SPN	FMI	J1939 Lamp	Suspect Parameter	Condition Which Causes the Fault	Likely Causes / Impact of Failure	Level 1 Text	Level 2 Text	Derate Limit (% Power) or (rpm)	Derate Rate (%/min) or (rpm/sec)	Recovery Rate (%/min) or (rpm/sec)	Snapshot Buffer
27	3	w	Engine Exhaust Gas Recirculation Valve Position	EGR Valve Position Voltage OOR High	Open circuit in the harness, either signal or ground. Sensor failure.	Engine System	EGR sensor circuit fault.	25%	20%/min	20%/min	0
27	4	w	Engine Exhaust Gas Recirculation Valve Position	EGR Valve Position Voltage OOR Low	Sensor signal shorted to ground. Sensor failed.	Engine System	EGR sensor circuit fault.	25%	20%/min	20%/min	0
27	7	w	Engine Exhaust Gas Recirculation Valve Position	EGR Valve Not Responding or Out of Adjustment	EGR Valve actuator mismatch error	Engine System	EGR Valve not responding or out of adjustment.	25%	20%/min	20%/min	0
94	3	w	Engine Fuel Delivery Pressure	Fuel Pressure Voltage OOR High	Pressure sensor harness has an open in the ground circuit or a short in the harness to high voltage. Pressure sensor fault						0
94	4	w	Engine Fuel Delivery Pressure	Fuel Pressure Voltage OOR Low	Pressure sensor not connected or open in the signal line. Pressure sensor supply connection open. Harness shorted to ground. Pressure sensor failure						0
94	18	w	Engine Fuel Delivery Pressure	Fuel Pressure Low - Moderately Severe Level	Low pressure in the fuel supply pump circuit. Restriction in the low pressure system due to a plugged filter or pump failure. This probably doesn't need to be a stop alarm. It could be on the second low level on Rail Pressure	Engine System	Fuel pressure low. Check fuel supply and filters	20%	5%/min	5%/min	0
97	0	S						50% Shutdown after 30 seconds	20%/min	20%/min	0
97	3	w	Water In Fuel Indicator	Water In Fuel Voltage OOR High	Open circuit in the harness, either signal or ground. Water in fuel sensor failure.	Engine System	Water separator sensor voltage high.				0
97	4	w	Water In Fuel Indicator	Water In Fuel Voltage OOR Low	Water in fuel sensor signal shorted to ground. Water in fuel sensor failed.	Engine System	Water separator sensor voltage low.				0
97	16	S	Water In Fuel Indicator	Water In Fuel Detected	Water has been detected in the separator bowl.	Engine System	Engine Water Separator Full. Drain water separator.	50%	20%/min	20%/min	1
100	1	S	Engine Oil Pressure	Oil Pressure Low - Most Severe Level	Oil pressure low due to low or no oil present.	Engine System	Oil Pressure Extremely low. Check engine oil level.	60% Shutdown after 30 seconds	20%/min	20%/min	1
100	2	w	Engine Oil Pressure	Oil Pressure Detected At Zero Engine Speed	Oil pressure detected at zero engine speed due to open ground in the sensor circuit.	Engine System	Oil Pressure Detected At Zero Engine Speed				0
100	3	w	Engine Oil Pressure	Oil Pressure Voltage OOR High	Pressure Ensor harness has an open in the ground circuit or a short in the harness to high voltage. Pressure Sensor Fault						0
100	4	w	Engine Oil Pressure	Oil Pressure Voltage OOR Low	Pressure Sensor not connected or open in the signal line. Pressure sensor supply connection open. Harness shorted to ground. Pressure sensor failure. Due to harware limitations, this fault may be tripped erroneously at elevations over 16,000 feet when the engine is not running.						0
100	18	w	Engine Oil Pressure	Oil Pressure Low - Moderately Severe Level	Oil pressure low due to low or no oil present.	Engine System	Oil Pressure low. Check engine oil level.	20%	5%/min	5%/min	1
101	0	S	Engine Crankcase Pressure	Pressure much higher than threshold	Blowby filter is restricted and bypass is not functioning. Potential for oil leakage past engine seals.	Engine System	Engine Crankcase Pressure High. Check blowby filter.	50%	20%/min	20%/min	0
101	3	w	Engine Crankcase Pressure	Crankcase Pressure Voltage OOR High	Pressure sensor harness has an open in the ground circuit or a short in the harness to high voltage. Pressure sensor failure	Engine System	Crankcase pressure sensor voltage high				0
101	4	w	Engine Crankcase Pressure	Crankcase Pressure Voltage OOR Low	Pressure sensor not connected or open in the signal line. Pressure sensor supply connection open. Harness shorted to ground. Pressure sensor failure.	Engine System	Crankcase pressure sensor voltage low				0
101	16	w	Engine Crankcase Pressure	Pressure higher than threshold	Blowby filter is restricted. Engine power cylinder failures that create high blowby. Or turbo seal failure. Service reminder.	Engine System	Engine Crankcase Pressure High. Check blowby filter.				0
102	3	w	Engine Intake Manifold #1 Pressure	Boost Pressure Voltage OOR High	Pressure Sensor has an open in the ground circuit or a short in the harness to high voltage. Pressure sensor failure	Engine System	Intake manifold pressure sensor voltage high	25%	20%/min	20%/min	0

102	4	w	Engine Intake Manifold #1 Pressure	Boost Pressure Voltage OOR Low	Pressure sensor not connected or open in the signal line. Pressure sensor supply connection open. Harness shorted to ground. Pressure sensor failure	Engine System	Intake manifold pressure sensor voltage low	25%	20%/min	20%/min 0
102	7	w	Engine Intake Manifold #1 Pressure	Boost Pressure Model Mismatch during engine running/ Measurement Crosscheck Mismatch at key off or key on, not running	Boost pressure invalid due to an in-range failure of the Boost Pressure sensor or Turbo Speed sensor. Model computation does not agree with MAP reading.	Engine System	Intake manifold pressure sensor fault.	25%	20%/min	20%/min 3
103	0	w	Engine Turbocharger 1 Speed	Turbo Speed High - Most Severe Level	Due to high altitude or erratic VTG operation. 160krpm	Engine System	Turbocharger speed extremely high. Reduce engine speed and load.	50%	20%/min	20%/min 0
105	0	S	Engine Intake Manifold 1 Temperature	Manifold Air Temperature High - Most Severe Level	Cooling system performance has degraded or failed. 123°C Refers to Mixed temperature.	Engine System	Intake manifold air temperature high. Reduce engine speed and load. Check cooling system for debris.	60% Shutdown after 30 seconds	20%/min	20%/min 1
105	3	w	Engine Intake Manifold 1 Temperature	Manifold Air Temperature Voltage OOR High	Open circuit in the harness, either signal or ground. Manifold air temperature sensor failure.	Engine System	Intake manifold air temperature sensor voltage high	25%	20%/min	20%/min 0
105	4	w	Engine Intake Manifold 1 Temperature	Manifold Air Temperature Voltage OOR Low	Manifold air temperature sensor signal shorted to ground. Manifold air temperature sensor failed.	Engine System	Intake manifold air temperature sensor voltage low	25%	20%/min	20%/min 0
105	15	w	Engine Intake Manifold 1 Temperature	Manifold Air Temperature High - Least Severe Level	Cooling system performance has degraded or failed. 120°C	Engine System	Intake manifold air temperature high. Reduce engine speed and load. Check cooling system for debris.			0
105	16	w	Engine Intake Manifold 1 Temperature	Manifold Air Temperature High - Moderately Severe Level	Cooling system performance has degraded or failed. 121.5°C Refers to Mixed temperature.	Engine System	Intake manifold air temperature high. Reduce engine speed and load. Check cooling system for debris.	20%	5%/min	5%/min 1
107	0	S	Engine Air Filter Differential Pressure	Pressure drop across air intake system exceeds 11kPa for more than 0.5 sec	Restricted air filter, other restrictions in air inlet system, in-range sensor failure	Engine System	Engine Air Filter is Restricted. Clean or replace air filter.	60%	60%/min	60%/min 0
107	15	w	Engine Air Filter Differential Pressure	Pressure drop across air intake system exceeds 1st threshold table(6.25kPa) for more than 30 sec	Restricted air filter, other restrictions in air inlet system, in-range sensor failure	Engine System	Engine Air Filter is Restricted. Clean or replace air filter.			0
107	16	w	Engine Air Filter Differential Pressure	Pressure drop across air intake system exceeds 2nd threshold table (7.5kPa) for more than 30 sec	Restricted air filter, other restrictions in air inlet system, in-range sensor failure	Engine System	Engine Air Filter is Restricted. Clean or replace air filter.	20%	5%/min	5%/min 0
108	2	w	Barometric Pressure	Barometric Pressure Invalid	Sensor is in range but incorrect based on MAP and Exhaust Pressure or Air Inlet Pressure readings. Internal sensor failure.	Engine System	Barometric pressure sensor fault.			0
108	7	w	Barometric Pressure	Sensor cross check	Internal sensor failure	Engine System	Barometric pressure sensor fault.			0
110	0	S	Engine Coolant Temperature	Coolant Temperature High - Most Severe Level	Cooling system performance has degraded or failed. 116°C	Engine System	Engine Coolant Temperature High. Reduce engine speed and load. Check cooling system for debris.	60% Shutdown after 30 seconds	20%/min	20%/min 1
110	3	w	Engine Coolant Temperature	Coolant Temperature Voltage OOR High	Open circuit in the harness, either signal or ground. Coolant temperature sensor failure	Engine System	Coolant temperature sensor voltage high			0
110	4	w	Engine Coolant Temperature	Coolant Temperature Voltage OOR Low	Coolant temperature sensor signal shorted to ground. Coolant temperature sensor failed.	Engine System	Coolant temperature sensor voltage low			0
110	15	w	Engine Coolant Temperature	Coolant Temperature High - Least Severe Level	Cooling system performance has degraded or failed. 113°C	Engine System	Engine Coolant Temperature High. Reduce engine speed and load. Check cooling system for debris.			0
110	16	w	Engine Coolant Temperature	Coolant Temperature High - Moderately Severe Level	Cooling system performance has degraded or failed. 114°C	Engine System	Engine Coolant Temperature High. Reduce engine speed and load. Check cooling system for debris.	20%	5%/min	5%/min 1
110	17	w	Engine Coolant Temperature	Coolant Temperature Low - Least Severe Level	Engine temperature has not risen into the normal operating range under operating conditions. Likely due to stuck open thermostat. Engine is likely operating in an AECD state.	Engine System	Engine Coolant Temperature Low. Check cooling system.			1

111	1	S	Engine Coolant Level	Coolant level below the loss switch while coolant temp is >95°C	Low coolant, open circuit	Engine System	Coolant Level extremely low. Engine Power Limited. Add coolant and inspect for leakage.	50% Shutdown after 30 seconds	20%/min	20%/min	0
111	7	w	Engine Coolant Level	Switches indicate that coolant level is below the loss switch but not below the service switch	Open circuit on the loss switch; wires to switches swapped	Engine System	Coolant level circuit fault. Coolant level monitor without function. Verify coolant level.				0
111	17	w	Engine Coolant Level	At power-up, if coolant temp is >-20°C and coolant level is below the service switch	Low coolant, open circuit	Engine System	Coolant level below the service switch. Add Coolant.				0
157	1	S	Engine Injector Metering Rail 1 Pressure	Rail pressure is 25Mpa under setpoint for 3 sec	Rail pressure relief valve opened, can be due to failed relief valve, non functioning SCV, major leak Impact - major power loss, high PM can fill DPF	Engine System	Fuel rail pressure extremely low. Engine power limited.	50%	20%/min	20%/min	0
157	2	S	Fuel Pressure	Fuel Pressure In Range Invalid	Fuel pressure sensor excitation voltage open, Pressure sensor failure.	Engine System		50%	20%/min	20%/min	5
157	3	S	Fuel Pressure	Fuel Pressure Voltage OOR High	An open in the ground circuit of the fuel pressure system. Short in the harness to high voltage or sensor failure.	Engine System	Fuel pressure sensor voltage high.	50%	20%/min	20%/min	5
157	4	S	Fuel Pressure	Fuel Pressure Voltage OOR Low	Fuel pressure sensor not connected or open in the signal line. Pressure sensor supply connection open. harness shorted to ground. Pressure sensor failure.	Engine System	Fuel rail pressure sensor voltage low. Engine power limited.	50%	20%/min	20%/min	5
157	12	S	Fuel Pressure	Defective Rail Pressure Sensor	Bad intelligent device or component	Ŭ,		50%	20%/min	20%/min	5
157	16	w	Engine Injector Metering Rail 1 Pressure	Rail pressure is 10Mpa over setpoint for 15 sec	Non-functioning SCV Inlet fuel pressure high at low rail pressure settings will supercede. Impact - can lead to blown relief valve.	Engine System	Fuel rail pressure high.				0
157	17	w	Engine Injector Metering Rail 1 Pressure	Rail Pressure Not Developed During Cranking (10Mpa within 8 sec)	During start, the engine is not able to develop starting rail pressure setpoint. Injector feed tube leak. Fuel is not being supplied to the engine. Inlet fuel pressure low fault.	Engine System	Fuel rail pressure low during starting. Check fuel level and filters.				0
158	12	w	Keyswitch Battery Potential	ECU Cannot Power Down	Internal failure in ECU prevents the ECU from powering down. Impact - run down battery eventually	Engine System	ECU Cannot Power Down				0
168	1	w	Battery Potential/ Power Input	If engine is in run mode and unswitched battery voltage supply is <10v	Low voltage to the ECU. Voltage is < 10 V. Impact - possible loss of injections	Electrical System	Battery voltage low.				0
168	16	w	Battery Potential/ Power Input	Battery Voltage Above Normal- Moderately Severe Level	High voltage to the ECU. Voltage is > 16 V.		Battery voltage				5
168	18	w	Battery Potential/ Power Input	Battery voltage below normal operating level-Moderately Severe Level	Check charging system, alterntor drive belt, and batteries.	Electrical System	Battery voltage low.				0
174	0	S	Engine Fuel Temperature	Fuel Temperature High - Most Severe Level	Cooling system performance has degraded or failed. Pump damage can occur. 77°C	Engine System	Fuel temperature High. Engine power limited. Check cooling system for debris.	20% Shutdown after 30 seconds	5%/min	5%/min	1
174	3	w	Engine Fuel Temperature	Fuel Temperature Voltage OOR High	Open circuit in the harness, either signal or ground. Fuel temperature sensor failue. Default temperature used. Starting may be affected						0
174	4	w	Engine Fuel Temperature	Fuel Temperature Voltage OOR Low	Fuel temperature sensor signal shorted to ground. Fuel temperature sensor failed.						0
174	16	w	Engine Fuel Temperature	Fuel Temperature High - Moderately Severe Level	Cooling system performance has degraded or failed. 73°C	Engine System	Fuel temperature High. Check cooling system for debris.				0
189	31	w	Engine Rated Speed	A condition exists which is causing the engine to derate.	One of the speed derate conditions exists on the engine.	Engine System	A condition exists which is causing the engine to derate. Engine speed limited.				0
190	0	S	Engine Speed	Engine Speed High - Most Severe Level	Engine has exceeded overspeed threshold. 3600 RPM	Engine System	Engine Speed High. Reduce engine speed.				0
190	16	S	Engine Speed	Engine speed over spec has been detected.	Engine has exceeded overspeed threshold. 3000 RPM	Engine System	Engine Speed High. Reduce engine speed.				0
412	0	S	Exhaust Gas Recirculation Temperature	EGR Temperature High - Most Severe Level	* High loads with poor EGR cooling. 250°C	Engine System	EGR temperature high. Reduce engine speed and load. Check cooling system for debris.	60%	20%/min	20%/min	3

				Voltage from the EGR temperature sensor is higher than the							
				normal temperature sensor range.							
				Conditions must be met: Coolant Temperature above 80C, Delay							
412	3	w		Time 5 min (warmed up), Intercooler Outlet Temperature 5C, MAT							0
			Exhaust Gas Recirculation	25C.			EGR temperature sensor				
			Temperature		EGR temperature sensor failure.	Engine System	voltage high.				
412	4		Exhaust Gas Recirculation		EGR temperature sensor signal shorted to ground. Temperature						
412	4	vv	Temperature	EGR Temperature Voltage OOR Low	sensor failed						0
							EGR temperature high.				
412	15	M/					Reduce engine speed and	E%/	Immodiate	E%/min	2
412	15	vv	Exhaust Gas Recirculation				load. Check cooling system for	3%	mmeulate	5%/11111	5
			Temperature	EGR Temperature High - Least Severe Level	* High loads with poor EGR cooling. 230°C	Engine System	debris.				
							EGR temperature high.				
412	10						Reduce engine speed and	200/	EQ(/as in	EQ(/axia	_
412	16	w	Exhaust Gas Recirculation				load. Check cooling system for	20%	5%/min	5%/min	3
			Temperature	EGR Temperature High - Moderately Severe Level	* High loads with poor EGR cooling. 240°C	Engine System	debris.				
					A low side on Bank 1 is shorted to battery,						
					Impact - would likely not inject on that cylinder (software does						
					not shutoff drive)						
611	3	w			OR the high side on Bank 1 is shorted to battery.						5
					Impact - would likely not inject on that bank (software does not		Fuel injector circuit voltage				
			System Diagnostic Code	Short to battery on the injector lines	shutoff drive)	Engine System	high.				
					A low side on Bank 1 is stuck on, which may lead to more than						+
					one injector on Bank 1 being actuated at once, or the high side on						
					Bank 1 is shorted to ground.						
611	4	W			Impact - would likely not inject on that bank (software shuts off						5
					drive)		Fuel injector circuit voltage				
			System Diagnostic Code	Short to ground on the injector lines	uncj	Engine System	low				
			System Diagnostic Couc	Short to ground on the injector lines	A low side on Pank 2 is shorted to battery, or the high side on	Engine System	Evol injector circuit shorted to				-
612	3	w	System Diagnostic Code #2	Short to battery on the injector lines	Bank 2 is shorted to battery	Engine System	hattery				5
			System Diagnostic Code #2	Short to battery on the injector lines	A low side on Pank 2 is stuck on which may load to more than	Lingine System	battery.				_
					A low side on bank 2 is stuck on, which may lead to more than						
612	4	w			One injector on Bank 2 being actuated at once, or the high side on		For all independent allocates de la seconda de la				5
-			Custom Discussetia Carda #2	Chart to prove dow the Infortent Page	Bank 2 is shorted to ground.	Farala a Guatana	Fuel Injector circuit shorted to				
			System Diagnostic Code #2	Short to ground on the injector lines	Impact: Disable injection on this injector bank	Engine System	ground.				_
							Wiring Fault Detected in				
613	3	w					Engine High Pressure Pump				0
			System Diagnostic Code #3	Wiring Fault	Wiring Harness Shorted to Battery	Engine System	Drive Circuit				
							Wiring Fault Detected in				
613	4	w					Engine High Pressure Pump				0
			System Diagnostic Code #3	Wiring Fault	Wiring Harness Shorted to ground	Engine System	Drive Circuit				
613	31	w					Failure detected in ECU High				0
			System Diagnostic Code #3	Internal ECU Failure.	Failure detected in ECU High Pressure Pump Drive Circuit	Engine System	Pressure Pump Drive Circuit				
629	12	W					Engine control unit fault.				0
025							Restart engine to attempt				Ŭ
			Controller	Bad Intelligent Device or Component	Bad EEPROM.	Engine System	vehicle recovery.				
					Noise is being detected on the engine position sensor. The						
636	2	W			connections to the sensor or the sensor has an intermittent		Camshaft position sensor				4
			Engine Position Sensor	Engine Position Sensor Noise Detected	failure The sensing target is damaged	Engine System	fault.				
626					Open or intermittent harness or connector problem. Detected in		Camshaft position sensor				
636	5	vv	Engine Position Sensor (Cam)	Engine Position Sensor Current Below Normal Or Open Circuit	Harness Diagnostics Mode.	Engine System	circuit fault.				0
626	6			Engine Position Sensor Current Above Normal Or Grounded	The harness is shorted to ground. Detected in Harness Diagnostics		Camshaft position sensor				
636	ь	vv	Engine Position Sensor (Cam)	Circuit	Mode.	Engine System	circuit fault.				0
											T
636	8	w			The signal from the engine position sensor is missing. The		Camshaft position sensor				4
			Engine Position Sensor (Cam)	Engine Position Sensor Signal Missing	connections to the sensor are open circuit. The sensor has failed.	Engine System	missing signal.				
			1		The signal from the engine position sensor does not have the						1
636	10	W			proper pulse pattern. The sensing target is damaged. The sensor		Camshaft position sensor				4
050	10		Engine Position Sensor (Cam)	Engine Position Sensor Pattern Error Detected	is improperly installed.	Engine System	fault.				
<u> </u>			,				i				+
					Noise is being detected on the engine position sensor on the						1
637	2	w			crankshaft. The intermittent failure of the connections to the		Crankshaft position sensor	50%	20%/min	20%/min	4
1			Timing Sensor (Crank)	Timing Sensor Noise Detected	sensor or the sensor itself. The sensing target is damaged	Engine System	circuit fault.				1
— ——			<u> </u>	<u></u>	Open or intermittent harness or connector problem. Detected in	J	Crankshaft position sensor				+
637	5	W	Timing Sensor (Crank)	Timing Sensor Current Below Normal Or Open Circuit	Harness Diagnostics Mode.	Engine System	circuit fault.				0
1				ining senser current below normal or open circuit	names blaghostics mode.	ensine system	circuit luuit.				

					The harness is shorted to ground. Detected in Harness Diagnostics		Crankshaft position sensor				T
637	6	w	Timing Sensor (Crank)	Timing Sensor Current Above Normal Or Grounded Circuit	Mode.	Engine System	circuit fault.				0
637	7	w	Timing Concer (Crank)	Timing Contor / Engine Desition Contor Microstop	The relationship between the two engine position signals is not correct. The signal polarity is incorrect possibly due to miss wiring.	Facine System	Engine should conside foult				4
			Timing Sensor (Crank)	Timing Sensor / Engine Position Sensor Mismatch	The signal from the engine position sensor on the crankshaft is	Engine System	Engine speed sensing rauit.				+
637	8	w	Timing Sensor (Crank)	Timing Sensor Signal Missing	sensor has failed.	Engine System	communication fault.	50%	20%/min	20%/min	4
					The signal from the engine position concer on the graphyboft does						
637	10	w			not have the proper pulse pattern. The sensing target is damaged.		Camshaft position sensor	50%	20%/min	20%/min	4
			Timing Sensor (Crank)	Timing Sensor Pattern Error Detected	The sensor is improperly installed.	Engine System	fault.				
651	2	W	Engine Injector Cylinder #1	Injector #1 Part Number is Invalid	The Injector part number entered is not valid	Engine System	Injector #1 fault.	1200 rpm	600 rpm/sec	0 rpm/sec	0
651	5	w			Open circuit in the injector wiring, on either connection. Injector solenoid failure.						5
			Engine Injector Cylinder #1	The current to the injector in cylinder #1 is less than expected	Impact: Dead cylinder	Engine System	Injector #1 circuit current low.				
651	6	w	Engine Injector Orlindor #1	The injector fuel flow at Cylinder #1 is lower than expected	Injector has internal short	Engine System	Injector #1 circuit current				5
			Engine injector cynnder #1	The injector rue now at cylinder #1 is lower than expected.	The injector part number is correct, but the OR/Calibration string	Eligine System	ingii.				
651	13	w	Injector Cylinder #1	Injector #1 QR Code string error	formed is not what is expected.	Engine System	Injector #1 calibration fault.	1200 rpm	600 rpm/sec	0 rpm/sec	0
					Injector is not working. Injector flow limiter is closed. Pump		The injector fuel flow at				+
651	18	w			mistimed.		Cylinder #1 is lower than				5
			Engine Injector Cylinder #1	The injector fuel flow at Cylinder #1 is lower than expected.	Impact: Dead cylinder	Engine System	expected.				
652	2	W	Engine Injector Cylinder #2	Injector #2 Part Number is Invalid	The Injector part number entered is not valid	Engine System	Injector #2 fault.	1200 rpm	600 rpm/sec	0 rpm/sec	0
					Open circuit in the injector wiring, on either connection. Injector						
652	5	w	Facility Information Collinging #2	The summary states to be the test of the state of the test of the state of the stat	solenoid failure.	Facility Contains	1-1				5
			Engine injector Cylinder #2	The current to the injector in cylinder #1 is less than expected	Impact-dead cylinder	Engine System	Injector #2 circuit current low.				_
652	6	w	Engine Injector Cylinder #2	The injector fuel flow at Cylinder #2 is lower than expected	Injector has internal short	Engine System	high				5
			Engine injector cynnaer #2	The injector fact now at cylinder #2 is lower than expected.	The injector part number is correct, but the OR/Calibration string	Engine System	ingin.				+
652	13	w	Injector Cylinder #2	Injector #2 QR Code string error	formed is not what is expected.	Engine System	Injector #2 calibration fault.	1200 rpm	600 rpm/sec	0 rpm/sec	0
					Injector is not working. Injector flow limiter is closed. Pump		The injector fuel flow at				1
652	18	w			mistimed.		Cylinder #2 is lower than				5
			Engine Injector Cylinder #2	The injector fuel flow at Cylinder #2 is lower than expected.	Impact - dead cylinder	Engine System	expected.				
653	2	W	Engine Injector Cylinder #3	Injector #3 Part Number is Invalid	The Injector part number entered is not valid	Engine System	Injector #3 fault.	1200 rpm	600 rpm/sec	0 rpm/sec	0
					Open circuit in the injector wiring, on either connection. Injector						
653	5	w	Engine Injector Orlindor #2	The current to the injector in cylinder #2 is less than expected	solenoid failure.	Engine System	Injector #2 circuit current low				5
			Engine injector Cylinder #3	The current to the injector in cylinder #5 is less than expected	Impact-dead cylinder	Engine System	Injector #3 circuit current				-
653	6	w	Engine Injector Cylinder #3	The injector fuel flow at Cylinder #3 is lower than expected.	Injector has internal short	Engine System	high.				5
					The injector part number is correct, but the QR/Calibration string		-				1
653	13	w	Injector Cylinder #3	Injector #3 QR Code string error	formed is not what is expected.	Engine System	Injector #3 calibration fault.	1200 rpm	600 rpm/sec	0 rpm/sec	0
					Injector is not working. Injector flow limiter is closed. Pump		The injector fuel flow at				1
653	18	W			mistimed.		Cylinder #3 is lower than				5
			Engine Injector Cylinder #3	The injector fuel flow at Cylinder #3 is lower than expected.	Impact - dead cylinder	Engine System	expected.				_
654	2	W	Engine Injector Cylinder #4	Injector #4 Part Number is Invalid	The Injector part number entered is not valid	Engine System	Injector #4 fault.	1200 rpm	600 rpm/sec	0 rpm/sec	0
	-				Open circuit in the injector wiring, on either connection. Injector						
654	5	w	Engine Injector Cylinder #4	The current to the injector in cylinder #4 is less than expected	Impact-dead cylinder	Engine System	Injector #4 circuit current low.				5
			Engine injector cymider int	The current to the injector in cylinder in the less than expected		Engine System	Injector #4 circuit current				+
654	6	w	Engine Injector Cylinder #4	The injector fuel flow at Cylinder #4 is lower than expected.	Injector has internal short	Engine System	high.				5
					The injector part number is correct, but the QR/Calibration string				/		1
654	13	w	Injector Cylinder #4	Injector #4 QR Code string error	formed is not what is expected.	Engine System	Injector #4 calibration fault.	1200 rpm	600 rpm/sec	0 rpm/sec	0
					Injector is not working. Injector flow limiter is closed. Pump		The injector fuel flow at				
654	18	w			mistimed.		Cylinder #4 is lower than				5
			Engine Injector Cylinder #4	The injector fuel flow at Cylinder #4 is lower than expected.	Impact - dead cylinder	Engine System	expected.				
676					open circuit in narness; open circuit in relay coll; snort to battery		Cold start aid with restricted				
6/6	5	W	Engine Glow Plug Relay	The current to the glow plug relay is less than expected	Impact: loss of glow plug use	Engine System	function.				U
—							Cold start aid with restricted				+
676	6	w	Engine Glow Plug Relay	The current to the Glow Plug Relay is higher than expected	Short circuit to ground in harness or relay	Engine System	function.				0
676					Glow Plug relay output is low when the relay is energized by the	Engine Starting	Cold start aid with restricted				
6/6	14	W	Glow Plug Relay	Glow Plug Relay Output Low When Relay Active.	ECU. Open circuit or failed relay	System	function.				U

676	31	w	Glow Plug Relay	Glow Plug Relay Output High When Relay Not Active.	Glow Plug relay output is high when the relay is not energized by the ECU. Short to battery or relay is stuck on	Engine Starting System	Cold start aid with restricted function.				0
970	31	w	Vehicle Immobilizer System (JD Proprietary)	ImmobilizerAuthenticationResponseincorrect, ImmobilizerAuthenticationTimedOut, or ImmobilizerAuthenticationUnabletoInitiate flag is set.	Controllers did not complete Immobilizer authentication within allowed time. Possible controller swapping. Engine shut down.	Communication System	Immobilizer Shutdown				0
1075	6	w	Engine Electric Lift Pump for Engine Fuel Supply	current higher than expected	Short circuit in harness or relay						0
1109	31	S									0
1110	31	S	Engine Protection System has Shutdown	Engine Not Available or Condition Exits	Engine has been shutdown due to shutdown command received from the vehicle.	Engine System	Engine Protection Shutdown.				0
1136	0	S	Engine ECU Temperature	ECU Temperature High - Most Severe Level	Inadequate cooling of the area around the ECU. Occurs at 135°C.	Engine System	Engine control unit internal temperature high.	1200 rpm	600 rpm/sec	0 rpm/sec	1
1136	2	w	Engine ECU Temperature	ECU Temperature Invalid	Bad data from internal sensor.	Engine System	ECU temperature sensor fault.				0
1136	16	w	Engine ECU Temperature	ECU Temperature High - Moderately Severe Level	Inadequate cooling of the area around the ECU. Occurs at 125°C.	Engine System	Engine control unit internal temperature high.				0
1172	12	w	Engine Turbocharger 1 Compressor Inlet Temperature	Sensor indicating an error condition	Sensor Failure Impact: Loss of ambient temperature estimation, input to model for compressor out temp - model used for turbo protection Loss of compressor outlet temperature protection	Engine System	Turbocharger inlet temperature sensor circuit fault.				0
1176	7	w	Engine Turbocharger 1 Compressor Intake Pressure	Cross check with MAP, BAP and Exhaust pressure sensors indicate an in-range failure.	Sensor failure	Engine System	Turbocharger inlet pressure sensor circuit fault.				0
1176	12	w	Engine Turbocharger 1 Compressor Inlet Pressure	Sensor indicating an error condition	Sensor failure Impact: Loss of air filter restriction detection, loss of backup model to MAP	Engine System	Turbocharger inlet pressure sensor circuit fault.				0
1180	0	S	Turbocharger 1 Turbine Inlet Temperature	Sensor indicating an error condition	Fuel to Air ratio is too high. Occurs at 750°C.	Engine System	Exhaust temperature high. Reduce engine speed and load. Check cooling system for debris.	50%	20%/min	20%/min	1
1180	16	w	Turbocharger 1 Turbine Inlet Temperature	Exhaust temperature is higher than spec for the current operating conditions-Most Severe.	Fuel to Air ratio is too high. Occurs at 730°C.	Engine System	Exhaust temperature high. Reduce engine speed and load. Check cooling system for debris.	5%	Immediate	5%/min	1
1209	3	w	Engine Exhaust Gas Pressure	Voltage from the exhaust pressure sensor is higher than the normal pressure sensor range	Wiring fault, shorted to high source; exhaust pressure sensor failed			50%	20%/min	20%/min	0
1209	4	w	Enginer Exhaust Gas Pressure	Voltage from the exhaust pressure sensor is lower than the normal pressure sensor range	Wiring fault, exhaust pressure sensor shorted to ground. Pressure sensor failure			50%	20%/min	20%/min	0
1209	7	w	Engine Exhaust Gas Pressure	Mismatch between sensor and model	There is a mismatch between the model and sensor. Potential damaged sensor or model not working currently. Potential damage to exhaust manifold.	Engine System	Exhaust pressure sensor fault. Engine power limited.	25%	20%/min	20%/min	3
1321	9	w	Starter Solenoid Lockout Relay Driver Circuit	Starter Solenoid Control Request Signal Missing	Starter Solenoid Control Request Signal Missing		TBD				0
1321	16	w	starter Solenoid Lockout Relay Driver Circuit	Too Long	starter was engaged for 30 or more seconds. Starter needs to be disengaged for 60s to clear		TBD				0
1347	5	S	Engine Fuel Pump Pressurizing Assembly	The circuit to pump solenoid #1 is open, shorted to ground, or overloaded.	A wiring connection to pump solenoid #1 is open. Pump solenoid #1 has failed.	Engine System	High pressure fuel pump control valve circuit current low.				0
1347	6	S	Engine Fuel Pump Pressurizing Assembly	The current to the High Pressure Pump SCV is higher than expected	A wiring connection to pump solenoid #1 is open. Wiring to pump solenoid #1 is shorted to ground. Pump solenoid #1 has failed.	Engine System	The current to the High Pressure Pump SCV is higher than expected				0
1569	31	w	Engine Protection Derate	A condition exists which is causing the engine to derate.	One of the derate conditions exists on the engine.	Engine Power Derated	Engine power derate condition exists. Engine power limited.				0
1639	1	w	Fan Speed	Fan Speed Low - Most Severe Level. ECU detects zero fan speed.	Engine fan speed low. Check fan drive system	Engine Cooling System	Engine fan speed low. Check fan drive system.				0
1639	16	w	Fan Speed	Fan Speed Signal Moderately High. ECU detects higher fan speed than desired	Engine fan speed high. Check fan drive system.	Fan Speed High	Engine fan speed high. Check fan drive system				0
1639	18	w	Fan Speed	Fan Speed Signal Moderately Low. ECU Detects Lower Fan Speed Than Desired.	Engine fan speed low. Check fan drive system.	Fan Speed Low	Engine fan speed low. Check fan drive system.				0

1761	1	w	DEF Tank Level	DEF Tank is empty	DEF Tank Empty. SCR Inducement.			40% 1500 rpm	5%/min 300 rpm/sec	49%/min Immediate 0
1761	3	w	DEF Tank Level	Sensor voltage is higher than expected	Sensor Disconnected, Wiring fault, shorted to high source, sensor failure / Loss of level sensing, Level will be held at last value, and carried over a key cycle. SCR Inducement					0
1761	4	w			Short to ground, sensor failure / Loss of level sensing, Level will be held at last value, and carried over a key cycle. SCR Inducement					0
			DEF Tank Level	Sensor voltage is lower than expected						
1761	17	W	DEF Tank Level	Tank Level reading is lower than approximately 10%	DEF Tank Level Low. SCR Inducement.					0
1761	18	W	DEF Tank Level	Tank Level reading is 0%	DEF Tank Level Very Low. SCR Inducement			25%	5%/min	49%/min 0
2003	9	S	Source Address 3	No CAN message (TSC) received from source address 3 (EQT) within timeout period		Communication System	rransmission control unit communication fault. Restart engine to attempt vehicle recovery			0
2630	0	S	Charge Air Cooler Outlet Temperature	Charree Air Cooler Temperature High - Most Severe Level	Air cooler is plugged or radiator needs to be cleaned. Occurs at 91°C. Refers to Fresh Air Temperature.	Engine System	Charge air cooler temperature high. Reduce engine speed and load. Check cooling system for debris.	60%	20%/min	20%/min 1
2620	2				Open circuit in the harness, either signal or ground. Temperature	8	-,			0
2030	3	W	Charge Air Cooler Outlet Temperature	Charge Air Cooler Sensor Voltage OOR High	sensor fault		 			0
2630	4	w	Charge Air Cooler Outlet Temperature	Charge Air Cooler Sensor Voltage OOR Low	Temperature Sensor signal shorted to ground. Sensor failed					0
2630	15	w	Charge Air Cooler Outlet Temperature	Charge Air Cooler Temperature High - Least Severe Level	Air cooler is plugged or radiator needs to be cleaned. Occurs at 88°C. Refers to Fresh Air Temperature.	Engine System	Charge air cooler outlet temperature high. Check cooling system for debris.			0
2630	16	w	Charge Air Cooler Outlet Temperature	Charge Air Cooler Temperature High - Moderately Severe Level	Air cooler is plugged or radiator needs to be cleaned. Occurs at 89.5°C. Refers to Fresh Air Temperature.	Engine System	Charge air cooler outlet temperature high. Reduce engine speed and load. Check cooling system for debris.	20%	5%/min	5%/min 1
2659	1	w	Engine Exhaust Gas Recirculation (EGR) Mass Flow Rate	Adaptive learn correction factor exceeded. The NOX based EGR flow correction logic in the software has reached its maximum correction and the NOx conversion efficiency monitor/fault is about to set.	EGR venturi coking.	Engine System	EGR system error.	25%	20%/min	20%/min 0
2659	2	w	Engine Exhaust Gas Recirculation (EGR) Mass Flow Rate	EGR model mismatch between delta temperature and/or delta pressure	In-range EGR delta P sensor failure or EGR Venturi coking or EGR cooler fouling	Engine System		25%	20%/min	20%/min 3
2659	3	w	Engine Exhaust Gas Recirculation (EGR) Mass Flow Rate	EGR Delta Pressure Sensor Voltage OORH	Wiring fault, shorted to high source or pressure sensor fault. Will run open loop EGR control; Diagnostic AECD with a derate.	Engine System	EGR Delta Pressure sensor voltage high	25%	20%/min	20%/min 0
2659	4	w	Enginer Exhaust Gas Recirculation (EGR) Mass Flow Rate	EGR Delta Pressure Sensor Voltage OORL	Wiring fault. Harness shorted to ground or pressure sensor fault. Will run open loop EGR control; Diagnostic AECD with a derate.	Engine System	EGR Delta Pressure Sensor Voltage Low	25%	20%/min	20%/min 0
2659	15	w	Engine Exhaust Gas Recirculation (EGR) Mass Flow Rate	EGR Flow Higher Than Expected - Least Severe Level	EGR flow detected with valve closed. EGR will run Open-Loop.	Engine System	EGR system error.	25%	20%/min	20%/min 3
2659	17	w	Engine Exhaust Gas Recirculation (EGR) Mass Flow Rate	EGR Flow Lower Than Expected - Least Severe Level	No EGR flow detected with valve open. Most likely caused by clogged cooler or broken valve shaft. EGR will run Open-Loop.	Engine System	EGR system error.	25%	20%/min	20%/min 3
2659	18	Р	Engine Exhaust Gas Recirculation (EGR) Mass Flow Rate	Adaptive learn correction factor nearly exceeded. The NOx based EGR flow correction logic in the software has reached its maximum allowable correction.	EGR venturi coking.	Engine System	EGR system error.			0
2790	16	w	Turbocharger Compressor Outlet Temperature	Compressor Outlet Temperature High - Moderately Severe Level	High compressor outlet temperature due to high ambient temperatures or intercooler restriction.	Engine System	Turbocharger outlet temperature high. Reduce engine speed and load.	50%	20%/min	20%/min 0
2791	5	w	Engine Exhaust Gas Recirculation (EGR) Valve Control	The current to the EGR Valve is less than expected	Open circuit in harness	Engine System	EGR valve circuit fault.			0
2791	6	w	Engine Exhaust Gas Recirculation (EGR) Valve Control	The current to the EGR Valve is higher than expected	Short circuit	Engine System	EGR valve circuit fault.			0

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2791	7	w	Engine Exhaust Gas Recirculation (EGR) Valve Control	EGR Valve Not Responding or Out of Adjustment	EGR Valve Learn Cycle Error	Engine System	EGR valve position fault.				0
2791	13	w	Engine Exhaust Gas Recirculation (FGR) Valve Control	EGR Valve Out of Calibration	EGR Valve Learn Shift Error	Engine System	FGR valve position fault.				0
2797	3	w	Injector Group 1	High Voltage Driver Stuck On	High voltage supply is stuck on for Bank 1. ECU has internal failure.	Engine System	Engine control unit fault.				0
2797	5	w	Injector Group 1	Ini, Hold Driver Stuck Off	The hold current driver for Bank 1 is stuck off. ECU has internal failure.	Engine System	Engine control unit fault.				0
2797	6	w	Injector Group 1	Ini. Hold Driver Stuck On	The hold current driver for Bank 1 is stuck on. ECU has internal failure.	Engine System	Engine control unit fault.				0
2798	3	w	Injector Group 2	High Voltage Stuck On	High voltage supply is stuck on for Bank 2. ECU has internal failure.	Engine System	Engine control unit fault.				0
2798	5	w	Injector Group 2	Ini, Hold Driver Stuck Off	The hold current driver for Bank 2 is stuck off. ECU has internal failure.	Engine System	Engine control unit fault.				0
2798	6	w	Injector Group 2	Inj. Hold Driver Stuck On	The hold current driver for Bank 2 is stuck on. ECU has internal failure.	Engine System	Engine control unit fault.				0
3031	3	w	DEF Tank Temperature Sensor	Sensor voltage is higher than expected	Sensor Disconnected, Wiring fault, shorted to high source, sensor failure / Defrost condition will be determined from backup sources, backup thawing strategy will be used if necessary. SCR Inducement		-				0
3031	4	w	DEF Tank Temperature Sensor	Sensor voltage is lower than expected	Short to ground, faulty sensor. / Defrost condition will be determined from backup sources, backup thawing strategy will be used if necessary. SCR Inducement						0
3216	9	w	DPF Outlet NOx Sensor	Loss of communication	CAN wiring problems, loss of power to sensor module, faulty sensor module. SCR inducement						0
3216	12	w	DPF Outlet NOx Sensor	Faulty Sensor	Failed sensor / Backup model used for SCR inlet NOx, SCR Inducment machine will be functionally disabled. SCR Inducement						6
3216	14	w	DPF Outlet NOx Sensor	Sensor reading not changing as expected.	Tampering, Failed Sensor, SCR Inducment machine will be functionally disabled. SCR Inducement.						0
3226	9	w	SCR Outlet NOx Sensor	Loss of communication	CAN wiring problems, loss of power to sensor module, faulty sensor module. SCR Inducement						0
3226	12	w	SCR Outlet NOx Sensor	Faulty Sensor	Failed sensor / Backup model used for SCR inlet NOx, SCR Inducment machine will be functionally disabled. SCR Inducement						0
3226	14	w	SCR Outlet NOx Sensor	Faulty Sensor	Failed sensor / Tampering, SCR Inducment machine will be functionally disabled. SCR Inducement.						0
3361	3	w	Diesel Exhaust Fluid Dosing Injector	Diagnostic voltage is higher than expected	Wiring fault, shorted to high source. SCR Inducement						0
3361	4	w	Diesel Exhaust Fluid Dosing Injector	DEF Injection Valve voltage OOR Low	Wiring harness shorted to ground. SCR Inducement.						0
3361	5	w	Diesel Exhaust Fluid Dosing Injector	Measured current is lower than expected when the output is active.	Wiring Fault (Open Circuit), Connector disconnected, Faulty Dosing Injector. SCR Inducement						0
3361	6	w	Diesel Exhaust Fluid Dosing Injector	Measured current Higher than expected when output is active	Wiring Fault (Short Circuit), Faulty Reversing Valve. SCR Inducement						0
3361	7	w	Diesel Exhaust Fluid Dosing Injector	No impedence change detected when solenoid is activated.	Faulty solenoid. SCR Inducement						0
3361	31	w	DEF Dosing Valve	During system priming, the DEF injection valve is opened and the DEF supply pressure is monitored. If the pressure doesn't reduce by a given amount, the pressure line is believed to be blocked or the DEF injection valve didn't open and the DEF delivery system will be shut down for the remainder of the key cycle. This diagnostic is run once per key cycle.	Restriction in Pressure Line (Debris, Ice or Pinched), In-Range Pressure Sensor Failure, Stuck/Blocked DEF Injection Valve, Frozen Pressure Line. SCR Inducement						0
3465	5	w	Exhaust Throttle (Engine Throttle Valve 2 Position)	The current to the Exhaust Throttle Valve is less than expected	Open circuit in harness	Engine System	Exhaust Throttle Valve circuit fault.				0
3465	6	w	Exhaust Throttle (Engine Throttle Valve 2 Position)	The current to the ExhaustThrottle Valve is higher than expected	Short circuit	Engine System	Exhaust Throttle Valve circuit fault.				0

3465	7	w	Exhaust Throttle (Engine Throttle Valve 2 Position)	Exhaust Throttle Not Responding or Out of Adjustment	Exhaust Throttle Learn Cycle Error. Range of travel limited due to buildup on the valve or restrictions in the mechanical linkage. / Previous stored learned value used for control, engine performance only affected where travel restricted.	Engine System	Exhaust Throttle not responding or outof adjustment			0
3465	13	w	Exhaust Throttle (Engine Throttle Valve 2 Position)	Exhaust Throttle Out of Calibration	Exhaust Throttle Learn Shift Error. Range of travel limited due to buildup on the valve or restrictions in the mechanical linkage. / New learned values stored and used for position control, reduced range of travel expected to degrade engine performance.	Engine System	Exhaust Throttle out of calibration			0
3509	3	S	Sensor Supply Voltage 1	Sensor Supply Voltage OOR High	Sensor supply connection 1 is shorted to a higher voltage.	Engine System	Engine control unit sensor supply voltage high.			0
3509	4	S	Sensor Supply Voltage 1	Sensor Supply Voltage OOR Low	Sensor supply connection 1 is shorted to ground.	Engine System	Engine control unit sensor supply voltage low.			0
3510	3	w	Sensor Supply Voltage 2	Sensor Supply Voltage OOR High	5V Supply shorted to a higher voltage. Refer to schematic for pinout information.	Engine System	Engine control unit sensor supply voltage high.			0
3510	4	w	Sensor Supply Voltage 2	Sensor Supply Voltage OOR Low	5V Supply shorted to ground. Refer to schematic for pinout information.	Engine System	Engine control unit sensor supply voltage low.			0
3511	3	w	Sensor Supply Voltage 3	Sensor Supply Voltage OOR High	SV Supply shorted to a higher voltage. Refer to schematic for pinout information.	Engine System	Engine control unit sensor supply voltage high.			0
3511	4	w	Sensor Supply Voltage 3	Sensor Supply Voltage OOR Low	SV Supply shorted to ground. Refer to schematic for pinout information.	Engine System	Engine control unit sensor supply voltage low.			0
3512	3	w	Sensor Supply Voltage 4	Sensor Supply Voltage OOR High	SV Supply shorted to a higher voltage. Refer to schematic for pinout information.	Engine System	Engine control unit sensor supply voltage high.			0
3512	4	w	Sensor Supply Voltage 4	Sensor Supply Voltage OOR Low	SV Supply shorted to ground. Refer to schematic for pinout information.	Engine System	Engine control unit sensor supply voltage low.			0
3513	3	w	Sensor Supply Voltage 5	Sensor Supply Voltage OOR High	SV Supply shorted to a higher voltage. Refer to schematic for pinout information.	Engine System	Engine control unit sensor supply voltage high.			0
3513	4	w	Sensor Supply Voltage 5	Sensor Supply Voltage OOR Low	SV Supply shorted to ground. Refer to schematic for pinout information.	Engine System	Engine control unit sensor supply voltage low.			0
3514	3	w	Sensor Supply Voltage 6	Sensor Supply Voltage OOR High	5V Supply shorted to a higher voltage. Refer to schematic for pinout information.	Engine System	Engine control unit sensor supply voltage high.			0
3514	4	w	Sensor Supply Voltage 6	Sensor Supply Voltage OOR Low	SV Supply shorted to ground. Refer to schematic for pinout information.	Engine System	Engine control unit sensor supply voltage low.			0
3597	1	w	ECU Power Output Supply Voltage #1	The high voltage supply is too low,	From a cause other than low battery voltage. Internal failure in the ECU. Impact: will lose some injections, especially at high speeds	Engine System	Engine control unit high voltage fault. Engine Speed Limited.	1200 rpm	600 rpm/sec	0 rpm/sec 5
3673	3	w	Exhaust Throttle Position	Exhaust Throttle Valve Position Voltage OOR High	Shorted to high source or sensor failed	Engine System	Exhaust Throttle Valve Position sensor circuit fault	25%	20%/min	20%/min 0
3673	4	w	Exhaust Throttle Position	Exhaust Throttle Valve Position Voltage OOR Low	Open circuit, shorted to ground, or sensor failure	Engine System	Exhaust Throttle Valve Position sensor circuit fault	25%	20%/min	20%/min 0
3673	7	w	Exhaust Throttle Position	Exhaust Throttle Not Responding or Out of Adjustment	Exhaust Throttle mismatch error	Engine System	Exhaust Throttle Not Responding or Out of Adjustment	25%	20%/min	20%/min 0
3711	14	w	Diesel Particulate Filter Active Regeneration Inhibited Due to Low Exhaust Gas Temperature	DOC inlet temperature target not reached during ETM with parasitic loading	Regeneration failure. Service only level.	Exhaust Filter System	Exhaust Filter inlet temperature not reached. Active Exhaust Filter Cleaning unavailable.			6

3711	31	w	Diesel Particulate Filter Active Regeneration Inhibited Due to Low Exhaust Gas Temperature	DOC inlet temperature target not reached during ETM	Very low ambient, and/or parasitics; elevated idle is disabled; application requirements not met. In range sensor failure.	Exhaust Filter System	Exhaust Filter inlet temperature not reached. Active Exhaust Filter Cleaning unavailable.				6
3719	0	S	Particulate Trap #1 Soot Load Percent	Soot level high-most severe level	Soot at the service only level. A derate will be applied.	Exhaust Filter Restricted	Exhaust Filter Restricted. Engine Power Limited. Contact service representative.	1810 rpm	600 rpm/sec	600 rpm/sec	6
3719	15	м	Particulate Trap #1 Soot Load Percent	Soot level high-least severe level	Light and fault may be dependant on application display		soot at the high level				6
3719	16	w	Particulate Trap #1 Soot Load Percent	Soot level high-moderately severe level	Engine power limited. Start parked filter cleaning on engine setting page	Exhaust Filter System	Exhaust Filter Restricted. Engine Power Limited. Start parked filter cleaning on engine settings page per Operators Manual.				6
4334	0	w	DEF Dosing Pressure Sensor	Supply module pressure above a maximum pressure at any time	Restriction in Return line (could be frozen or plugged by a different restriction), Pump speed higher than commanded (pump failure), an in-range pressure sensor failure, an in-range return line heater failure (line failed to thaw) / This fault sets once per key cycle unless it is reset by a DM11 request. Once set, the DEF system is shutdown until a key cycle or DM11 request. SCR Inducement						0
4334	1	w	DEF Dosing Pressure Sensor	Pressure sensor reading abnormally low	DEF tank empty, blocked or broken suction line, failed supply pump / unable to dose and engine derate. SCR Inducement						0
4334	3	w	DEF Dosing Pressure Sensor	Sensor voltage is higher than expected	Sensor Disconnected, Wiring fault, shorted to high source, sensor failure. SCR Inducement						0
4334	4	W	DEF Dosing Pressure Sensor	Sensor voltage is lower than expected	Short to ground, faulty sensor. SCR Inducement						0
4334	11	w	DEF Dosing Pressure Sensor	The supply module fails to relieve the system pressure during a shutdown sequence or prime re-attempt sequence	Mechanically failed reverting valve, blockage in DEF supply Line, mechanically failed DEF Injector, mechanically failed pump / This fault sets once per key cycle unless it is reset by a DM11 request. Once set, the DEF system is shutdown until a key cycle or DM11 request. SCR Inducement						0
4334	16	w	DEF Dosing Pressure Sensor	Supply module pressure above threshold, only detected while dosing.	Incomplete defrost, pinched line, pump control issue or sensor in- range failure. SCR Inducement						0
4334	18	w	DEF Dosing Pressure Sensor	Pressure sensor reading abnormally low	Blocked or broken suction line, DEF dosing valve stuck open / engine derate. SCR Inducement						0
4334	31	w	DEF Dosing Pressure Sensor	DEF Supply Pressure exceeds a threshold during the detection mode state while priming the DEF system	Restriction in Return line (could be frozen or plugged by a different restriction), Pump speed higher than commanded (pump failure), an in-range pressure sensor failure, an in-range return line heater failure (line failed to thaw) / This fault sets once per key cycle unless it is reset by a DM11 request. Once set, the DEF system is shutdown until a key cycle or DM11 request. SCR Inducement						0
4341	5	w	DEF Dosing Unit Pressure Line Heater	Measured current is lower than expected when the output is active.	Wiring Fault (Open Circuit), shorted to high source on the supply side. Connector disconnected, faulty heater / Loss of ability to defrost DEF Line. SCR Inducement.						0
4341	6	w	DEF Dosing Unit Pressure Line Heater	Measured current Higher than expected when output is active	Wiring Fault (Short Circuit), Faulty heater. / Loss of ability to defrost DEF Line, Driver will be disabled until key cycle. SCR Inducement.						0
4343	5	w	DEF Line Heater - Suction Line (Supply Line)	Measured current is lower than expected when the output is active.	Wiring Fault (Open Circuit), shorted to high source on the supply side. Connector disconnected, faulty heater / Loss of ability to defrost DEF Line. SCR Inducement						0
4343	6	w	DEF Line Heater - Suction Line (Supply Line)	Measured current Higher than expected when output is active	Wiring Fault (Short Circuit), Faulty heater. / Loss of ability to defrost DEF Line, Driver will be disabled until key cycle. SCR Inducement						0
4345	5	w	DEF Line Heater - Return Line (Backflow Line)	Measured current is lower than expected when the output is active	Wiring Fault (Open Circuit), shorted to high source on the supply side. Connector disconnected, faulty heater / Loss of ability to defrost DEF Line. SCR Inducement						о

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4345	6	w	DEF Line Heater - Return Line (Backflow Line)	Measured current Higher than expected when output is active	Wiring Fault (Short Circuit), Faulty heater. / Loss of ability to defrost DEF Line, Driver will be disabled until key cycle. SCR Inducement				0
4360	7	w	SCR Inlet Temperature Sensor	Sensor does not respond as expected.	Faulty Temperature Module / Will use backup model as long as SCR Outlet temperature is valid, SCR Inducement.				0
4360	12	w	SCR Inlet Temperature Sensor	Loss of Communication with the SCR Temperature Module, or the module indicates that there is an error with the temparature reading.	Faulty Temperature Module / Will use backup model as long as SCR Outlet temperature is valid, no loss of performance. SCR Inducement				6
4364	1	w	SCR Conversion Efficiency	Measured NOx out of SCR is not reduced compared to Measured NOx into the SCR, and a regeneration has been completed but did not correct the problem.	Poor DEF quality Malfunctioning DEF Injection system Malfunctioning SCR Catalyst DEF deposits in the DEF injection system Swapped NOx sensors. SCR Inducement.				0
4364	18	w	SCR Conversion Efficiency	Measured NOx out of SCR is not reduced compared to Measured NOx into the SCR	Poor DEF quality Malfunctioning DEF Injection system Malfunctioning SCR Catalyst DEF deposits in the DEF injection system Swapped NOx sensors. SCR Inducement.				0
4366	5	w	DEF Tank Heater Control Valve	Measured current is lower than expected when the output is active.	Wiring Fault (Open Circuit), Connector disconnected, faulty control valve / Loss of ability to defrost DEF Tank. SCR Inducement.				0
4366	6	w	DEF Tank Heater Control Valve	Measured current Higher than expected when output is active	Wiring Fault (Short Circuit), Faulty Control Valve. / Loss of ability to defrost DEF Tank, Driver will be disabled until key cycle. SCR Inducement.				0
4366	16	w	DEF Tank Coolant Control Valve	DEF Tank Temperature is higher than expected	Coolant Control Valve Stuck Open or Shorted to Voltage Source, High ambient temperature / System will shut down and empty. SCR Inducement				0
4366	18	w	DEF Tank Coolant Control Valve	DEF Tank heating/defrosting time is excessive	Coolant Control Valve Stuck Shut, Insufficient Coolant Temperature (Engine Coolant System Problem) Insufficient Coolant Flow (Blocked Line) In-range tank temperature sensor failure / Inability to defrost DEF tank. SCR Inducement				0
4376	5	w	DEF Supply Module Reversing Valve	Measured current is lower than expected when the output is active.	Wiring Fault (Open Circuit), Connector disconnected, Faulty Reversing Valve. SCR Inducement.				0
4376	6	w	DEF Supply Module Reversing Valve	Measured current Higher than expected when output is active	Wiring Fault (Short Circuit), Faulty Reversing Valve				0
4376	14	w	DEF Supply Module Reversing Valve	While idling, if the temperature is above 1000 deg C, AND Pressure is above 100 kPa. After keyoff, and waiting an additional 10 sec, this fault sets if the pressure is above 75 kPa.	If you can build pressure - stuck in non reversing direction If you can't build pressure – blocked line between tank and supply module If there is no pressure change – in range sensor failure				0
4490	12	w	Specific Humidity	Sensor indicating an error condition	Sensor failure Impact to condensation AECD, Reduced accuracy of engine out Nox models, revert to T3 humidity model No derate required	Engine System	Compressor inlet sensor fault		0
4765	0	w	DOC Inlet Temperature	High Inlet Temperature. In-range sensor failure.	Unable to complete Regen	Exhaust Filter System			6
4765	12	w	Particulate Trap Intake Gas Temperature	Error reported from sensor	Thermocouple channel wires are open circuit or shorted to ground or power. Impact - dosing not allowed	Exhaust Filter System	Exhaust filter temperature sensor error.	 	6
4766	12	w	Particulate Trap Intermediate Gas Temperature	Error reported from sensor	Thermocouple channel wires are open circuit or shorted to ground or power. Impact - dosing not allowed, loss of unintended dosing diagnostic	Exhaust Filter System	Exhaust filter temperature sensor error.		6
4766	15	w	Particulate Trap Intermediate Gas Temperature	DOC Outlet Temperature High	System dosing more than expected, slow response time of sensors (sooted up), erratic fuel supply or nozzle performance; DOC over performance; see also unintended HC fault Impact - regeneration must retry	Exhaust Filter System	TBD		6

4766	16	w	Particulate Trap Intermediate Gas Temperature	DOC Outlet Temperature Higher than expected for too many times in one key cycle	System dosing more than expected, slow response time of sensors (sooted up), erratic fuel supply or nozzle performance; DOC over performance; see also unintended HC fault Impact - regeneration cannot complete	Exhaust Filter System	Exhaust filter temperature higher than expected. Active Exhaust Filter Cleaning unavailable.				0
4766	17	w	Particulate Trap Intermediate Gas Temperature	Desired temperature not reached after 900 seconds.	Face plugging, dosing injector not operating correctly; excessive DOC deactivation (poisoning); fuel coking in dosing line; undetected in-range failure of DOC inlet (reading too high) or outlet temp Impact: regen is aborted	Exhaust Filter System	Exhaust filter cleaning system fault. Not able to continue cleaning.				6
4766	18	w	Particulate Trap Intermediate Gas Temperature	Desired temperature not reached after 900 seconds and happens 10 times.	Face plugging, dosing injector not operating correctly; excessive DOC deactivation (poisoning); fuel coking in dosing line; undetected in-range failure of DOC inlet (reading too high) or outlet temp Impact: regen is aborted until power cycle Impact: regen is aborted	Exhaust Filter System	Exhaust filter cleaning system fault. Not able to continue cleaning.				6
4795	13	w	Diesel Particulate Filter	Calibration string does not match what is expected	Incorrect DOC, DPF or SCR string used. SCR Inducement.	Engine System	Exhaust Filter calibration data invalid. Engine power limited.	1200 rpm	600 rpm/sec	0 rpm/sec	0
5018	0	S	Aftertreatment Diesel Oxidation Catalyst System	Too many occurrences of DOC out >x+C DOC in when regen is not active and DOC in is >300°C	Turbo seals failure, injector misfire, leaking dosing nozzle, leaking coolant - check engine liquid levels Impact - engine power derate and inhibit active regen	Engine System	Unexpected temperature in Exhaust Filter Catalyst	50%	49%/min	49%/min	6
5018	16	w	Aftertreatment Diesel Oxidation Catalyst System	Too many occurrences of DOC out >xC DOC in when regen is not active and DOC in is >300°C	Turbo seals failure, injector misfire, leaking dosing nozzle, leaking coolant - check engine liquid levels Impact - none	Engine System	Unexpected temperature in Exhaust Filter Catalyst	50%	49%/min	49%/min	6
5125	3	w	Sensor Supply Voltage 7	Sensor Supply Voltage OOR High	5V Supply shorted to a higher voltage. Refer to schematic for pinout information.	Engine System	Sensor Supply Voltage OOR High				0
5125	4	w	Sensor Supply Voltage 7	Sensor Supply Voltage OOR Low	5V Supply shorted to ground. Refer to schematic for pinout information.	Engine System	Sensor Supply Voltage OOR Low				0
5126	3	w	Sensor Supply Voltage 8	Sensor Supply Voltage OOR High	5V Supply shorted to a higher voltage. Refer to schematic for pinout information.	Engine System	Sensor Supply Voltage OOR High				0
5126	4	w	Sensor Supply Voltage 8	Sensor Supply Voltage OOR Low	5V Supply shorted to ground. Refer to schematic for pinout	Engine System	Sensor Supply Voltage OOR				0
5127	3	w	Consol Supply Voltage C			Engine System	Sensor Supply Voltage OOR				0
5127	4	w	Sensor Supply Voltage 9		Suppry shorted to a higher voltage.	Engine System	Sensor Supply Voltage OOR				0
5128	6	W	Sensor Supply Voltage 9 Sensor Supply Voltage 10	Communication Supply Voltage OOR Low Current higher than expected when driver is active	Supply shorted to ground. Wiring fault (short circuit) or faulty solenoid	Engine System	Low				0
5246	0	w	Aftertreatment SCR Operator Inducement Severity	Warning when 10 minutes remain prior to inducement Derate condition	An emission fault is active. Engine power may be severely reduced within 10 minutes.	Engine Emission System Problem	An emission fault is active. Engine power may be severely reduced within 10 minutes				0
5246	13	W									0
5246	14	S	Aftertreatment SCR Operator Inducement Severity	Warning when 20 minutes remain prior to final inducement begins ramping in.	Engine Emission System Fault. Engine limited to idle only operation within 20 minutes.	Engine Emission System Problem	Engine limited to idle only operation within 20 minutes.				0
5246	15	×	Aftertreatment SCR Operator Inducement Severity	Warning when 30 minutes remain prior to Inducement Derate condition	An emission fault is active. Engine power may be severely reduced within 30 minutes.	Engine Emission System Problem	An emission fault is active. Engine power may be severely reduced within 30 minutes				0
5246	16	w	Aftertreatment SCR Operator Inducement Severity	Warning when 20 minutes remain prior to Inducement Derate condition	An emission fault is active. Engine power may be severely reduced within 20 minutes.	Engine Emission System Problem	An emission fault is active. Engine power may be severely reduced within 20 minutes				0
5246	31	S	Attertreatment SCR Operator Inducement Severity	Warning when final inducement begins ramping in.	An emission fault is active. Engine limited to idle only operation.	Engine Emission System Problem	Engine limited to idle only operation.				0
5298	1	w	Aftertreatment Diesel Oxidation Catalyst Conversion Efficiency	Check DPF delta T at the end of a complete active deep clean regen and if DPF out T is greater than inlet by 100°C for too many occurrences	DOC catalyst deactivation, DOC poisoning, dosing injector too much fuel or not atomized; in-range temperature sensor failure Impact - inhibit active regen	Engine System	Exhaust Filter Catalyst Ineffective				6
5298	18	N	Aftertreatment Diesel Oxidation Catalyst Conversion Efficiency	Check DPF delta T at the end of a complete active deep clean regen and if DOC out T is greater than inlet by 100°C	DOC catalyst deactivation, DOC poisoning, dosing injector too much fuel or not atomized; in-range temperature sensor failure	Engine System	Exhaust Filter Catalyst Ineffective				6

5435	6	w	DEF Dosing Unit Pump	Measured current Higher than expected when output is active	Wiring Fault (Short Circuit), Faulty Supply Pump. SCR Inducement.						0
5435	9	w	DEF Dosing Unit Pump	Loss of communication	Wiring problem with the pump control line / Impact - may lead to other faults						0
5435	11	w	DEF Dosing Unit Pump	Inability for pump to build pressure when priming	Incomplete defrost, DEF tank empty, blocked or broken suction line, failed supply pump / unable to dose and engine derate. SCR Inducement						0
5435	14	w	DEF Dosing Unit Pump	DEF Supply Module Control Line feedback is above a threshold	Wiring failure in pump or wiring harness (wire is short circuited to battery or higher voltage) / Active inducement after 4 hours. SCR Inducement						0
5435	31	w	Diesel Exhaust Fluid Dosing Injector	DEF supply pressure is unstable.	Reverting valve stuck on, faulty pump, leak or restriction in pressure line or supply line. SCR Inducement						0
5571	5	w	High Pressure Common Rail Fuel Pressure Relief Valve	Circuit resistance is higher than expected	Open Circuit, Connector disconnected.			20%	5%/min	5%/min	0
5571	6	w	High Pressure Common Rail Fuel Pressure Relief Valve	Circuit resistance is lower than expected	Short circuit in wiring harness or across coil.			20%	5%/min	5%/min	0
5745	5	w	DEF Dosing Unit Heater	Measured current is lower than expected when the output is active.	Wiring Fault (Short Circuit), Faulty heater. / Loss of ability to defrost DEF Dosing Unit , Driver will be disabled until key cycle. SCR Inducement						0
5745	6	w	DEF Dosing Unit Heater	Measured current Higher than expected when output is active	Wiring Fault (Open Circuit), shorted to high source on the supply side. Connector disconnected, faulty heater / Loss of ability to defrost DEF Dosing Unit SCR Inducement						0
5745	18	W	DEF Dosing Unit Heater	In-range temperature sensor failure or wiring fault.	Bad supply module. SCR Inducement						0
5745	31	N	DEF Dosing Unit Heater	If the duty cycle received from the DEF Supply module is invalid, this fault will set. (This failure is only checked when the DEF System is not actively controlling pressure.)	Failed heater temperature sensor or wiring in the DEF supply module						0
520629	31	w	Illegal Input Map Structure	illegal input Map Structure	Illegal operation found. There is an incorrect input map structure. This should never be seen beyond development.	Engine System					0
522494	9	w	Engine Turbocharger 1 Compressor Inlet Sensor	No CAN message received within timeout period	CAN wiring issue to compressor inlet sensor, sensor failure, power supply issue	r Engine System	Compressor inlet sensor communication fault.				0
522495	9	w	Engine Exhaust Filter Temperature Module	Loss of communication	Open or short circuit on the communication wire, open or short on either power supply. Failed device. SCR Inducement.	Exhaust Filter System	Exhaust filter temperature sensor communication fault				0
523653	1	w	ECU Power Input Supply Voltage #3	Low voltage detected on ECU supply #3.	Blown fuse or open circuit on ECU supply voltage #3. Engine will shutdown.			Shutdown immediately			0
523653	14	N		Removal of battery power, likely with a manual battery cut-off switch, prior to completely DEF injection system shutdown (line emptying).	Battery Disconnected prior to ECU completing shutdown. Any DEF ramaining in the lines or supply module can freeze at sufficiently low temperatures and damage the hardware.						0
523665	1	w	ECU Power Input Supply Voltage #1	Low voltage detected on ECU supply #1.	Blown fuse or open circuit on ECU supply voltage #1. Engine will shutdown			Shutdown immediately			0
523666	1	w	ECU Power Input Supply Voltage #2	Low voltage detected on ECU supply #2.	Blown fuse or open circuit on ECU supply voltage #2. Engine will shutdown.			Shutdown immediately			0