=	FALSE	-		
						see the definition)					
						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		
						off					
						or					
						integrated upstream NOx	>=	3276.70	g		
						)					
						Corresponded Reductors /					
						Decrease of Reductant load level	=	FALSE	-		
						(please see the definition)		200.00			
						for time	>	300.00	sec		
						)					
						( Average clow filtered NOv mass flow	-	0.20	a/2005		
						Average slow filtered NOx mass flow	<=	0.20	g/sec		
						upstream SCR for time		0.50	600		
						Monitor disable time based on average	>		sec		
						NOx mass flow and the time (see Look-	>	0 to 120	sec		
						Up-Table #88)					
						Ob- I anie #88)					
1 I	I	I	1 I			)				i I	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Oystem	oouc	Description	Onteria	Logic and value	i arameters		Conditions		Required	mann.
					for time with	>	5.00	sec		
					() Delta SCR temperature (see Look-Up- Table #85)	<	59.96 to 64.96	°C		
					Delta SCR temperature (see Look-Up- Table #101)	>	-50.04 to -0.04	°C		
					Delta SCR temperature	<=	524.96	°C		
					Delta SCR temperature	>=	199.96	°C		
					Initialization time of temperature gradient calculation	>=	2.50	sec		
					or Delta SCR temperature	<	229.96	°C		
					or		100.00			
					Delta SCR temperature for time	> >	499.96 10.00	°C sec		
					)	-	10.00	000		
					( normalized HC load in SCR catalyst )	>	21.00	-		
					( ambient pressure	>=	74.80	kPa		
					ambient pressure ambient temperature	>=	-7.04	°С		
					)					
					Stuck reductant dosing valve fault was	=	FALSE	-		
					healed last particulate filter regeneration successful	=	TRUE	-		
					)					
					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)					
					for time	>	600.00	sec		
					SCR NOx Catalyst Efficiency Below Threshold Bank 1 was performed this drive cycle	=	FALSE	-		
					( engine speed	>=	1000.00	rom		
					engine speed engine speed	>= <=	3000.00	rpm rpm		
					for time	>	0.00	sec		
					) SCR estimated current Reductant load (see Look-Up-Table #77)	>=	0.05 to 0.75	g		
					SCR estimated current Reductant load (see Look-Up-Table #77)	<=	2 to 2.2	g		
					Difference between nominal and estimated Reductant (see Look-Up-	>=	-0.5 to -0.1	g		
					Table #79) Difference between nominal and	<=	0.15 to 0.25	g		
					estimated Reductant (see Look-Up- Table #78)					

SOR In Pre-Carror State (pressee = FALSE - b chinkman - Busable shirt SCR atalystem - FALSE - FALS	Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Disable after SCR admitter       SCR admitter<							=	FALSE	-		
Image: Set in the set in						the definition)					
Image: Set in the set in											
Image: Set in the set in						) Disable after SCR adaptation	_	FALSE			
0       0											
Image: Section of the section of th						)					
Image: Section of the section of th						((					
Image: Section of the section of t											
$\left  \left( \begin{array}{c} (a) (b) (b) \\ (a) (c) (b) \\ (a) (c) (b) \\ (b) (downstream SCR catalyst temperature bound of the second of the secon$						for time	>	0.00	sec		
$\left  \left( \begin{array}{c} (a) (b) (b) \\ (a) (c) (b) \\ (a) (c) (b) \\ (b) (downstream SCR catalyst temperature bound of the second of the secon$						) Or					
Image: Control of the callyst temperature (a) upstream SCR callyst temperature temperature (b) downstream SCR callyst temperature (c) downstream SCR is into a temperature (c) downstream SCR is into a for time is into a for time is into a sec into a sec into a power temperature interesting into a sec into a se						(					
(a) upstram SCR catalyst immerature						(a) - (b)	>=	14.96	°C		
(b) downstream SCR catalyst temperature )) Integrated NOx mass upstream SCR for time > 0.00 sec 398.98 °C Average SCR Temperature > 390.36 °C Downstream SCR catalyst temperature > 3003.66 °C Downstream SCR catalyst temperature > 3003.66 °C Downstream SCR catalyst temperature > 3549.94 °C SCR 50.00 ppm = Filtered and delayd upstream NOx raw emission = Filtered and delayd upstream NOx raw emission = Filtered and delayd upstream NOx raw emission = Filtered and delayd upstream SCR = 0.01 g/sec mass flow upstream SCR = 0.01 g/sec = 236.13 g/sec = 236.13 g/sec = 236.13 g/sec = 10.00 sec = 236.13 g/sec = 10.00 sec = 236.13 g/sec = 10.00 sec = 10.00 sec							>	0.00	sec		
Image: construction of the second						(a) upstream SCR catalyst temperature					
Image: construction of the second											
Integrated Nox mass upstream SCR       >       1.00       g         Integrated Nox mass upstream SCR       -       0.00       sec         Average SCR Tremperature       >=       -3843.94       *C         Downstream SCR catalyst temperature       >=       750.00       ppm         efficient and delayed uptraam Nor raw       <=											
Image: Section of the sectin this section of the section of the section of the s						(inperature)					
Image: Section of the sectin this section of the section of the section of the s						Integrated NOx mass upstream SCR	>	1.00	q		
Average SCR temperature       >=       -3549.94       "C         Downstream SCR catalysit emperature       >=       -3549.94       "C         Downstream SCR catalysit emperature       >=       -3549.94       "C         Filtered and delayed upstream NCx rate       >=       750.00       ppm         Filtered and delayed upstream NCx rate       >=       750.00       ppm         Filtered and delayed upstream NCx rate       <=							>	0.00			
Average SCR temperature       >=       -3549.94       "C         Downstream SCR catalysit emperature       >=       -3549.94       "C         Downstream SCR catalysit emperature       >=       -3549.94       "C         Filtered and delayed upstream NCx rate       >=       750.00       ppm         Filtered and delayed upstream NCx rate       >=       750.00       ppm         Filtered and delayed upstream NCx rate       <=											
Image: construction SCR catalyst temperature       >=       3003.66       *C         Downstream SCR catalyst temperature       >=       -5454.94 %       *C         Filtered and delayed upstream NOX raw       >=       750.00       ppm         emission       <=											
Downstream SCR catalyst temperature											
Filtered and delayed upstream NOX raw       >=       750.00       ppm         Filtered and delayed upstream NOX raw       <=											
emission       emission       emission       emission         Filtered and delayed ADX raw emission       emission       emission       emission         Filtered and delayed NOX raw emission       >=       0.17       g/sec         mass flow upstream of SCR       mass flow upstream of SCR       emission       >=       0.01       g/sec         Filtered exhaust gas mass flow       >=       -910.30       g/sec       g/sec         MAP for valid engine operation points for       =       0101       -       SCR efficiency monitoring (see Look-Up-         CR efficiency monitoring (see Look-Up-       Titlered exhaust gas mass flow       >=       -910.30       g/sec         MAP for valid engine operation points for       >       0.00       sec       intrime       >       0.00       sec         Inverse calculated accelerator pedial       >       5.00       %       %       intrinalization mode       intrinalization mode       intrinalization mode       intrinalization mode       =       0.35       factor         EWMA fast initialization mode       =       0.35       factor       intrinalization mode       intrinalization mode       integrad etals SCR catalys       >       0.12       factor         EWMA fagid Response mode       EWMA filtered data SCR catalys <td></td>											
emission       emission       emission       emission       g/sec         Filtered and delayed NOx raw emission       >=       0.01       g/sec         Biltered and delayed NOx raw emission       >=       0.01       g/sec         Filtered and delayed NOx raw emission       >=       0.01       g/sec         Filtered exhaust gas mass flow       >=       -910.30       g/sec         Filtered exhaust gas mass flow       >=       -910.30       g/sec         SCR efficiency monitoring (see Lock-Up-       Table #83)       -       -         Table #83       0.00       sec       %         Inverse calculated accelerator pedal       >       0.00       sec         filter coefficient for fast initialization mode:       =       0.35       factor         measurements for fast initialization mode:       =       0.30       count         measurements for fast initialization mode:       =       0.30       count         EWMA Rapid Response mode:       =       -       3.00       count         EWMA Rapid Response mode:       =       -       -       -         EWMA Rapid Response mode:       =       -       -       -         EWMA Rapid Response mode:       =       -									PP		
Filtered and delayed NOx raw emission 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 vestream of SCR       -       236.13       g/sec         Filtered exhaust gas mass flow vestream of SCR       -       -910.30       g/sec         Filtered exhaust gas mass flow vestream of SCR       -       0 to 1       -         SCR efficiency monitoring to a bid regine operation points for solution to regine operation points for solution to regine operation points for time is 0.00       sec       -         Inverse calculated accelerator peaks       5.00       %       -         Inverse calculated accelerator peaks       -       0.00       sec         filtered exhaust gas mass flow upstream of sec       -       -       -         mass flow upstream of sec       -       -       -       -         SCR efficiency monitoring table H3       -       -       -       -         Inverse calculated accelerator peaks       -       -       -       -         introduction from the second mathematic second mathmatematic second mathematic second mathmatic second math							<=	175.00	ppm		
mass flow upstream of SCR											
Filtered and delayed NÓx raw emission       >=       0.01       g/sec         mass flow upstream of SCR       Filtered exhaust gas mass flow       <=							<=	0.17	g/sec		
Image: Structure and SCR       Image: Structure and SCR       Image: Structure and SCR         Filtered exhaust gas mass flow       >=       -910.30       g/sec         Filtered exhaust gas mass flow       >=       -910.30       g/sec         MAP for valid engine operation points for       =       0.101       -         SCR efficiency monitoring time       >       0.00       sec         Table #83)       for time       >       0.00       sec         Inverse calculated accelerator pedal       >       5.00       %         Value       value       >       0.00       sec         filter coefficient for fast initialization       =       0.35       factor         measurements for fast initialization       =       0.35       factor         measurements for fast initialization mode:       =       0.12       factor         EWMA flittered deta SCR catalyst       >       0.12       factor         efficiency       =       0.01       factor							>-	0.01	a/sec		
Filtered exhaust gas mass flow       <=								0.01	9/000		
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         inverse calculated accelerator pedal       >       5.00       %         value       -       -       -       -         inverse calculated accelerator pedal       >       0.00       sec         ifiliter coefficient for fast initialization mode:       =       0.35       factor         measurements for fast initialization mode:       =       =       -       =         EWMA Rapid Response mode:       =       EWMA filtered delta SCR catalyst       >       0.12       factor         efficienc							<=	236.13	g/sec		
SCR efficiency monitoring (see Look-Up-Table #83)         Table #83)         Inverse calculated accelerator pedal       >       0.00       sec         Inverse calculated accelerator pedal       >       5.00       %         value       -       -       -         EWMA fast initialization mode:       -       -       -         filter coefficient for fast initialization       =       0.35       factor         number of SCR efficiency       >=       3.00       count         measurements for fast initialization mode:       -       -       -         EWMA fast initialization mode:       -       -       -       -         EWMA fast initialization mode:       -       -       -       -       -         filter coefficient for fast initialization mode:       -											
Table #83)       for time       >       0.00       sec         Inverse calculated accelerator periodal       >       5.00       %         value       value       value       %         for time       >       0.00       sec         EWMA fast initialization mode:       =       0.35       factor         number of SCR efficiency       >=       3.00       count         measurements for fast initialization mode       =       0.12       factor         EWMA failtered delta SCR catalyst       >       0.12       factor         efficiency       =       (a) - (b)       <							=	0 to 1	-		
Image: Sector of the sector											
Inverse calculated accelerator pedal       >       5.00       %         Value       value       for time       >       0.00       sec         EWMA fast initialization mode:        0.35       factor         filter coefficient for fast initialization mode:       >       3.00       count         measurements for fast initialization mode:       >       0.12       factor         EWMA filtered delta SCR catalyst >       0.12       factor         efficiency       -       -0.01       factor							~	0.00	Sec		
Value for time       >       0.00       sec         EWMA fast initialization mode: filter coefficient for fast initialization number of SCR efficiency       =       0.35       factor         Sec       3.00       count       =       0.35       factor         Response mode: EWMA Rapid Response mode: EWMA filtered delta SCR catalyst       >       0.12       factor         (a) - (b)       <											
EWMA fast initialization mode:         filter coefficient for fast initialization         number of SCR efficiency         number of SCR efficiency         measurements for fast initialization mode:         EWMA Rapid Response mode:         EWMA filtered delta SCR catalyst         efficiency         (a) - (b)											
filter coefficient for fast initialization       =       0.35       factor         number of SCR efficiency       >=       3.00       count         measurements for fast initialization mode       >=       0.12       factor         EWMA Rapid Response mode:       =       0.12       factor         efficiency       =       0.01       factor						for time	>	0.00	sec		
filter coefficient for fast initialization       =       0.35       factor         number of SCR efficiency       >=       3.00       count         measurements for fast initialization mode       >=       0.12       factor         EWMA Rapid Response mode:       =       0.12       factor         efficiency       =       0.01       factor											
filter coefficient for fast initialization       =       0.35       factor         number of SCR efficiency       >=       3.00       count         measurements for fast initialization mode       >=       0.12       factor         EWMA Rapid Response mode:       =       0.12       factor         efficiency       =       0.01       factor											
number of SCR efficiency       >=       3.00       count         measurements for fast initialization mode            EWMA Rapid Response mode:            EWMA filtered delta SCR catalyst       >       0.12       factor         efficiency             (a) - (b)       <							_	0.35	factor		
measurements for fast initialization mode         EWMA Rapid Response mode:         EWMA filtered delta SCR catalyst       > 0.12       factor         efficiency         (a) - (b)       < -0.01											
EWMA Rapid Response mode: EWMA filtered delta SCR catalyst > 0.12 factor efficiency (a) - (b) < -0.01 factor											
EWMA filtered delta SCR catalyst       >       0.12       factor         efficiency       -       -       0.01       factor											
EWMA filtered delta SCR catalyst       >       0.12       factor         efficiency       -       -       0.01       factor											
efficiency (a) - (b) < -0.01 factor								0.10	<i>c</i>		
(a) - (b) < -0.01 factor							>	0.12	tactor		
							~	-0.01	factor		
						(a) measured SCR catalyst efficiency		-0.01	100101		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Lo	gic and Value		Parameters		Conditions		Required	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 number of SCR efficiency	> = >=	0.00 0.16 6.00	factor factor count		
							EWMA filtered value too small in Fast Init. And Rapid Response mode 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			
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:	=	TRUE see sheet enable tables	-	fail conditions exists for 0.19 s monitor runs with 0.01 s rate whenever	A
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	enable conditions are met	
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	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		tables		whenever enable	

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	-	conditions are met	
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		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	>	0.12 to 0.18 measured parameter 2.00 0.45	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.
			(d) redundant voltage of acceleration pedal (from pedal position sensor 2)	= calculated - parameter				
Injector Positive Voltage Control Circuit Group 1	P2146		Voltage high during driver off state (indicates short to power, short to ground, or open circuit)	<ul> <li>Short to power: ≤ - 0.5 Ω impedance between signal and controller power</li> <li>Open Circuit: ≥ 200 K Ω impedance between ECU pin and load signal and controller ground</li> <li>Short to ground: ≤ 0.5 Ω impedance between signal and controller ground</li> </ul>	Engine Running (see parameter definition)	= TRUE -	fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
					and fuel system status	= no fuel cut off -		
Injector Positive Voltage Control Circuit Group 2	P2149		Voltage high during driver off state (indicates short to power, short to ground, or open circuit)	<ul> <li>Short to power: ≤ - 0.5 Ω impedance between signal and controller power</li> <li>Open Circuit: ≥ 200 K Ω impedance between ECU pin and load signal and controller ground</li> <li>Short to ground: ≤ 0.5 Ω impedance between signal and controller ground</li> </ul>	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.
					and fuel system status	= no fuel cut off -		
Injector Positive Voltage Control Circuit Group 3	P2152		Voltage high during driver off state (indicates short to power, short to ground, or open circuit)	<ul> <li>Short to power: ≤ - 0.5 Ω impedance between signal and controller power</li> <li>Open Circuit: ≥ 200 K Ω impedance between ECU pin and load signal and controller ground</li> <li>Short to ground: ≤ 0.5 Ω impedance between signal and controller ground</li> </ul>	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

16 OBDG08 ECM Summary Tables (LGH/L	_ML Common)
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Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
System 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)	-	Logic and value         Short to power: ≤         0.5 Ω impedance         between signal         and controller         power         Open Circuit: ≥         200 K Ω         impedance         between ECU pin         and load signal         and controller         ground         Short to ground:         ≤ 0.5 Ω         impedance         between signal         and controller         ground	-	Engine Running (see parameter definition) and fuel system status	=	TRUE no fuel cut off		required fail conditions exists for more than 0.04 s monitor runs with 0.01 s rate whenever enable conditions are met	A
Reductant tank heater short circuit	P214F	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	1/Ohm	ignition switch on urea tank heater powerstage on 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 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

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
Intake Air Temp Sensor 1 / 2 Correlation	P2199	Detects biased Humidity Temperature Sensor (IAT #1) or MAF Intake Air Temperature Sensor (IAT #2) by comparing the measured temperatures at start.	Path 1:				minimum engine-off time	>=	28800.00	Sec	fail conditions exists for 0.1 s monitor runs once per trip with 0.1 s	В
			<ul> <li>(a) - (b) (see Look-Up-Table #2)</li> <li>where</li> <li>(a) captured intake air temperature at start</li> </ul>	> =	100 to 999 measured parameter	°C -	and ambient air temperature and	>	-60.04	°C	rate whenever enable	
			(b) captured humidity temperature at	=	measured	_	Engine Running (see parameter definition) for	=	TRUE	-	conditions are met	
			start	-	parameter		time	>	0.00	sec		
			or <b>Path 2:</b>				and engine post drive/ afterun	=	FALSE	-		
			(  (a) - (b)  (see Look-Up-Table #2)	<=	100 to 999	°C	and diagnostic performed in current dc	=	FALSE	-		
			where (a) captured intake air temperature at start	=	measured parameter	-	and basic enable conditions met:	=	see sheet enable tables	-		
			and (b) captured humidity temperature at start and	=	measured parameter	-	and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			(a) - (b)  (see Look-Up-Table #5) where	>	20 to 999	°C						
			(a) captured intake air temperature at start and	=	measured parameter	-						
			(b) captured humidity temperature at start and	=	measured parameter	-						
			status of block heater (see parameter definition)	=	FALSE	-						
			status of sun-load detection (see parameter definition) ) )	=	FALSE	-						
Reductant Level	P21AA	CAN message: Discrete	Reductant Tank Level 2 Error Status	=	1		ignition on	=	TRUE		fail	A
Sensor 2 Circuit Low		level sensor level 2 short to ground error									conditions exists for	
			( tank level sensor 2 voltage directly measured after a test impulse was	<	(0.17)	V	battery voltage	>	8	V	more than 3 sec	
			applied )				basic enable conditions met:	=	see sheet enable tables	-	monitor runs with 1 s rate whenever enable conditions	

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value	•	Parameters		Conditions		Required	Illum.
Reductant Level Sensor 2 Circuit High	P21AB	Path 1:										
		CAN message: Discrete level sensor 2 open load error	Reductant Tank Level 2 Error Status	=	3	-	ignition on	=	TRUE	-		
			( measured tank level sensor 2 voltage after 1.5 ms since a test impulse was applied )	>	(3.56)	V	battery voltage	>	8	V		
			( measured tank level sensor 2 voltage after 1.5 ms since a test impulse was applied )	×	(4.74)	V	basic enable conditions met:	=	see sheet enable tables	-		
		Path 2: CAN message: Discrete level sensor 2 short to battery error	Reductant Tank Level 2 Error Status	=	2	-	ignition on	=	TRUE			
		ballery entit	( measured tank level sensor 2 voltage after 1.5 ms since a test impulse was applied )	>	(4.74)	V	battery voltage	>	8	V		
			арр.:::са )				basic enable conditions met:	=	see sheet enable tables	-		
Reductant Level	P21AF	CAN message: Discrete	Reductant Tank Level 3 Error Status	=	1		ignition on	-	TRUE		fail	A
Sensor 3 Circuit Low	1200	level sensor level 3 short to ground error									conditions exists for	
			( tank level sensor 3 voltage directly measured after a test impulse was applied )	<	(0.17)	V	battery voltage	>	8	V	more than 3 sec monitor runs	
			аррнец )				basic enable conditions met:	=	see sheet enable tables	-	with 1 s rate whenever enable conditions	
Reductant Level	P21B0	Path 1:									are met	
Sensor 3 Circuit	PZIDU											
i ngn		CAN message: Discrete level sensor 3 open load error	Reductant Tank Level 3 Error Status	=	3	-	ignition on	=	TRUE	-		
			( measured tank level sensor 3 voltage after 1.5 ms since a test impulse was applied )	>	(3.56)	V	battery voltage	>	8	V		
			(measured tank level sensor 3 voltage after 1.5 ms since a test impulse was applied )	<	(4.74)	V	basic enable conditions met:	=	see sheet enable tables	-		
		Path 2: CAN message: Discrete level sensor 3 short to battery error	Reductant Tank Level 3 Error Status	=	2		ignition on	=	TRUE	-		

Code		Criteria				Parameters		Conditions		Required	Illum.
		( measured tank level sensor 3 voltage after 1.5 ms since a test impulse was applied )	>	Logic and Value (4.74)	V	basic enable conditions met:	>	8 see sheet enable	V -	Required	muni.
								tables			
measure tank hea	ed conductance of a ater against the ld		<=	(a) * (b) with		urea tank heater powerstage on	=	TRUE	-	fail conditions exists for 0.001 s	В
			=	1.00		battery voltage engine off time urea tank temperature (	<= >= <=	655.40 5400.00 41.96	V sec °C	once per trip with 0.001 s rate whenever	
						steady or falling maximum counter or	>	1000.00	- count	enable conditions are met	
						) basic enable conditions met:	=	see sheet enable tables	-		
_					_	NO Pending or Confirmed DTCs:	=	see sheet inhibit tables			
circuit st NOx ser	tatus message from nsor is received	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	>= <=	11.00 655.34	V V	with 0.01 s rate	
						SCR upstream temperature	>= <= =	3003.56	°C °C -	enable conditions	
						for time Can Bus Initialized ( CAN Bus is Active )	>= =	20.00 TRUE	sec -	are met	
						consisting of: ignition on for time battery voltage battery voltage	= >= > <	TRUE 3 9.8 655.34	sec V V		
						Upstream NOx sensor dewpoint achieved (please see the definition) no pending or confirmed faults	=	TRUE see sheet inhibit tables	-		
						basic enable conditions met:	=	see sheet enable tables	-		
	200 Detects NOX se continuo	200 Detects a failure when open circuit status message from NOX sensor is received continuously for a time	measured conductance of a tank heater against the threshold       (a) lower threshold         (a) lower threshold       (b) factor for tolerances         200       Detects a failure when open circuit status message from NOx sensor is received continuously for a time       Open circuit NOx signal error	measured conductance of a tank heater against the threshold       (a) lower threshold       =         (a) lower threshold       (b) factor for tolerances       =         200       Detects a failure when open circuit NOx signal error       =         00       Detects a failure when open circuit NOx signal error       =         00       Detects a failure when open circuit NOx signal error       =	measured conductance of a tank heater against the threshold       (a) lower threshold       with         (a) lower threshold       = 0.28         (b) factor for tolerances       = 1.00         200       Detects a failure when open circuit NOx signal error       = TRUE         Continuously for a time       Open circuit NOx signal error       = TRUE	measured conductance of a tank heater against the threshold       (a) lower threshold       with         (a) lower threshold       =       0.28       1/Ohm         (b) factor for tolerances       =       1.00       factor         200       Detects a failure when open circuit NOx signal error       =       TRUE         0       Detects a failure when open circuit NOx signal error       =       TRUE	measured conductance of a tark heater against the threshold       (a) lower threshold       with       urea tark heater powerstage on battery voltage engine off time urea tark heater powerstage on battery voltage engine off time urea tark temperature { conductance of the urea tark heater is steady or falling maximum counter or heater activation time } basic enable conditions met:         200       Detects a failure when open circuit NOx signal error       =       TRUE       -       following conditions for time or heater activation time } basic enable conditions for time         200       Detects a failure when open circuit NOx signal error       =       TRUE       -       following conditions for time         201       Detects a failure when open circuit NOx signal error       =       TRUE       -       following conditions for time         202       Detects a failure when open circuit NOx signal error       =       TRUE       -       following conditions for time         200       Detects a failure when open circuit NOx signal error       =       TRUE       -       following conditions for time         202       Detects a failure when open circuit NOx signal error       =       TRUE       -       following conditions for time         203       Detects a failure when open circuit NOx signal error       =       TRUE       -       following conditions for time         204       Detects a failure when open circuit NOX signal error <td>measured conductance of a tank heater against the threshold       (a) ower threshold       with       uras tank heater powerstage on batery voltage       -         at ank heater against the threshold       (b) factor for tolerances       at any heater against the tank heater powerstage on tank temperature       -         at any heater against the threshold       (b) factor for tolerances       at any heater against the tank heater powerstage on tank temperature       -         at any heater against the tank heater is steady or falling       =       1.00       factor         at any heater activation time       &gt;       -       -         basic enable conditions met:       =       -       -         basic enable conditions for time       &gt;       -       -         vox sensor is received conditions for time       -       -       -         battery voltage       -       -       -       -         period       at the measure       -       -       -         vox sensor is received conditions for time       -       -       -       -         orining       -       -       -       -       -         battery voltage       -       -       -       -       -         optimized (CAN Bus is Active prime tor time)       -       -       &lt;</td> <td>measured conductance of a tark heater agains the threshold       i<!--</td--><td>messured conductance of a tark heater powerstage on tark heater powerstage on the threshold       =       TRUE       -         a) lower threshold       (b) factor for tolerances       =       1.00       1/0r       battery voltage       -       655.40       V         =       1.00       1/0r       factor       factor       factor       battery voltage       -       655.40       V         =       1.00       1/0r       factor       factor       factor       battery voltage       -       655.40       V         conductance of the ures tank heater is stady or failing       -       factor       -       655.40       V         conductance of the ures tank heater is stady or failing       -       factor       -       600.00       sec         basic enable conditions met:       =       see sheet enable       -       -       1000.00       count         not statist message from NOX sensor is received       -       NO Pending or Confirmed DTCs:       =       see sheet enable       -         control statist message from NOX sensor is received       -       -       following conditions for time       &gt;       -       0.50       sec         control statist message from NOX sensor is received       -       -       -       -</td><td>measured conductance of a tark heater gasins the threshold       with       una tark heater powerstage on tark heater powerstage on battery voltage       =       TRUE       -       0.001 s         (a) lower threshold       (b) factor for tolerances       =       0.28       1/Orm       battery voltage       -=       5-       11.00       V         =       0.28       1/Orm       battery voltage       -=       565.40       V       -       montor runs       -       -       0.001 s       montor runs       -       -       0.000       court       reperture       -       -       0.000       court       reperture       -       -       -       0.000       court       reperture       -&lt;</td></td>	measured conductance of a tank heater against the threshold       (a) ower threshold       with       uras tank heater powerstage on batery voltage       -         at ank heater against the threshold       (b) factor for tolerances       at any heater against the tank heater powerstage on tank temperature       -         at any heater against the threshold       (b) factor for tolerances       at any heater against the tank heater powerstage on tank temperature       -         at any heater against the tank heater is steady or falling       =       1.00       factor         at any heater activation time       >       -       -         basic enable conditions met:       =       -       -         basic enable conditions for time       >       -       -         vox sensor is received conditions for time       -       -       -         battery voltage       -       -       -       -         period       at the measure       -       -       -         vox sensor is received conditions for time       -       -       -       -         orining       -       -       -       -       -         battery voltage       -       -       -       -       -         optimized (CAN Bus is Active prime tor time)       -       -       <	measured conductance of a tark heater agains the threshold       i </td <td>messured conductance of a tark heater powerstage on tark heater powerstage on the threshold       =       TRUE       -         a) lower threshold       (b) factor for tolerances       =       1.00       1/0r       battery voltage       -       655.40       V         =       1.00       1/0r       factor       factor       factor       battery voltage       -       655.40       V         =       1.00       1/0r       factor       factor       factor       battery voltage       -       655.40       V         conductance of the ures tank heater is stady or failing       -       factor       -       655.40       V         conductance of the ures tank heater is stady or failing       -       factor       -       600.00       sec         basic enable conditions met:       =       see sheet enable       -       -       1000.00       count         not statist message from NOX sensor is received       -       NO Pending or Confirmed DTCs:       =       see sheet enable       -         control statist message from NOX sensor is received       -       -       following conditions for time       &gt;       -       0.50       sec         control statist message from NOX sensor is received       -       -       -       -</td> <td>measured conductance of a tark heater gasins the threshold       with       una tark heater powerstage on tark heater powerstage on battery voltage       =       TRUE       -       0.001 s         (a) lower threshold       (b) factor for tolerances       =       0.28       1/Orm       battery voltage       -=       5-       11.00       V         =       0.28       1/Orm       battery voltage       -=       565.40       V       -       montor runs       -       -       0.001 s       montor runs       -       -       0.000       court       reperture       -       -       0.000       court       reperture       -       -       -       0.000       court       reperture       -&lt;</td>	messured conductance of a tark heater powerstage on tark heater powerstage on the threshold       =       TRUE       -         a) lower threshold       (b) factor for tolerances       =       1.00       1/0r       battery voltage       -       655.40       V         =       1.00       1/0r       factor       factor       factor       battery voltage       -       655.40       V         =       1.00       1/0r       factor       factor       factor       battery voltage       -       655.40       V         conductance of the ures tank heater is stady or failing       -       factor       -       655.40       V         conductance of the ures tank heater is stady or failing       -       factor       -       600.00       sec         basic enable conditions met:       =       see sheet enable       -       -       1000.00       count         not statist message from NOX sensor is received       -       NO Pending or Confirmed DTCs:       =       see sheet enable       -         control statist message from NOX sensor is received       -       -       following conditions for time       >       -       0.50       sec         control statist message from NOX sensor is received       -       -       -       -	measured conductance of a tark heater gasins the threshold       with       una tark heater powerstage on tark heater powerstage on battery voltage       =       TRUE       -       0.001 s         (a) lower threshold       (b) factor for tolerances       =       0.28       1/Orm       battery voltage       -=       5-       11.00       V         =       0.28       1/Orm       battery voltage       -=       565.40       V       -       montor runs       -       -       0.001 s       montor runs       -       -       0.000       court       reperture       -       -       0.000       court       reperture       -       -       -       0.000       court       reperture       -<

Component / Faul		Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System Code	<ul> <li>Description</li> <li>Detects a failure when open circuit status message from binary lambda signal from the NOx sensor is received continuously for a time period</li> </ul>	Criteria Open circuit binary lambda signal error	Logic and Value = TRUE -	Parameters following conditions for time	>	Conditions 0.50	sec	Required fail conditions exists for more than 13 sec. nonitor runs with 0.01 s	IIIum.
				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	∨ ∨ °C	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 basic enable conditions met:		TRUE 3 9.8 655.34 TRUE see sheet inhibit tables ee sheet enable tables	sec V V -		
	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: 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 3 9.8 655.34 TRUE see sheet inhibit tables ee sheet enable tables	n V V °C	fail conditions exists for more than 13 sec. nonitor runs with 0.01 s rate whenever enable conditions are met	

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description Detects a failure when short circuit status message from NOx sensor is received continuously for a time period	Criteria Short Circuit NOx signal error	Logic and Value = TRUE -	Parameters following conditions for time	>	Conditions 0.50	Sec	Required fail conditions exists for more than 13 sec. monitor runs	Illun
					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 °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 basic enable conditions met:	= <u> </u>	TRUE 3 9.8 655.34 TRUE see sheet inhibit tables see sheet enable tables	- V V -		
		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 V	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate	
					battery voltage SCR upstream temperature SCR upstream temperature Engine Running for time Can Bus Initialized ( CAN Bus is Active )	<= >= <= >= =	655.34 94.96 3003.56 TRUE 20.00 TRUE	V °C °C - sec -	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	-		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description Detects a failure when short circuit status message from linear lambda signal from the NOx sensor is received continuously for a time period	Criteria Short Circuit linear lambda signal error	=	ogic and Value TRUE		Parameters following conditions for time	>	Conditions 0.50	sec	Required fail conditions exists for more than 13 sec. monitor runs with 0.01 s	IIIum.
							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	>= <= >= = >= =	11.00 655.34 94.96 3003.56 TRUE 20.00 TRUE TRUE	∨ ∨ °C - sec -	rate whenever enable conditions are met	
							for time battery voltage battery voltage Upstream NOx sensor dewpoint achieved (please see the definition) no pending or confirmed faults basic enable conditions met:	- > - - - - - - - - - - - - - - - - - -	3 9.8 655.34 TRUE see sheet inhibit tables see sheet enable tables	sec V V -		
N0x Sensor Circuit High Bank 1 Sensor 1	P2203	Detects an out of range high fault of the upstream NOx Sensor	NOx sensor signal (raw information received via CAN from NOx sensor)	>	2500.00	ppm	NOx sensor 1 ready status (see parameter definition) 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	В
							Engine Running (see parameter definition)	=	TRUE	-	when enable conditions are met	
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	for time and	>	20.00	SEC		
							Injection Quantity or Upstream NOx sensor dewpoint	> =	8.00 TRUE	mm^3/rev -		
							achieved (please see the definition) for time	>	600.00	sec		
NOx Sensor Heater Control Circuit Bank 1 Sensor 1	P2205	Detects a failure when open circuit status message from NOx sensor heater is received continuously for a time period	Open Circuit NOx Heater signal error	=	TRUE		following conditions for time	>	0.50	sec	fail conditions exists for more than 13 sec. monitor runs	A
							battery voltage	>=	11.00	V	with 0.01 s	

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters		Conditions		Required	Illum.
					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	<= >= = >= = >=	655.34 94.96 3003.56 TRUE 20.00 TRUE TRUE 3	V °C °C - sec - sec	rate whenever enable conditions are met	
					battery voltage battery voltage Upstream NOx sensor dewpoint achieved (please see the definition) no pending or confirmed faults	> < = =	9.8 655.34 TRUE see sheet inhibit	V V -		
					basic enable conditions met:	=	tables see sheet enable tables	-		
		Detects a failure when short circuit status message from NOx sensor heater is received continuously for a time period	Short Circuit NOx heater signal error	= TRUE -	following conditions for time battery voltage battery voltage SCR upstream temperature	> >= <= >=	0.50 11.00 655.34 94.96	sec V V °C	fail conditions exists for more than 13 sec. monitor runs with 0.01 s rate whenever	
					SCR upstream temperature Engine Running for time Can Bus Initialized ( CAN Bus is Active ) consisting of:	<= = >= =	3003.56 TRUE 20.00 TRUE	°C - sec -	enable conditions are met	
					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 tables	sec V V -		
					basic enable conditions met:	=	see sheet enable tables	-		
NOx Heater Performance Bank 1 Sensor 1	P2209	Monitoring of the upstream NOx sensor signal readiness	Upstream NOx sensor heater temperature has reached set point	= FALSE -	( battery voltage and battery voltage and	>= <=	11.00 655.34	V V	fault exists for more than 1 event when dewpoint end is reached;	В

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value	е	Parameters		Conditions		Required	Illum.
							Oxidation Catalyst upstream temperature and Oxidation Catalyst upstream temperature	>= <=	94.96 3003.56	℃ ℃	monitor runs at 0.02 s when enable conditions are met	
							and Engine running for time and	= >	TRUE 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	P221C	Compare the measured	conductance of pressure line heater	>=	(a) * (b)	1/Ohm	ignition switch on	=	TRUE	-	fail	В
pressure line heater open circuit		conductance of a pressure line heater against the threshold			with						conditions exists for 5 s monitor runs	
			(a) upper threshold	=	0.26	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 engine off time	<= >=	655.34 0.00	V sec	are met	
							heater activation time basic enable conditions met:	>= =	81.00 see sheet enable	sec		
							NO Pending or Confirmed DTCs:	=	tables see sheet inhibit tables	-		
									labics			
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	
			( )								enable	
			(b) factor for tolerances	=	1.00	factor	battery voltage battery voltage	>= <=	11.00 655.34	V V	conditions 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	-		
Urea supply	P221E	Detects a supply module	a <= b	=	TRUE	-	ignition switch on	=	TRUE	-	fail	В
module heater open circuit		heater open circuit by detecting low conductance									conditions exists for 0.1	

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold	_	Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Valu	е	Parameters		Conditions		Required	Illum.
		in the heater	with (a) maximum conductance of the supply module heater and with	=	calculated parameter	1/Ohm	and supply module heater powerstage on and	=	TRUE	-	s monitor runs 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	
							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	>	100.00	sec		
							or heater activation time )	>=	10.00	sec		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Urea supply module heater short circuit	P221F	Detects a supply module heater short circuit by detecting high conductance in the heater	a >= b with	=	TRUE	-	ignition switch on and	=	TRUE	•	fail conditions exists for 0.1 s	В
			(a) maximum conductance of the supply module heater	=	calculated parameter	1/Ohm	supply module heater powerstage on	=	TRUE	-	monitor runs 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	
							and battery voltage	<=	655.34	V	are met	
							and 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		
		I	I				and					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		eshold 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	-		
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		.97 V 0.00 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		1.54 V 15.00 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)	= 42.5	g*h) to 45.0 kPa	<ul> <li>(</li> <li>VNT turbocharger offset adaptation active</li> <li>- 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</li> </ul>	=	FALSE		fail conditions exists for 15 s monitor runs with 0.01 s rate whenever enable conditions are met	A
			(h) correction factor (see Look-Up- Table #59)	= 0.900	024 to 1 factor	VNT turbocharger wiping is active	=	FALSE	-		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value	,	Parameters		Conditions		Required	Illum.
							<ul> <li>in order to prevent soot accumulation</li> <li>e.g. in a long idle operation under cold</li> <li>engine condition on the turbine the</li> </ul>					
							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	>=	80.00	mm^3/rev		
							injection Quantity and	<=	480.00	mm^3/rev		
							engine Speed	>=	1200.00	rpm		
							engine Speed and	<=	3400.00	rpm		
							working range of boost pressure is in closed-loop	=	TRUE	-		
							means (					
							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			
			Path 2				(				fail	
			control deviation of the boost pressure calculated out of difference between	<	(i*j)	-	VNT turbocharger offset adaptation active	=	FALSE	-	conditions exists for 15	
			desired and actual value with				- in order to compensate sensor drift				s monitor runs	
							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				with 0.01 s rate whenever enable	
					90 to 10	kDa	and used for the calculation of offset drift of the valve				conditions are met	
			<ul><li>(i) the upper limit (see Look-Up-Table #63)</li></ul>	=	-80 to -40	kPa	and					
			(j) correction factor	=	1.00	factor	VNT turbocharger wiping is active	=	FALSE	-		

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters		Conditions		Required	Illum.
					<ul> <li>in order to prevent soot accumulation</li> <li>e.g. in a long idle operation under cold</li> <li>engine condition on the turbine the</li> <li>desired value of the boost pressure</li> <li>actuator position governor is assigned</li> <li>from the set-point value</li> </ul>					
					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 80.00	rpm/sec mm^3/rev		
					injection Quantity injection Quantity and	>= <=	480.00	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	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)	<ul> <li>Open Circuit: ≥ - 200 K Ω impedance between ECU pin and load signal and controller ground</li> </ul>	battery voltage	>	11.00	V	fail conditions exists for 0.5 s monitor runs with 0.01 s rate whenever enable	A
					time and	>	3.00	sec	conditions are met	
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					ignition on and	=	TRUE	-		
					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 Illum
		Diagnoses the Fuel Pressure Regulator 2 low side driver circuit for driver over temperature faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match and the IC maximum temperature has been exceeded IC Tempeature	> 150.00 °C	battery voltage for time and NO Pending or Confirmed DTCs: and ignition on and basic enable conditions met:	<ul> <li>&gt; 11.00 V</li> <li>&gt; 3.00 sec</li> <li>= see sheet inhibit - tables</li> <li>= TRUE -</li> <li>= see sheet enable - tables</li> </ul>	fail conditions exists for 1 s monitor runs with 0.01 s rate whenever enable conditions are met
Fuel Pressure Regulator 2 Control Circuit Low Voltage	P2295	Diagnoses the Fuel Pressure Regulator 2 low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	<ul> <li>Short to ground: - ≤ 0.5 Ω impedance between signal and controller ground</li> </ul>	for time and NO Pending or Confirmed DTCs: and ignition on and basic enable conditions met:	>       11.00       V         >       3.00       sec         =       see sheet inhibit tables       -         =       TRUE       -         =       see sheet enable sheet enable sheet enable sheet enables       -	fail A conditions exists for 0.75 s monitor runs with 0.01 s rate whenever enable conditions are met
Fuel Pressure Regulator 2 Control Circuit High Voltage	P2296	Diagnoses the Fuel Pressure Regulator 2 low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	= Short to power: - ≤ 0.5 Ω impedance between signal and controller power	battery voltage for time	> 11.00 V > 3.00 sec	fail A conditions exists for 0.5 s monitor runs with 0.01 s rate whenever enable

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
					and NO Pending or Confirmed DTCs: and ignition on and basic enable conditions met:	=	see sheet inhibit tables TRUE see sheet enable tables	-	conditions are met	
NOx Sensor Circuit Bank 1 Sensor 2	P229E	Detects a failure when open circuit status message from downstream NOx sensor is received continuously for a time period	Open circuit downstream NOx signal error	= TRUE -	following conditions for time 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 °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	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	> ~= ~= = ~= > ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	0.50 11.00 655.34 94.96 3003.56 TRUE 20.00 TRUE 3 9.8 655.34	V V °C °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	5	Time Required	MIL Illur
					Downstream NOx sensor dewpoint achieved (please see the definition) no pending or confirmed faults basic enable conditions met:	= TRUE = see sheet inhi tables = see sheet ena tables			
		Open circuit error of linear lambda signal of Downstream NOx sensor via the CAN message	Open circuit lambda linear error of downstream NOx sensor via CAN message	= TRUE -	following conditions for time 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:	<ul> <li>&gt; 0.50</li> <li>&gt;= 11.00</li> <li>&lt;= 655.34</li> <li>&gt;= 94.96</li> <li>= 3003.56</li> <li>= TRUE</li> <li>&gt;= 20.00</li> <li>= TRUE</li> <li>= TRUE</li> <li>= 9.8</li> <li>&lt; 655.34</li> <li>= TRUE</li> <li>= see sheet inhit tables</li> <li>= see sheet ena tables</li> </ul>		fail conditions exists for more than 13 s monitor runs with 0.1 s rate whenever enable conditions are met	
		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 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:	<ul> <li>&gt; 0.50</li> <li>&gt;= 11.00</li> <li>&lt;= 655.34</li> <li>&gt;= 94.96</li> <li>&lt;= 3003.56</li> <li>= TRUE</li> <li>&gt;= 20.00</li> <li>= TRUE</li> <li>= TRUE</li> <li>= 3</li> <li>&gt; 9.8</li> <li>&lt; 655.34</li> <li>= TRUE</li> <li>= see sheet inhititables</li> <li>= see sheet ena tables</li> </ul>		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 Illum.
		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 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 3 9.8 655.34 TRUE 3 9.8 655.34 TRUE see sheet inhibit tables see sheet enable tables	V 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	
		Short circuit error of linear lambda signal of Downstream NOx sensor via the CAN message	Short circuit lambda linear error of downstream NOx sensor via CAN message	= TRUE -	following conditions for time 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 3 9.8 655.34 TRUE see sheet inhibit tables see sheet enable tables	Sec 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	
NOx Sensor Circuit High Bank 1 Sensor 2	P22A1		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

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	1	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
NOx Sensor Circuit Low Bank 1	P22A0	fault of the downstream NOx	Downstream NOx sensor signal (raw information received via CAN from NOx	< -90.00	ppm	Engine Running (see parameter definition)	=	TRUE	-	conditions are met	
Sensor 2		Sensor	sensor)			for time and	>	20.00	sec		
						Injection Quantity or	>	8.00	mm^3/rev		
						Downstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
						for time	>	600.00	sec		
NOx Heater Control Circuit	P22A3	Downstream NOx sensor heater open circuit error via	Open circuit heater error of downstream NOx sensor via CAN message	= TRUE	-	following conditions for time	>	0.50	sec	fail conditions	A
Bank 1 Sensor 2		the CAN message				battery voltage	>=	11.00	V	exists for more than	
						battery voltage SCR downstream temperature	<= >=	655.34 94.96	∨ °C	13 s monitor runs	
						SCR downstream temperature	<=	3003.56	°C	with 0.1 s	
						Engine Running	=	TRUE	-	rate	
						for time Can Bus Initialized ( CAN Bus is Active	>= =	20.00 TRUE	sec	whenever enable	
						)				conditions	
						consisting of: ignition on	=	TRUE		are met	
						for time	>=	3	sec		
						battery voltage	>	9.8	V		
						battery voltage Downstream NOx sensor dewpoint	< =	655.34 TRUE	V		
						achieved (please see the definition)					
						no pending or confirmed faults	=	see sheet inhibit tables	-		
						basic enable conditions met:	=	see sheet enable tables	-		
									_		
		Downstream NOx sensor heater short circuit error via the CAN message	Short circuit heater error of downstream NOx sensor via CAN message	= TRUE	-	following conditions for time	>	0.50	sec	fail conditions exists for	
						battery voltage	>=	11.00	V	more than	
						battery voltage SCR downstream temperature	<= >=	655.34 94.96	∨ °C	13 s monitor runs	
						SCR downstream temperature	<=	3003.56	°Č	with 0.1 s	
						Engine Running for time	= >=	TRUE 20.00	- sec	rate	
						Can Bus Initialized (CAN Bus is Active	=	TRUE	-	whenever enable	
						) consisting of:				conditions	
						ignition on	=	TRUE	-	are met	
						for time	>=	3	sec		
						battery voltage battery voltage	> <	9.8 655.34	V V		
						Downstream NOx sensor dewpoint achieved (please see the definition)	=	TRUE	-		
						no pending or confirmed faults	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	I	Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
- Cystom	0000		ontona				basic enable conditions met:	=	see sheet enable tables	-	noquirou	
NOx Heater Performance Bank 1 Sensor 2	P22A7	between the time ECU	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
							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 Engine running for time	<= = >	3003.56 TRUE 20.00	°C - 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: No Pending or Confirmed DTCs	=	see sheet enable tables see sheet inhibit	-		
									tables			
N0x Sensor Performance Bank 1 Sensor 1	P22FA	Compare the measured NOx signal response time with the threshold when injection quantity changes from fueling to overrun	measured upstream NOx response time from 70% of the initial NOx value to 40% of the initial NOx value	>	2.30	Sec	global enable conditions:				fail conditions exist for 1 event, test is performed in the 0.01 ms	В
			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	
			initiai value.				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	>=	1200.00	rpm		

System         Lose problem         Description         Line and the system         Logic and value         injection quantity or combustion         >=         120.00         mm*3trey           state-machine: Check-Operating point         the following conditions moves the state machine: The state machine in the state machine indexision of injection         =         120.00         rpm           state-machine in the state machine in the state machine in the state machine interval in the state machine indexision of injection         >=         120.00         rpm           state-machine interval interval          =         120.00         rpm           state-machine interval interval          =         120.00         rpm           state-machine interval interval         =         =         120.00         rpm           state-machine interval in	Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
the following conditions moves the state machine from wait-for-overrun to evaluate-edge state: ( injection quantity for combustion < (a) - (b) mm^3/rev with (a) Reference injection quantity picked in Check-operating point state (b) Maximum deviation of injection quantity ) state-machine: evaluate-edge the following conditions moves the state machine from evaluate-edge state to	Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Parameters           injection quantity for combustion upstream NOx concentration )           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 with           (a) Reference injection quantity picked in Check-operating point state           (b) Maximum deviation of injection quantity	, , , , , , , , , , , , , , , , , , ,	Conditions           120.00           100.00           1200.00           100.00           (a) + (b)           (a) - (b)           measured           parameter           40.00	rpm ppm mm^3/rev mm^3/rev mm^3/rev mm^3/rev	Time Required	MIL Illum.
injection quantity for combustion < 2.00 mm^3/rev						<ul> <li>(b) Maximum deviation of injection quantity for time</li> <li>state-machine: Wait-for-Overrun the following conditions moves the state machine from wait-for-overrun to evaluate-edge state:         <ul> <li>(injection quantity for combustion with</li> <li>(a) Reference injection quantity picked in Check-operating point state</li> <li>(b) Maximum deviation of injection quantity</li> <li>(b) Maximum deviation of injection quantity</li> <li>(c) State-machine: evaluate-edge the following conditions moves the state machine from evaluate-edge state to overrun state:             <li>(c) (c) (c) (c) (c) (c) (c) (c) (c) (c)</li></li></ul></li></ul>	~ = =	40.00 2.00 (a) - (b) measured parameter 40.00	sec mm^3/rev mm^3/rev mm^3/rev		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
Downstream NOx sensor Self diagnostic Bank 1 Sensor 2	P22FE	NOx sensor self-diagnosis, which occurs within the NOx sensor and reported to the ECM, which runs in the ECM afterrun, and measures the sensor drift by comparing to a reference point.	average stored NOx sensor self- diagnostic result	>	143.99	%	Global Release conditions:				fault exists for more than 3 events; monitor runs at 0.1 s once per trip during the	B
			Or				time interval between the runs of the diagnostic tests	>	10.00	sec	afterrun	
			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	°C °C		
							status of current engine operation system ≠ Post Drive	=	TRUE	-		
							Engine operation mode = normal mode engine speed	= <=	TRUE 1500.00	- rpm		
							engine speed for time	>=	0.00 5.00	rpm sec		
							Modeled downstream NOx concentration	<	160.00	ppm		
							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 virtual pedal angle	< <	1200.00 10.00	rpm %		
							for time With (((	<=	14400.00	sec		
							SCR downstream temperature for time	<= >=	129.96 40.00	°C sec		
							) for time )	>=	600.00	sec		
							(( vehicle speed for time	<= >=	31.08 40.00	mph sec		
							) for time	>=	40.00	sec		
							))					
							( Status: DFP Regeneration active Or	=	FALSE	-		
							Status: DPF Regeneration not completed	=	FALSE	-		
							)					

		Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters		Conditions		Required	Illum.
							TD:			
					Rising edge of the following conditions:	=	TRUE	-		
					( Ignition key on	=	TRUE	-		
					Engine operation status	=	Running	-		
					)		Ū.			
					, with					
					(					
					Status: DPF Regeneration not	=	TRUE	-		
					completed Status: DFP Regeneration active	=	TRUE	-		
					Engine coolant temperature	= <=	59.96	°C		
					))	~-	00.00	0		
					(					
					Ignition key on	=	TRUE	-		
					Or status of over run condition	=	TRUE	-		
					for time	<=	12.00	sec		
					status of over run condition	=	FALSE	-		
					for time	>	20.00	sec		
					)					
					(					
					( Estimated HC Load in SCR catalyst	<=	2.00	g		
					Or			5		
					(					
					change of estimated HC Load in SCR	>=	(a) * (b)	g		
					catalyst within time		0.20	000		
					(a) Estimated HC Load limit in SCR	< =	-0.01	sec g/sec		
					catalyst		0.01	9,000		
					(b) time factor	=	0.20	sec		
					))					
					And					
					( Estimated HC Load in SCR catalyst	>=	32.00	g		
					engine speed	<=	4000.00	rpm		
					engine speed	>=	500.00	rpm		
					SCR downstream temperature	<=	199.96	°C		
					SCR downstream temperature	>=	-40.04	°C		
					(( SCR downstream temperature	<=	199.96	°C		
					for time	<= >=	1.00	sec		
					)	-				
					for time (see Look-Up-Table #99)	>=	100 to 900	sec		
					)					
					(( vehicle speed	<=	44.75	mph		
					for time	>=	1.00	sec		
					)	. –		- 50		
					for time (see Look-Up-Table #99)	>=	100 to 900	sec		
					))					
					Additional release conditions:					
					Additional release conditions: vehicle speed	=	0	mph		
					number of possible test runs in after-run	<	20.00	counts		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Lo	gic and Valu	<u>.</u>	Parameters		Conditions		Required	Illum.
-,							Engine operation status = Post Drive	=	True	-		
							for time	>=	100.00	sec		
							for time in ECM afterrun	>=	30.00	sec		
							for time in ECM afterrun	<=	300.00	Sec		
							status of heater temperature validity for	=	True	-		
							downstream NOx sensor	=	Thue	-		
									4.00			
							number of tests for averaging test result	<=	1.00	count		
							Status of downstream NOx sensor self	=	4	decimal		
							diagnosis (Bit2)					
							for time	>=	1	sec		
							and					
							aggressive driving conditions not	=	TRUE	-		
							encountered					
							which means					
							time at idle	<	10.00	sec		
							where idle is defined as:					
							following conditions for time:	>	30.00	sec		
							vehicle speed		0.60			
								<		mph		
							engine running	=	TRUE	-		
							vehicle speed deceleration rate	>	2.00	m/sec^2		
							(calculated based on vehicle					
							speed)					
							and					
							vehicle speed deceleration rate	>	2.00	m/sec^2		
							(calculated based on vehicle speed)					
							`````					
							Afterrun Conditions:					
							NO Pending or Confirmed DTCs:	=	see sheet inhibit	-		
							No Fending of Committee D103.	-	tables			
							Engine operation status = Post Drive	_	True	_		
								=		-		
							vehicle speed	=	0			
							measured downstream NOx	<=	160.00	ppm		
							concentration					
							DPF regeneration active	=	FALSE	-		
							engine speed	>=	0.00	rpm		
							engine speed	<=	1500.00	rpm		
							NOx sensor signal is valid (e.g. No CAN	=	TRUE	-		
							error of NOx CAN messages)					
							maximum duration in afterrun	<=	300.00	sec		
							minimum duration to start self-diagnostic	<=	100.00	sec		
							number of self-diagnostic attempts	<	20.00	count		
							basic enable conditions met:	=	see sheet enable	count		
							basic enable conditions met.	=		-		
									tables			
	B.0										<i>(</i> );	i i i
xhaust Gas High	P2428	Detects implausible	Any two of the following four conditions:				basic enable conditions met:	=	see sheet enable	-	fail	A
emperature		temperatures in order to	((a) and (b)) or ((a) and (c)) or ((a) and						tables		conditions	
		protect the engine	(d)) or ((b) and (c)) or ((b) and (d)) or ((c)								exists for 6 s	
		-	and (d))								test	
			with				and				performed	
			(a) oxidation catalyst upstream	>	799.96	°C	NO Pending or Confirmed DTCs:	=	see sheet inhibit	-	continuously	
			temperature			č			tables		0.1 s rate	
			and with						100103		0.131010	
			(b) oxidation catalyst downstream	>	799.96	°C						
I												
			temperature	-	155.50	0						

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) SCR downstream temperature and with (d) particulate filter downstream temperature	>	799.96 799.96	°C °C						
Exhaust Gas Temperature (EGT) Sensor 3 Circuit Low Voltage	P242C	Detects low voltage condition of the downstream SCR catalyst temperature sensor circuit, indicating an OOR low condition	voltage of SCR downstream catalyst temperature sensor same as Downstream SCR Catalyst temperature	<	-50	∨ ℃	(( 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:	<pre>&lt;=</pre>	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 - -	fail conditions exists for more than 5.0 sec. monitor runs with 0.1 s rate whenever enable conditions are met	A
Exhaust Gas Temperature (EGT) Sensor 3 Circuit High Voltage	P242D	Detects high voltage condition of the downstream SCR catalyst temperature sensor circuit, indicating an OOR high condition	voltage of SCR downstream catalyst temperature sensor same as Downstream SCR Catalyst temperature	>	2.21	∨ °C	(( engine speed engine speed current injection quantity current injection quantity engine coolant temperature time since engine start exhaust-gas mass flow downstream of the exhaust manifold ) or SCR catalyst temperature ) for time NO Pending or Confirmed DTCs:	<= >= >= > > > > =	6000.00 0.00 800.00 -50.04 0.00 0.00 -45.04 0.00 see sheet inhibit 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	L	Threshold ogic and Value	•	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							basic enable conditions met:	=	see sheet enable tables	-		
Diesel Particulate Filter Differential Pressure Sensor Performance	P2453	Detects in range faults on the DPF differential pressures sensor.	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	
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	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

Component /	Fault Code	Monitor Strategy	Primary Malfunction Criteria		Threshold Logic and Value		Secondary		Enable Conditions		Time	MIL Illum.
System Diesel Particulate Filter Differential Pressure Sensor Circuit High Voltage	P2455	Description 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	Parameters ignition on and basic enable conditions met: and NO Pending or Confirmed DTCs:	=	TRUE see sheet enable tables see sheet inhibit tables	-	Required fail conditions exists for 3 s test performed continuously 0.020 s rate	indin.
Exhaust Gas Recirculation (EGR) Cooler Performance	P2457	Performs a check of the EGR cooler performance by monitoring the EGR efficiency and comparing it to a threshold value	EGR cooler efficiency	<	0.65		following conditions for time	>=	120.00	sec	fail conditions exists for 120 s monitor runs with 0.1 s rate	В
							( engine speed and engine speed	>= <=	1100.00 2000.00	rpm rpm	whenever enable conditions are met	
							, and ( injection quantity and injection quantity ) and ( recirculated exhaust-gas mass flow downstream of the EGR cooler	>= <= >=	20.00 240.00 16.68	mm^3/rev mm^3/rev g/sec		
							and recirculated exhaust-gas mass flow downstream of the EGR cooler ) and EGR controller is active and	<=	40.28 TRUE	g/sec -		
							(a) - (b) with (a) filtered temperature upstream of EGR-cooler and with (b) engine temperature ) and (	>=	210.00	℃		
							(a) - (b) with	<=	3276.70	°C		

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters		Conditions		Required	Illum.
					(a) filtered temperature upstream of EGR-cooler and with (b) engine temperature					
					) and engine coolant temperature and	>=	69.96	°C		
					engine coolant temperature and	<=	129.96	°C		
					( actual valve position of exhaust-gas recirculation and	>=	9.9976	%		
					actual valve position of exhaust-gas recirculation )	<=	399.99	%		
					and ( control value provided for EGR cooling bypass	>=	-400.00	%		
					and control value provided for EGR cooling bypass	<=	5.00	%		
					for time )	>	10.00	sec		
					and ambient pressure and	>=	74.80	kPa		
					( ambient temperature and	>=	-7.04	°C		
					ambient temperature ) and	<=	3003.56	°C		
					DPF regeneration not active and	=	TRUE	-		
					diagnostic performed in current Drive Cycle and	=	FALSE	-		
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
					) and basic enable conditions met:	=	see sheet enable tables	-		
Diesel Particulate Filter Regeneration Frequency	P2459	Detects a DPF that is regeneration too frequently by comparing a threshold to a soot model.	soot mass in the particulate filter (measured used for determining DPF regeneration trigger)	> ((a) - (b)) + ((c) * g (d))	particulate filter regeneration - transition false to true	=	TRUE	-	fail conditions exists for more than 1 event	В
1		l	with		and				monitor runs ∩1 s rate	

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value	1	Parameters		Conditions		Required	Illum.
			<ul> <li>(a) engine out soot mass flow in the exhaust-gas (function of vehicle speed only) and with</li> <li>(b) soot mass at the end of previous</li> </ul>	=	measured parameter calculated	-	last particulate filter regeneration successful or particulate filter regeneration must have	=	TRUE	-	whenever enable conditions are met	
			DPF regeneration and with (c) factor for calculation of a soot mass value offset depending on the simulated maximal base soot mass (see Look-Up-Table #1)	=	parameter 0 to 121.8	g	been completed and basic enable conditions met:	=	see sheet enable tables	-		
			and with (d) factor for determination of correction factor for ash in the particulate filter	=	1.00	factor	and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Diesel Particulate Filter - Soot Accumulation	P2463	Detects high levels of soot in the DPF as indicated by	soot mass in the particulate filter	>	69.60	g	ignition on	=	TRUE	·	fail conditions	A
Accumulation		the soot model.					and basic enable conditions met:	=	see sheet enable tables		exists for 30 s test performed continuously 0.1 s rate	
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	0.131416	
Exhaust Gas Temperature (EGT) Sensor 4 Sensor Circuit Low Voltage	P2470	Detects low voltage readings on the EGT 4 circuit, indicating an OOR low condition on the EGT 4	particulate filter downstream temperature sensor voltage	<	0.65	V	ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs 0.05 s rate	В
			same as particulate filter downstream temperature	<	-60	°C	and basic enable conditions met:	=	see sheet enable tables	-	whenever enable conditions are met	
Exhaust Gas Temperature (EGT) Sensor 4 Circuit High Voltage	P2471	Detects high voltage readings on the EGT 4 circuit, indicating an OOR high condition on the EGT 4	particulate filter downstream temperature sensor voltage	>	2.21	V	ignition on	=	TRUE	-	fail conditions exists for 3 s monitor runs 0.05 s rate	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	•	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
			same as particulate filter downstream temperature	>	999.6	℃	and basic enable conditions met:	=	see sheet enable tables	-	whenever enable conditions are met	
Closed loop Reductant Injection Control at Limit-Flow too high	P249D	Detects an out of range high of the long term Reductant quantity adaption factor	long term adaptation factor of Reductant quantity	>	1.40	factor	long term adaption triggered 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
Closed loop Reductant Injection Control at Limit-Flow too low	P249E		long term adaptation factor of Reductant quantity	<	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

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
Closed Loop Particulate Filter Regeneration Control At Limit - Temperature Too Low	P24A0	Detects insufficient HCI temperature. Temperature readings are compared to desired temperature values as an indication of an insufficient exhaust gas temperature.	commanded control value of the HCI temperature controller	>=	0.00	-	current engine operating point is suitable for monitoring deviation of exhaust gas temperature control - depending on engine speed and injection quantity (see Look-Up-Table #25)	=	0 to 1	-	fail conditions exists for 300 s monitor runs with 0.1 s rate whenever	В
			and deviation from the temperature set point for HCI control loop with (a) temperature threshold value	>	maximum of (a) and (b+c) 100.00	°C	for time and (	>	30.00	sec	enable conditions are met	
			and with (b) temperature value for threshold of monitoring	=	0.00	°C	exhaust gas temperature control is active means	=	TRUE	-		
			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		
							and ( particulate filter temperature	<	719.96	°C		
							or particulate filter temperature for activated post injection )	<	749.96	°C		
							) and release status means	=	TRUE	-		
							( vehicle speed	>=	14.92	mph		
							and vehicle speed and	<=	124.30	mph		
							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	-		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Closed Loop Particulate Filter Regeneration Control At Limit - Temperature Too High	P24A1	Detects excessive HCI temperature. Actual HCI controller ratio and temperature readings are compared to desired HCI controller ratio and temperature values as an indication of an excessive exhaust gas temperature.	commanded control value of the HCI temperature controller	<=	0.99	-	current engine operating point is suitable for monitoring deviation of exhaust gas temperature control - depending on engine speed and injection quantity (see Look-Up-Table #26)	=	0 to 1		fail conditions exists for 300 s monitor runs with 0.1 s rate whenever enable conditions are met	В
			and deviation from the temperature set point for HCI control loop with	<	minimum of (a) and (b+c-(d-e))		for time and	>	30.00	sec	are met	
			(a) and with (b) temperature value for threshold of	=	-75.00 0.00	°C ℃	exhaust gas temperature control is	=	TRUE	-		
	monitoring with	monitoring with (c) basic temperature threshold value	=	100.00	°C	active means (						
			for monitoring and with (d) temperature set point for exhaust gas system control loop	=	calculated parameter	-	temperature upstream of the oxidation catalyst and	>	224.96	°C		
			and with (e) actual temperature for exhaust gas system control loop	=	measured	-	( particulate filter temperature and	>	229.96	°C		
							( particulate filter temperature	<	719.96	°C		
							or 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: 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 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)		<	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	=	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		
Particulate Matter	P24B1	Range check on IDE-supply	Path 1:				Ignition on	=	TRUE		fault exists	В
Sensor Circuit High Voltage		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)						_			for more than 0.1 sec; monitor runs at 0.1 s when enable conditions are met	5
			IDE supply voltage is on IDE supply voltage OR	= >=	TRUE 49.72	v	Battery voltage (ECM)	>=	11.00	V		
			IDE supply voltage	<=	41.55	V						
1		I	OR									

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
			Path 2: ( IDE supply voltage is on IDE supply voltage )	= >=	FALSE 2.00	v						
Particulate Matter Sensor Heater Control Circuit/Open	P24B3	Heater voltage check in the state "heater on" (as detected by µC-in-port)	Electrical error of the heater self diagnosis of the particulate sensor is detected in the state "heater on" 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
Particulate Matter Sensor Temperature Circuit	P24C6	Range check of meander temperature raw signal: comparison voltage of meander temperature signal with maximum and minimum threshold		> <	3.00 0.30 920.00	V V ℃	Ignition on for time Battery voltage (ECM) Exhaust gas temperature and Exhaust gas temperature	= > = > = <=	3.00 11.00 -40.04 799.96	sec V °C °C	fault exists for more than 2 sec; monitor runs at 0.1 s when enable conditions are met	В

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
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)	>	34.96 to 74.96	°C	Sensor in a measurement phase	=	TRUE		fault exists for more than 5 sec; monitor runs at 0.1 s when enable	В
			or difference of the measured PM sensor temperature and the modeled exhaust gas temperature (see Look-Up-Table #103)	<	-70.04 to -110	°C	with Time after the end of sensor regeneration	>	180.00	sec	conditions are met	
							Vehicle velocity and	>=	15.53	mph		
							Vehicle velocity	<=	155.34	mph		
							Barometric pressure	>	75	kPa		
							Engine running (please see the definition)	=	TRUE	-		
							exhaust model temperature at PM sensor and	>	49.96	°C		
							exhaust model temperature at PM sensor	<	249.96	°C		
						(A - B) (Absolute value of the temperature difference)	<=	29.96	°C			
							for time since stationary modeled temperature in the driving mode is detected	>=	90.00	sec		
							with (a) Model temperature	=	measured parameter	-		
							and with (b) frozen model temperature value at beginning of enable condition release	=	calculated parameter	-		
							,					
Particulate Matter Sensor Supply Voltage Circuit Low	P24D0	(SCU) battery supply plausibility check which compares the difference in voltages as measured by ECM and SCU with	Path 1:				Ignition on	=	TRUE		fault exists for more than 1.5 sec; monitor runs at 0.1 s when enable	В
		threshold	Battery voltage (ECM)	>	15.00	V	for time	>	3.00	sec	conditions are met	
			difference of ECM measured voltage and SCU voltage	>	3.00	V	Initialization values have been transferred (i.e. CAN communication with ECM established)	=	TRUE	-		
							Sensor is in the state "ready"	=	TRUE	-		
							means Battery voltage (ECM)	>=	11.00	V		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
			Path 2: Battery voltage (ECM) difference of ECM measured voltage and SCU voltage or	< >	11.7 1.90	V V						
			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						
		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 or	> >	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" means Battery voltage (ECM) Heater duty cycle of PM Sensor	= = = >	3.00 TRUE TRUE 11.00 23	sec - - 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) 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	=	TRUE		regeneration phase is active measurement request to particulate matter sensor is active	=	TRUE	-	fault event exists for one time; monitor runs at 0.1 s when enable conditions	В
			Monitor is released	=	TRUE	-	PM sensor dewpoint achieved	=	TRUE	-	are met	

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters the time the particle sensor spent under unacceptable working conditions during the regeneration, means	<	Conditions 10	sec	Required	Illum.
					( exhaust gas acceleration or ratio between demanded and max	>	5	m/s^2		
					available heater power )		11.00	V		
					Battery voltage (ECM)	>	11.00	v		
ECM Power Relay Circuit	P2510	Detection of Main Relay that has opened without a	Number of detected occurrences of main relay opening without ECM request	> 1.00 c	punts ignition on	=	TRUE		fail conditions	В
Performance			(stored in EEPROM)		and				exists for 0.02 s	
					engine pre drive and	=	TRUE	-	monitor runs once per	
					Basic enable conditions met:	=	see sheet enable conditions	-	driving cycle during predrive with 0.02 s rate whenever enable	
		Detection of main relay that is stuck and not opened when commanded by ECM	Time after request to open the main relay	> 1.40	sec ignition on	=	FALSE	-	fail conditions exists for 0.02 s	В
					and engine pre drive and	=	FALSE	-	monitor runs once per driving cycle	
					Basic enable conditions met:	=	see sheet enable conditions	-	during predrive with 0.02 s rate	
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	whenever enable	
Torque Management Request Input	P2544	Detects implausible torque request information received from the TCM	Path 1:		ignition on	=	TRUE	-	fail conditions exist for	В
Signal "A"			number of messages with rolling count / protection value errors detected with	>= 7.00	- and	_	soo shoot onchis		0.005 s test performed	
1		l	WILLI		basic enable conditions met:	=	see sheet enable tables	-	continuously 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.
			number of consecutive frames or	=	15.00	-	and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
			Path 2: internal calculated checksum value for transmission is not equal the received value	=	TRUE	-						
			and number of fault results	>	15.00	-						
Turbocharger Boost Control Position Sensor Circuit High Voltage	P2565	Detects high voltage readings on the turbo boost control position sensor circuit, indicating an OOR high condition on the circuit	voltage of boost pressure position sensor	>	4.75	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously	A
			same as boost pressure position	>	93,5	%	and basic enable conditions met: and	=	see sheet enable tables	-	0.01 s rate	
							No Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
Turbocharger Boost Control Position Sensor Circuit Low Voltage	P2564	Detects low voltage readings on the turbo boost control position sensor circuit, indicating an OOR low condition on the circuit	voltage of boost pressure position sensor	<	0.15	V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed continuously	A
			same as boost pressure position	<	4.60	%	and basic enable conditions met:	=	see sheet enable tables	-	0.01 s rate	
							and No Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
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	В
					_		and adaption not active and	=	FALSE	-	rate 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 and	=	TRUE	-	conditions are met	

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters		Conditions		Required	Illum.
					engine running for time (see Look-Up-Table #92) and	=	TRUE 30 to 327.67	- sec		l
					( engine coolant temperature and	>=	69.96	°C		1
					engine coolant temperature ) and	<	129.96	°C		l
					( environmental temperature and	>=	-15.04	°C		1
					environmental temperature ) and	<	199.86	°C		l
					basic enable conditions met: and	=	see sheet enable tables	-		1
					no pending or confirmed DTCs and	=	see sheet inhibit tables	-		l
					no pending or confirmed DTCs	=	see sheet inhibit tables	-		l
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
					and basic enable conditions met: and NO Pending or Confirmed DTCs:	=	see sheet enable tables see sheet inhibit tables	-		

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions		Required	Illum.
Control Module Power Off Timer Performance	P262B	Detects a failure in the engine off timer if during the after run the internal SW timer and the EOT do not correlate. A failure is detected when the respective timers are started after a calibration time then both are stopped, if the difference between the calculated times exceeds a calibrated threshold a fault is set.	Path 1:				time since engine post drive/ afterun	<	20.00	Sec	fail conditions exists for 0.01 s monitor runs once per driving cycle with 0.01 s rate whenever enable conditions are met	В
			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	- ~ %	and engine post drive/ afterun and basic enable conditions met:	=	TRUE see sheet enable tables			
		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	
		Detects an interrupted supply voltage of the engine off time circuit (permanent battery voltage supply line to ECM)	permanent supply voltage is interrupted via open circuit	=	TRUE	-	ignition on	=	TRUE		fail conditions exists for more than 1 event monitor runs once per driving cycle	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					basic enable conditions met:	= see sheet enable - tables	with 0.01 s rate whenever enable conditions are met	
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)	<ul> <li>Open Circuit:≥ - 200 K Ω impedance between ECU pin and load</li> </ul>	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 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)	<ul> <li>Short to ground: - ≤ 0.5 Ω impedance between signal and controller ground     </li> </ul>	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 Relay Control Circuit High	P2634	Electronic out-put driver circuitry determines that the tank transfer pump circuit is shorted to battery.	Voltage high during driver on state (indicates short to power)	= Short to power: - ≤ 0.5 Ω impedance between signal and controller power	ignition on	= TRUE -	fail conditions exists for 3 s monitor runs 0.02 s rate whenever enable	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 basic enable conditions met:	=	see sheet enable tables	-	conditions are met	
Fuel Transfer Pump Performance	P2636	tank transfer pump performance by comparing the decrease of the fuel level in both tanks.	Path 1: change in fuel volume in primary tank and change in fuel volume in secondary tank or Path 2: change in fuel volume in primary tank and change in fuel volume in secondary tank or Path 3: change in fuel volume in primary tank and change in fuel volume in secondary tank	< < < < < < < < < < < < < < < < < < < <	0.80 0.00 0.80 0.00 0.80	1	<pre>( Engine Running and fuel transfer pump active means ( ( ( filtered fuel volume in primary tank or filtered fuel volume in secondary tank and time between activations of transfer pump and fuel level zone 5 means ( filtered fuel volume in primary tank and filtered fuel volume in secondary tank ) vehicle speed and NO Pending or Confirmed DTCs: ) for time and basic enable conditions met:</pre>	= = 、、、、、、、 =	TRUE TRUE 1638.30 0.00 32767.00 137.40 0.00 0.00 see sheet inhibit tables 327.67 see sheet enable	- I Sec I mph - Sec -	fail conditions exists for 327 s monitor runs 0.02 s rate 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.
Fuel Injector Calibration Not Programmed	P268A	Detects un-programmed Injector Calibration Data (IQA) in ECM	Path 1: the checksum of the injector adjustment code words is correct	= FALSE -	engine pre drive and basic enable conditions met:	= TRUE = see sheet enable tables	-	fail conditions exist for 1 s monitor runs once per driving cycle during predrive with 1 s rate	A
Cylinder 1 Injector Data Incorrect (IQA)	P268C	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 1 transmitted via CAN from GPCM (glow plug module) match with the stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 1 are valid and basic enable conditions met: and NO Pending or Confirmed DTCs:	<ul> <li>TRUE</li> <li>see sheet enable tables</li> <li>see sheet inhibit tables</li> </ul>	-	fail conditions exist for 1 s test performed continuously with 1 s rate	A
Cylinder 2 Injector Data Incorrect (IQA)	P268D	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 2 transmitted via CAN from GPCM (glow plug module) match with the stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 2 are valid and basic enable conditions met: and NO Pending or Confirmed DTCs:	<ul> <li>TRUE</li> <li>see sheet enable tables</li> <li>see sheet inhibit tables</li> </ul>	-	fail conditions exist for 1 s test performed continuously with 1 s rate	A
Cylinder 3 Injector Data Incorrect (IQA)	P268E	Detects a miss match in IQA values between ECM and GPCM	IQA (injection quantity adjustment) value of injector 3 transmitted via CAN from GPCM (glow plug module) match with the stored ECM value	= FALSE -	transmitted IQA data from GPCM (glow plug module) for cylinder 3 are valid and basic enable conditions met: and NO Pending or Confirmed DTCs:	<ul> <li>TRUE</li> <li>see sheet enable tables</li> <li>see sheet inhibit tables</li> </ul>	-	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 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:	<ul> <li>TRUE</li> <li>see sheet enable tables</li> <li>see sheet inhibit tables</li> </ul>	fail conditions exist for 1 s test performed continuously with 1 s rate	А
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 turbine speed, output shaft speed, and gear ratio	-	FALSE		Current Transmission Gear and Current Transmission Gear 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:	* * = = ^ ^ ~ = =	Park/Neutral Reverse FALSE TRUE 12.43 100.00 10.00 6000.00 1000.00 see sheet enable tables see sheet inhibit tables	- - mph % rpm rpm -	fail conditions exists for 0.05 s test performed continuously 0.02 s rate	В
Reductant Delivery	P2BAA	Compared EWMA filtered			24.80	kPa	Madalad SCB aatalyst tamparatura		199.96	°C	foult ovisto	A
Performance monitor	Γ∠DAA	pressure drop with the threshold	EWMA filtered pressure drop	<	24.00	۲ď	Modeled SCR catalyst temperature	>=	133.30	C	fault exists for more than 1 event; monitor runs at 0.1 s once per trip	A
							Modeled SCR catalyst temperature Temperature gradient of SCR Temperature gradient of SCR for time Exhaust mass flow	<= >= < > >	399.96 -40.00 40.00 0.20 0.50	°C °C/sec °C/sec sec g/sec		

Component /	Fault	Monitor Strategy	Primary Malfunction	Threshold	Secondary		Enable		Time	MIL
System	Code	Description	Criteria	Logic and Value	Parameters		Conditions		Required	Illum.
					Exhaust mass flow	<=	44.40	g/sec		
					(a) - (b)	>	-0.30	g		
					(a) Desired NH3 load level	=	calculated	9		
						-	parameter			
					(b) estimated NH2 load lovel	=	calculated	-		
					( b ) estimated NH3 load level	=		-		
							parameter			
					Estimated NH3 load level	<	3.00	g		
					Status of the SCR adaptation plausibility	=	FALSE	-		
					check active (please see the definition)					
					DPF Regen not active	=	TRUE	-		
					Reductant dosing off request	=	FALSE	-		
					SCR control sub state (please see the	=	Metering Control	-		
					definition)		Ū			
					Dosed reductant amount of current	>=	7.00	g		
					driving cycle			э		
					Dosed reductant amount of current	<=	100.00	g		
					driving cycle	~-	100.00	Э		
					Dwell time in Metering control substate	<=	42949672.95	sec		
						<=		sec		
					State of Reductant injection valve	=	0	-		
					Component Protection (please see					
					definition)					
					Vehicle speed	<	4.35	mph		
					for time	>	4.00	sec		
					NO Pending or Confirmed DTCs	=	see sheet	-		
							inhibit tables			
					basic enable conditions met:	=	see sheet enable	-		
							tables			
					EWMA fast initialization mode:					
					EWMA filter coefficient for Fast	=	0.28	factor		
					Initialization mode	-	0.20	lactor		
					Maximum number of pressure drop per		3.00	count		
						>=	3.00	Count		
					driving cycle in Fast Initialization mode					
					Table allowed and the form		4.00			
					Total number of pressure drop for Fast	=	4.00	count		
					Initialization mode					
					EWMA Rapid Response mode:					
					Pressure difference: (a) - (b)	>	-12.0	kPa		
					(a) measured pressure drop	=	measured	-		
							parameter			
					(b) EWMA filtered pressure drop	=	calculated	-		
							parameter			
					EWMA filter coefficient for Response to	=	0.20	factor		
					Step Change mode					
					Maximum number of pressure drop per	>=	3.00	count		
					driving cycle in Response to Step	-				
					Change mode					
					Total number of pressure drop	=	8.00	count		
						-	0.00	count		
					measurement for Response to Step					
					Change mode					
					EWMA stabilized mode:					
					EWMA filter coefficient for stabilized	=	0.20	factor		
					mode					

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Lo	Threshold ogic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							Total number of pressure drop for stabilized mode	=	1.00	count		
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:	1	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	=	TRUE FALSE	-	test performed continuously at 0.02 s rate whenever	В

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	•	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							Frame enabled. The EMC is authorized to read the frame and basic enable conditions met:	=	TRUE see sheet enable tables	-	enable conditions are met	
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 ) 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 5 sec monitor runs with 0.1 s rate	A
		CAN frame rolling counter and protection value verification using a sliding window evaluation Check of level sensor	DLS1 Sliding Window error counter within a number of message frames	=	8.00		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	monitor runs with 1 s rate	
		CAN frame rolling counter and protection value verification using a sliding window evaluation Check of temperature sensor	DLS2 Sliding Window error counter within a number of message frames	=	8.00		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	monitor runs with 1 s rate	
		CAN frame rolling counter and protection value verification using a sliding window evaluation Check of error states	DLS3 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 with 1 s rate	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Lo	Threshold ogic and Valu	e	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
							consisting of: ignition for time battery voltage battery voltage	= ^ V ^	TRUE 5.00 655.34 9.00	- sec V V		
Engine Out NOx Sensor CAN Message #1	U029D	Engine out NOx sensor CAN message #1 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	5.00	counts	CAN Bus is Active Can Bus Initialized ( CAN Bus is Active ) consisting of: ignition for time battery voltage battery voltage	=	TRUE 5.00 655.34 9.00	- sec V V	fail conditions exists for more than 20 sec monitor runs with 0.005 s rate	A
		CAN frame rolling counter and protection value verification using a sliding window evaluation Check of engine out NOx cor	Sliding window error counter within a number of message frames	=	8.00		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	monitor runs whenever enable conditions are met	
		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 ) 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 #2		Engine out NOx sensor CAN message #2 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	5.00	counts	CAN Bus is Active	=	TRUE	-	fail conditions exists for more than	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MII Illui
							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	20 sec monitor runs with 0.005 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	>=	8.00 9.00	counts	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 tables	sec 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 for time	= = >	TRUE TRUE 5.00	- - Sec	fail conditions exists for more than 20 sec monitor runs with 0.005 s rate	
		CAN frame rolling counter and protection value	Sliding window error counter	>=	8.00	counts	battery voltage battery voltage CAN Bus is Active	< >	655.34 9.00 TRUE	V V -	monitor runs whenever	
		verification using a sliding window evaluation Check of engine out NOx ser	within a number of message frames	=	9.00	counts	Can Bus Initialized ( CAN Bus is Active ) consisting of: ignition for time battery voltage battery voltage No pending or confirmed DTCs	II	TRUE 5.00 655.34 9.00 see sheet inhibit tables	- Sec V V -	enable conditions are met	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	9	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Engine Out NOx Sensor CAN Message #4		Engine out NOx sensor CAN message #4 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	25.00	counts	CAN Bus is Active Can Bus Initialized ( CAN Bus is Active ) consisting of: ignition for	=	TRUE	-	fail conditions exists for more than 20 sec monitor runs with 0.02 s rate	
							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	>=	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 tables	sec V V		
Engine Out NOx Sensor CAN Message #5		Engine out NOx sensor CAN message #5 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	25.00	counts	CAN Bus is Active Can Bus Initialized ( CAN Bus is Active ) consisting of: ignition for time	= = ^	TRUE TRUE 5.00	- - Sec	fail conditions exists for more than 20 sec monitor runs with 0.1 s rate	
							battery voltage battery voltage	< >	655.34 9.00	V V		
Post Catalyst NOx Sensor CAN Message #1	U029E	Post catalyst NOx sensor CAN message #1 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	5.00	counts	CAN Bus is Active Can Bus Initialized ( CAN Bus is Active ) consisting of: ignition	=	TRUE	-	fail conditions exists for more than 21 sec monitor runs with 0.005 s rate	A
							for time battery voltage	= > <	5.00 655.34	sec V	rate	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Valu	ue	Secondary Parameters		Enable Conditions		Time Required	II
							battery voltage	>	9.00	V		
		CAN frame rolling counter and protection value verification using a sliding window evaluation Check of nost ratalyst NOV of	Sliding window error counter within a number of message frames	>=	8.00	counts	CAN Bus is Active Can Bus Initialized ( CAN Bus is Active )	=	TRUE	-	monitor runs whenever enable conditions are met	
				-	3.00	counts	consisting of: ignition for time battery voltage battery voltage No pending or confirmed DTCs	= ^ V ^ =	TRUE 5.00 655.34 9.00 see sheet inhibit tables	sec V V	aremet	
		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 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 tables	- sec V V -	monitor runs whenever enable conditions are met	
st Catalyst NOx Sensor CAN Message #2		Post catalyst NOx sensor CAN message #2 frame not received after a calibrated number of times	Counts up when message frame is not received in the time out interval	>	5.00	counts	CAN Bus is Active 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 21 sec monitor runs with 0.005 s rate	
		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	CAN Bus is Active Can Bus Initialized ( CAN Bus is Active )	-	TRUE		monitor runs whenever enable conditions are met	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum
						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 #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 Can Bus Initialized ( CAN Bus is Active )	=	TRUE	·	fail conditions exists for more than 21 sec	
						consisting of: ignition for time battery voltage battery voltage	= > < > >	TRUE 5.00 655.34 9.00	- sec V V	monitor runs with 0.005 s rate	
		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 = 10.00	counts	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 tables	- 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 Can Bus Initialized ( CAN Bus is Active )	=	TRUE	·	fail conditions exists for more than 21 sec	
						consisting of: ignition for time battery voltage battery voltage	= > < >	TRUE 5.00 655.34 9.00	- Sec V V	monitor runs with 0.02 s rate	

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Valu		Parameters		Conditions		Required	Illum.
		and protection value verification using a sliding window evaluation	Sliding window error counter within a number of message frames	>=	8.00 9.00		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 tables	- Sec V V -		
Post Catalyst NOx Sensor CAN Message #5			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 )	=	TRUE	-	fail conditions exists for more than 21 sec monitor runs	
							consisting of: ignition for time battery voltage battery voltage	= > < >	TRUE 5.00 655.34 9.00	sec V V	with 0.1 s rate	
Lost Communication With PM Sensor	U02A3		SCU signal timeout CAN error (no message received)	=	TRUE	-	Battery voltage (ECM)	>=	11.00	V	fault exists for more than 1.4 sec;	В
							Ignition on for time	= >	TRUE 1.20	- sec	monitor runs at 0.1 s	
							Ignition on	=	TRUE	-	fault exists for more than 1.5 sec;	

# 16 OBDG08 ECM Summary Tables (LGH Specific)

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Fuel Temperature Sensor 2 Circuit Low	P0187	Detects low voltage condition of the fuel temperature sensor circuit, indicating an OOR low condition	fuel temperature sensor voltage same as fuel temperature	< 0.60 > 150		ignition on and basic enable conditions met:	=	TRUE see sheet enable tables		fail conditions exists for 5 s test performed continuousl y 0.2 s rate	В
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 same as fuel temperature	> 4.75 < -50	°C	ignition on and basic enable conditions met:	=	TRUE see sheet enable tables		fail conditions exists for 5 s test performed continuousl y 0.2 s rate	В
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)	<ul> <li>Open Circuit:≥</li> <li>200 K Ω</li> <li>impedance</li> <li>between ECU pin</li> <li>and load</li> </ul>		engine post drive/ afterun for time and battery voltage for time and ( ignition on and basic enable conditions met: )		FALSE 1.00 11.00 3.00 TRUE see sheet enable tables	- V sec -	fail conditions exists for 1.99s monitor runs with 0.2 s rate whenever enable conditions are met	В

# 16 OBDG08 ECM Summary Tables (LGH Specific)

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Fuel Pre-supply Pump Control Circuit 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)	<ul> <li>Short to ground: ≤ 0.5 Ω impedance between signal and controller ground</li> </ul>	-	engine post drive/ afterun for time and battery voltage for time and (	= > >	FALSE 1.00 11.00 3.00	- sec V sec	fail conditions exists for 1s monitor runs with 0.2 s rate whenever enable conditions are met	В
						ignition on and basic enable conditions met: )	=	TRUE see sheet enable tables			
Fuel Pre-supply Pump Control Circuit High Voltage	P0629	Diagnoses the Fuel Pre- Supply Pump low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between signal and controller power		engine post drive/ afterun for time and battery voltage for time and ( ignition on and basic enable conditions met: )	= > > = =	FALSE 1.00 11.00 3.00 TRUE see sheet enable tables	sec V sec -	fail conditions exists for 2 s monitor runs with 0.2 s rate whenever enable conditions are met	В
Fuel Temperature Sensor 1 Circuit High	P111F	Detects an error in the fuel pump temperature sensor performance by comparing start-up temperatures between fuel pump temperature and fuel rail temperature	Path 1:  (a) - (b)  (see Look-Up-Table #41) where ( (a) captured fuel temperature 1 at start	> 100.00 = measured parameter	°C	minimum engine-off time and ambient temperature and	>=	-60.04	sec °C	fail conditions exists for 0.2 s monitor runs once per trip with 0.2 s rate whenever enable conditions	В

# 16 OBDG08 ECM Summary Tables (LGH Specific)

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value	l	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
			and with (b) captured fuel temperature 2 at start ) or Path 2: [(a) - (b)] (see Look-Up-Table #41) with (a) captured fuel temperature 1 at start and with (b) captured fuel temperature 2 at start and [(a) - (b)] (see Look-Up-Table #42) where (a) captured fuel temperature 1 at start and with (b) captured fuel temperature 2 at start and with (b) captured fuel temperature 2 at start and ( status of block heater (see parameter definition)		measured parameter 100.00 measured parameter 20.00 measured parameter measured parameter FALSE	- - - - -	engine speed (see Look-Up-Table #91) for time and engine post drive/ afterun and diagnostic performed in current dc and basic enable conditions met: and NO Pending or Confirmed DTCs:		600 to 850 0.00 FALSE FALSE see sheet enable tables see sheet inhibit tables	rpm sec - -	are met	
Lost Communications with Auxiliary Heater Control Module	U0166	Detects loss of communication between ECM (on-board control unit) and Auxiliary Heater Control Module	time since last message from auxiliary heater control module was received	>	2.50	sec	ignition on for time and battery voltage and battery voltage and basic enable conditions met: and NO Pending or Confirmed DTCs:	= >= = =	TRUE 3.00 9.00 16.00 see sheet enable tables see sheet inhibit tables	- V V -	fail conditions exists for 12 s test performed continuousl y 0.01 s rate	Special C

# 16 OBDG08 ECM Summary Tables (LML Specific)

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Ambient Air Temperature Sensor Circuit "A" Range/Performanc e	P0071	Detects a biased ambient air temperature sensor or intake air temperature sensor (MAF) by comparing the respective values at startup.		> = = = = = =	100.00 measured parameter measured parameter 100 to 999 measured parameter 20 to 999 measured parameter measured parameter measured parameter KALSE FALSE	2° - - - - - - - - - - -	minimum engine-off time and ambient temperature and engine speed (see Look-Up-Table #91) for time and engine post drive/ afterun and diagnostic performed in current dc and basic enable conditions met: and NO Pending or Confirmed DTCs:	> > = = = =	-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
Ambient Air Temperature Sensor Circuit "A" Low	P0072	Detects low voltage readings on the AAT circuit, indicating an OOR low condition on the AAT circuit		>	0.53	°C	ignition on and basic enable conditions met:	=	TRUE see sheet enable tables	-	fail conditions exists for 5 s test performed continuousl y 0.2 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.
Ambient Air Temperature Sensor Circuit "A" High	P0073	Detects high voltage readings on the AAT circuit, indicating an OOR high condition on the AAT circuit	voltage of ambient air temperature sensor same as ambient air temperature	> 4.89 V < -60.00 °C	ignition on and basic enable conditions met:	= TRUE = see sheet enable tables	-	fail conditions exists for 5 s test performed continuousl y 0.2 s rate	В
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)	<ul> <li>Short to ground: - ≤ 0.5 Ω impedance between signal and controller ground</li> </ul>	EGR Cooling Bypass Solenoid Control Circuit	= ACTIVE	-	fail conditions exists for 3 s monitor runs with	В
				ground	and battery voltage for time and starter is active cranking for time and basic enable conditions met:	<ul> <li>&gt; 11.00</li> <li>&gt; 3.00</li> <li>= FALSE</li> <li>&gt; 3.00</li> <li>= see sheet enable tables</li> </ul>	V sec - sec -	0.005 s rate whenever enable conditions are met	
Exhaust Gas Recirculation (EGR) Motor Control Circuit 2 High Voltage	P1412	Diagnoses the EGR Cooler Bypass high side driver circuit for circuit faults.	Voltage high during driver off state (indicates short to power )	<ul> <li>Short to power: ≤ - 0.5 Ω impedance between signal and controller power</li> </ul>	EGR Cooling Bypass Solenoid Control Circuit and battery voltage for time and starter is active cranking for time	= ACTIVE > 11.00 > 3.00 = FALSE > 3.00	- V sec -	fail conditions exists for 3 s monitor runs with 0.005 s rate whenever enable conditions are met	В
					time and basic enable conditions met:	> 3.00 = see sheet enable tables	sec -		

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		reshold and Value	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Exhaust Gas Recirculation (EGR) Motor Control Circuit Shorted	P1413	Electronic output driver circuitry determines circuit integrity on the EGR cooler bypass solenoid.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.			EGR Cooling Bypass Solenoid Control Circuit and	=	ACTIVE	-	fail conditions exists for 3 s monitor runs with	В
		This failure detects a short between the two output circuits				battery voltage	>	11.00	V	0.005 s rate whenever	
						for time and starter is active cranking	> =	3.00 FALSE	sec -	enable conditions are met	
						for time and	>	3.00	sec		
						basic enable conditions met:	=	see sheet enable tables	-		
	_								_		
Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Current Performance	P1414	Electronic output driver circuitry determines circuit integrity on the EGR cooler bypass solenoid.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.			EGR Cooling Bypass Solenoid Control Circuit	=	ACTIVE	-	fail conditions exists for 2 s monitor runs with	В
						and battery voltage for	>	11.00	V	0.005 s rate whenever	
						time and	>	3.00	sec	enable conditions	
						starter is active cranking for time	=	FALSE 3.00	- sec	are met	
						and basic enable conditions met:	=	see sheet enable tables	-		
	_								_		
Hill Descent Control Message Counter Incorrect	P155D	Hill Descent Control CAN communication monitoring (Frame \$2F9)	amount of errors in consecutive frames	>=	10.00 counts	ignition on	=	TRUE	-	fail conditions exists for	Special C
			with number of consecutive frames	=	16.00 counts	and basic enable conditions met and	=	see sheet enable tables	-	0.005 s monitor runs with 0.005 s	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
					NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-	rate whenever enable conditions are met	
Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit	P245A	Diagnoses the EGR Cooler Bypass low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	<ul> <li>Open Circuit:≥ -</li> <li>200 K Ω</li> <li>impedance</li> <li>between ECU pin</li> <li>and load</li> </ul>	battery voltage	>	11.00	V	fail conditions exists for 7s (in engine postdrive/	В
		The faults of the output circuit, that are detected with this diagnosis, are an open circuit or an overtemperature of the integrated circuit within the ECM.			time and	>	3.00	sec	afterun duration limited to 5s) monitor runs with 0.01s rate	
					starter is active cranking for	=	FALSE	-	whenever enable	
					time and	>	3.00	sec	conditions are met	
					EGR Cooling Bypass Solenoid Control Circuit for	=	ACTIVE	-		
					time and ( open load diagnostics is triggered after offset learning of valve is completed	>	3.00	sec		
					or NO Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
					, and basic enable conditions met:	=	see sheet enable tables	-		
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		battery voltage	>	11.00	V	fail conditions exists for 3 s	
					time and starter is active cranking	>	3.00 FALSE	sec	s monitor runs with 0.005 s	
					for time and	>	3.00	sec	rate whenever enable	

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria	Threshold Logic and Value	Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
					EGR Cooling Bypass Solenoid Control Circuit and ( NO Pending or Confirmed DTCs ) and basic enable conditions met:	= =	ACTIVE see sheet inhibit tables see sheet enable tables	-	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)	<ul> <li>Short to ground: - ≤ 0.5 Ω impedance between signal and controller ground</li> </ul>	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
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	for time and starter is active cranking for time and	>	11.00 3.00 FALSE 3.00	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.
							EGR Cooling Bypass Solenoid Control Circuit and ( NO Pending or Confirmed DTCs ) and basic enable conditions met:	= = =	ACTIVE see sheet inhibit tables see sheet enable tables	-		
Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Current Performance	P2493	Detects a controller deviation in EGR cooling bypass valve. Actual deviation readings are compared to a threshold.	controller deviation of EGR cooling bypass valve actuator calculated out of difference between desired and actual value 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 /	Fault	Monitor Strategy	Primary Malfunction		shold	Secondary		Enable		Time	MIL
System EGR Cooling Bypass Position	<b>Code</b> P2494	on the EGR cooling bypass	Criteria raw voltage of EGR cooling bypass actuator position sensor	Logic ar < 0.2	n <b>d Value</b> 25 V	Parameters ignition on	=	Conditions TRUE	-	fail conditions	A Illum.
Sensor Circuit Low Voltage		position circuit, indicating an OOR low condition on the EGR cooling bypass position circuit	same as EGR cooling bypass actuator position	< -22	2.5 %	and basic enable conditions met: and NO Pending or Confirmed DTCs:	=	see sheet enable tables see sheet inhibit tables	-	exists for 5 s test performed continuousl y 0.01 s rate when enable conditions are met	
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	raw voltage of EGR cooling bypass actuator position sensor	> 4.8	30 V	ignition on	=	TRUE	-	fail conditions exists for 5 s test performed	A
		circuit	same as EGR cooling bypass actuator position	> 11	4 %	and basic enable conditions met:	=	see sheet enable tables	-	continuousl y 0.01 s rate when enable conditions are met	
						and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
EGR Cooling Bypass Performance	P24C4	Detects adaptation values of EGR cooling bypass valve that are not plausible. Compares the difference between the maximum and minimum adaptation values to a threshold.	Path 1:				(			fail conditions exists for 0.01 s monitor runs with 0.01 s rate whenever	В
			difference between the max and min EGR cooler bypass valve offset values or Path 2:	> 50.	00 %		(			enable conditions are met	

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria learned offset value for EGR cooler	>	Logic and Value 16.00	%	Parameters active cleaning mode of EGR cooler	=	Conditions FALSE		Required	Illum.
			bypass valve in the present driving cycle	>	16.00	70	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	>	13.00	%	and ( battery voltage	>=	10.00	V		
			multiple open-close cycles or mean value for EGR cooling bypass	<	-16.00	%	and battery voltage	<=	655.34	V		
			valve offset learned at the open end during the current driving cycle over multiple open-close cycles				)					
							and ( engine coolant temperature	>=	5.06	°C		
							and engine coolant temperature )	<=	130.06	°C		
							) or offset learning active	=	TRUE	-		
							or diagnosis tester present	=	FALSE	-		
							, and completion of offset learning	=	TRUE	-		
							and basic enable conditions met:	=	see sheet enable tables	-		
							and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
				_		_						
		Detects a jammed EGR cooling bypass valve during opening or closing the valve.	Path 1:				EGR cooler bypass valve is opening	=	TRUE	-	fail conditions exists for 5	
			EGR cooler bypass valve stuck during opening which means	=	TRUE	-	or EGR cooler bypass valve is closing	=	TRUE	-	s monitor runs with 0.01 s rate	
			( (a) + (b) with	>=	75.01	%	and (				whenever enable conditions	
			(a) position of the EGR cooling bypass valve and with				active cleaning mode of EGR cooler bypass valve - no movement in EGR cooling bypass valve and	=	FALSE	-	are met	

Component /	Fault	Monitor Strategy	Primary Malfunction		Threshold		Secondary		Enable		Time	MIL
System	Code	Description	Criteria		Logic and Value		Parameters		Conditions TRUE		Required	Illum.
			(b) learned offset value of EGR cooler bypass valve in the previous driving cycle and	=	calculated parameter	-	engine post drive/ afterun and	=	TRUE	-		
			(a) - (b) with	>=	0.99	%	( battery voltage	>=	10.00	V		
			(a) position of the EGR cooling bypass valve			-	and	/-				
			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 (		5.00			
			or				engine coolant temperature and	>=	5.06	°C ℃		
			Path 2: EGR cooler bypass valve stuck during closing which means	=	TRUE	-	engine coolant temperature ) )	<=	130.06			
			( 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				basic enable conditions met:	=	see sheet enable tables	-		
			(a) position of the EGR cooling bypass valve and with				and NO Pending or Confirmed DTCs:	=	see sheet inhibit	_		
			(b) position of the EGR cooling bypass	=	calculated	-	The Following of Committee DT03.	_	tables			
			valve of the previous process cycle		parameter							
			) for time	>	5.00	sec						
					_				_			_

Component / System	Fault Code	Monitor Strategy Description	Primary Malfunction Criteria		Threshold Logic and Value		Secondary Parameters		Enable Conditions		Time Required	MIL Illum.
Component / System Particulate filter efficiency monitoring	Fault Code P2002	Description	Criteria particulate filter efficiency factor	>	Threshold Logic and Value 0.36		Parameters Calculated exhaust-gas volume flow in the particulate filter and Calculated exhaust-gas volume flow in the particulate filter and Temperature upstream of the particulate filter and Temperature upstream of the particulate filter and Temperature downstream particulate filter and Upstream and downstream particulate filter temperature difference and Upstream and downstream particulate filter temperature difference and Simulated surface temperature, particulate filter and Simulated surface temperature, Simulated sur		Enable Conditions 3000.00 600.00 799.96 499.96 499.96 300.00 -300.00 799.96 499.96	m^3/h m^3/h °C °C °C °C °C °C °C °C	Time Required fail conditions exists for 0.1s monitor runs with 0.1s rate whenever enable conditions are met	B
							Simulated surface temperature, particulate filter and Basic enable conditions met NO Pending or Confirmed DTCs	> = =	499.96 see sheet enable tables see sheet inhibit tables	°C - -		
	_					_		_		_		

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
Battery Voltage		Battery Voltage Correction Factor	<ul> <li>battery voltage correction factor</li> <li>Nominal Declared Battery Voltage divided by measured battery voltage</li> </ul>	=	13.6	V
Engine Cooling System States		Status of the Block Heater	active under following conditions ( engine speed for time and (a) - (b) with (a) reference temperature (engine coolant temperature) captured during start	> >	500 60 1.8 measured parameter	rpm sec °C -
			and with (b) engine coolant temperature )		measured parameter	-
		status of Block Heater monitor time	active under following conditions ( engine speed for time		500 60	rpm sec
		Status of Sun Load Detection ( high thermal input from the sun which influences system behavior )	active under following condition ( Vehicle speed for		14.92	mph
			time and engine speed (see Look-Up-Table #14) for time and	>	300 600 to 850 600	sec rpm sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			(a) - (b) with (a) intake at temperature at start and with (b) minimum intake air temperature value for the comparison with the reference temperature during	=	4.5 measured parameter measured parameter	°C - -
		Status of Sun Load Detection time	driving cycle ) active under following condition		_	
			( Vehicle speed for time and	>	14.92 300	mph sec
			engine speed (see Look-Up-Table #14) for time )	>	600 to 850 600	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	processor operating normally ignition	= =	TRUE OFF	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
		"engine stopping" during engine spin down	key off bookkeeping cleanup	=	in process	-
Engine Operating Modes	Exhaust Operating Mode focus	Normal Mode Particulate Filter Regeneration Mode Particulate Filter Regen Service Mode Exhaust Gas Temperature (Active) Management Mode also known as Engine Operating Mode		=	Warm Up or Maintain Temperature Exhaust Warm-	
Exhaust Gas Recirculation (EGR)		Exhaust Gas Recirculation (EGR) Control is enabled	see Closed Loop Enable Conditions for EGR Closed Loop conditions		up	_
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	engine running	=	TRUE	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
		also known as Decel Fuel Shut Off or Over-Run	required actual engine torque -	-	1 -	Nm -
		Status of Diesel Fuel Refill Detection	(( Filtered total fuel volume available (a) Amount of fuel volume change that indicates a refueling event occurred (b) captured remaining diesel fuel volume under the following conditions		(a) + (b) 25.26 measured parameter	- % -
			( Vehicle speed time ) and	<= >	1.24 4	mph sec
			( Vehicle speed time )) or	<= >	1.24 30	mph sec
			at initialization of Diesel fuel level which means ECM Code-Clear of ECM Replacement occurred		TRUE TRUE	-
Idle Speed Control		Idle Speed Controller Active "normal" low idle speed governor	no overrides for: Gear-Shift Harmonization Intrusive Diagnosis Action Power Take Off or other working load handling			
		Engine Idling Time Ratio	= ( time accumulated at idle divided by time since engine start )			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
NOx Sensor		Status of NOx signal of upstream NOx				
		sensor	(			
			following condition met for time:	>	30	sec
			( Integrated heat quantity (see Look-Up-Table #1)	>=	375 to 500	kJ
			NOx status signal received via CAN message (Please see the definition)		TRUE	-
			for time		0.5	sec
			calculated lambda value based on air mass flow and injection quantity		0.9	-
			for time		0.5	sec
			engine speed		100	rpm
			for time		20	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
			))			
		Lingtreem New Concer Signal Dearly	following condition mot for times		30	
		Upstream Nox Sensor Signal Ready or Upstream Nox SensorDewpoint	following condition met for time:	>	30	sec
		Reached or				
		Lambda signal from NOx sensor ready	Integrated heat quantity (see Look-Up-Table #1)	>=	375 to 500	kJ
			)			
					_	_
		Status of NOx signal of downstream NOx sensor				
			( following condition met for time:	>	30	sec
			( Integrated heat quantity (see Look-Up-Table #2)	>=	0 to 350	kJ
			NOx status signal received via CAN message (Please see the definition)		TRUE	-
			(Please see the definition) for time		0.5	sec
			calculated lambda value based on air mass flow and injection quantity	>	0.9	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			for time engine speed for time NO Pending or Confirmed DTCs: ))	~ ~ ~ =	0.5 100 20 see sheet inhibit tables	sec rpm sec -
		Downstream Nox Sensor Signal Ready or Downstream NOx Sensor Dewpoint	following condition met for time: ( Integrated heat quantity (see Look-Up-Table #2)	>	30 0 to 350	sec kJ
		Reached or Lambda signal from NOx sensor ready				
		Enabling Upstream NOx sensor heater diagnosis				
			( SCR Catalyst downstream temperature SCR Catalyst downstream temperature battery voltage battery voltage	>= <= >= <=	94.96 3003.56 11 655.34	°C °C V V
			and Integrated heat quantity (see Look-Up-Table #2)	>=	0 to 350	kJ
			for time ) and	>	30	sec
			for time NO Pending or Confirmed DTCs:	> =	1 see sheet inhibit tables	sec -
		Enabling Downstream NOx sensor			_	
		heater diagnosis	(			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			SCR Catalyst upstream temperature	>=	94.96	°C
			SCR Catalyst upstream temperature	<=	3003.56	°C
			battery voltage	>=	11 655.34	V V
			battery voltage	<=	655.34	V
			and Integrated heat quantity (see Look-Up-Table #1)	>=	375 to 500	kJ
			for time )	>	30	sec
			and for time NO Pending or Confirmed DTCs:	> =	1 see sheet inhibit tables	sec -
Rail Pressure Control System Operating States		Rail Control at ECM Start	reset condition or	=	TRUE	-
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		Rail Pre-Control (Just after start)	Rail Control at ECU Start	=	TRUE	-
			and			
			engine speed and	<=	300	rpm
			( rail pressure	>=	15000	kPa
			or (a) - (b)	<	5000	kPa
			(a)Fuel Rail Pressure Setpoint	=	measured	-
			(b)Maximum Rail Pressure for last 10ms	=	paramter measured	-
			)		paramter	
		Rail Control - PCV Closed Loop Control				
		Only				

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
		PCV = Pressure Control Valve	Rail Pressure Precontrol (Just after start) and Number of Crankshaft revolutions since entering Rail Pressure Precontrol	= >=	TRUE 10	- revs
			) or ( state machine rail pressure control transitioning pressure control valve mode and	=	TRUE	-
			setpoint volume flow of the metering unit out of rail pressure control (see Look-Up-Table #6) or	>	60000 to 224000	mm^3/rev
			( Fuel system pressure and high pressure pump outlet and	<	0	kPa
			engine status )	=	RUNNING	-
		Rail Control - Metering Unit Closed Loop Control	state machine rail pressure control equal transitioning to metering unit pressure control mode and	=	TRUE	-
			Controller for PCV not wound-up (large corrective control)	=	TRUE	-
		Rail Control - Metering Unit + PCV Closed Loop Control	state machine rail pressure control transitioning to coupled pressure control mode (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-
			and (a) + (b) (see Look-Up-Table #7)	<	12 to 400	mm^3/rev
			(a)Torque Generating fuel injection quantity (b)Non-Torque generating fuel injection quantity	=	calculated parametet calculated parametet	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
		Switchover Between Metering Unit + PCV Closed Loop Control to Metering Unit Closed Loop Control only	(			
		Child Closed Loop Conitor 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) + (b) (a)Torque Generating fuel injection quantity	< =	(c) + (d) calculated parametet	-
			(b)Non-Torque generating fuel injection quantity	=	calculated parametet	-
			(c) (see Look-Up-Table #7)	=	12 to 400	mm^3/rev
			(d)	=	12	mm^3/rev
			and NO Pending or Confirmed DTCs: or	=	see sheet inhibit tables	-
			) 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 and		0	kPa
			engine status		RUNNING	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			) ) and NO Pending or Confirmed DTCs: )	Н	see sheet inhibit tables	-
		Switchover between PCV or Metering Unit closed loop control to Metering Unit + PCV Closed Loop Control	(			
			state machine rail pressure control equal to pressure control valve		TRUE	-
			or state machine rail pressure control equal coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-
			or state machine rail pressure control transitioning pressure control valve mode	=	TRUE	-
			or state machine rail pressure control equal transitioning to metering unit pressure control mode ) and	=	TRUE	-
			( exhaust gas system regeneration mode )	!=	REGEN	-
			and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		Switchover Between Metering Unit + PCV Closed Loop Control to PCV Closed Loop Control only	(			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			state machine rail pressure control equals coupled pressure control (rail pressure is controlled by metering unit and pressure control valve)	=	TRUE	-
			or state machine rail pressure control transitioning to coupled pressure control mode (rail pressure is controlled by metering unit and pressure control valve) )	=	TRUE	-
			and (a) + (b) (see Look-Up-Table #7) where	<	12 to 400	mm^3/rev
			(a)Torque Generating fuel injection quantity (b)Non-Torque generating fuel injection quantity	=	calculated parametet calculated	-
			(b) ton roique generating rue injection quantity	_	parametet	
Regeneration of the Diesel Particulate Filter		Status thermal regeneration active	Reduced particle mass flow in simulation by thermal regeneration			
			(a) * (b) * ( c) (a) Correction factor for thermal soot burn-out dependent on lambda and oxygen mass flow (see	> =	0 0 to 4.0	- factor
			Look-Up-Table #4) (b) Effect of temperature on regenerated particle mass (see Look-Up-Table #5)	=	0 to 2.97	-
			( c) Basis value of produced soot mass flow dependent on actual soot mass (see Look-Up- Table #3)	=	0.02 to 0.29	g/sec
SCR System	NOx Control System Reductant Dosing Strategy	Release of dosing of the dosing strategy				
	Active State		status of SCR control state (please see the definition) Reductant dosing is released	=	Metering Control TRUE	-
			Deactivation of dosing to execute the NOx Offset test (Please see the definition)	=	FALSE	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			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:	X U X ∧ X ∧ I	0.02 300 0.01 179.96 89.96 -0.62 400 see sheet inhibit tables	sec °C/sec °C °C °C mph rpm -
		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	= > >= = =	NO Pressure Control on 550 2 169.96 TRUE TRUE	- sec °C -

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			Preliminary release of the heater control for the main state machine (please see the definition) ) NO Pending or Confirmed DTCs:	=	TRUE 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 Reductant Pump Module Pressure	<	50 200	% kPa
			) Set-point duty cycle for Reductant dosing valve Set-point duty cycle for the Reductant Pump pressure Motor actuator NO Pending or Confirmed DTCs:	= = =	100 40.00 see sheet inhibit tables	% % -
		State of Reductant Pressure Control	SCR control state (please see the definition)	=	Pressure Control	-
		System: Pressure build up (substate of Pressure control)	( Reductant filling state in the pressure line or	>=	50	%
			Reductant Pump Module Pressure for time ) Reductant Pump Module Pressure	>= >	200 0.5 350	kPa sec kPa
			Set-point duty cycle for Reductant dosing valve Set-point duty cycle for the Reductant Pump pressure Motor actuator NO Pending or Confirmed DTCs:	< = = =	0% 80.00 see sheet inhibit tables	кга % %

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
		State of Reductant Pressure Control System: Ventilation (substate of Pressure control)	SCR control state (please see the definition)	=	Pressure Control	-
		,	Reductant Pump Module Pressure	<	350	kPa
			Dwell time in Pressure Build up substate	>	10	sec
			system pressurizes in pressure buildup and ventilation states	<	10	counts
			Set-point duty cycle for Reductant dosing valve	=	100	%
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	80.00	%
			Dwell time in the sub state ventilation	<	0.23	sec
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
					-	
		State of Reductant Pressure Control System: Metering control (substate of Pressure control)	SCR control state (please see the definition)	=	Pressure Control	-
		,	Reductant Pump Module Pressure	>=	350	kPa
			Set-point duty cycle for Reductant dosing valve	=	0	%
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
			· · · · ·		"	
		State of Reductant Pressure Control System: Pressure reduction	ignition	=	off	-
			dwell time in the state of pressure reduction	<	5	sec
			Activation state of Reductant reverting valve power stage	=	On	-
			Set-point duty cycle for Reductant dosing valve	=	0	%
			Set-point duty cycle for the Reductant Pump		15.00	%
			pressure Motor actuator			
			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
		l				I

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
	Reductant Dosing Strategy based on DPF Fload	Status fill level decrease (please see the definition)				
	based on DFT Tibad		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) (a) Nominal value of Reductant fill level in the catalyst	>=	0	-
			(b) Estimated current Reductant load ( c) Reductant Dosing quantity limitation	=	100	factor
			or SCR catalyst temperature too high to convert Reductant under Particle filter Regeneration request			
			Average temperature inside the SCR catalyst:	>	999.96	°C
	Reductant Heater and Defrost System Control States and Status					
		Reductant Defrost check	status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			State of the defrosting check of pressure line (please see the definition)	=	TRUE	-
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-
			duration, for which the conditions for a hydraulic release reset of pressure line heater circuit are satisfied	<=	1200	sec
			ambient temperature	>	-4.04	°C
			Release heater pressure line and	=	FALSE	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			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	status of reductant tank heater temperature		_	_
		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)		_	

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			time since supply module heating on under supply module defrost mode	>=	0 to 3276.7	sec
			or			
			status of SCR control state (please see the definition)	=	No Pressure Control	-
			Supply module defrost timer	=	0	sec
			or			
			ignition engine speed	= >	on 550	sec rpm
			engine speed (	-	550	ipin
			Pressure line defrost check in last driving cycle	=	TRUE	-
			status of SCR control state (please see the definition)	=	No Pressure Control	-
			Engine off Time	<	0	sec
			NO Pending or Confirmed DTCs:	=	TRUE	-
					0.4000	
		The component protection release of the heater control	Current time for heating / not heating of heater circuit 1 (tank)	>=	0 to 299	sec
			Reductant Defrost check (please see the	=	FALSE	-
			definition)			
		Preliminary release of the heater control	Preliminary release of the heater control for the			
		for the main state machine	main state machine (please see the definition)			
			Current time for heating / not heating of heater circuit 1 (tank)	>=	0 to 3276	sec
			status of reductant tank heater defrost	=	FALSE	-
			status of reductant tank heater temperature	=	FALSE	-
			(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 (please see the definition)	=	TRUE	-
			(please see the definition)			
			, or			
			( ignition	_	00	500
			engine speed	= >	on 550	sec rpm
		l	Engine off Time	<=	0	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			State of the defrosting check of pressure line (please see the definition)	=	TRUE	-
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-
			and if the following conditions were met in previous driving cycle (	=	TRUE	-
			ignition engine speed	= >	on 550	sec
			Engine off Time	<=	0	rpm sec
			State of the defrosting check of pressure line (please see the definition)	=	TRUE	-
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-
		Release of tank heater circuit				
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec
			or Requested heating time for Reductant tank heater (see Look-Up-Table #17) )	>=	0 to 3277	sec
			or ((			
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec
			or Requested heating time for Reductant tank heater (see Look-Up-Table #17) )	>=	0 to 3277	sec
			and (			
			Requested defrosting time for pressure line heater (see Look-Up-Table #18) 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 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			or			
			(( Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)		0 to 14400	sec
			or Requested heating time for Reductant tank heater (see Look-Up-Table #17)		0 to 3277	sec
			) and			
			Requested defrosting time for supply module heater (see Look-Up-Table #19) 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 Look-Up-Table #19)		0 to 3276.7	sec
			or Requested heating time for supply module heater (see Look-Up-Table #21) ))		0 to 3276.7	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			and NO Pending or Confirmed DTCs:	=	TRUE	-
		Release of pressure line heater circuit	( Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 3276.7	sec
			or Requested heating time for pressure line heater (see Look-Up-Table #20) )	>=	0 to 3276.7	sec
			or (( Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 3276.7	sec
			or Requested heating time for pressure line heater (see Look-Up-Table #20) )	>=	0 to 3276.7	sec
			and ( Requested defrosting time for supply module heater (see Look-Up-Table #19) 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) or	>=	0 to 3276.7	sec
			or Requested heating time for supply module heater (see Look-Up-Table #21) )	>=	0 to 3276.7	sec

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			or			
			(( Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec
			or Requested heating time for Reductant tank heater (see Look-Up-Table #17)	>=	0 to 3277	sec
			and			
			Requested defrosting time for supply module heater (see Look-Up-Table #19) 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 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) )) or	>=	0 to 3276.7	sec
			(( 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
	l		and			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			) Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 3276.7	sec
			or Requested heating time for pressure line heater (see Look-Up-Table #20)	>=	0 to 3276.7	sec
			) and (			
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	0 to 3276.7	sec
			or Requested heating time for supply module heater (see Look-Up-Table #21) ))	>=	0 to 3276.7	sec
			and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-
		Status of the battery voltage being in the valid working range for Reductant tank heater	battery voltage battery voltage for time		100 11 2	V V sec
				1	Z	360
		Status of the battery voltage being in the valid working range for pressure line heater			400	V
			battery voltage battery voltage for time	< > >	100 11 2	V V sec
		Status of Reductant Tank Heater Release	(			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired	>	0	sec
			,			
			or ((			
			Waiting time before tank heater released started with	<	32767	sec
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-
			) and (			
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired ()	>	0	sec
			or ((			
			Waiting time before tank heater released started with	>	32767	sec
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-
			) and			
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired		0	sec
	Reductant Tank Level	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	-
1	l	I				

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
		Otatus of Darksstant tank laws lases t				
		Status of Reductant tank level reset when refilling is detected (please see	(			
		the definition)				
			time since potential Reductant refill detection is	>=	12	sec
			set			
			and with			
			Derivation of the PT1 filtered level signal (DT1)	>=	1.00	%/sec
			ignition on	=	TRUE	-
			engine speed		550	rpm
			Vehicle speed		6.22	mph
			time since engine started		(a) * (b)	
			(a) Time period for a positive slope to detect refueling		12	sec
			(b) Factor for the extension of the detection time for refueling	=	20	factor
			since the following conditions met:	=	TRUE	-
			(			
			Falling edge of ignition or	=	TRUE	-
			Reductant Refill enabling conditions reset timers	=	TRUE	-
			or			
			(			
			time since potential Reductant refill detection is	>=	8	sec
			set and with			
			(			
			Derivation of the PT1 filtered level signal (DT1)	>=	1.00	%/sec
			filter release for Reductant tank level calculation		TRUE	-
			at ignition on on (Please see the definition) and with			
			and with			
			Frozen state is active during a certain warning	=	TRUE	-
			level (please see the definition) and with			
			( Reductant tank Temperature	>=	-100.04	°C
		1	or			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			Reductant low warning level (Please see the	>=	0	level
			definition) )))			
			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
		Status of Reductant Tank Level	status of reductant tank level release (please see			
		Release	the definition)			
			Status of Filter release for reductant tank level	=	TRUE	-
			calculation (please see the definition)			
			and ((			
			ambient temperature	>=	-100.04	°C
			((			
			status of reductant tank heater temperature (please see the definition)	=	FALSE	-
			Waiting time before tank heater released	<	32767	sec
			and			
			status of reductant tank heater temperature (please see the definition)	=	TRUE	-
			Waiting time after tank heater release expired	>	0	sec
			)			
			or			
			status of reductant tank heater temperature	=	FALSE	-
			(please see the definition)		171202	
			Waiting time before tank heater released	>=	32767	sec
			and status of reductant tank heater temperature	=	TRUE	_
			(please see the definition)	_	TROL	-
			Waiting time after tank heater release expired	>=	0	sec
			))			
			or Frozen state is active during a certain warning	=	TRUE	-
			level (please see the definition)			
			)		0.00	
			Vehicle speed	>=	6.22	mph
			) or			
			filter release for Reductant tank level calculation	=	TRUE	-
			at ignition on on (Please see the definition)			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
		Status of Filter release for reductant tank level calculation				
			Reductant tank Temperature	>=	-100.04	°C
			or Reductant low warning level (Please see the definition)	>=	0	-
			NO Pending or Confirmed DTCs:	=	TRUE	-
			or Frozen state is active during a certain warning level (please see the definition)		TRUE	-
		Filter release for Reductant tank level calculation at Ignition on	ignition	=	on	-
			Engine on timer is expired (please see the definition)	=	FALSE	-
			Vehicle speed Reductant low warning level (Please see the	>= >=	0.62 49	mph level
			definition) and with	2-	43	ievei
			(( Raw Reductant tank level and with	>=	33.3	%
			) Remaining Reductant quantity (a) - (b):	<	(a) - (b)	
			(a) Tank level for reserve mode (Restriction level) in [g]		2614	g
			<ul> <li>(b) Tank level threshold range below Restriction threshold for ignition on refill detection release</li> </ul>		1015	g
			or Raw Reductant tank level and with	>=	66.7	%
			) Remaining Reductant quantity (a) - (b):	<	(a) - (b)	
			(a) Tank level for reserve mode (Warning level) in [g]	=	5279	g
			(b) Tank level threshold range below WARNING threshold for ignition on refill detection release )		1617	g

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			or Raw Reductant tank level and with	>=	100	%
			( 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
					_	_
		Status of Refill detection of Reductant tank	Status of Refill detection of Reductant tank (please see the definition) Reductant tank level changed	=	TRUE	-
			(( Captured Reductant tank level at last tank level change	=	Empty	-
			or Captured Reductant tank level at last tank level change )	=	Restriction	
			, and (			
			one or more of following conditions are met status of Reductant tank level (please see the definition)	=	Warning	-
			or status of Reductant tank level (please see the definition)	=	OK	
			or status of Reductant tank level (please see the definition) ۱۱	=	Full	-
			)/ or (( Captured Reductant tank level at last tank level change or		Warning	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			Captured Reductant tank level at last tank level change )	=	OK	-
			and			
			status of Reductant tank level (please see the definition)	=	Full	-
			or (			
			Captured Reductant tank level at last tank level change	=	OK	-
			status of Reductant tank level (please see the definition) ))	=	Full	-
		Engine on timer is expired	time since engine started	>=	(a) * (b) 12 20	sec sec -
			and with ((			
			ignition engine speed	= >	on 550	sec rpm
			Vehicle speed ) or	>=	6.22	mph
			( Vehicle speed	>=	6.22	mph
			NO Pending or Confirmed DTCs: for time ))	= >	TRUE 1	sec
			and with timer reset conditions			
			( Falling edge of ignition	=	TRUE	-
			or Reductant Refill enabling conditions reset timers )	=	TRUE	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
	Reducant Tank Level Low Warning States	Normal_Operation_OK: 0 decimal, normal operation	Reductant tank level		Full	-
			and with (			
			Warning level or	<=	49	-
			Previous warning level		49	-
			vehicle speed ))	<=	98.75	mph
			or Reductant Quality state	>	0	-
					_	
		Warning_Leve1: 1 decimal, Warning level 1	Reductant tank level	<	Full	-
			Remaining mileage and with		1558.75	miles
			( Warning level	<=	49	Warning level
			or (			
			Previous warning level	>	49	Warning level
			vehicle speed	<=	98.75	mph
			and with Reductant Quality state	=	0	-
					Ũ	
		Warning_Level2: 2 decimal, Warning	Reductant tank level	<	Full	
		level 2	Remaining mileage and with		1558.75	miles
			( Warning level		49	Warning
			or			level

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			( Previous warning level	>	49	Warning level
			vehicle speed	<=	98.75	mph
			,,, and with Reductant Quality state	=	0	-
		Warning_Level3: 16 decimal, Warning	Reductant tank level	<	Full	-
		level 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	=	TRUE	-
			Reductant Quality state	=	0	-
		Warning_Level4: 32 decimal, Warning level 4	Reductant tank level	<	Full	-
			Remaining mileage and with	<=	855	miles
			( Warning level or	<=	49	Warning level
			( Previous warning level	>	49	Warning level
			vehicle speed ))	<=	98.75	mph
			and with Reductant Quality state	=	0	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
		Warning_Level5: 48 decimal, Warning level 5	((			
			Reductant tank level	<	Full	-
			Remaining mileage and with	<=	628.75	miles
			( Warning level	<=	49	Warning
				-	10	level
			or (			
			Previous warning level	>	49	Warning level
			vehicle speed	<=	98.75	mph
			))) or			
			() Warning level	=	48	Warning
			initialization phase after Reductant refill event is	=	TRUE	level
			active	_	INCL	
			))			
			and with Reductant Quality state	=	0	-
					0	
		Warning_Level6: 49 decimal, Warning level 6	((			
			Warning level	=	49	Warning level
			initialization phase after Reductant refill event is	=	TRUE	-
			active )			
			or			
			Warning level	<	49	Warning
			Failed Reductant system pressure build up		1	level -
			))			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			and with Reductant Quality state	=	0	-
		Warning_Level8: 80 decimal,Vehicle speed restriction mild	Warning level	=	80	Warning level
			initialization phase after Reductant refill event is active and with	=	TRUE	
			Reductant Quality state	=	0	
		Warning_Level10: 112 decimal,Vehicle speed restriction aggressive	Warning level	=	112	Warning level
		speed restriction aggressive	initialization phase after Reductant refill event is active	=	TRUE	-
			and with Reductant Quality state	=	0	-
		Warning_Level12: 144 decimal, Vehicle	Warning level	=	144	Warning
		speed restriction severe	initialization phase after Reductant refill event is active	=	TRUE	level -
			and with 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	-
				-	_	

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
	Reductant frozen System States	Frozen state is active during a certain warning level	ignition for time Reductant tank Temperature Reductant low warning level (Please see the definition)	= ~ ~ = ~ =	On 5 -9.04 2	- °C level
		Status of Reductant tank as frozen	( Engine off Time Reductant tank Temperature ) or ( Engine off Time time since the following conditions are met ( status of reductant tank heater defrost Vehicle speed Status of urea tank as frozen (please see the definition) ))	> < < = < = = > =	14400 -11.04 7200 7200 On or Defrost 6.22 TRUE	sec °C sec sec - 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 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 definition)		64 2 Pressure Build up 350 10 10 10 TRUE	- counts - kPa sec counts -

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			)			
SCR System Diagnosis	SCR System Long Term Adaptation Release States	Long-term Adaption Triggered	underdosing detected (please see the definition) OR overdosing detected (please see the definition)	=	TRUE 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 OR	<=	-6	g
			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

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
		Status of the SCR adaptation plausibility	(			
		check active	Status of NOx signal of downstream NOx sensor	=	TRUE	-
			(please see the definition)			
			NOx concentration downstream SCR catalyst	>	15	ppm
			for time	>	3	sec
			Estimated SCR catalyst efficiency		0.3	factor
			for time	>	3	sec
			NOx concentration deviation between sensor reading and modeled NOx concentration	>	measured	-
			downstream SCR catalyst		parameter	
			for time	>	10	sec
			(			
			Time since when the Reductant load level adaptation and the plausibility have been locked	>=	600	sec
			or		50	
			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	<	0.125	g
			Reductant Difference between nominal and estimated		0.5	-
			Reductant	>=	-0.5	g
			Filtered Upstream NOx mass flow Filtered Upstream NOx mass flow	>= <=	10 500	mg/sec mg/sec
			. (	~-	500	-
			Upstream Nox mass flow difference : (a) - (b) Upstream Nox mass flow difference : (a) - (b)	>= <=	0 500	mg/sec mg/sec
			and with	~-	500	mg/sec
			(a) Filtered Upstream NOx mass flow (b) Filtered actual upstream NOx mass flow			
			(0)			
			Status of pre controlled dosing (please see the	=	FALSE	-
			definition)			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			Difference between nominal and estimated Reductant	<	0.125	g
			Difference between nominal and estimated Reductant	>=	-0.5	g
			for time	>	5	sec
			HC load in SCR catalyst	<=	10	factor
			overall aging factor of the SCR catalyst	>=	0	factor
			for time	>	1	sec
			Temperature gradient of SCR	>=	-1	°C/sec
			Temperature gradient of SCR	<=	1	°C/sec
			for time	>	18	sec
			Integrated NOx mass flow after engine start	>=	5	g
			Release of Reductant dosing	=	active	-
			engine operating condition based on engine speed and injection quantity (see Look-Up-Table #10)	>	0 to 1	factor
			( Difference between nominal and estimated Reductant 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	< =	0 measured	g/sec
			(a) Thered NOX mass now downstream SCR measured by the sensor	_	parameter	-
			(b) Filtered and delayed NOx raw emission mass flow upstream of SCR	=	measured parameter	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
		Deactivation of dosing to execute the NOx Offset test				
			SCR catalyst temperature	>	400.06	°C
			SCR catalyst temperature	<	999.96	°C
			time	>	60	sec
			and			
			Currently dosed Reductant mass flow	<=	0.005	g/sec
			time	>	30	sec
			and Feed ratio			
			(a ) / (( b) * ( c))	<=	0.1	ratio
			(a) Currently dosed Reductant mass flow	=	measured	-
			(b) NOx raw emission mass flow	=	parameter measured parameter	-
			(c) Stoichiometric conversion factor NOx to	=	calculated	-
			Reductant time	>	parameter 10	sec
			une	>	10	Sec
			and Estimated current Reductant load	<=	0.3	g
			time	>	10	sec
		Release plausibility of Reductant Load		_		
			Release plausibility timer active or	>=	600	sec
			(			
			Release plausibility timer active	>=	50	sec
			Integrated NOx raw emission since fill level adaptation and plausibility have been locked	>=	2	g
			)			
		Status for disabling the SCR Efficiency monitor following an SCR Adaptation				
		cycle completion	Maximum dosing quantity	<	0.6	g/sec
		1				3. 300

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			or (a) - (b) (a) Reductant Dosing quantity (b) Maximum Reductant Dosing quantity	> = =	0 measured parameter calculated parameter	- - -
			or (a) - (b) (a) Reductant Desired value (b) Reductant Dosing quantity limitation due to frozen tank	> = =	0 calculated parameter calculated parameter	-
		Request for pre controlled dosing	Filtered exhaust gas mass flow (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	> =	(a) * (b) 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 (b) Upper hysteresis threshold for filtered exhaust- gas mass flow, dependent on thermal ageing SCR	> =	(a) * (b) 1 0.25	_ factor 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 ℃

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			and			
			ambient pressure	>	(a) + (b)	-
			(a) Upper hysteresis threshold for environment	=	74.5	kPa
			pressure (b) Offset for upper hysteresis switch on threshold	=	65.0	kPa
			for environment pressure	=	05.0	кга
			or environment pressure			
			ambient pressure	<	74.0	kPa
			and			
			Intake air temperature	>	(a) + (b)	-
			(a) Lower hysteresis switch on threshold for inlet	=	-6.54	°C
			air temperature			
			(b) Offset for upper hysteresis switch on threshold	=	49.5	°C
			for inlet air temperature			
			or Intake air temperature	<	-8.04	°C
			intake an temperature		-0.04	C
			)			
			,			
			and			
			(			
			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	Ĵ
			controlled mode			
			engine operation in normal mode	=	TRUE	-
			SCR Nox Catalyst Efficiency check was	=	FALSE	-
			performed this drive cycle			
			Incorrect Reductant Composition check was	=	FALSE	-
			performed this drive cycle		<b>TD: /</b>	
			NO Pending or Confirmed DTCs:	=	TRUE	-
			)			
			(k) + (l) + ( m)	>	75	
				-		
			(k) = (a) * (b)			

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			<ul> <li>(a) entry condition for pre controlled dosing at sea level (see Look-Up-Table #13)</li> <li>(b) Altitude multiplier factor for sea level</li> </ul>	=	0 to 100 measured paramter	-
			<ul> <li>(l) = ( c) * (d) * (e)</li> <li>( c) entry condition for online dosing at Mid level (see Look-Up-Table #12)</li> <li>(d) Multiplier to Mid Level enable speed load map</li> </ul>	=	0 to 100 1	- factor
			(e) Altitude multiplier factor for medium altitude	=	measured paramter	-
			(m) = ( f) * (g) * (h) (f) Entry condition for online dosing at Hi level (see Look-Up-Table #11)	=	0 to 100	-
			(g) Multiplier to Hi Level enable speed load map (h) Altitude multiplier factor for high altitude	=	1 measured paramter	factor -
			and Low pass filtered rNOxNSCDs signal )	>	2000	-
	Reductant Tank Heater Performance Diagnosis Status	start temperature is captured in EERPOM if monitoring is active over several driving cycles	continuation of previously started tank temperature performance monitoring cycle (see definition)	=	1.56	°C
		or start temperature is captured in EERPOM if monitoring is not active over several driving cycles	( continuation of previously started tank temperature performance monitoring cycle (see definition)	=	FALSE	-
			ignition on for time or ice detection by tank temperature difference:	> =	60 TRUE	sec
			(a) - (b) (a) filtered current tank temperature	<= =	-0.14 measured paramter	°C -

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
			(b) tank temperature captured at the beginning of current monitoring cycle	=	measured paramter	-
			))		paramet	
			or (a) - (b)	<=	-0.14	°C
			(a) filtered current tank temperature	=	measured paramter	-
			(b) tank temperature captured at the beginning of	=	measured	-
			current monitoring cycle or		paramter	
			monitoring was performed in previous driving cycle			
			Cycle			
					_	_
		continuation of previously started tank temperature performance monitoring cycle	temperature difference: (a) - (b)	<=	1.56	°C
			(a) filtered current tank temperature	=	measured	-
			(b) tank temperature of the previous driving cycle	=	paramter measured paramter	-
			temperature difference: (a) - (b)	<=	0	°C
			(a) tank temperature of the previous driving cycle	=	measured paramter	-
			(b) filtered current tank temperature	=	measured paramter	-
			temperature difference: (a) - (b)	>=	0	°C
			(a) tank temperature of the previous driving cycle	=	measured paramter	-
			start tank temperature of current monitoring cycle from EEPROM (see definition)	=	measured paramter	-
			Engine off Time	<=	2000	sec
			This monitor was complete in the last driving cycle	=	FALSE	
			ice detection by tank temperature difference:	_	0.1.1	*0
			(a) - (b) (a) filtered current tank temperature	> =	-0.14 measured	°C -
					paramter	
			(b) tank temperature captured at the beginning of current monitoring cycle	=	measured paramter	-

Component / System	State or Status Sub-Grouping	Description of State or Status found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units
		State of Reductant injection valve Component Protection	(( status of SCR control sub state (please see the definition) and with (	=	Metering control	
			PM Filter Regeneration	=	not active	-
			Modeled Reductant injection valve tip temperature based on its coil temperature (see Look-Up-Table #15) ) or		100.96 to 114.96	℃
			( PM Filter Regeneration Reluctant dosing valve modeled temperature )) or		active 19.96	℃
			( status of SCR control sub state (please see the definition) and with (	¥	Metering control	-
			PM Filter Regeneration Modeled Reductant injection valve tip temperature based on its coil temperature (see Look-Up-Table #15) ) or	>	not active 100.96 to 114.96	°C
			( PM Filter Regeneration Modeled Reductant injection valve tip temperature based on its coil temperature )))	>	active 19.96	°C

Component / System	State or Status Sub-Grouping	Description of State or Status found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units
Turbo Charger			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 / State or S System Sub-Gro	uping found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
Exhaust Gas Recirculation (EGR) Exhaust Gas Re (EGR) Closed L Control is enable	oop						
	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	P0335,P0336, P0016 P0722, P0721 P2122, P2123, P2138, P2127, P2128 P040C, P040D, P040F
	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, P0108, P0108, P0107, P0008, P0097, P007D, P007C, P02E0, P02E8, P02E3, P122F, P02E3, P122F, P02E4, P122C, P02E9, P02E8, P006F, P006E, P0045, P0048, P0047.		Engine off timer	P02610
	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	Calibrated out on our application					
	in Regeneration	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			
	(Harm Childred System)	Regeneration Mode	=	Active			

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
-		EGR controller is active in Overrun	DFCO Active	=	TRUE	-		
		(Cold exhaust system)	Regeneration Mode	=	Active			
		Atmospheric Pressure too low in	Calibrated out on our application					
		Regeneration	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 Engine Speed	> <	550 875	rpm rpm	Crank Position Crank Position	P0335,P0336, P0016 P0335,P0336, P0016
			Engine Coolant Temperature	>	60	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
			Engine Coolant Temperature		108	°C	Engine Coolant Temperature Sensor	P0128, P0117, P0118, P008F
			Ambient Air Temperature Vehicle Speed	> <	-5 4	°C mph	Intake Air Temperature 2 Transmission output speed sensor	P0097, P0098, P111C P0722, P0721
			Accelerator Pedal	<	2	%	Pedal Position 1 & 2	P2122, P2123, P2138, P2127, P2128
			Upstream DOC Temperature	>	200	°C		
			Transmission not in Reverse DPF Regeneration	=	TRUE FALSE			
			Di i Regeneration	_	THEOL			
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	<u>&lt;</u>	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, P1224, 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
		oonmand i dor edanny	injection quantity	=	(Look-Up-Table #31) to (Look-Up-Table #31 + 20)			P2122, P2123, P2138, P2127, P2128
		Engine Speed	engine speed range 1	=	(Look-Up-Table #91)- 250 to (Look-Up-Table	rpm	Crank Position	P0335,P0336, P0016
			engine speed range 2	=	#91) - 150 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, P1237, P1233, P1236, P1239, P122A			
	InActive	Command Fuel Quantity	injection quantity Range 1 or	<	6		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

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		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
		Active Errors	No DTC Pending OR Active	=	P0341, P0340, P0336, P0335, P2146, P2149, P2152, P2155, P0201, P0202, P0203, P0204, P0205, P0203, P0204, P0208, P1224, P1227, P1242, P1247, P1233, P1236, P1239, P122A			
HCI Loop	Closed Loop	Regen demand	time distance fuel soot		70,200 802 325 44	sec miles liters grams	Delta Pressure Sensor	P2459, P2463 P2459, P2463 P2459, P2463 P2453, P2454, P2455
		DOC inlet temperature	upstream DOC temperature upstream DOC temperature for time		620 230 0.5	C C s	EGT 1 EGT 1	P0545, P0546, P20E2, P2080, P2428 P0545, P0546, P20E2, P2080
		DPF inlet temperature	DPF upstream temperature DPF upstream temperature for time		750 230 0.5	C C s	EGT 3 EGT 3	P242D, P242C, P242D, P113A, P242B, P2428 P242D, P242C, P242D, P113A, P242B
	Open Loop	Regen demand	time distance fuel soot		70,200 802 325 44	s miles liters grams	Delta Pressure Sensor	P2610 P0722, P0721 P2122, P2123, P2138, P2127, P2128 P2453, P2454, P2455
		DOC inlet temperature	upstream DOC temperature for time		230 0.5	C s	EGT 1	P0545, P0546, P20E2, P2080
		DPF inlet temperature	DPF upstream temperature or	<u>&gt;=</u>	750	С	EGT 3	P242D, P242C, P242D, P113A, P242B, P2428
			DPF upstream temperature for time		230 0.5	C s	EGT 3	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						

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		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			
		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		Not Active R, 1, 2 -20 130 1.85 0.65 333.33 500	- °C °C ratio ratio g/sec rpm / sec	Transmission Range Switch Engine Coolant Temperature Sensor Barometric Pressure Manifold Absolute Pressure Sensor Mass Air Flow Sensor Crank Position	P0706, P0708 P0128, P0117, P0118, P008F P2228, P2229, P0106 P0107, P0108, P0106 P0102, P0103, P0101 P0335, P0336, P0016
			Engine Torque Demand Gradient	<	-720	Nm / sec	Pedal Position 1 & 2	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	<pre>&lt; &lt; &lt; = = &lt; &lt;</pre>	80 4 66 Not Active P, N Not Active 1300 15.53 P0571, P0118, P017, P0336, P0335, P2123, P2128, P2122, P2127, P007D, P007C	°C °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 P0570, P057C, P0335, P0336, P0016 P0722, P0721
Inner Loop - Reneration Temperature Control	Closed 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
		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

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		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
		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
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 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) of The component protection release of the heater control (please see the definition) 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)	=	Pressure Control			

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			Reductant filling state in the pressure line and	<	50	%		
			Reductant Pump Module Pressure	<	200	kPa	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			) Set-point duty cycle for Reductant dosing valve	=	100	%	Reductant Injector	P1048, P2048, P1049, P2049, P2047, P202E
			Set-point duty cycle for the Reductant Pump pressure Motor actuator	=	40.00	%	Reductant Pump	P1043, P1044, P208B, P208A, P208D
			NO Pending or Confirmed DTCs:	=	see sheet inhibit	-		
					tables			
						_		
		State of Reductant Pressure Control	SCR control state (please see the definition)	=	Pressure Control	-		
		System: Pressure build up (substate of Pressure control)						
			( Reductant filling state in the pressure line	>=	50	%		
			or				Deducted Deve Develop	
			Reductant Pump Module Pressure for time	>= >	200 0.5	kPa sec	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			)					
			Reductant Pump Module Pressure	<	350	kPa	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			Set-point duty cycle for Reductant dosing valve Set-point duty cycle for the Reductant Pump pressure	=	0% 80.00	%	Reductant Injector Reductant Pump	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	SCR control state (please see the definition)	=	Pressure Control	•		
		System: Ventilation (substate of Pressure control)						
			Reductant Pump Module Pressure	<	350	kPa	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			Dwell time in Pressure Build up substate system pressurizes in pressure buildup and ventilation	> <	10 10	sec counts		
			states Set-point duty cycle for Reductant dosing valve	=	100	%	Reductant Injector	P1048, P2048, P1049, P2049, P2047, P202E
			Set-point duty cycle for the Reductant Pump pressure	=	80.00	%	Reductant Pump	P1043, P1044, P208B, P208A, P208D
			Motor actuator					
			Dwell time in the sub state ventilation NO Pending or Confirmed DTCs:	< =	0.23 see sheet inhibit	sec		
					tables			
		Otata a Daduata di Davasara Ocata l			December 0 and a l			
		State of Reductant Pressure Control System: Metering control (substate of	SCR control state (please see the definition)	=	Pressure Control	-		
		Pressure control)	Reductant Pump Module Pressure	>=	350	kPa	Reductant Pump Pressure Sensor	P204C, P204D, P204B
			Set-point duty cycle for Reductant dosing valve	=	0	кРа %	Reductant Injector	P1048, P2048, P1049, P2049, P2047, P202E
			NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		
		State of Reductant Pressure Control	ignition	=	off			
		System: Pressure reduction	_					
			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	=	0	%	Reductant Injector	P1048, P2048, P1049, P2049, P2047, P202E
			Set-point duty cycle for the Reductant Pump pressure	=	15.00	%	Reductant Pump	P1043, P1044, P208B, P208A, P208D
			Motor actuator NO Pending or Confirmed DTCs:	=	see sheet inhibit	-		
					tables			
	SCR Engine State required for operation	SCR Engine State	Ignition on	=	TRUE	-		
			engine speed	>	550	rpm	Crank Position	P0335,P0336, P0016

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 160BDG08	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
	Reductant Heater and Defrost System Control States and Status				_			
	otatos and otatos	Reductant Defrost check	status of reductant tank heater temperature (please see	=	TRUE			
			the definition) State of the defrosting check of pressure line (please see the definition)	=	TRUE			
			State of the defrosting check of supply module (please see the definition)	=	TRUE			
			duration, for which the conditions for a hydraulic release reset of pressure line heater circuit are satisfied	<=	1200	sec		
			ambient temperature Release heater pressure line and	> =	-4.04 FALSE	°C -	Intake Air Temperature 2	P0097, P0098, P111C
			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 temperature	status of reductant tank heater temperature (please see the definition)					
			Reductant tank heat temperature at Standby state or	>	-0.04	°C	Reductant Tank Temperature Sensor	P205D, P205C, P205B
			Engine off Time Reductant tank heat temperature at Standby state	< >	2147483647 -9.04	°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 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 defrecting about of surplus				_		
		State of the defrosting check of supply module	State of the defrosting check of supply module (please see the definition) time since supply module heating on under supply module defrost mode	>=	0 to 3276.7	sec		
			or status of SCR control state (please see the definition) Supply module 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 status of SCR control state (please see the definition)	=	TRUE No Pressure Control	-		
			Engine of Time NO Pending or Confirmed DTCs:	< =	0 TRUE	sec -		
					_			

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		The component protection release of the heater control	Current time for heating / not heating of heater circuit 1 (tank)	>=	0 to 299	sec		
			Reductant Defrost check (please see the definition)	=	FALSE	-		
		Preliminary release of the heater control for the main state machine	Preliminary release of the heater control for the main state machine (please see the definition)					
			Current time for heating / not heating of heater circuit 1 (tank)	>=	0 to 3276	sec		
			status of reductant tank heater defrost status of reductant tank heater temperature (please see the definition)	=	FALSE FALSE			
			State of the defrosting check of pressure line (please see the definition)	=	TRUE	-		
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-		
			or ( ignition	_	on	sec		
			engine speed	= >	550	rpm	Crank Position	P0335,P0336, P0016
			Engine off Time	<=	0	sec		
			State of the defrosting check of pressure line (please see the definition)	=	TRUE	-		
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-		
			and if the following conditions were met in previous driving cycle	=	TRUE			
			(					
			ignition engine speed	= >	on 550	sec rpm	Crank Position	P0335,P0336, P0016
			Engine off Time	<=	0	sec		
			State of the defrosting check of pressure line (please see the definition)	=	TRUE			
			State of the defrosting check of supply module (please see the definition)	=	TRUE	-		
			))					
		Release of tank heater circuit						
			Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec		
			Requested heating time for Reductant tank heater (see Look-Up-Table #17)	>=	0 to 3277	sec		
			) or					
			(( Requested defrosting time for Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec		
			or Requested heating time for Reductant tank heater (see Look-Up-Table #17)	>=	0 to 3277	sec		
			) and (					
			Requested defrosting time for pressure line heater (see Look-Up-Table #18) or	>=	0 to 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 Reductant tank heater (see Look-Up-Table #16)	>=	0 to 14400	sec		

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			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	>=	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		
			))					
			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 (set	>=	0 to 3277	sec		
			Look-Up-Table #17) ) and					
			( Requested defrosting time for pressure line heater (see	>=	0 to 3276.7	sec		
			Look-Up-Table #18		0103270.7	360		
			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 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	>=	0 to 3276.7	sec		
			Look-Up-Table #18) or					
			Requested heating time for pressure line heater (see Look-Up-Table #20)	>=	0 to 3276.7	sec		
			)					
			or ((					
			Requested defrosting time for pressure line heater (see Look-Up-Table #18)	>=	0 to 3276.7	sec		
			or Requested heating time for pressure line heater (see Look-Up-Table #20)	>=	0 to 3276.7	sec		
			) and					
			Requested defrosting time for supply module heater (see	>=	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		
			))					
			and NO Pending or Confirmed DTCs:	=	see sheet inhibit	-		
					tables			

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		Release of tank heater circuit	( 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)		0100270.7	300		
			or	-				
			(( 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)	>=	0 to 3277	sec		
			/ and (	r				
			Requested defrosting time for supply module heater (see Look-Up-Table #19)	>=	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 pressure line heater (see	>=	0 to 3276.7	sec		
			Look-Up-Table #18) or					
			Requested heating time for pressure line heater (see Look-Up-Table #20)	>=	0 to 3276.7	sec		
			and (	r.				
			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 ((	- r				
			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 (	l r				
			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		
			رہ and NO Pending or Confirmed DTCs:	=	see sheet inhibit tables	-		

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		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 started with status of reductant tank heater temperature (please see the definition)	< =	32767 FALSE	sec -		
			and ( 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 started with status of reductant tank heater temperature (please see the definition)	> =	32767 FALSE	sec -		
			and status of reductant tank heater temperature (please see the definition) Waiting time after tank heater release expired ))	=	TRUE 0	- sec		
	Reductant Tank Level System States and Status	status of Reductant tank level	Tank level > full (100%) Warning (66.67%) < tank level < full (100%) Restriction (33.33%) < tank level < Warning (66.67%) Empty < tank level < Restriction (33.33%) Tank level <= 0.1%	= = =	Full OK Warning 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		1.00 TRUE	%/sec -		

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			engine speed	>	550	rpm	Crank Position	P0335,P0336, P0016
			Vehicle speed time since engine started	>= <=	6.22 (a) * (b)	mph	Transmission output speed sensor	P0722, P0721
			(a) Time period for a positive slope to detect refueling	=	12	sec		
			(b) Factor for the extension of the detection time for refueling	=	20	factor		
			since the following conditions met:	=	TRUE	-		
			Falling edge of ignition	=	TRUE	-		
			Reductant Refill enabling conditions reset timers	=	TRUE	-		
			))) or					
			time since potential Reductant refill detection is set and with	>=	8	sec		
			Derivation of the PT1 filtered level signal (DT1) 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	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	-		
			the definition) 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	=	FALSE			
			the definition) Waiting time before tank heater released	>=	32767	sec		
			and status of reductant tank heater temperature (please see the definition)	=	TRUE	-		
			Waiting time after tank heater release expired	>=	0	sec		
			)) or Frozen state is active during a certain warning level	=	TRUE	-		
			(please see the definition)	=	INUE	-		
			) Vehicle speed )	>=	6.22	mph	Transmission output speed sensor	P0722, P0721
			or filter release for Reductant tank level calculation at ignition on on (Please see the definition)	=	TRUE	-		
	l							

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		Status of Filter release for reductant tank						
		level calculation	Reductant tank Temperature	>=	-100.04	°C	Reductant Tank Temperature Sensor	P205D, P205C, P205B
			or			-		,
			Reductant low warning level (Please see the definition) NO Pending or Confirmed DTCs:	>= =	0 TRUE	-		
			or			-		
			Frozen state is active during a certain warning level (please see the definition)	=	TRUE	-		
			(please see the definition)					
		Filter release for Reductant tank level	ignition	=	on	-		
		calculation at Ignition on	English on times in Applied (closer and the 1.47 Mich.)					
			Engine on timer is expired (please see the definition) Vehicle speed	= >=	FALSE 0.62	- mph	Transmission output speed sensor	P0722, P0721
			Reductant low warning level (Please see the definition)	>=	49	level		,
			and with ((					
			Raw Reductant tank level	>=	33.3	%		
			and with					
			Remaining Reductant quantity (a) - (b):	<	(a) - (b)			
			(a) Tank level for reserve mode (Restriction level) in [g]	=	2614	g		
			(b) Tank level threshold range below Restriction threshold	=	1015	g		
			for ignition on refill detection release					
			)					
			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	=	1617	g		
			for ignition on refill detection release					
			)					
			or Raw Reductant tank level		100	%		
			Raw Reductant tank level and with	>=	100	%		
			(		(-) ())			
			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	=	1617	g		
			for ignition on refill detection release					
			"					
		Status of Refill detection of Reductant	Status of Refill detection of Reductant tank (please see					
		tank	the definition) Reductant tank level changed	=	TRUE	_		
			((	=	INUE	-		
			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	-		
		1	l	I			l	I I

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			)) or					
			(( Captured Reductant tank level at last tank level change	=	Warning	-		
			or Captured Reductant tank level at last tank level change	=	ОК	-		
			)					
			and (					
			status of Reductant tank level (please see the definition)	=	Full	-		
			) or (					
			Captured Reductant tank level at last tank level change	=	OK	-		
			status of Reductant tank level (please see the definition)	=	Full	-		
			))					
		Engine on timer is expired	time since engine started	>=	(a) * (b) 12	sec		
			and with		20	sec -		
			)) ignition	=	on	sec		
			engine speed Vehicle speed	> >=	550 6.22	rpm mph	Crank Position Transmission output speed sensor	P0335,P0336, P0016 P0722, P0721
			or (					
			Vehicle speed NO Pending or Confirmed DTCs: for time	>= = >	6.22 TRUE 1	mph sec	Transmission output speed sensor	P0722, P0721
			))	-	I.	360		
			and with timer reset conditions		70115			
			Falling edge of ignition or Reductant Refill enabling conditions reset timers	=	TRUE	-		
			)					
	Reducant Tank Level Low	Normal_Operation_OK: 0 decimal,	Reductant tank level	=	Full			
	Warning States	normal operation	and with					
			() Warning level or	<=	49	-		
			( Previous warning level	>	49	-		
			vehicle speed ))	<=	98.75	mph	Transmission output speed sensor	P0722, P0721
			or Reductant Quality state	>	0	-		
		Warning_Leve1: 1 decimal, Warning level 1	Reductant tank level	<	Full	-		
			Remaining mileage and with	>	1558.75	miles		
			( Warning level	<=	49	Warning level		

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			or ( Previous warning level vehicle speed )) and with Reductant Quality state	> <= =	49 98.75 0	Warning level mph	Transmission output speed sensor	P0722, P0721
		Warning_Level2: 2 decimal, Warning	Reductant tank level	<	Full	-		
		level 2	Remaining mileage and with	<=	1558.75	miles		
			( Warning level	<=	49	Warning level		
			or ( Previous warning level	>	49	Warning		
			۔ vehicle speed ۱	<=	98.75	level	Transmission output speed sensor	P0722, P0721
			and with Reductant Quality state	=	0	-		
		Warring Level2: 40 desired Warring	Reductant tank level		Full			
		Warning_Level3: 16 decimal, Warning level 3	Remaining mileage	<	855	- miles		
			and with (					
			Warning level or	=	2	Warning level		
			Warning level	=	16	Warning level		
			and with initialization phase after Reductant refill event is active Reductant Quality state	= =	TRUE 0	1		
		Warning_Level4: 32 decimal, Warning	Reductant tank level	<	Full			
		level 4	Remaining mileage and with	<=	855	miles		
			( Warning level or	<=	49	Warning level		
			( Previous warning level	>	49	Warning		
			vehicle speed	<=	98.75	level	Transmission output speed sensor	P0722, P0721
			)) and with Reductant Quality state	=	0	-		
		Warning_Level5: 48 decimal, Warning level 5	(( Reductant tank level	<	Full			
			Reductant lank level Remaining mileage and with	<=	628.75	miles		
			( Warning level or	<=	49	Warning level		

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
			Previous warning leve	>	49	Warning		
			vehicle speed	<=	98.75	level mph	Transmission output speed sensor	P0722, P0721
			))) O					
			Warning leve	=	48	Warning		
			initialization phase after Reductant refill event is active		TRUE	level		
			))					
			and with Reductant Quality state	=	0	-		
		Warning_Level6: 49 decimal, Warning	(1			_		
		level 6	Warning leve	=	49	Warning		
			initialization phase after Reductant refill event is active	=	TRUE	level		
			O					
			Warning leve	<	49	Warning		
			- Failed Reductant system pressure build up		1	level		
			) and with					
			Reductant Quality state	=	0	-		
					_	_		
		Warning_Level8: 80 decimal, Vehicle speed restriction mild	Warning leve		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 leve		112	Warning level		
			initialization phase after Reductant refill event is active and with		TRUE	-		
			Reductant Quality state	=	0	-		
						_		
		Warning_Level12: 144 decimal, Vehicle speed restriction severe	Warning leve		144	Warning level		
			initialization phase after Reductant refill event is active and with		TRUE	-		
			Reductant Quality state	=	0	-		
		Warning_Level14: 176 decimal, Vehicle speed restriction final	Warning leve		176	Warning level		
			initialization phase after Reductant refill event is active and with		TRUE	-		
			Reductant Quality state	=	0	-		
					_	_		
	Reductant frozen System	Frozen state is active during a certain	ignition	=	On	-		
	States	warning level	for time		5	sec		
			Reductant tank Temperature Reductant low warning level (Please see the definition)	<= >=	-9.04 2	°C level	Reductant Tank Temperature Sensor	P205D, P205C, P205B
I	1	1		I			l	1

Component / System	State or Status Sub-Grouping	Closed Loop System Details found in 16OBDG08	Defined by:	Enable Logic	Enable Values	Enable Units	Sensor Used	Sensor DTCs
		Status of Reductant tank as frozen						
			( Engine off Time	>	14400	sec		
			Reductant tank Temperature		-11.04		Reductant Tank Temperature Sensor	P205D, P205C, P205B
			) or					
			( Engine off Time	<=	7200	sec		
			time since the following conditions are met		7200	sec		
			( status of reductant tank heater defrost		On or Defrost			
			Vehicle speed Status of urea tank as frozen (please see the definition)		6.22 TRUE	mph	Transmission output speed sensor	P0722, P0721
			Status of thea tank as nozen (please see the definition)	-	INOL			
			))					
						_		
	SCR System Pressure State	Status of Low Reductant Pump Pressure						
		<ul> <li>Under Reductant warning level 3 - Main state 0x30</li> </ul>						
			Reductant low warning level (Please see the definition)		64 2	-		
			number of pressure build-up attempts and	>=	Z	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		10	counts		
			states Reductant Defrost check (please see the definition)	=	TRUE			
			)					

### 16 OBDG08 Calibration Look Up Table - ECM (LGH/LML Common)

#### Table no. Fault Codes

Label (Internal Manufacturer Reference)

	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	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8								
	240	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8								
	280	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8								
	380	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8								
P2199	Air_t[	DiffMaxHiT	AFS_CUF	२													
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	0iffMaxHiT	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 Engine Off Time (sec)	Air_tE	0iffMaxHiT	EGRClr20	Ds_CUR	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					100	100
	-				333	555	999		555	555	999	999	999	999	100	100	
P2199	Air_tE	DiffMaxLoT	AFS_CU	R				·	·					·	·	·	
Engine Off Time (sec)	Air_tE	600	AFS_CUI	R 800	900	1000	2000	3000	4000	5000	8000	17999	18000	28799	28800	30000	32000
			AFS_CUI 700 999	R 800 999				·	·					·	·	·	
Engine Off Time (sec) Delta Temperature (°C)		600 999	AFS_CUI 700 999	R 800 999	900	1000	2000	3000	4000	5000	8000	17999	18000	28799	28800	30000	32000
Engine Off Time (sec) Delta Temperature (°C) P10CF		600 999 DiffMaxLoT	AFS_CUI 700 999 CACDs_(	800 999 CUR	900 999	1000	2000 999	3000 999	4000	5000 999	8000 999	17999 999	18000	28799 999	28800	30000 20	<u>32000</u> 20
Engine Off Time (sec) Delta Temperature (°C) P10CF Engine Off Time (sec)	Air_t	600 999 DiffMaxLoT 600	AFS_CUI 700 999 CACDs_( 700 999	R 999 CUR 800 999	900 999 900	1000 999 1000	2000 999 2000	3000 999 3000	4000 999 4000	5000 999 5000	8000 999 8000	17999 999 17999	18000 999 18000	28799 999 28799	28800 20 28800	30000 20 30000	32000 20 32000
Engine Off Time (sec) Delta Temperature (°C) P10CF Engine Off Time (sec) Delta Temperature (°C)	Air_t	600 999 0iffMaxLoT 600 999	AFS_CUI 700 999 CACDs_( 700 999	R 999 CUR 800 999	900 999 900	1000 999 1000	2000 999 2000	3000 999 3000	4000 999 4000	5000 999 5000	8000 999 8000	17999 999 17999	18000 999 18000	28799 999 28799	28800 20 28800	30000 20 30000	32000 20 32000

# 16 OBDG08 Calibration Look Up Table - ECM (LGH/LML Common)

Table no. 8	Fault Codes P0401	Label (Intern AirCtl_facEnv			ference)							
	Ambient Pressure (kPa)	70	75	80	82.5	87.5	90	97.5	100			
	Correction Factor (-)	0.48	0.48	0.6	0.7	0.867	0.9	1	1			
9	P0401 Ambient Pressure (kPa)	AirCtl_mEGR		_CUR 73	76	79	82	85	88	91	94	97
	Air Mass Flow (g/rev)	0.8		0.8	0.8	0.85	0.9	0.95	00	1.05	94 1.1	1.15
10	P0402	AirCtl_mMax	Dvt_MAP							1.00		1.10
	Injection Qty (mm^3/rev) / Engine Speed (rpm)	1000		1200	1300	1400	1500	1600	1700			
	120			0.36	0.32	0.32	0.32	0.32	0.32			
	200			0.56	0.52	0.32	0.32	0.32	0.32			
	240			0.64	0.64	0.4	0.32	0.32	0.32			
	280			0.8	0.8	0.64	0.56	0.48	0.48			
	320			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 Injection Qty (mm^3/rev) / Engine Speed (rpm)	AirCtI_mMax		1000	1500	2000	2500	3000	3750			
		2		2	2	2	2	2	2			
	20			2	2	2	2	2	2			
	40			2	2	2	2	2	2			
	60			2	2	2	2	2	2			
	160			1.8 1.8	1.8 1.6	1.8 1.6	1.8 1.6	2	2			
	320			1.8	1.6	1.6	1.6	2	2			
	380			2	2	2	2	2	2			
12	P0402 Ambient Pressure (kPa)	AirCtl_facEnv		vt_CUR 75	80	83	90	95	100			
	Correction Factor (-)	2		1.75	1.594	1.5	1.208	1	1			
13	P2138	APP_uSync_		0.5								
	Accel Pedal Voltage (V) Pedal Deviation (V)	0.5		2.5 0.18								
14	P057B	Brk_facEWM										
	Prake Decition Sensor Voltage (V)		0.0246	0.025	0.04	0.045	0.051	0.0510	E			
	Brake Position Sensor Voltage (V) factor (-)	0	0.0346	0.035	0.04	0.045	0.051	0.0512	5 1			
		0	U	U	U	U	U		I			

1.2

# 16 OBDG08 Calibration Look Up Table - ECM (LGH/LML Common)

Table no. Fault Codes		Label (Internal	Manufac	cturer Refe	erence)												
15 P008F		CEngDsT_tDiffM	laxHi_Cl	UR													
Engine Off Time (sec) Delta Temperature (°C)		600 999	700 999	800 999	900 999	1000 999	2000 999	3000 999	4000 999	5000 999	8000 999	17999 999	18000 999	28799 999	28800 100	30000 100	32767 100
Della Temperature (C)		335	999	999	999	333	999	999	999	999	399	999	999	999	100	100	100
16 P008F		CEngDsT_tDiffM	laxLo_C	UR													
Engine Off Time (sec)		600	700	800	900	1000	2000	3000	4000	5000		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_facGa	oPlausHi	gh_CA													
-		8 5	5.8125	3.375	3.375												
18 P0336		EpmCrS_facIncl		h_CA													
-		2	1.8125	1.5	1.5												
			1.0120	1.0	1.0												
P02CD, P02CF, P02D1, P02 19 P02DB	D3, P02D5, P02D7, P02D9,	ETClb_pRailSet_	_CA														
Rail Pressure Setpoint (kPa)		30000	70000	90000													
P02CD, P02CF, P02D1, P02 20 P02DB	D3, P02D5, P02D7, P02D9,	ETClb_tiET_MA															
Injector Energizing Time (use	ec)	670.8	384.4	353.2													
21 P01CD, P01CF, P01D1, P01 P01DB	D3, P01D5, P01D7, P01D9,	ETClb_tiETFbOt	isMax_C	A													
Injector Energizing Time (use	ec)	16	12	10													
22 P01CD, P01CF, P01D1, P01 P01DB	D3, P01D5, P01D7, P01D9,	ETClb_tiETFbOt	fsMin_C/	Ą													
Injector Energizing Time (use	ec)	16	12	10													
				-													

### Table no. Fault Codes

23 P144B

## Label (Internal Manufacturer Reference)

ETCtl\_stPOpCtVILopMax\_MAP

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

24 P144C

ETCtl\_stPOpCtVILopMin\_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)		750	900	2250	3000
	0	0	1	1	0
4	0	0	1	1	0
16	0	0	1	1	0
20	0	0	0	0	0

25 P24A0

ETCtlHCI\_stPOpCtVHCILopMaxInjMs\_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)		700	900	2250	3000
	0	0	1	1	1
	40	0	1	1	1
	60	0	1	1	1
	00	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
	40	0	1	1	1
	60	0	1	1	1
	200	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_facLamS	tatNSCDs	_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

P2080, P2084, P242B, P246F	Exh_st	iPOpModF			eference)												
Injection Qty (mm^3/rev) / Engine Speed (rpm)	0 20 40 100 200 320	700 0 255 255 255 0 0	1000 0 255 255 255 255 255 0	1500 0 255 255 255 255 255 0	2000 0 255 255 255 255 255 0	3000 0 255 255 255 255 255 0	3300 0 0 0 0 0 0										
P20E2	Exh_tD	DiffMaxHiT	OxiCatD	s_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
P20E2	Exh_tD	DiffMaxLo			000	1000	2000	2000	4000	5000	8000	17000	18000	29700	28800	20000	22000
Engine Off Time (sec) Delta Temperature (°C)		600 999	700 999	800 999	900 999	1000 999	2000 999	3000 999	4000 999	5000 999	8000 999	17999 999	18000 999	28799 999	28800 30	30000 30	32000 30
P0483 Fan Speed (rpm)		_facDiaDr 400 0	1679 0	1680 1	1800	2000	2400	2800	3200 1	3600 0.9	4000	4400	4800	5200	5600	6000	6400
Tactor (-)		0	0								0.0	0.7	0.6	0.4	0.2	0	0
factor (-) P0483	FanCtl	_facDiaDr		UR			·				0.0	0.7	0.6	0.4	0.2	0	0
P0483	FanCtl	_facDiaDr	vStab_C		-400	0	400	700	1200		0.0	0.7	0.6	0.4	0.2	0	0
	FanCtl	_facDiaDr		UR -700 0.6	-400	0	400	700 0.6	1200	<u>1600</u>	0.0	0.7	0.6	0.4	0.2	0	0
P0483 Fan Speed (rpm)		_facDiaDr -1600	vStab_C -1200 0	-700						1600	0.0	0.7	0.6	0.4	0.2	0	0
P0483 Fan Speed (rpm) factor (-) P0483 Engine Coolant Temperature (°C)	FanCtl	_facDiaDr -1600 0 _facDiaEC -20.04	vStab_C -1200 0 CT_CUR -7.04	-700 0.6 19.96	1 68.96	69.96	1 79.96	0.6	0	1600 0	0.0	0.7	0.6	0.4	0.2	0	0
P0483 Fan Speed (rpm) factor (-) P0483	FanCtl	_facDiaDr -1600 0 _facDiaEC	vStab_C -1200 0 CT_CUR	-700 0.6	1	1	1	0.6	0	<u>1600</u> 0	0.0	0.7	0.6		0.2	0	0
P0483 Fan Speed (rpm) factor (-) P0483 Engine Coolant Temperature (°C)	FanCtl	_facDiaDr -1600 0 _facDiaEC -20.04	vStab_C -1200 0 CT_CUR -7.04 0	-700 0.6 19.96	1 68.96	69.96	1 79.96	0.6	0	1600 0	0.0	0.7	0.6	0.4	0.2	U	0
P0483         Fan Speed (rpm)         factor (-)         P0483         Engine Coolant Temperature (°C)         factor (-)         P0483         Intake Air Temperature (°C)	FanCtl	_facDiaDr -1600 0 _facDiaEC -20.04 0 _facDiaIA _facDiaIA	vStab_C -1200 0 CT_CUR -7.04 0 T_CUR -7.04	-700 0.6 19.96 0	1 68.96 0 9.96	1 69.96 0.6	1 79.96 0.95 19.96	0.6	0 104.96 0.95 69.96	1600 0 124.96 0.9 99.96	0.0	0.7	0.6	0.4	0.2	U	0
P0483 Fan Speed (rpm) factor (-) P0483 Engine Coolant Temperature (°C) factor (-) P0483	FanCtl	_facDiaDr -1600 0 _facDiaEC -20.04 0 _facDiaIA	vStab_C -1200 0 CT_CUR -7.04 0 T_CUR	-700 0.6 19.96 0	1 68.96 0	69.96 0.6	1 79.96 0.95	0.6 99.96 1	0	1600 0 124.96 0.9	0.0	0.7	0.6	0.4	0.2	0	0
P0483         Fan Speed (rpm)         factor (-)         P0483         Engine Coolant Temperature (°C)         factor (-)         P0483         Intake Air Temperature (°C)	FanCtl	_facDiaDr -1600 0 _facDiaEC -20.04 0 _facDiaIA _facDiaIA	vStab_C -1200 0 CT_CUR -7.04 0 T_CUR -7.04 0.6	-700 0.6 19.96 0	1 68.96 0 9.96	1 69.96 0.6	1 79.96 0.95 19.96	0.6 99.96 1	0 104.96 0.95 69.96	1600 0 124.96 0.9 99.96	0.0	0.7	0.6	0.4	0.2	U	0
P0483         Fan Speed (rpm)         factor (-)         P0483         Engine Coolant Temperature (°C)         factor (-)         P0483         Intake Air Temperature (°C)         factor (-)	FanCtl	_facDiaDr -1600 _facDiaEC -20.04 _facDiaIA _facDiaIA	vStab_C -1200 0 CT_CUR -7.04 0 T_CUR -7.04 0.6	-700 0.6 19.96 0	1 68.96 0 9.96	1 69.96 0.6	1 79.96 0.95 19.96	0.6 99.96 1	0 104.96 0.95 69.96	1600 0 124.96 0.9 99.96	<u>3600</u> 1500	4000	4400	<u>4800</u> 1500	<u>5200</u>	<u>5600</u> 1500	6000 1500

Table no. Fault Codes 37 P0495

### Label (Internal Manufacturer Reference)

FanCtl\_volClthDia\_CUR

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

38 P0263, P0266, P0269, P0272, P0275, P0278, P0281, P0284 FBC\_qLimNeg\_MAP

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

### 39 P0263, P0266, P0269, P0272, P0275, P0278, P0281, P0284 FBC\_qLimPos\_MAP

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

#### 43 P0171, P0172, P026C, P026D

FMO\_facObsvrCmpnProtnRels\_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	50	0 600	1200	1600	2200	2400	3000	3200
	0	) 1	1	1	1	1	1	1
	28	) 1	1	1	1	1	1	1
2	80	) 1	1	1	1	1	1	1
3	00	0 0	0	1	1	1	1	1
3	20	0 0	0	1	1	1	0	(
3	40	0 0	0	1	1	1	0	(
3	60	0 0	0	0	1	1	0	0
3	80	0 0	0	0	0	0	0	C

# Table no.Fault Codes44P026D

### Label (Internal Manufacturer Reference)

FMO\_qFlSysThresMax\_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	450	500	550	600	650	700	750	800
2	8 8	8	8	8	13.2	13.2	13.2	15.2
3	2 8	8	8	8	13.2	13.2	13.2	15.2
3	6 8	10	10	10	14	14	14	16
4	0 12	12	12	12	14.4	14.4	14.4	16.4
4	<b>4</b> 14	14	14	14	16	16	16	18
4	8 16	16	16	16	20	20	20	22
5	2 20	20	20	20	24	24	24	26
5	6 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

47 P0171

### FMO\_qOBDMin\_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	Ę	00	700	900	1000	1100	1200	1300	1500
	40 -46	12	-52.44	-58.72	-65.04	-68.16	-71.32	-77.64	-109.12
	<b>80</b> -54	04	-60.36	-66.64	-72.96	-76.12	-79.24	-85.56	-117.04
	20	62	-68.28	-74.6	-80.88	-84.04	-87.2	-93.48	-125
	<b>60</b> -65	96	-72.24	-78.56	-84.84	-88	-91.16	-97.44	-128.96
	<b>80</b> -69	92	-76.2	-82.52	-88.8	-91.96	-95.12	-101.4	-132.92
	-73	88	-80.16	-86.48	-92.76	-95.92	-99.08	-105.36	-136.88
	40 -77	84	-84.12	-90.44	-96.72	-99.88	-103.04	-109.32	-140.84
	<b>80</b> -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	(
340	0	0	0	0	1	1	1	0	0	C
360	0	0	0	0	0	1	1	0	0	0
380	0	0	0	0	0	0	0	0	0	C

Table no. Fault Codes

Label (Internal Manufacturer Reference)

49 P11B4, P11B5

Hegn\_facLamDiaFdbk\_CUR

-		0	3	5	6	7	8	9	10
fa	actor (-)	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
19.9	160	160	160	160	160	160
39.9	136	136	136	136	136	136
69.9	122.8	122.8	122.8	128.8	128.8	128.

54 P0606

MoFCoOfs\_rTrqPtdOfs\_MAP

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

55 P0606

### MoFInjQnt\_tiZFCETMax\_CUR

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

56 P0606

### MoFInjQnt\_tiZFCETMin\_CUR

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

57 P0606

#### MoFOvR\_nEngStrtThres\_CUR

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

58 P0606

### MoFOvR\_tiLimET\_CUR

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

Table no	b. Fault Codes	Label (Internal	Manufac	turer Ref	erence)				
59	P2263	PCR_facMaxUr	ndrBstDvt	_CUR					
	Environmental Pressure (kPa)	70	75	80	85	90	95	100	112.5
	factor (-)	0.900024	0.9	0.95	0.95	1	1	1	1
60	P0234	PCR_facPresD	vtCorMin_	_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\_pMaxDvt\_MAP

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

62 P0234

### PCR\_pMinDvt\_MAP

Injection Qty (mm^3/rev) / Engine Speed (rpm)	0	1500	1600	1700	1800	2000	2500	3000
14	-10	-10	-10	-10	-10	-11.7	-27	-31.5
11	<b>0</b> -10	-10	-10	-10	-10	-12.5	-27	-31.5
20	-10	-10	-10	-10	-14.5	-16	-27	-31.5
24	-12.5	-12.5	-12.5	-12.5	-20	-25.2	-27	-31.5
28	-15.3	-15.3	-18.6	-22.5	-22.5	-25.2	-27	-31.5
32	-17.6	-17.6	-22.1	-27.5	-27.5	-27.5	-30	-31.5
30	-19.8	-19.8	-24.3	-30	-30	-30	-30	-31.5
40	-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
	<b>0</b> -80	-80	-80	-80	-80	-60	-40	-40
6	<b>0</b> -80	-80	-80	-80	-80	-60	-40	-40
12	<b>0</b> -80	-80	-80	-80	-80	-60	-40	-40
18	<b>0</b> -80	-80	-80	-80	-80	-60	-40	-40
24	<b>0</b> -65	-65	-65	-65	-65	-55	-45	-45
30	<b>0</b> -50	-50	-50	-50	-50	-50	-50	-50
36	<b>0</b> -50	-50	-50	-50	-50	-50	-50	-50
48	<b>0</b> -50	-50	-50	-50	-50	-50	-50	-50

ble no. 64	Fault Codes P2263		<b>bel (Internal</b> R_pUndrBst			ference)				
	Injection Qty (mm^3/rev) / Engine Speed (rpm)		500	750	1000	1500	2000	2500	3000	35
		0	45	45	45	45	45	45	45	
		60	45	45	45	45	45	45	45	
		120	45	45	45	45	45	45	45	
		180	45	45	45	45	45	45	45	
		240	42.5	42.5	42.5	42.5	42.5	42.5	42.5	4
		300	42.5	42.5	42.5	42.5	42.5	42.5	42.5	4
		360 480	42.5 42.5	42.5 42.5	42.5 42.5	42.5 42.5	42.5 42.5	42.5 42.5	42.5 42.5	4
		400	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
65	P2459	PFI	t_mSotThres	sRgnFred	q_CUR					
	q		0	5	10	20	30	45		
	Soot Mass (g)		0	13.5	27.1	54.1	81.2	121.8		
67	P128E	Rai	I_pCPCFltM	in_CUR						
	Engine Speed (rpm)		580	630						
	Rail Pressure (kPa)		0	15000						
68	P0087	Rai	I_pMeUnDvt	tMax_CU	R					
	Engine Speed (rpm)		580	630						
	Rail Pressure (kPa)		80000	11000						
69	P0088	Rai	I_pMeUnDvt	tMin_CU	2					
	Engine Speed (rpm)		580	630						
	Rail Pressure (kPa)			-18000						
	· · · · · · · · · · · · · · · · · · ·	I								
70	P128E	Rai	I_pMeUnFltN	Min_CUR						
	Engine Speed (rpm)		580	630						
	Rail Pressure (kPa)		0	15000						
-	2000									
71	P0087	Ra	I_pPCVDvtN	lax_CUR	1					
	Engine Speed (rpm)		580	630						
	Rail Pressure (kPa)		80000	11000						
72	P128E	Rai	I_pPCVFltMi	in_CUR						
72	P128E Engine Speed (rpm)	Rai	I_pPCVFltMi	in_CUR 630						

Table no. Fa	ault Codes
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### Label (Internal Manufacturer Reference)

74 P11CB

SCRChk\_idcPOpMaxNOxUsPlaus\_GMAP

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

### 75 P11CC

#### SCRChk\_idcPOpMinNOxUsPlaus\_GMAP

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

76 P20EE

SCRChk\_mEstNH3LdMax\_CUR

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

77 P20EE

### SCRChk\_mEstNH3LdMin\_CUR

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

10 FZUEE
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### SCRChk\_mNH3LdDvtMax\_CUR

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

79 P20EE

### SCRChk\_mNH3LdDvtMin\_CUR

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

. Fault Codes	Label (Intern	al Manuf	acturer R	eference)												
P11CC	SCRChk_rNC	xDiffThre	esBasMint	Js_GMAP												
Injection Qty (mm^3/rev) / Engine Speed (rpm)	1100	1199	1200	1400	1600	1800	2000	2001	2200	2400						
40	-1	-1		-1	-1	-1	-1		-1	-1						
60	-1	-1		-1	-1	-1	-1		-1	-1						
79.6	-1	-0.5358		-0.5233	-0.4972	-0.549			-1	-1						
80	-1	-0.5358		-0.5233	-0.4972	-0.549	-0.4863		-1	-1						
120 160	-1 -1	-0.5674 -0.5092		-0.5975 -0.5607	-0.5458 -0.5867	-0.5417 -0.5824	-0.5541 -0.5643		-1 -1	-1 -1						
200	-1	-0.5237		-0.561	-0.5796	-0.5466			-1	-1						
200.04	-1	-0.5237		-0.561	-0.5796	-0.5466			-1	-1						
204	-1	-1	1	-1	-1	-1	-1		-1	-1						
240	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1						
Exhaust Temp (°C)	-0.04															
Exhaust Temp (°C) factor (-)	-0.04	1														
factor (-)			xUsPlaus_	CA												
factor (-)	0	jCharNO>	_	-	0	0	0	0								
factor (-) P11CB, P11CC Fuel Injector Pattern (-)	0 SCRChk_stIn	jCharNO> 56	58	-	0	0	0	0								
factor (-) P11CB, P11CC Fuel Injector Pattern (-)	0 SCRChk_stIn 24	jCharNO> <u>56</u> DpSelEta	58 1_MAP	26	0	0			274.96	279.96	284.96	289.96	294.96	299.96	314.96	329.96
factor (-) P11CB, P11CC Fuel Injector Pattern (-) P20EE Filtered Exh Mass Flow (g/s) / SCR Upstream Temp (°C) 61.11	0 SCRChk_stin 24 SCRChk_stP( 219.96 0	jCharNO> 56 DpSelEta 239.96 0	58 1_MAP 244.96 0	26 249.96 0		259.96 0	264.96 0	269.96	274.96 0	0	0	0	0	0	0	<u>329.96</u>
factor (-) P11CB, P11CC Fuel Injector Pattern (-) P20EE Filtered Exh Mass Flow (g/s) / SCR Upstream Temp (°C) 61.11 69.44	0 SCRChk_stin 24 SCRChk_stP( 219.96 0 0	iCharNO> 56 DpSelEta 239.96 0 0	58 1_MAP 244.96 0 0	26 249.96 0 0		259.96 0 1	264.96 0 1	269.96		0 0	0 0	0 0	0 0	0 0	0 0	<u>329.96</u>
factor (-) P11CB, P11CC Fuel Injector Pattern (-) P20EE Filtered Exh Mass Flow (g/s) / SCR Upstream Temp (°C) 61.11 69.44 80.56	0 SCRChk_stln 24 SCRChk_stP( 219.96 0 0 0 0	jCharNO> 56 DpSelEta 239.96 0 0 0 0	58 1_MAP 244.96 0 0 0	26 249.96 0 0		259.96 0	264.96 0	269.96		0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	329.96 () () () ()
factor (-) P11CB, P11CC Fuel Injector Pattern (-) P20EE Filtered Exh Mass Flow (g/s) / SCR Upstream Temp (°C) 61.11 69.44 80.56 83.33	0 SCRChk_stln 24 SCRChk_stP( 219.96 0 0 0 0 0 0	jCharNO> 56 DpSelEta 239.96 0 0 0 0 0 0 0	58 1_MAP 244.96 0 0 0 0	26 249.96 0 0 0 1		259.96 0 1	264.96 0 1	269.96		0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	( ( ( (
factor (-) P11CB, P11CC Fuel Injector Pattern (-) P20EE Filtered Exh Mass Flow (g/s) / SCR Upstream Temp (°C) 61.11 69.44 80.56	0 SCRChk_stln 24 SCRChk_stP( 219.96 0 0 0 0	jCharNO> 56 DpSelEta 239.96 0 0 0 0 0 0 0 0 0 0 0	58 1_MAP 244.96 0 0 0 0 0	249.96 0 0 0 1 1		259.96 0 1	264.96 0 1 1 1	269.96		0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	
factor (-) P11CB, P11CC Fuel Injector Pattern (-) P20EE Filtered Exh Mass Flow (g/s) / SCR Upstream Temp (°C) 61.11 69.44 80.56 83.33 97.22	0 SCRChk_stln 224 SCRChk_stP( 219.96 0 0 0 0 0 0 0 0 0 0 0 0	jCharNO 56 DpSelEta 239.96 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	58 1_MAP 244.96 0 0 0 0 0 0 0 0 0 0 0	249.96 0 0 1 1 1		259.96 0 1 1 1 1	264.96 0 1 1 1 1	269.96 0 1 1 1 1 1		0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	
factor (-) P11CB, P11CC Fuel Injector Pattern (-) P20EE Filtered Exh Mass Flow (g/s) / SCR Upstream Temp (°C) 61.11 69.44 80.56 83.33 97.22 102.78 111.11 119.44	0 SCRChk_stin 24 SCRChk_stP 219.96 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	jCharNO) 56 DpSelEta 239.96 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	58 1_MAP 244.96 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	249.96 0 0 1 1 1 1 1 1 1	254.96 0 1 1 1 1 1 1	259.96 0 1 1 1 1 1 1	264.96 0 1 1 1 1 1 1 1 1	269.96 0 1 1 1 1 1	0 1 1 1 1 1	0 0 0 0 0	0 0 0 0 0 1 1	0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	
factor (-) P11CB, P11CC Fuel Injector Pattern (-) P20EE Filtered Exh Mass Flow (g/s) / SCR Upstream Temp (°C) 61.11 69.44 80.56 83.33 97.22 102.78 111.11 119.44 127.78	0 SCRChk_stin 24 SCRChk_stP0 219.96 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	iCharNO 56 239.96 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	58 1_MAP 244.96 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	249.96 0 0 1 1 1 1 1 1 1 1	254.96 0 1 1 1 1 1 1 1 1 1 1	259.96 0 1 1 1 1 1 1 1 1 1	264.96 0 1 1 1 1 1 1 1 1 1 1 1	269.96 0 1 1 1 1 1	0 1 1 1 1 1 1 1 1 1 1 1	0 0 0 0 1 1 1 1 1	0 0 0 0 0 0 1 1 1	0 0 0 0 0 0 0 1 1	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0	
factor (-) P11CB, P11CC Fuel Injector Pattern (-) P20EE Filtered Exh Mass Flow (g/s) / SCR Upstream Temp (°C) 61.11 69.44 69.44 60.56 83.33 97.22 102.78 111.11 119.44 127.78 136.11	0 SCRChk_stin 24 SCRChk_stP( 219.96 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	iCharNO 56 DpSelEta 239.96 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	58 1_MAP 244.96 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	249.96 0 0 1 1 1 1 1 1 1 1 1 1	254.96 0 1 1 1 1 1 1	259.96 0 1 1 1 1 1 1 1 1 1 1 1	264.96 0 1 1 1 1 1 1 1 1 1 1 1 1	269.96 0 1 1 1 1 1	0 1 1 1 1 1 1 1 1 1	0 0 0 0 1 1 1	0 0 0 0 0 1 1 1 1	0 0 0 0 0 0 0 1 1 1 1	0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0	
factor (-) P11CB, P11CC Fuel Injector Pattern (-) P20EE Filtered Exh Mass Flow (g/s) / SCR Upstream Temp (°C) 61.11 69.44 80.56 83.33 97.22 102.78 111.11 119.44 127.78 136.11 144.44	0 SCRChk_stin 24 SCRChk_stP0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	iCharNO 56 239.96 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	58 1_MAP 244.96 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	249.96 0 0 1 1 1 1 1 1 1 1 1 1 1 1	254.96 0 1 1 1 1 1 1 1 1 1 1 1 1 1	259.96 0 1 1 1 1 1 1 1 1 1 1 1 1 1	264.96 0 1 1 1 1 1 1 1 1 1 1 1 1 1	269.96 0 1 1 1 1 1 1 1 1 1 1 1 1 1	0 1 1 1 1 1 1 1 1 1 1 1 1 1	0 0 0 1 1 1 1 1 1 1 1	0 0 0 0 1 1 1 1 1 1	0 0 0 0 0 0 0 1 1 1 1 1	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0	
factor (-) P11CB, P11CC Fuel Injector Pattern (-) P20EE Filtered Exh Mass Flow (g/s) / SCR Upstream Temp (°C) 61.11 69.44 80.56 83.33 97.22 102.78 111.11 119.44 127.78 136.11 144.44 152.78	0 SCRChk_stln 24 SCRChk_stP0 219.96 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	jCharNO> 56 239.96 0 0 0 0 0 0 0 0 0 0 0 0 0	58 1_MAP 244.96 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	249.96 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1	254.96 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1	259.96 0 1 1 1 1 1 1 1 1 1 1 1	264.96 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	269.96 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 1 1 1 1 1 1 1 1 1 1 1	0 0 0 0 1 1 1 1 1	0 0 0 0 0 1 1 1 1	0 0 0 0 0 0 0 1 1 1 1	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0	329.96 C C C C C C C C C C C C C C C C C C C
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319.96

64.96

0.4

0.4

rable no.	Taur codes	Laber (interna			sierence)				
85	P20EE	SCRChk_tDel	taTempS	CRMax_C	UR				
	Filtered SCR Temp (°C)	249.96	259.96	269.96	279.96	289.96	299.96	309.96	
	Delta SCR Temp (°C)	59.96	59.96	59.96	59.96	64.96	64.96	64.96	
88	P20EE	SCRChk_tiAd	dDisbl_M	AP					
	Nox Peak Duration (s) / Nox Mass Flow (g/s)	0.05	0.1	0.15	0.2	0.25	0.3	0.35	
	0	0	0	0	0	0.1	0.2	0.3	
	1	0.3	0.3	0.3	0.3	0.5	1	1.5	
	3	0.5	0.5	0.5	0.5	1	2	3	
	4	. 1	1	1	1	2	4	6	-

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

Label (Internal Manufacturer Reference)

90 P10D0

Table no. Fault Codes

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
65	850	800	735	735	735	735	675	600
70	850	800	735	735	735	735	675	600
75	<b>5</b> 850	800	735	735	735	735	675	600
80	850	800	735	735	735	735	675	600
85	850	800	735	735	735	735	675	600
90	834	790	720	720	720	720	660	600
95	834	790	720	720	720	720	660	600
100	834	790	720	720	720	720	660	600

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

#### P01CB, P01CD, P01D7, P01D9, P01D1, P01D3, P01D5, ZFC\_stGearRls\_CA 93 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

### Table no. Fault Codes

Label (Internal Manufacturer Reference)

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
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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

Label (Internal Manufacturer Reference)

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								
	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_tDelt	alempS	CRMin_C	UR												
	Filtered SCR Temp (°C)	249.96	259.96	269.96		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_tPPDsTe	mpMeaDi	fPos_CU	IR												
	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		54.96	44.96	34.96	34.96								
103	P24C7	Exh_tPPDsTer	mpMeaDi	fNeg_CL	JR												
	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								
104	P0071 (LML Only)	EnvT_tDiffMax	(Hi_CUR														
	Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	10000	15000	20000	28799	28800 3	2767
	Delta Temperature (°C)	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	3276.7	100	100
105	P0071 (LML Only)	EnvT_tDiffMax	Lo_CUR														
	Engine Off Time (sec)	600	700	800	900	1000	2000	3000	4000	5000	8000	10000	15000	20000	28799	28800 3	2767
	Delta Temperature (°C)	3276.7	3276.7	3276.7		3276.7	3276.7	3276.7					3276.7		3276.7	20	20

end S1-16OBDG08 - Calibration Tables

Table no. Fault Codes

100 P20EE

Table no. Fault Codes

Label (Internal Manufacturer Reference)

**Calibration Parameter Definition - Calibration Tables** 

Status and State Calibration Tables

Table no. Status or State

Label (Internal Manufacturer Reference)

1 Status of NOx signal of upstream NOx sensor DewDet\_wThresLSU0\_MAP

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

### 2 Status of NOx signal of downstream NOx sensor DewDet\_wThresLSU1\_MAP

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

### 3 Status thermal regeneration active

PFltLd\_dmSotSimRgnBas\_CUR

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

### Table no. Fault Codes

4

### Label (Internal Manufacturer Reference)

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

#### 5 Status thermal regeneration active

Status thermal regeneration active

PFltLd\_facTempSimRgn\_CUR

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

### 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

### 7 Rail Control - Metering Unit + PCV Closed Loop Control Rail\_qMeUnCtIType\_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
0.1	2 0	0	0	0.04	0.04	0.04
0.4	4 0	0	0	0.04	0.04	0.04
0.	<b>6</b> 0	0	0	0.04	0.04	0.04
0.	3 0	0	0	0.04	0.04	0.04
	I 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

### Table no. Fault Codes

### Label (Internal Manufacturer Reference)

10 Status of the SCR adaptation plausibility check active SCRAd\_stSpdLd\_MAP

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

11	Request for pre controlled dosing	SCRFFC_stN0	QntCurrH	li_MAP									
		104	136	160	192	216	256	320	408	480	720	800	801.6
	Engine Speed (rpm) / Injection Qty. (mm^3/rev)	26	34	40	48	54	64	80	102	120	180	200	200.4
	800	7	7	7	7	7	7	7	7	7	7	7	7
	1200	7	7	7	7	7	7	7	7	7	7	7	7
	1400	7	7	7	7	7	7	7	7	7	7	7	7
	1475	7	7	7	7	7	7	7	7	7	7	7	7
	1700	7	7	7	7	7	7	7	7	7	7	7	7
	2000	7	7	7	7	7	7	7	7	7	7	7	7
	2200	7	7	7	7	7	7	7	7	7	7	7	7
	2400	7	7	7	7	7	7	7	7	7	7	7	7
	2600	7	7	7	7	7	7	7	7	7	7	7	7
	2800	7	7	7	7	7	7	7	7	7	7	7	7
	3000	7	7	7	7	7	7	7	7	7	7	7	7
	3200	7	7	7	7	7	7	7	7	7	7	7	7

### 12 Request for pre controlled dosing

#### SCRFFC\_stNQntCurrMid\_MAP

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

### Table no. Fault Codes

### Label (Internal Manufacturer Reference)

### 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

#### 14 Engine Running

### StSys\_nStrtCutOut\_MAP

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

### 15 State of Reductant injection valve Component Protection UDC\_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

Table no.	Fault Codes	Label (Interna	al Manufa	cturer Re	ference)				
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_tiDfrstC	2_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_tiDfrstC	3_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_	-	45.04	14.04	7.04	0.04	4.00	5 00

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

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

end Calibration Parameter Definition - Calibration Tables

Table no. Fault Codes

Label (Internal Manufacturer Reference)

**Closed Loop Enable Conditions - Calibration Tables** 

Closed Loop Enable Condition Parameter Summary

22 EGR Closed Loop - Overlong Idle Time Delay AirCtl tiDbShOffExtdIdl MAP

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

### 23 EGR Closed Loop - Injection Quantity too Large

AirCtl\_q2HiEOM\_MAP

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

### 24 Intake Manifold Pressure Cold Start

PCR\_tiCldStrt\_CUR

Coolant Temperature (°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 Altitude 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									

#### Intake Manifold Closed Loop EGR Contol OFF Medium Altit PCR\_GovOnEGROffMed\_CUR 26

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

### Table no. Fault Codes

### Label (Internal Manufacturer Reference)

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									

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

Active DTC				Inhibited DTCs					
P0016 - Crankshaft to Camshaft Correlation	P0191 - Fuel Rail Pressure Sensor Performance	P0315 - Crankshaft Position System Variation Not Learned							
P0045 - Turbocharger Boost Control Circuit	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive					
P0047 - Turbocharger Boost Control Circuit Low Voltage	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive					
P0048 - Turbocharger Boost Control Circuit High Voltage	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive					
P006E - Turbocharger Boost High Control Circuit Low Voltage	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient		-				
P006F - Turbocharger Boost High Control Circuit High Voltage	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2510 - ECM Power Relay Circuit Performance				
P007C - CAC Temperature Sensor Circuit Low Voltage	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance	]
P007D - CAC Temperature	P0234 - Turbocharger Engine	P0299 - Turbocharger Engine	P0401 - Exhaust Gas Recirculation	P0402 - Exhaust Gas Recirculation	P2080 - Exhaust Temperature	P2084 - Exhaust Temperature	P242B - Exhaust Temperature	P246F - Exhaust Temperature	
Sensor Circuit High Voltage P008F - Engine Coolant Temperature (ECT)-Fuel Temperature Not Plausible	Overboost P0101 - Mass Air Flow Sensor Performance	Underboost	Flow Insufficient	Flow Excessive	Sensor 1 Performance	Sensor 2 Performance	Sensor 3 Performance	Sensor 4 Performance	1
P0097 - Intake Air Temperature Sensor 2 Circuit Low	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance	]				
P0098 - Intake Air Temperature Sensor 2 Circuit High	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance					
P00CA - Fuel Pressure Regulator 1 High Control Circuit High Voltage	P2510 - ECM Power Relay Circuit Performance		Consol of Chamaroo		1				
P0101 - Mass Air Flow Sensor	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P2002 - Diesel Particulate Filter (DPF) Low Efficiency	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P2453 - Diesel Particulate Filter Differential Pressure Sensor Performance
Performance	P2459 - Diesel Particulate Filter Regeneration Frequency	P246F - Exhaust Temperature Sensor 4 Performance	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High					
P0102 - Mass Air Flow Sensor Circuit Low	P0101 - Mass Air Flow Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P0103 - Mass Air Flow Sensor Circuit High	P0101 - Mass Air Flow Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P0106 - Manifold Absolute Pressure Sensor Performance	P0101 - Mass Air Flow Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	Ochour Prenomance	Ochour 2 Tenormance	Sensor ST enormance	Genadi 41 endiminide
P0107 - Manifold Absolute Pressure (MAP) Sensor Circuit	P0101 - Mass Air Flow Sensor Performance	P0106 - Manifold Absolute Pressure Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P2263 - Turbo Boost System Performance
Low Voltage	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance		L.		I	I	l.	
P0108 - Manifold Absolute Pressure (MAP) Sensor Circuit	P0101 - Mass Air Flow Sensor Performance	P0106 - Manifold Absolute Pressure Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P2263 - Turbo Boost System Performance
High Voltage	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance						·	
P0112 - Intake Air Temperature Sensor 1 Circuit Low	P0101 - Mass Air Flow Sensor Performance	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P0113 - Intake Air Temperature Sensor 1 Circuit High	P0101 - Mass Air Flow Sensor Performance	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
	P0106 - Manifold Absolute Pressure Sensor Performance	P0191 - Fuel Rail Pressure Sensor Performance	P0234 - Turbocharger Engine Overboost	P0263 - Cly 1 Balance System	P0266 - Cly 2 Balance System	P0269 - Cly 3 Balance System	P0272 - Cly 4 Balance System	P0275 - Cly 5 Balance System	P0278 - Cly 6 Balance System
P0117 - 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 5 Misfire Detected
Temperature Sensor Circuit Low	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P0506 - Idle Speed Low	P0507 - Idle Speed High	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance
	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance						·	
	P0106 - Manifold Absolute Pressure Sensor Performance	P0191 - Fuel Rail Pressure Sensor Performance	P0234 - Turbocharger Engine Overboost	P0263 - Cly 1 Balance System	P0266 - Cly 2 Balance System	P0269 - Cly 3 Balance System	P0272 - Cly 4 Balance System	P0275 - Cly 5 Balance System	P0278 - Cly 6 Balance System
P0118 - 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 5 Misfire Detected
Temperature Sensor Circuit High	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P0506 - Idle Speed Low	P0507 - Idle Speed High	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance
	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance							
P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P0101 - Mass Air Flow Sensor Performance		<u>.</u>						
P014C - HO2S Slow Response Rich to Lean Sensor 1	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1			
P0171 - Fuel Trim System Lean	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1							
P0172 - Fuel Trim System Rich	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1		1	T				
P0182 - Fuel Temperature Sensor	P01CB - Cylinder 1 Injection Timing Retarded	Advanced	P01CD - Cylinder 2 Injection Timing Retarded	Advanced	Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded
1 Circuit Low	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		
								-	

Active DTC				Inhibited DTCs					
P0183 - Fuel Temperature Sensor	P01CB - Cylinder 1 Injection Timing Retarded	P01CC - Cylinder 1 Injection Timing Advanced	P01CD - Cylinder 2 Injection Timing Retarded	P01CE - Cylinder 2 Injection Timing Advanced	P01CF - Cylinder 3 Injection Timing Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded	P01D2 - Cylinder 4 Injection Timing Advanced	P01D3 - Cylinder 5 Injection Timing Retarded
1 Circuit High	P01D4 - Cylinder 5 Injection Timing Advanced	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded	P01DA - Cylinder 8 Injection Timing Advanced		
P0192 - Fuel Rail Pressure Sensor Circuit Low	P0191 - Fuel Rail Pressure Sensor Performance							•	
P0193 - Fuel Rail Pressure Sensor Circuit High	P0191 - Fuel Rail Pressure Sensor Performance								
P01F0 - Coolant Temperature Dropped Below Diagnostic Monitoring Temperature	P2181 - Engine Thermostat stuck open								
	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
P0201 - Injector 1 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							
	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
P0202 - Injector 2 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	7 ta ta food	Retarded	/ availed	riotaldod	randod	riolardod	Navanoda
	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	Advanced	Retarded	P01CE - Cylinder 2 Injection Timing Advanced	Retarded	P01D0 - Cylinder 3 Injection Timing Advanced	P01D1 - Cylinder 4 Injection Timing Retarded
P0203 - Injector 3 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							
	P0171 - Fuel Trim System Lean	P0172 - Fuel Trim System Rich	P01CB - Cylinder 1 Injection Timing Retarded	Advanced	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
P0204 - Injector 4 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							
	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
P0205 - Injector 5 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							
	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							
	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	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							
	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	P01D5 - Cylinder 6 Injection Timing Retarded	P01D6 - Cylinder 6 Injection Timing Advanced	P01D7 - Cylinder 7 Injection Timing Retarded	P01D8 - Cylinder 7 Injection Timing Advanced	P01D9 - Cylinder 8 Injection Timing Retarded	P01DA - Cylinder 8 Injection Timing Advanced
	P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High							
P0234 - Turbocharger Engine Overboost	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1							
P0299 - Turbocharger Engine Underboost	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1							
P026C - Injection Quantity Too Low	P026D - Injection Quantity Too High	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1						
P026D - Injection Quantity Too High	P026C - Injection Quantity Too Low	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1						
P02E7 - Diesel Intake Air Flow Position Sensor Circuit Range Performance	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive		I					
Performance P02E8 - Diesel Intake Air Flow Position Sensor Circuit Low	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning Limit	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P02E9 - Diesel Intake Air Flow Position Sensor Circuit High	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P02EB - Intake Air Flow Valve Control Motor Current Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning Limit		1	1	
Performance P0335 - Crankshaft Position Sensor Circuit	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High		P0315 - Crankshaft Position System Variation Not Learned	P0506 - Idle Speed Low	P0507 - Idle Speed High			
P0336 - Crankshaft Position Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0191 - Fuel Rail Pressure Sensor Performance	P0315 - Crankshaft Position System Variation Not Learned	P0506 - Idle Speed Low	P0507 - Idle Speed High			
Sensor Fenormance	Gircuit LOW	Circuit nign	renormance	vanauon NOLLeamed			I		

Active DTC				Inhibited DTCs					
P0340 - Camshaft Position Sensor Circuit	P0191 - Fuel Rail Pressure Sensor Performance	P0315 - Crankshaft Position System Variation Not Learned							
P0341 - Camshaft Position Sensor Performance	P0191 - Fuel Rail Pressure Sensor Performance								
P0400 - Exhaust Gas Recirculation (EGR) Flow Incorrect	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High					
P0401 - Exhaust Gas Recirculation Flow Insufficient	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P2459 - Diesel Particulate Filter Regeneration Frequency	P246F - Exhaust Temperature Sensor 4 Performance	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High
P0402 - Exhaust Gas Recirculation Flow Excessive	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P2459 - Diesel Particulate Filter Regeneration Frequency	P246F - Exhaust Temperature Sensor 4 Performance	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High
P0405 - Exhaust Gas Recirculation Position Sensor Circuit Low	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P049D - EGR Control Position Not Learned	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance		
P0406 - Exhaust Gas Recirculation Position Sensor Circuit High	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P049D - EGR Control Position Not Learned	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance		
P040C - Exhaust Gas Recirculation (EGR) Temperature Sensor 2 Circuit Low Voltage	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation								
P040D - Exhaust Gas Recirculation (EGR) Temperature Sensor 2 Circuit High Voltage	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation								
P041C - Exhaust Gas Recirculation (EGR) Temperature Sensor 1 Circuit Low Voltage	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation								
P041D - Exhaust Gas Recirculation (EGR) Temperature Sensor 1 Circuit High Voltage	P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation								
P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High						_	
P046C - Exhaust Gas Recirculation(EGR) Position Sensor Performance	P0101 - Mass Air Flow Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance		
P0545 - Exhaust Gas Temperature (EGT) Sensor 1 Circuit Low Voltage	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P2428 - Exhaust Gas High Temperature					
P0546 - Exhaust Gas Temperature (EGT) Sensor 1 Circuit High Voltage	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P2428 - Exhaust Gas High Temperature					
P0575 - Cruise Control Input Circuit	P0567 - Cruise Control Resume Switch Circuit	P0568 - Cruise Control Set Switch Circuit							
P057C - Brake Pedal Position Sensor Circuit High Voltage	P057D - Brake Pedal Position Sensor Circuit Low Voltage								
P057D - Brake Pedal Position Sensor Circuit Low Voltage	P057C - Brake Pedal Position Sensor Circuit High Voltage								
P0606 - Control Module Internal Performance	P2146 - Injector Positive Voltage Control Circuit Group 1	P2149 - Injector Positive Voltage Control Circuit Group 2	P2152 - Injector Positive Voltage Control Circuit Group 3	P2155 - Injector Positive Voltage Control Circuit Group 4					
P064C - Glow Plug Control Module Performance	P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P2209 - N0x Heater Performance Bank 1 Sensor 1							
P0651 - 5 Volt Reference 2 Circuit	P2127 - Accelerator Pedal Position Sensor 2 Circuit Low	P2128 - Accelerator Pedal Position (APP) Sensor 2 Circuit High Voltage							
P0697 - 5 Volt Reference 3 Circuit	P2122 - Accelerator Pedal Position Sensor 1 Circuit Low	P2123 - Accelerator Pedal Position Sensor 1 Circuit High							
P0851 - Park/Neutral Position (PNP) Switch Circuit Low Voltage	P0852 - Park/Neutral Position (PNP) Switch Circuit High Voltage								
P0852 - Park/Neutral Position (PNP) Switch Circuit High Voltage	P0851 - Park/Neutral Position (PNP) Switch Circuit Low Voltage								
P1048 - Reductant Injector High Control Circuit Low Voltage	P202E - Reductant Injector Performance								
P1049 - Reductant Injector High Control Circuit High Voltage	P202E - Reductant Injector Performance	P2510 - ECM Power Relay Circuit Performance							
P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High							
P11DC - NOx Sensor Current Performance Bank 1 Sensor 2	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High							
P1224 - Injector 1 Control Circuit Shorted P1227 - Injector 2 Control Circuit	P0201 - Injector 1 Control Circuit	P0606 - Control Module Internal Performance P0606 - Control Module Internal	P2146 - Injector Positive Voltage Control Circuit Group 1 P2152 - Injector Positive Voltage						
Shorted	P0202 - Injector 2 Control Circuit	Performance	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						

Active DTC				Inhibited DTCs	1	
P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning Limit	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive		
P1233 - Injector 4 Control Circuit Shorted	P0204 - Injector 4 Control Circuit	P0606 - Control Module Internal Performance	P2146 - Injector Positive Voltage Control Circuit Group 1			
P1236 - Injector 5 Control Circuit Shorted	P0205 - Injector 5 Control Circuit	P0606 - Control Module Internal Performance	P2152 - Injector Positive Voltage Control Circuit Group 3			
P1239 - Injector 6 Control Circuit Shorted	P0206 - Injector 6 Control Circuit	P0606 - Control Module Internal Performance	P2149 - Injector Positive Voltage Control Circuit Group 2			
P1242 - Injector 7 Control Circuit Shorted	P0207 - Injector 7 Control Circuit	P0606 - Control Module Internal Performance	P2149 - Injector Positive Voltage Control Circuit Group 2			
P1247 - Injector 8 Control Circuit Shorted	P0208 - Injector 8 Control Circuit	P0606 - Control Module Internal Performance	P2155 - Injector Positive Voltage Control Circuit Group 4			
P125B - Fuel Pressure Regulator 2 High Control Circuit High Voltage	P2510 - ECM Power Relay Circuit Performance		· · · ·	-		
P140B - Exhaust Gas Recirculation Slow Response- Increasing Flow	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High		
P140C - Exhaust Gas Recirculation Slow Response- Decreasing Flow	P11CB - NOx Sensor Performance - Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High		
P140F - Exhaust Gas Recirculation (EGR) Motor Current Performance	P0101 - Mass Air Flow Sensor Performance	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P049D - EGR Control Posit 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		4			
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		2		
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	1 chomanos	1			
P205D - Reductant Tank	P205B - Reductant Tank	P20BA - Reductant Heater 1	]			
Temperature Sensor Circuit High P208A - Reductant Pump Control Circuit	Temperature Sensor Performance P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	Performance P20A1 - Reductant Purge Valve Performance	P20E8 - Reductant Pressure Too Low	P20E9 - Reductant Pressure Too High		
P208D - Reductant Pump Control Circuit High Voltage	P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	P20A1 - Reductant Purge Valve Performance	P20E8 - Reductant Pressure Too Low	P20E9 - Reductant Pressure Too High	P2510 - ECM Power Relay Circuit Performance	]
P20A0 - Reductant Purge Valve Control Circuit	P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	P20A1 - Reductant Purge Valve Performance	P20E8 - Reductant Pressure Too Low	P20E9 - Reductant Pressure Too High		
P20A2 - Reductant Purge Valve Control Circuit Low Voltage	P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	P20A1 - Reductant Purge Valve Performance	P20E8 - Reductant Pressure Too Low	P20E9 - Reductant Pressure Too High		,
P20A3 - Reductant Purge Valve Control Circuit High Voltage	P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	P20A1 - Reductant Purge Valve Performance	P20E8 - Reductant Pressure Too Low	P20E9 - Reductant Pressure Too High	P2510 - ECM Power Relay Circuit Performance	
P20CB - Exhaust Aftertreatment Fuel Injector Control Circuit	P2510 - ECM Power Relay Circuit Performance					
P20CE - Exhaust Aftertreatment Fuel Injector Control Circuit High Voltage	P2510 - ECM Power Relay Circuit Performance					_
P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	P0101 - Mass Air Flow Sensor Performance	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance	]
P2122 - Accelerator Pedal Position Sensor 1 Circuit Low	P2138 - Accelerator Pedal Position (APP) Sensor 1-2 Correlation					

P2123 - Accelerator Pedal     P2138 - Accelerator Pedal Position (APP) Sensor 1-2 Correlation       P2127 - Accelerator Pedal     P2138 - Accelerator Pedal Position (APP) Sensor 1-2 Correlation	
Position Sensor 1 Circuit High (APP) Sensor 1-2 Correlation P2127 - Accelerator Pedal P2138 - Accelerator Pedal Position	
P2128 - Accelerator Pedal Position (APP) Sensor 2 Circuit High Voltage P2138 - Accelerator Pedal Position (APP) Sensor 1-2 Correlation	
P2146 - Injector Positive Voltage P0606 - Control Module Internal	
Control Circuit Group 1 Performance P2143-Injector Positive Vistage 9 P0606 - Control Module Internal	
Control Circuit Group 2 Performance	
P2152 - Injector Positive Voltage P0606 - Control Module Internal	
Control Circuit Group 3 Performance P2155 - Injector Positive Voltage P0606 - Control Module Internal P2146 - Injector Positive Voltage P2149 - Injector Positive Voltage P2152 - Injector Positive Voltage	
Control Circuit Group 4 Performance Control Circuit Group 1 Control Circuit Group 2 Control Circuit Group 3 P249D - Closed Loop Reductant P249E - Closed Loop Reductant	
1 Sensor 1 Performance Bank 1 Sensor 1 Bank 1 Sensor 1 Injection Control At Limit - How Too Injection Control At Limit - How Too High	
Bank 1 Sensor 1 Low Injection Control At Limit - Flow Too High	
P2203 - N0x Sensor Circuit High Bank 1 Sensor 1         P2490 - 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 - N0x Sensor Current Performance Bank 1 Sensor 1         P2209 - N0x Heater Performance Bank 1 Sensor 1         P2249 - Closed Loop Reductant Injection Control At Limit - Flow Too Low         P2492 - Closed Loop Reductant Injection Control At Limit - Flow Too High	
P2209 - N0x Heater Performance Bank 1 Sensor 1 Low High	
P220A - N0x Sensor Supply D4455 N0x Sensor Output D2000 N0x Users Defension	
Voltage Out DF Kange Bank 1 Sensor 1 Performance Bank 1 Sensor 1 Bank 1 Sensor 1	
Voltage Out Of Range Bank 1 Sensor 2 P1/DB - NOX Sensor Current P2/209 - NOX Heater Penformance Bank 1 Sensor 1 Bank 1 Sensor 1	
P2228 - Barometric Pressure Sensor Performance Overboost Underboost Underboost Flow Insufficient P0402 - Exhaust Gas Recirculation P1402 - Exh	P11CC - NOx Sensor Performance - P2002 - Diesel Particulate Filter     Signal Low Bank 1 Sensor 1 (DPF) Low Efficiency
Prezer baufinition Pressure Conson Formance Conson Formation	Olghai Low Dank i Gensol i (Di Ti) Low Encloricy
Sensor 1 Performance Sensor 2 Performance Sensor 3 Performance	
P2229 - Barometric Pressure         P0106 - Manifold Absolute Pressure         P0234 - Turbocharger Engine         P0409 - Turbocharger Engine         P0401 - Exhaust Gas Recirculation         P0402 - Exhaust Gas Recirculation         P11CB - NOX Sensor Performance           P2229 - Barometric Pressure         Sensor Performance         Overboost         Underboost         Flow Insufficient         Flow Excessive         Signal High Bank 1 Sensor 1	P11CC - NOx Sensor Performance - Signal Low Bank 1 Sensor 1     P2002 - Diesel Particulate Filter     (DPF) Low Efficiency
Sensor Circuit High P2080 - Exhaust Temperature P2084 - Exhaust Temperature P2428 - Exhaust Temperature P2459 - Diesel Particulate Filter P246F - Exhaust Temperature	
Sensor 1 Performance         Sensor 2 Performance         Sensor 3 Performance         Regeneration Frequency         Sensor 4 Performance           P2263 - Turbo Boost System         P0101 - Mass Air Flow Sensor         P0106 - Manifold Absolute Pressure         P0234 - Turbocharger Engine         P0299 - Turbocharger Engine         P0401 - Exhaust Gas Recirculation         P0402 - Exhaust Gas Recirculation	
Performance Performance Server Performance Server Performance Verboard Construction	
P229E - NOx Sensor Circuit Bank 1 Sensor 2         P11AF - H02S Performance - Signal         P1282 - H02S Performance - Signal         P249D - Closed Loop Reductant         P249E - Closed Loop Reductant           1 Sensor 2         High During Moderate Load Bank 1 Sensor 2         Low During Moderate Load Bank 1 Sensor 2         Low During Moderate Load Bank 1 Sensor 2         Low During Moderate Load Bank 1 Injection Control At Limit - Flow Too High	
P202.0. NOv Horses Control P11AF - HO2S Performance - Signal P11B2 - HO2S Performance - Signal P249D - Closed Loop Reductant P249E - Closed Loop Reductant	
P22043 - NOX Reader Collina High During Moderate Load Bank 1 Low During Moderate Load Bank 1 Injection Control At Limit - Flow Too Injection Control At Limit - Flow Too High	
222A7 - NOx Heater Performance P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Injection Control At Limit - Flow Too	
D2442 Exhaust Can	
P2490 * Okacet Coop Reductain Recirculation (EGR) System Performance - Signal High Bank 1 Sensor 1 Signal Low Bank 1 Sensor 1 Signal Low Bank 1 Sensor 1	
P242C - Exhaust Gas     P2428 - Exhaust Gas High     P2428 - Exhaust Temperature       Temperature (EGT) Sensor 3     Temperature     Sensor 3 Performance       Circuit Low Voltage     Temperature     Sensor 3 Performance	
P242D - Exhaust Gas         P2428 - Exhaust Gas High         P2428 - Exhaust Temperature           Temperature (EGT) Sensor 3         Temperature         Sensor 3 Performance         P2426 - Exhaust Temperature           Circuit Hink Voltage         Temperature         Sensor 3 Performance         Sensor 4 Performance	
P2453 - Diese Ranculate Filter Differential Pressure Sensor Performance P0234 - Turbocharger Engine Overboost 0verboost 0verbo	7
D0464 Direct Destructor Films D0466 Direct Destructor Films	
P2403 - Dissel Particulate Priter           Differential Pressure Sensor Circuit Low Voltage         (DPF) Low Efficiency         Differential Pressure Sensor         Differential Pressure Sensor         P2403 - Dissel Particulate Filter	
D0450 Direct Destructor Files D0454 Direct Destructor Files	
P2403 - Diesel Particulate Filter         P2403 - Diesel Particulate Filter         P2403 - Diesel Particulate Filter           Differential Pressure Sensor         (DPF) Low Efficiency         Differential Pressure Sensor         Differential Pressure Sensor Circuit           Differential Pressure Sensor         Differential Pressure Sensor         Differential Pressure Sensor Circuit         P2403 - Diesel Particulate Filter	
P245A - Exhaust Gas Recirculation (EGR) Cooler Brow Insufficient P0401 - Exhaust Gas Recirculation P0402 - Exhaust Gas Recirculation Flow Insufficient P0402 - Exhaust Gas Recirculation Flow Insufficient Power Sensor 2 Performance Sensor 1 Performance Sensor 1 Performance Sensor 3 Performance Sensor 4 P	P246F - Exhaust Temperature P2510 - ECM Power Relay Circuit Sensor 4 Performance Performance
Dybase valve Control Circuit         P2002 - Diesel Particulate Filter           Soch Accumulation         (DPF) Low Efficiency	
P2470 - Exhaust Gas Temperature (EGT) Sensor 4 Temperature = P2428 - Exhaust Gas High Temperature = Sensor 4 Performance	

Active DTC				Inhibited DTCs					
P2471 - Exhaust Gas	P2428 - Exhaust Gas High	P246F - Exhaust Temperature							
Temperature (EGT) Sensor 4 Circuit High Voltage	Temperature	Sensor 4 Performance							
P2493 - EGR Cooler BY Pass Position Sensor Performance	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive							
P2494 - EGR Cooler BY Pass Position Sensor Circuit Low	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P140A - EGR Cooler BY Pass Position Sensor Exceded Learning Limit	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P2495 - EGR Cooler BY Pass Position Sensor Circuit High	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive	P140A - EGR Cooler BY Pass Position Sensor Exceded Learning Limit	P2080 - Exhaust Temperature Sensor 1 Performance	P2084 - Exhaust Temperature Sensor 2 Performance	P242B - Exhaust Temperature Sensor 3 Performance	P246F - Exhaust Temperature Sensor 4 Performance
P249D - Closed loop Reductant Injection Control at Limit-Flow too high	P20EE - SCR Nox Catalyst Efficiency Below Threshold Bank 1								
P249E - Closed loop Reductant Injection Control at Limit-Flow too low	P20EE - SCR Nox Catalyst Efficiency Below Threshold Bank 1				_				
P2564 - Turbocharger Boost Control Position Sensor Circuit Low	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive					
P2565 - Turbocharger Boost Control Position Sensor Circuit High	P0234 - Turbocharger Engine Overboost	P0299 - Turbocharger Engine Underboost	P0401 - Exhaust Gas Recirculation Flow Insufficient	P0402 - Exhaust Gas Recirculation Flow Excessive					
P2598 - Turbocharger Boost Control Position Sensor "A" Circuit Range/Performance - Stuck Low	P0101 - Mass Air Flow Sensor Performance								
P2599 - Turbocharger Boost Control Position Sensor "A" Circuit Range/Performance - Stuck High	P0101 - Mass Air Flow Sensor Performance								
U0073 - CAN A BUS OFF	P0851 - Park/Neutral Position (PNP) Switch Circuit Low Voltage	P0852 - Park/Neutral Position (PNP) Switch Circuit High Voltage							
U0101 - Lost Communications With Transmission Control System	P0851 - Park/Neutral Position (PNP) Switch Circuit Low Voltage	P0852 - Park/Neutral Position (PNP) Switch Circuit High Voltage							
U0106 - Lost Communication With Glow Plug Control Module	P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High						
U029D - N0x 1 loss of comm	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High							
U029E - N0x 2 loss of comm	P11DB - NOx Sensor Current Performance Bank 1 Sensor 1	P249D - Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249E - Closed Loop Reductant Injection Control At Limit - Flow Too High						
	P0087 - Fuel Rail Pressure Too Low	P0088 - Fuel Rail Pressure Too High	P0191 - Fuel Rail Pressure Sensor Performance	P0263 - Cly 1 Balance System	P0266 - Cly 2 Balance System	P0269 - Cly 3 Balance System	P0272 - Cly 4 Balance System	P0275 - Cly 5 Balance System	P0278 - Cly 6 Balance System
	P0281 - Cly 7 Balance System	P0284 - Cly 8 Balance System	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected
Fuel Level less than 15%	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P11AF - HO2S Performance - Signal High During Moderate Load Bank 1 Sensor 2	P11B2 - HO2S Performance - Signal Low During Moderate Load Bank 1 Sensor 2	P128E - Fuel Rail Pressure Performance	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected
. 33 E990 1633 tildiri 1378	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	High During Moderate Load Bank 1 Sensor 2	Sensor 2	P128E - Fuel Rail Pressure Performance	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected
	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P11AF - HO2S Performance - Signal High During Moderate Load Bank 1 Sensor 2	P11B2 - HO2S Performance - Signal Low During Moderate Load Bank 1 Sensor 2	P128E - Fuel Rail Pressure Performance				

DTC			Additional Basic Enable Conditions				
P0016 - Crankshaft to Camshaft Correlation	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P003A - Turbocharger Boost Control Position Not Learned	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0045 - Turbocharger Boost Control Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P0047 - Turbocharger Boost Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P0048 - Turbocharger Boost Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P006E - Turbocharger Boost High Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P006F - Turbocharger Boost High Control Circuit High Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)						
P0071 - Ambient Air Temperature Sensor Circuit "A" 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)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0072 - Ambient Air Temperature Sensor Circuit "A" 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)
P0073 - Ambient Air Temperature Sensor Circuit "A" 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)
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)

DTC			Additional Basic Enable Conditions	<b>i</b>					
P00F5 - Humidity Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P00F6 - Humidity Sensor Circuit Intermittent/Erratic	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0101 - Mass Air Flow Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0102 - Mass Air Flow Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0103 - Mass Air Flow Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0106 - Manifold Absolute Pressure Sensor Performance	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			_	
P0107 - Manifold Absolute Pressure (MAP) Sensor Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0108 - Manifold Absolute Pressure (MAP) Sensor Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0112 - Intake Air Temperature Sensor 1 Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0113 - Intake Air Temperature Sensor 1 Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0117 - Engine Coolant Temperature Sensor Circuit Low	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P0118 - Engine Coolant Temperature Sensor Circuit High	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P0131 - HO2S Bank 1 Sensor 1 circuit low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)		Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0132 - HO2S Bank 1 Sensor 1 circuit high	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)		Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0137 - HO2S Bank 1 Sensor 2 circuit low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)		Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0138 - HO2S Bank 1 Sensor 2 circuit high	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)		Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P014C - HO2S Slow Response Rich to Lean Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0171 - Fuel Trim System Lean	System is not in active regeneration mode								
P0172 - Fuel Trim System Rich	System is not in active regeneration mode	1							
P0182 - Fuel Temperature Sensor 1 Circuit Low		Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0183 - Fuel Temperature Sensor 1 Circuit High	as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0191 - Fuel Rail Pressure Sensor Performance	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								

P0192 - Fuel Rail Pressure Sensor Circuit Lowengine is not in standby state (state doubs) state cours after FCM, initialization or following after-run)battery voltage is above 11 V for at least 3sP0193 - Fuel Rail Pressure Sensor Circuit Highengine is not in standby state (statedoubs) state cours after ECM, initialization or following after-run)battery voltage is above 11 V for at least 3sP010B - Cylinder 1 Injection Timing Retardedambient air temperature is above -7 deg Cambient pressure is above 74.8&Pa ambient pressure is above 74.8&Paengine is not in ready state (which is active when the ingnition is on or following a stal of the engine)P010D - Cylinder 2 Injection Timing Advancedambient air temperature is above -7 deg Cambient pressure is above 74.8&Pa ambient pressure is above 74.8&Paengine is not in ready state (which is active when the ingnition is on or following a stal of the engine)P010D - Cylinder 2 Injection Timing Retardedambient air temperature is above -7 deg Cambient pressure is above 74.8&Pa ambient pressure is above 74.8&Paengine is not in ready state (which is active when the ingnition is on or following a stal of the engine)P010D - Cylinder 2 Injection Timing Retardedambient air temperature is above -7 deg Cambient pressure is above 74.8&Pa ambient pressure is above 74.8&Paengine is not in ready state (which is active when the ingnition is on or following a stal of the engine)P010D - Cylinder 2 Injection Timing Retardedambient air temperature is above -7 deg Cambient pressure is above 74.8&Pa ambient pressure is above 74.8&Pa deg Cengine is not in ready state (which is ac		
P01SB-Fuel real release Sense       (standby state occurs after ECM)       initialization or following after-run)       initialization or following after-run)         P01CB-Cylinder 1 Injection Timing       ambient air temperature is above 7-7       ambient pressure is above 74.8kPa       engine is not in ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or ready state (which is active when the ginition is on or read		
PUTCB - Cylinder 1 Injection Iming Retarded     ambient air temperature is above -7 deg C     ambient pressure is above -7.4.8kPa     active when the ignition is on or following a stall of the engine)       P01CC - Cylinder 1 Injection Timing Retarded     ambient air temperature is above -7 deg C     ambient pressure is above -7.4.8kPa     ambient pressure is above -7.4.8kPa     engine is not in ready state (Wich 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 (Wich is active when the ignition is on or following a stall of the engine)       P01CE - Cylinder 2 Injection Timing Retarded     ambient air temperature is above -7 ambient pressure is above 74.8kPa     ambient pressure is above 74.8kPa     engine is not in ready state (Wich is active when the ignition is on or following a stall of the engine)		
POTCL - Cylinder 1 Injection Timing Retarded       ambient air temperature is above 7-/ deg C       ambient pressure is above 74.8kPa ambient pressure is above 74.8kPa ambient pressure is above 74.8kPa       active when the ignition is on or following a stall of the engine)         POTCE - Cylinder 2 Injection Timing Retarded       ambient air temperature is above 7.7 ambient pressure is above 7.4kPa       ambient pressure is above 74.8kPa 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)		
POICD-Cylinded 2 injection trining Retarded       ambient an temperature is above -7 deg C       ambient pressure is above -7 following a stall of the engine)         POICE-Cylinder 2 Injection Timing ambient air temperature is above -7 ambient pressure is above -7 ambient pressure is above -7       ambient pressure is above -7 ambient pressure is above -7		
antibert and temperature is above 7/ ambient members and the C active when the ignition is on or		
Advariation deg C following a stall of the engine)		
P01CF - Cylinder 3 Injection Timing Retarded dg C ambient air temperature is above -7 deg C ambient pressure is above 74.8kPa ambient pressure is above 74.8kPa adve when the ignition is on or following a stall of the engine)		
P01D0 - Cylinder 3 Injection Timing Advanced deg C ambient air temperature is above -7 deg C ambient pressure is above 74.8kPa ambient pressure is above 74.8kPa adve when the ignition is on or following a stall of the engine)		
P01D1 - Cylinder 4 Injection Timing Retarded arbient air temperature is above -7 deg C arbient pressure is above 74.8kPa arbient pressure is above 74.8kPa		
P01D2 - Cylinder 4 Injection Timing Advanced deg C ambient air temperature is above -7 deg C ambient pressure is above 74.8kPa ambient pressure is above 74.8kPa ative when the lignition is on or tollowing a stall of the engine)		
P01D3 - Cylinder 5 Injection Timing Retarded dg C ambient air temperature is above -7 deg C ambient pressure is above 74.8kPa ambient pressure is above 74.8kPa atil of the engine)		
P01D4 - Cylinder 5 Injection Timing Advanced deg C ambient air temperature is above -7 deg C ambient pressure is above 78.8Pb and active when the ignition is on or tollowing a stall of the engine)		
P01D5 - Cylinder 6 Injection Timing Retarded arbient air temperature is above - 7 deg C arbient pressure is above 7.8 kep ambient pressure is above 7.8 kep arbient pressure is above 7.8 kep arbient pressure is above 7.8 kep arbient pressure is above 7.8 kep		
P01D6 - Cylinder 6 Injection Timing Advanced deg C ambient pressure is above -7 deg C ambient pressure is above 74.8PP 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 7 48.PP reductive when the ignition is on or following a stall of the engine)		
P01D8 - Cylinder 7 Injection Timing Advanced deg C engine is above 7-7 deg C ambient pressure is above 74.8 PP i ambient pressure is above 74.8 PP i ambient pressure is above 74.8 PP		
P01D9 - Cylinder 8 Injection Timing Retarded ambient air temperature is above -7 deg C ambient pressure is above 78.8PP ambient pressure is above 74.8PP reductive when the ignition is on or following a stall of the engine)		
P01DA - Cylinder 8 Injection Timing Advanced deg C ambient air temperature is above -7 deg C ambient pressure is above 78.8PP ready state (which is antive when the ignition is on or following a stall of the engine)		
POITP - Coclant Temperature Dropped Below Diagnostic Monitoring Temperature		
P0234 - Turbocharger Engine Overboost Der bione speed greater than 0 (defined as engine speed greater than 0 (m) militarization or following after-run)	e is running which means the e speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0263 - Cly 1 Balance System Power Take-Off (PTO) is not engaged		
P0266 - Cly 2 Balance System Power Take-Off (PTO) is not engaged		
P0269 - Cly 3 Balance System Power Take-Off (PTO) is not engaged		1
	e is running which means the e speed is greater than 600 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 ambient pressure is above 74.8kPa Power Take-Off (PTO) is not engaged 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 mode		
P0272 - Cly 4 Balance System Power Take-Off (PTO) is not engaged		
P0275 - Cly 5 Balance System Power Take-Off (PTO) is not engaged		
P0278 - Cly 6 Balance System Power Take-Off (PTO) is not engaged		
P0281 - Cly 7 Balance System Power Take-Off (PTO) is not engaged		

DTC			Additional Basic Enable Conditions	i					
P0284 - Cly 8 Balance System	Power Take-Off (PTO) is not engaged								
P0299 - Turbocharger Engine Underboost		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 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						L	
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) engine is not in ready state (which is								
P0304 - Cylinder 4 Misfire Detected	active when the ignition is on or following a stall of the engine)								
P0305 - Cylinder 5 Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								
P0306 - Cylinder 6 Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								
P0307 - Cylinder 7 Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)								
P0308 - Cylinder 8 Misfire Detected	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				1				
P0335 - Crankshaft Position Sensor Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)					
P0336 - Crankshaft Position Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)					
P0340 - Camshaft Position Sensor Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	active when the ignition is on or following a stall of the engine)					
P0341 - Camshaft Position Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)					
P0381 - Wait to Start Lamp Control Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				1	
P0400 - Exhaust Gas Recirculation (EGR) Flow Incorrect	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0401 - Exhaust Gas Recirculation Flow Insufficient	as engine speed greater than 0 rpm)	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	3					
	Engine pot in afterrup mode (defined	Engine speed greater than 600 to 850	engine is not in standby state	ambient air temperature is above -7		battery voltage is above 11 V for at	Engine Run Time greater than 10 seconds (engine speed greater than	System is not in active receneration	Engine is running which means the
P0402 - Exhaust Gas Recirculation Flow Excessive	as engine speed greater than 0 rpm)	rpm	(standby state occurs after ECM initialization or following after-run)	deg C	ambient pressure is above 74.8kPa	least 3s	600 to 850 rpm to indicate the engine is running)	mode	engine speed is greater than 600 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 is not in standby state								
P0403 - Exhaust Gas Recirculation (EGR) Motor Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P0405 - Exhaust Gas Recirculation Position Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0406 - Exhaust Gas Recirculation Position Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P040C - Exhaust Gas Recirculation EGR) Temperature Sensor 2 Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P040D - Exhaust Gas Recirculation EGR) Temperature Sensor 2 Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P040F - Exhaust Gas Recirculation (EGR) Temperature Sensor 1-2 Correlation	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P041C - Exhaust Gas Recirculation EGR) Temperature Sensor 1 Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P041D - Exhaust Gas Recirculation EGR) Temperature Sensor 1 Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0420 - NMHC Catalyst Efficiency Below Threshold Bank 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0461 - Fuel Level Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0462 - Fuel Level Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0463 - Fuel Level Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P046C - Exhaust Gas Recirculation(EGR) Position Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P0480 - Cooling Fan Speed Output Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					_
P0483 - Cooling Fan System Performance	as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	ambient pressure is above 74.8kPa	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0489 - Exhaust Gas Recirculation (EGR) Motor Control Circuit 1 Low Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P0490 - Exhaust Gas Recirculation (EGR) Motor Control Circuit 1 High Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P0495 - Cooling Fan Speed High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P049D - EGR Control Position Not Learned	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P0506 - Idle Speed Low	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)							
P0507 - Idle Speed High	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)							

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P0526 - Cooling Fan Speed Sensor Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P0545 - Exhaust Gas Temperature (EGT) Sensor 1 Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P0546 - Exhaust Gas Temperature (EGT) Sensor 1 Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P0567 - Cruise Control Resume Switch Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0568 - Cruise Control Set Switch Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P0575 - Cruise Control Input Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P057C - Brake Pedal Position Sensor Circuit High Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)							
P057D - Brake Pedal Position Sensor Circuit Low Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)							
P0606 - Control Module Internal Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P0627 - Fuel Pump Relay Control Circuit	battery voltage is above 11 V for at least 3s							
P0628 - Fuel Pump Relay Control Circuit Low	battery voltage is above 11 V for at least 3s							
P0629 - Fuel Pump Relay Control Circuit High	battery voltage is above 11 V for at least 3s							
P062F - Control Module Long Term Memory Performance	engine is not in standby state (standby state occurs after ECM initialization or following after-run)							
P0640 - Intake Air (IA) Heater Switch/Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0641 - 5 Volt Reference 1 Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P064C - Glow Plug Control Module Performance	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0650 - Malfunction Indicator Lamp Control Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				
P0651 - 5 Volt Reference 2 Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0671 - Glow Plug 1 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0672 - Glow Plug 2 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0673 - Glow Plug 3 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0674 - Glow Plug 4 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0675 - Glow Plug 5 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0676 - Glow Plug 6 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0677 - Glow Plug 7 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0678 - Glow Plug 8 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P0697 - 5 Volt Reference 3 Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						

DTC		1	Additional Basic Enable Conditions	3	•				
P06A3 - 5 Volt Reference 4 Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P06D2 - 5 Volt Reference 5 Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P0700 - Transmission Control	engine is not in standby state		-						
Module Requested Malfunction Indicator Lamp Illumination	(standby state occurs after ECM initialization or following after-run)								
P0851 - Park/Neutral Position (PNP) Switch Circuit Low Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)								
P0852 - Park/Neutral Position (PNP) Switch Circuit High Voltage	engine is not in standby state (standby state occurs after ECM								
ownest en our ringt vonage	initialization or following after-run)		1		1	1	l.		
P1043 - Reductant Pump High Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	services and in prestoration (these COO) to	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
P1044 - Reductant Pump High Control Circuit High Voltage	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			_	
P1048 - Reductant Injector High Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	_	
P1049 - Reductant Injector High Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P10CC - Exhaust Aftertreatment Fuel Injector Control Circuit Shorted	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	(standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P10CD - Exhaust Aftertreatment Fuel Injector High Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm					
P10CE - Exhaust Aftertreatment Fuel Injector High Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)		battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm		-			
P10D0 - Reductant Injector Temperature - Exhaust Gas Temperature 2 Correlation	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)				
P111F - Fuel Temperature Sensor 1 - Fuel Temperature Sensor 2 Not Plausible	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	1			
P113A - Exhaust Gas Temperature Sensors 3-4 Not Plausible	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	opging is not in standby state	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	1			
P11A6 - HO2S Performance - Signal High During Moderate Load Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P11A9 - HO2S Performance - Signal Low During Moderate Load Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)		Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P11AF - HO2S Performance - Signal High During Moderate Load Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)		Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 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)		Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm		
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)		Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 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)		Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 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 -	as engine speed greater than 0 rpm)	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	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	System is not in active regeneration mode
	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)							
P11CC - NOx Sensor Performance - Signal Low Back 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 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

DTC			Additional Basic Enable Conditions	8					
Oighai Low Dank T Ochool T	Engine is running which means the			-					
	engine speed is greater than 600 to 850 rpm	active when the ignition is on or following a stall of the engine)							
			engine is not in standby state	Manufacturer Enable Counter is zero		Engine Run Time greater than 10		Engine is running which means the	engine is not in ready state (which is
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	(standby state occurs after ECM	(value of 0 means ECM is locked and		seconds (engine speed greater than 600 to 850 rpm to indicate the engine	System is not in active regeneration mode	engine speed is greater than 600 to	active when the ignition is on or
	ab origino opoca greater than o rpmy	- ipii	initialization or following after-run)	out of assembly plant mode)	10451 00	is running)	mode	850 rpm	following a stall of the engine)
		5	engine is not in standby state	Manufacturer Enable Counter is zero		Engine Run Time greater than 10		Engine is running which means the	engine is not in ready state (which is
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	(standby state occurs after ECM	(value of 0 means ECM is locked and		seconds (engine speed greater than 600 to 850 rpm to indicate the engine	System is not in active regeneration mode	engine speed is greater than 600 to	active when the ignition is on or
			initialization or following after-run)	out of assembly plant mode)		is running)		850 rpm	following a stall of the engine)
P122C - Intake Air Flow Valve	engine is not in standby state (standby state occurs after ECM	battery voltage is above 11 V for at							
Control Circuit Shorted	initialization or following after-run)	least 3s							
P122D - Diesel Intake Air Flow Position Sensor Exceeded Learning	engine is not in standby state (standby state occurs after ECM	battery voltage is above 11 V for at							
Limit	initialization or following after-run)	least 3s							
P122E - Intake Air Flow Valve	engine is not in standby state (standby state occurs after ECM	battery voltage is above 11 V for at							
Control Circuit 2 Low Voltage	initialization or following after-run)	least 3s							
P122F - Intake Air Flow Valve	engine is not in standby state	battery voltage is above 11 V for at							
Control Circuit 2 High Voltage	(standby state occurs after ECM initialization or following after-run)	least 3s							
P125A - Fuel Pressure Regulator 2	Engine not in afterrun mode (defined	engine is not in standby state	battery voltage is above 11 V for at	Engine is running which means the	]				
High Control Circuit Low Voltage	as engine speed greater than 0 rpm)	(standby state occurs after ECM initialization or following after-run)	least 3s	engine speed is greater than 600 to 850 rpm					
P125B - Fuel Pressure Regulator 2	engine is not in standby state				ı				
High Control Circuit High Voltage	(standby state occurs after ECM initialization or following after-run)								
P128E - Fuel Rail Pressure	engine is not in ready state (which is	-							
Performance	active when the ignition is on or following a stall of the engine)								
P1407 - Exhaust Gas Recirculation	engine is not in standby state	battery voltage is above 11 V for at							
(EGR) Motor Control Circuit Shorted	(standby state occurs after ECM initialization or following after-run)	least 3s							
			engine is not in standby state				Engine Run Time greater than 10		Engine is running which means the
	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	(standby state occurs after ECM	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	seconds (engine speed greater than 600 to 850 rpm to indicate the engine	System is not in active regeneration mode	engine speed is greater than 600 to
P140B - Exhaust Gas Recirculation Slow Response-Increasing Flow	as engine speed greater than 0 rpm)	ipiti	initialization or following after-run)	ueg C		iedst 35	is running)	mode	850 rpm
Slow Response-increasing Flow	engine is not in ready state (which is active when the ignition is on or	i							
	following a stall of the engine)								
	Engine pot in offerrup mode (defined	Engine speed greater than 600 to 850	engine is not in standby state	ambient air temperature is above -7		battery voltage is above 11 V for at	Engine Run Time greater than 10 seconds (engine speed greater than	System is not in active regeneration	Engine is running which means the
P140C - Exhaust Gas Recirculation	as engine speed greater than 0 rpm)	rpm	(standby state occurs after ECM initialization or following after-run)	deg C	ambient pressure is above 74.8kPa	least 3s	600 to 850 rpm to indicate the engine	mode	engine speed is greater than 600 to 850 rpm
Slow Response-Decreasing Flow	engine is not in ready state (which is		initialization of following alter rany				is running)		ooo ipin
	active when the ignition is on or								
P140D - Exhaust Gas Recirculation	following a stall of the engine) engine is not in standby state								
(EGR) Motor Control Circuit 2 Low	(standby state occurs after ECM	battery voltage is above 11 V for at least 3s							
Voltage P140E - Exhaust Gas Recirculation	initialization or following after-run) engine is not in standby state								
(EGR) Motor Control Circuit 2 High	(standby state occurs after ECM	battery voltage is above 11 V for at least 3s							
Voltage	initialization or following after-run) engine is not in standby state								
P140F - Exhaust Gas Recirculation (EGR) Motor Current Performance	(standby state occurs after ECM	battery voltage is above 11 V for at least 3s							
P144B - Closed Loop Diesel	initialization or following after-run)			Engine Run Time greater than 10			1		
Particulate Filter (DPF)	Engine not in afterrun mode (defined	Engine speed greater than 600 to 850	engine is not in standby state (standby state occurs after ECM	seconds (engine speed greater than	Engine is running which means the engine speed is greater than 600 to	engine is not in ready state (which is active when the ignition is on or			
Regeneration Control At Limit - Stage 1 Temperature Too Low	as engine speed greater than 0 rpm)	rpm	initialization or following after-run)	600 to 850 rpm to indicate the engine is running)	850 rpm	following a stall of the engine)			
P144C - Closed Loop Diesel			engine is not in standby state	Engine Run Time greater than 10	Engine is running which means the	engine is not in ready state (which is	1		
Particulate Filter (DPF) Regeneration Control At Limit -	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	(standby state occurs after ECM	seconds (engine speed greater than 600 to 850 rpm to indicate the engine	engine speed is greater than 600 to	active when the ignition is on or			
Stage 1 Temperature Too High	ab oligino opoca greator than o rpiny	(pri)	initialization or following after-run)	is running)	850 rpm	following a stall of the engine)		_	
P1472 - Particulate Matter Sensor	Engine not in afterrup mode (defined	Engine speed greater than 600 to 850	engine is not in standby state	battery voltage is above 11 V for at	Engine Run Time greater than 10 seconds (engine speed greater than	Engine is running which means the	engine is not in ready state (which is		
Signal Message Counter Incorrect	as engine speed greater than 0 rpm)	rpm	(standby state occurs after ECM initialization or following after-run)	least 3s	600 to 850 rpm to indicate the engine	engine speed is greater than 600 to 850 rpm	active when the ignition is on or following a stall of the engine)		
P1479 - Particulate Matter Sensor	battery voltage is above 11 V for at	1	atter-fully		is running)	000 (pm		J	
Sensitivity Factor Performance	least 3s								
P154A - Intake Air (IA) Heater	engine is not in standby state (standby state occurs after ECM	battery voltage is above 11 V for at							
Feedback Circuit	initialization or following after-run)	least 3s							
P154B - Intake Air (IA) Heater	engine is not in standby state (standby state occurs after ECM	battery voltage is above 11 V for at							
Voltage Signal Circuit	(standby state occurs after ECM initialization or following after-run)	least 3s							
P154C - Intake Air (IA) Heater	engine is not in standby state	battery voltage is above 11 V for at							
Current Signal Circuit	(standby state occurs after ECM initialization or following after-run)	least 3s							
P154D - Intake Air (IA) Heater	engine is not in standby state	battery voltage is above 11 V for at							
Temperature Signal Circuit	(standby state occurs after ECM initialization or following after-run)	least 3s							
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DTC			Additional Basic Enable Conditions	i				
P155D - Hill Descent Signal Not Correct	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	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)	
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		1				
P1631 - Theft Deterrent Fuel Enable Signal Not Correct	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)					
P163C - Glow Plug Control Module Primary Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P163D - Glow Plug Control Module Secondary Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s					
P163E - Glow Plug Control ModuleOvertemperature	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s						
P166B - Intake Air (IA) Heater Over Temperature	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s					1	
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	deg C	ambient pressure is above 74.8kPa	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm		
P2032 - Exhaust Gas Temperature (EGT) Sensor 2 Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	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 of the engine)
P203C - Reductant Level Sensor 1 Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P203D - Reductant Level Sensor 1 Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P2047 - Reductant Injector Control Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P2048 - Reductant Injector Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P2049 - Reductant Injector Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P204B - Reductant Pump Pressure Sensor Performance	engine is not in standby state (standby state occurs after ECM initialization or following after-run)							-
P204C - Reductant Pump Pressure Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P204D - Reductant Pump Pressure Sensor Circuit High	engine is not in standby state (standby state occurs after ECM initialization or following after-run)							
P204F - Reductant System Performance Bank 1 (cannot build pump pressure)	SCR Reductant Level not in restriction or empty level state (see reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P205B - Reductant Tank Temperature Sensor Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	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)	

DTC			Additional Basic Enable Conditions				
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)	is running)	Engine is running which means the engine speed is greater than 600 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 $>= -7^{\circ}$ C and the reductant tank temperature is $>= -$ $7^{\circ}$ C			
P208D - Reductant Pump Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P20A0 - Reductant Purge Valve Control Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P20A1 - Reductant Purge Valve Performance	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s					
P20A2 - Reductant Purge Valve Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P20A3 - Reductant Purge Valve Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P20B9 - Reductant Heater 1 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s				•	
P20BA - Reductant Heater 1 Performance	SCR Reductant Level not in restriction or empty level state (see reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)		Engine is running which means the engine speed is greater than 600 to 850 rpm	
P20BB - Reductant Heater 1 Control Circuit Low	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s					
P20BC - Reductant Heater 1 Control Circuit High	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s					
P20BD - Reductant Heater 2 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s					
P20BF - Reductant Heater 2 Control Circuit Low	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s					
P20C0 - Reductant Heater 2 Control Circuit High	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s					
P20C1 - Reductant Heater 3 Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s					
P20C3 - Reductant Heater 3 Control Circuit Low	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s					
P20C4 - Reductant Heater 3 Control Circuit High	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s					
P20CB - Exhaust Aftertreatment Fuel Injector Control Circuit	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P20CC - Exhaust Aftertreatment Fuel Injector Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P20CD - Exhaust Aftertreatment Fuel Injector Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P20CE - Exhaust Aftertreatment Fuel Injector Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
P20E2 - Exhaust Gas Temperature (EGT) Sensors 1-2 not plausible	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		

DTC			Additional Basic Enable Conditions						
P20E8 - Reductant Pressure Too Low	SCR Reductant Level not in restriction or empty level state (see parameter definitions for reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P20E9 - Reductant Pressure Too High	SCR Reductant Level not in restriction or empty level state (see parameter definitions for reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P20EE - SCR Nox Catalyst Efficiency Below Threshold Bank 1	SCR Reductant Level not in restriction or empty level state (see reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Status of the Reductant Tank is not Frozen which means ambient air temperature is >= -7°C and the 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 of the engine)								
P214F - Reductant Heater 1 Current Too High	SCR Reductant Level not in restriction or empty level state (see parameter definitions for reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P21AA - Reductant Level Sensor 2 Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	5	
P21AB - Reductant Level Sensor 2 Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	5	
P21AF - Reductant Level Sensor 3 Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	5	
P21B0 - Reductant Level Sensor 3 Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	5	
P21DD - Reductant Heater 1 Current Too Low	SCR Reductant Level not in restriction or empty level state (see parameter definitions for reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P2200 - N0x Sensor Circuit Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P2202 - N0x Sensor Circuit Low Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)		Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm		
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)		Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm		
P2205 - N0x Heater Control Circuit Bank 1 Sensor 1	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)		Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm		
P2209 - N0x Heater Performance Bank 1 Sensor 1	as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)		Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P220A - N0x Sensor Supply Voltage Out Of Range Bank 1 Sensor 1	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P220B - N0x Sensor Supply Voltage Out Of Range Bank 1 Sensor 2	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s		1		1	1	1	
P221C - Reductant Heater 2 Current Too Low	SCR Reductant Level not in restriction or empty level state (see parameter definitions for reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P221D - Reductant Heater 2 Current Too High	SCR Reductant Level not in restriction or empty level state (see parameter definitions for reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P221E - Reductant Heater 3 Current Too Low	SCR Reductant Level not in restriction or empty level state (see parameter definitions for reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	

DTC			Additional Basic Enable Condition	S					
P221F - Reductant Heater 3 Current Too High	SCR Reductant Level not in restriction or empty level state (see parameter definitions for reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	0 (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time is greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P2228 - Barometric Pressure Sensor Circuit Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	-	
P2229 - Barometric Pressure Sensor Circuit High	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	_	
P2263 - Turbo Boost System Performance	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)		
P2295 - Fuel Pressure Regulator 2 Control Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm	_				
P2296 - Fuel Pressure Regulator 2 Control Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			1	1	
P229E - NOx Sensor Circuit Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)		600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P22A0 - NOx Sensor Circuit Low Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	
P22A1 - NOx Sensor Circuit High Bank 1 Sensor 2	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)		600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 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)		Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 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)		Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 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)	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)
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					
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	active when the ignition is on or following a stall of the engine)				
P242C - Exhaust Gas Temperature (EGT) Sensor 3 Circuit Low Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				
P242D - Exhaust Gas Temperature (EGT) Sensor 3 Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm		1	1	1
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 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	active when the ignition is on or following a stall of the engine)		
P2457 - Exhaust Gas (EGR) Cooler Performance	as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P2459 - Diesel Particulate Filter Regeneration Frequency	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa							
P245A - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
P245C - Exhaust Gas Recirculation (EGR) Cooler Bypass Valve Control Circuit 1 Low Voltage	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							

P245D - Exhaust Gas Recirculation			Additional Basic Enable Conditions						
(EGR) Cooler Bypass Valve Control	engine is 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 a Regeneration Frequency	ambient air temperature is above -7 deg C	ambient pressure is above 74.8kPa							
Soot Accumulation as	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	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 En Sensor 4 Performance	ingine 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)				
	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				
P2471 - Exhaust Gas Temperature (EGT) Sensor 4 Circuit High Voltage	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm				
	SCR Reductant Level not in restriction or empty level state (see reductant level warning definition)	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	initialization or following after-run)	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
P24A0 - Closed Loop Particulate Filter Regeneration Control At Limit - Temperature Too Low	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)			
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 b Heater Control Circuit	battery voltage is above 11 V for at least 3s								
	battery voltage is above 11 V for at least 3s								
	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)			<u> </u>	1		
Regneration Success Monitor as	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 b Performance	battery voltage is above 11 V for at least 3s								
	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby 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)		
Position Sensor Circuit High as	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby 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)		
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	as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not 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)			
	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s							
	Vanufacturer Enable Counter is zero value of 0 means ECM is locked and out of assembly plant mode)								
	Vanufacturer Enable Counter is zero value of 0 means ECM is locked and out of assembly plant mode)								
	Vanufacturer Enable Counter is zero value of 0 means ECM is locked and out of assembly plant mode)								
	Vanufacturer Enable Counter is zero value of 0 means ECM is locked and out of assembly plant mode)								
	Vanufacturer Enable Counter is zero value of 0 means ECM is locked and out of assembly plant mode)								

DTC				Additional Basic Enable Conditions	\$			
P2690 - Cylinder 5 Injecto Incorrect	or Data	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)						
P2691 - Cylinder 6 Injecto Incorrect	or Data	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)						
P2692 - Cylinder 7 Injecto Incorrect	or Data	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)						
P2693 - Cylinder 8 Injecto Incorrect	or Data	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)			_			
U0073 - CAN A BUS C	DFF	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 C	DFF	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s				
U0101 - Lost Communicatio Transmission Control Sy		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s				
U0106 - Lost Communicatio Glow Plug Control Mod		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s				
U010E - Lost Communicatio Reductant Control Mod		Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
U02A3 - Lost Communicati PM Sensor	ion with	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	engine is not in standby state (standby state occurs after ECM initialization or following after-run)	battery voltage is above 11 V for at least 3s	Engine Run Time greater than 10 seconds (engine speed greater than 600 to 850 rpm to indicate the engine is running)	Engine is running which means the engine speed is greater than 600 to 850 rpm	engine is not in ready state (which is active when the ignition is on or following a stall of the engine)
U029D - N0x 1 loss of co	omm	Engine not in afterrun mode (defined as engine speed greater than 0 rpm)	Engine speed greater than 600 to 850 rpm	battery voltage is above 11 V for at least 3s	Engine is running which means the engine speed is greater than 600 to 850 rpm			
U029E - N0x 2 loss of co	omm	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	1	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	< = (		A volts	glow plugs are commanded on DTCs P163E, P163C, P0671-P0678	= True Not set	50 tot	ner loop: 10 ms tal time: 600 ms	В
ROM error		Checksum error between calculated and stored values are compared	Checksums match	=	NO		Module power	On	15 tot	ner loop: 600 ms tal time: 600 ms	В
RAM error		Compariarson of read write values	Read write values match	=	NO		Module power	On	20 tot	ner loop: 10 ms tal time: 200 ms	В
EEPROM error		Checksum error between calculated and stored values	Checksums match	=	NO		Module power	On	20 tot	ner loop: 10 ms tal time: 200 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	tot	ner loop: 0 ms tal time: 30 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	16 tot	ner loop: 60 ms tal time: 60 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	~ ~	2.3	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 < 60 = Not set < 2	volts inr amps 60 amps tot 90 volts Pa inr 10 tot	ath1: her loop: 100 ms tal time: 100 ms tath2: her loop: 1000 ms tal time 1000	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		inr 20 tot	her loop: 100 ms tal time: 100 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 > valid > 6 <= 10 >= 400	19 tot	ner loop: 10 ms tal time: 90 ms	В
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 13 tot	ner loop: 0 ms tal time: 30 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	tot	ner loop: 0 ms tal time: 30 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 ha	25 amp 640 mse rdware protection (time varies amp with temperature)) 0 volt	5	> 6 volts	inner loop: 6000 ms total time: 9000 ms	В
			Path 4: (DC/DC Booster voltage - GPCM battery voltage)	-	±3 volt		= 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	Electronic circuitry determines a fault exists on GP circuit	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:	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	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	Ohn A	Ignition on Battery voltage at GPCM glow plugs are commanded on over temperature condition over voltage condition abs[Battery supply at GPCM - IGN voltage at GPCM]	= on > 7.0 volts = on = false false < 7.0 volts	inner loop:	
Glow plug low resistance		Electronic circuitry determines a fault exists on GP circuit	Glow Plug Resistance	< 250	mOl	m 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	<ul> <li>&gt; 1.5</li> <li>&lt; 6.9</li> <li>&gt; 6.9</li> <li>&lt; 16.0</li> <li>&gt; 9.5</li> </ul>	Voit Voit Voit Voit Voit	Path 1: IAH Commanded Path 2: DTCs not active IAH Commanded	<ul> <li>OFF for more then 65 msec</li> <li>P064C, P154D, P154C, P166B</li> <li>ON</li> </ul>	inner loop: 1000 ms total time: 4000 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.
Intake Air (IA) Heater Current Signal Circuit	P154C	Electronic GPCM circuitry determines if faults related to the IA heater current signal circuit or heater grid exist.	PATH1: IAH current IAH voltage signal feedback to GPCM	<	20 0.9	A 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 0.9	A 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		
			PATH3:IAH current signal feedback to GPCM	>	4.96	Volt	or IAH Command or	=	off			
			PATH 4:IAH grid current IAH heater grid calculated resistance	^ ^	20 500	A mOhm	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 +20	⊃° ⊃°	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	= ^ v	P154B, P0640, P0154A, P154C, P166B ON 6.0 <u>15-0</u>	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	=	<ul> <li>high when heartbeat signal is act</li> </ul>	ivated	DTC's are not set	=	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	= > > =	P154B,P154C, P0640, P154D ON 40 sec 6.9 Volt True		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		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:	
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	3200 ms inner loop: 1000 ms total time: 4000 ms	1
			PATH 2: (IGN - Voltage supply to GPCM)	> +/-5	Volt	or GPCM Voltage supply GPCM Ignition Voltage	> >	6.0 4.0	Volt Volt	4000 ms	
			PATH 3: (ECM reported voltage via CAN - Voltage supply to GPCM)	> +/-3	Voit	or 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>
Glow Flug would becondary circuit	FIGD	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			
Glow Plug Module Overtemperature	P163E	ECM monitors serial data from GPCM for P163E Error Message indicating GPCM detects GPCM overtemperature	GPCM Temperature	> 85	℃	IAH dutycycle GMLAN signal "coolant temperature" Conditions PATH1 P16AD	= < =	0 or 100 60 <b>True</b>	% °C	inner loop: 650 ms total time:	
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	= < >	P20BB ON 123 7.0	°C Volt	3650 ms 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	A	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 battery	hardware (power stage) determines voltage at reductant heater output pin	> V <sub>batt</sub> - 0.8	Volt	reductan heater commanded:	=	OFF		inner loop: 2000 ms total time: 2500 ms	
Reductant Heater 2 Control Circuit	P20BD	ECM monitors serial data from GPCM for P20BD Error Message indicating GPCM detects reductant heater not connected to GPCM or an interruption	reductant heater current and voltage at heater pin	< 0.2 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 Va	alue	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	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 °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 <sub>batt</sub> - 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 or	A	reductan heater commanded: GPCM temperature GPCM supply voltage KL30 or	= ON °C < 123 Volt > 7.0 Volt	inner loop: 1000 ms total time: 1500 ms	
			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 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 <sub>batt</sub> - 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	<ul> <li>OFF, power up procedure has started after reset</li> </ul>	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	= 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	> 5.0	Volt	status DC/DC booster	<ul> <li>OFF, power up procedure has started after reset</li> </ul>	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		
			PATH 3: DC/DC booster output current duration	> 37.5 > 20	A µs	status Dc/DC booster	= 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) 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	<ul> <li>threshold selected by look-up table refer to table 1 in sheet "Look-Up Tables"</li> </ul>	mV	Engine Off Timer (GMLAN) and Intake Air Temperature (GMLAN) and IAH Battery Voltage and IAH PWM and DTC P154D or	>= 8 hours >= -7 °C > 11 V = 100 % = not set	inner loop: 1310 ms total time: 1810 ms	
						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		
						Intake Air Temperature (GMLAN) and IAH Battery Voltage and IAH PWM and DTC P154D	> 25 °C > 11 V = 100 %		

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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 Heater Temperature Sensor Circuit High Voltage	P16AB	ECM monitors serial data from GPCM for P16AB Error Message indicating GPCM detects IAH temperature sensore voltage out of range high	PATH1: IAH temperature sensor voltage	> IAH Battery Voltage * 158/512 V	Engine Off Timer (GMLAN) and Intake Air Temperature (GMLAN) and DTC P154D or	>= 8 hours >= -7 °C = not set	inner loop: 655 ms total time: 1155 ms	
					IAH Run Time and IAH PWM and Intake Air Temperature (GMLAN) and DTC P154D or	> 120 sec > 90 % > -35 °C = not set		
			PATH2: IAH temperature sensor voltage	> IAH Battery Voltage* 146/512 V	Intake Air Temperature (GMLAN) and DTC P154D	> 25 °C = not set		
					(Engine Off Timer (GMLAN) or Intake Air Temperature (GMLAN) and (IAH Run Time or IAH PWM or Intake Air Temperature (GMLAN)	< 8 hours < -7 °C < 120 sec < 90 % < -35 °C		
					and (Engine Coolant Temperature (GMLAN) and Engine Run Time) and DTC P154D	< 60 °C > 40 sec = not set		