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1. 171.2-SE3799: Ambient Air Temperature - Data erratic, intermittent or incorrect

Air Temperature reading is In Range High

Monitor Operation:	
DTC	171.2-SE3799
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Engine is not in run state
171.3-SE3802, 171.4-SE3803
171.2-SE3871

Malfunction Thresholds (all active):
The cumulative high error of the sensor is greater than an allowable threshold within a time window.

2. 171.3-SE3802: Ambient Air Temperature Sensor 1 Circuit - Voltage above normal, or shorted to high source

Air Temperature sensor reading greater than specified operating range for a calibrated amount of time.

Monitor Operation:	
DTC	171.3-SE3802
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
Air Temperature Sensor value > 4.944 V (< -48.113 degC)	

3. 171.4-SE3803: Ambient Air Temperature Sensor 1 Circuit - Voltage below normal, or shorted to low source

Air Temperature sensor reading less than specified operating range for a amount of time.

Monitor Operation:	
DTC	171.4-SE3803
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
Air Temperature Sensor value < 0.107V (> 150 degC)	

4. 108.3-SE113: Barometric Pressure Sensor Circuit - Voltage above normal, or shorted to high source

Ambient Air Pressure sensor reading greater than specified operating range for a calibrated amount of time.

Monitor Operation:	
DTC	108.3-SE113
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):
Ambient Air Pressure sensor value > 4.75 V (110.32 kPa absolute)

5. 108.4-SE114: Barometric Pressure Sensor Circuit - Voltage below normal, or shorted to low source

Ambient Air Pressure sensor reading less than specified operating range for a calibrated amount of time.

Monitor Operation:	
DTC	108.4-SE114
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
Ambient Air Pressure sensor value < 0.25 V (44.82 kPa absolute)	

6. 108.2-SE3796: Barometric Pressure - Data erratic, intermittent or incorrect

Ambient Air Pressure reading is In Range High

Monitor Operation:	
DTC	108.2-SE3796
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Engine is not in Run State.
108.3-SE113, 108.4-SE114
108.2-SE4438

Malfunction Thresholds (all active):
The cumulative high error of the sensor is greater than an allowable threshold within a time window.

7. 108.2-SE3797: Barometric Pressure - Data erratic, intermittent or incorrect

Ambient Air Pressure reading is In Range Low

Monitor Operation:	
DTC	108.2-SE3797
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Engine is not in Run State.
108.2-SE4438
108.3-SE113, 108.4-SE114

Malfunction Thresholds (all active):
The cumulative low error of the sensor is greater than an allowable threshold within a time window.

8. 4752.18-SE3565: Engine Exhaust Gas Recirculation Cooler Efficiency - Data Valid But Below Normal Operating Range - Moderately Severe Level

EGR cooler failed to provide enough cooling

Monitor Operation:	
DTC	4752.18-SE3565
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
EGR flow < 1.65 kg/min
102.2-SE3651, 102.2-SE3652, 102.3-SE489, 102.4-SE490, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.3-SE493, 1209.4-SE494, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
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412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
110.2-SE3668, 110.2-SE3669, 110.3-SE75, 110.4-SE76
Exhaust temperature minus coolant temperature < 370 °C
168.17-SE4367, 27.2-SE3634, 27.4-SE1796, 2791.13-SE7321, 2791.13-SE7322, 2791.15-SE4368, 2791.5-SE1825, 2791.6-SE1826
Aftertreatment operation mode is in a mode other than NORMAL

Malfunction Thresholds (all active):
The cumulative high error of the sensor is greater than an allowable threshold within a time window.

9. 102.2-SE3651: Intake Manifold 1 Pressure - Data erratic, intermittent or incorrect

Charge Pressure Sensor reading is In Range High.

Monitor Operation:	
DTC	102.2-SE3651
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Abort Conditions (any active):
EGR is off and number of operating cycle Increases
Key Switch Detect Increase

Pause Conditions (any active):
Engine is not in Run State.
3464.3-SE2795, 3464.3-SE3989, 3464.4-SE2796, 3464.7-SE4720, 51.2-SE4014, 51.2-SE4015, 51.3-SE3530, 51.4-SE3529
102.3-SE489, 102.4-SE490
102.2-SE4439
103.16-SE3641, 103.18-SE3642, 105.2-SE3793, 105.2-SE4067, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1172.2-SE4190, 1172.2-SE4192, 1172.2-SE4746, 1172.3-SE486, 1172.4-SE484
EGR is off

10. 102.2-SE3652: Intake Manifold 1 Pressure - Data erratic, intermittent or incorrect

Charge Pressure Sensor reading is In Range Low.

Monitor Operation:	
DTC	102.2-SE3652
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Abort Conditions (any active):
EGR Off Engine Protection is active and Number of OBD Operating Cycle Increases
Key Switch Detect Increase

Pause Conditions (any active):
Engine is not in Run State.
102.2-SE4439
3464.3-SE2795, 3464.3-SE3989, 3464.4-SE2796, 51.2-SE4014, 51.2-SE4015, 51.3-SE3530, 51.4-SE3529
102.3-SE489, 102.4-SE490
103.16-SE3641, 103.18-SE3642, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1172.2-SE4190, 1172.2-SE4746, 1172.3-SE486, 1172.4-SE484
EGR Off Engine Protection is active

Malfunction Thresholds (all active):
Cumulative sum of error (Estimated Value - Measured Value) in 45 seconds is ever > 270,000 kPa, which is equivalent to [Average of Error - Tolerance] >= 60 kPa.
Where Tolerance is defined as: RefTable4 kPa.

11. 102.3-SE489: Intake Manifold 1 Pressure Sensor Circuit - Voltage above normal, or shorted to high source

Charge Pressure sensor reading greater than specified operating range for an amount of time.

Monitor Operation:	
DTC	102.3-SE489
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	5 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
Charge Pressure sensor value > 4.75V (349.98 kPa absolute)	

12. 102.4-SE490: Intake Manifold 1 Pressure Sensor Circuit - Voltage below normal, or shorted to low source

Charge Pressure sensor reading less than specified operating range for a amount of time.

Monitor Operation:	
DTC	102.4-SE490
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	5 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
Charge Pressure sensor value < 0.25V (44.82 kPa absolute)	

13. 105.2-SE4070: Intake Manifold 1 Temperature - Data erratic, intermittent or incorrect

Charge Temperature reading is In Range Low.

Monitor Operation:	
DTC	105.2-SE4070
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine has been in Run state for >= 120 s
Grid Heater State has been in OFF state for >= 120 s

Pause Conditions (any active):
105.3-SE487, 105.4-SE488
105.2-SE3793
Fresh Air Flow ≤ 8 kg/min
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
Ambient Air Temperature ≤ -6.67 °C
171.2-SE3799, 171.2-SE3871, 171.3-SE3802, 171.4-SE3803
Compressor Inlet Temperature ≥ 50 °C
1172.2-SE4190, 1172.2-SE4746, 1172.3-SE486, 1172.4-SE484
Compressor Outlet Temperature - Compressor Inlet Temperature < 40 °C
103.16-SE3641, 103.18-SE3642, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1172.2-SE4190, 1172.2-SE4746, 1172.3-SE486, 1172.4-SE484
Absolute difference of (Compressor Inlet Temperature - Ambient Air Temperature) > 12 °C
EGR Flow < 0 kg/min
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
PTO is active
Remote Throttle is active
EGR is Off
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878

Malfunction Thresholds (all active):

The cumulative low error of the sensor is greater than an allowable threshold within a time window.

14. 105.3-SE487: Intake Manifold 1 Temperature Sensor Circuit - Voltage above normal, or shorted to high source

Charge Temperature sensor reading greater than specified operating range for a calibrated amount of time.

Monitor Operation:	
DTC	105.3-SE487
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):
Charge Temperature sensor value > 4.883V (< -40 degC)

15. 105.4-SE488: Intake Manifold 1 Temperature Sensor Circuit - Voltage below normal, or shorted to low source

Charge Temperature sensor reading less than specified operating range for a amount of time.

Monitor Operation:	
DTC	105.4-SE488
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
Charge Temperature sensor value < 0.057V (> 139.617 degC)	

16. 411.3-SE485: Exhaust Gas Recirculation Differential Pressure Sensor Circuit - Voltage above normal, or shorted to high source

EGR Delta Pressure sensor reading greater than specified operating range for a calibrated amount of time.

Monitor Operation:	
DTC	411.3-SE485
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	8 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):
EGR Delta Pressure sensor value > 4.75V (36.932 kPa)

17. 411.4-SE483: Exhaust Gas Recirculation Differential Pressure Sensor Circuit - Voltage below normal, or shorted to low source

EGR Delta Pressure sensor reading less than specified operating range for a calibrated amount of time.

Monitor Operation:	
DTC	411.4-SE483
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	8 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
EGR Delta Pressure sensor value < 0.25V (-7.462 kPa)	

18. 411.2-SE1911: Exhaust Gas Recirculation Differential Pressure - Data erratic, intermittent or incorrect

EGR Delta Pressure Sensor Autozero Error

Monitor Operation:	
DTC	411.2-SE1911
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	1 counts
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine Speed = 0 RPM
EGR Valve is closed
Charge Temperature > 16 °C
Coolant Temperature > 68 °C
Key Switch is OFF after being on
ECM Internal Temperature (an indicator of EGR Delta Pressure Sensor Temperature) > -60 °C
All enable conditions have been TRUE for 0.6 sec

Abort Conditions (any active):
168.17-SE4367, 27.2-SE3634, 27.4-SE1796, 2791.13-SE7321, 2791.13-SE7322, 2791.15-SE4368, 2791.5-SE1825, 2791.6-SE1826
110.2-SE3668, 110.2-SE3669, 110.2-SE3805, 110.3-SE75, 110.4-SE76
105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488
411.3-SE485, 411.4-SE483

Malfunction Thresholds (all active):
The absolute value of EGR Delta Pressure Sensor > Threshold value taken from table RefTable15

19. 412.2-SE3876: Exhaust Gas Recirculation Temperature - Data erratic, intermittent or incorrect

EGR Orifice Temperature reading is In Range High

Monitor Operation:	
DTC	412.2-SE3876
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine has been in Run state for >= 120 s

Pause Conditions (any active):
EGR Cooler Bypass Valve Position > 0 %, or EGR Cooler Bypass Valve Position <= 0 % for < 0 s amount of time.
412.3-SE496, 412.4-SE495
412.2-SE3872
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 110.2-SE3668, 110.2-SE3669, 110.2-SE3805, 110.3-SE75, 110.4-SE76, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483
Coolant Temperature < 60 °C
168.17-SE4367, 27.2-SE3634, 27.4-SE1796, 2791.13-SE7321, 2791.13-SE7322, 2791.15-SE4368, 2791.5-SE1825, 2791.6-SE1826

Malfunction Thresholds (all active):
The cumulative high error of the sensor is greater than an allowable threshold within a time window.

20. 412.2-SE3877: Exhaust Gas Recirculation Temperature - Data erratic, intermittent or incorrect

EGR Orifice Temperature reading is In Range Low

Monitor Operation:	
DTC	412.2-SE3877
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine has been in Run state for >= 120 s

Pause Conditions (any active):
412.2-SE3872
EGR Cooler Bypass Valve Position > 0 %, or EGR Cooler Bypass Valve Position <= 0 % for < 0 s amount of time.
412.3-SE496, 412.4-SE495
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 110.2-SE3668, 110.2-SE3669, 110.2-SE3805, 110.3-SE75, 110.4-SE76, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483
EGR Flow < 1.5 kg/min
Coolant Temperature < 60 °C
168.17-SE4367, 27.2-SE3634, 27.4-SE1796, 2791.13-SE7321, 2791.13-SE7322, 2791.15-SE4368, 2791.5-SE1825, 2791.6-SE1826

Malfunction Thresholds (all active):
The cumulative low error of the sensor is greater than an allowable threshold within a time window.

21. 412.2-SE3878: Exhaust Gas Recirculation Temperature - Data erratic, intermittent or incorrect

EGR Orifice Temperature reading is In Range Stuck

Monitor Operation:	
DTC	412.2-SE3878
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine has been in Run state for >= 120 s

Pause Conditions (any active):
The difference (absolute value) between engine speed and filtered engine speed is under a Low Hysteresis threshold 80 RPM, or remains under High Hysteresis threshold 100 RPM.
412.2-SE3872
EGR Cooler Bypass Valve Position > 0 %, or EGR Cooler Bypass Valve Position <= 0 % for < 0 s amount of time.
412.3-SE496, 412.4-SE495
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 110.2-SE3668, 110.2-SE3669, 110.2-SE3805, 110.3-SE75, 110.4-SE76, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483
EGR Flow < 1.5 kg/min
Coolant Temperature < 60 °C
168.17-SE4367, 27.2-SE3634, 27.4-SE1796, 2791.13-SE7321, 2791.13-SE7322, 2791.15-SE4368, 2791.5-SE1825, 2791.6-SE1826

Malfunction Thresholds (all active):
Difference between maximum and minimum sensor values at the end of 60 seconds is < 0.3 °C

22. 412.3-SE496: Exhaust Gas Recirculation Temperature Sensor

Circuit - Voltage above normal, or shorted to high source

EGR Orifice Temperature Sensor reading is greater than specified operating range for calibrated amount of time.

Monitor Operation:	
DTC	412.3-SE496
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	8 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):
EGR Orifice Temperature sensor value > 4.85V (< -40 degC)

23. 412.4-SE495: Exhaust Gas Recirculation Temperature Sensor

Circuit - Voltage below normal, or shorted to low source

EGR Orifice Temperature Sensor reading is less than specified operating range for calibrated amount of time.

Monitor Operation:	
DTC	412.4-SE495
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	8 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):
EGR Orifice Temperature sensor value < 0.055V (> 500degC)

24. 3058.16-SE7295: Engine Exhaust Gas Recirculation (EGR) System - Data Valid But Above Normal Operating Range - Moderately Severe Level

EGR Flow higher than normal

Monitor Operation:	
DTC	3058.16-SE7295
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine is in run state.
Ambient Air Temperature > -50 °C
Compressor Inlet Density > 0 kg/m ³
Time which all Enable Conditions have been TRUE ≥ 0 sec

Pause Conditions (any active):
VGT driver failure (See RefCond20017.)
168.17-SE4367, 27.2-SE3634, 27.4-SE1796, 2791.13-SE7321, 2791.13-SE7322, 2791.15-SE4368, 2791.5-SE1825, 2791.6-SE1826
3464.3-SE2795, 3464.3-SE3989, 3464.4-SE2796, 51.2-SE4014, 51.2-SE4015, 51.3-SE3530, 51.4-SE3529
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494
1172.2-SE4190, 1172.2-SE4746, 1172.3-SE486, 1172.4-SE484
103.16-SE3641, 103.18-SE3642
The VGT Position is not known to be good. (See RefCond20018.)
The Intake Air Throttle Valve Position is not known to be good. (See RefCond20019.)
The EGR brushless motor valve position is not known to be good. (See RefCond20020.)
The EGR Bypass Valve Position is not known to be good. (See RefCond20021.)
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494
1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490
Charge Flow Command < 10 kg/min
Charge Flow Command is greater than a threshold.

VGT Actuator Effective Flow Area is in a range.
Charge Temperature is less than a threshold.
EGR Orifice Temperature is less than a threshold.

Malfunction Thresholds (all active):
The cumulative high error of the flow is greater than an allowable threshold within a time window.

25. 3058.18-SE7296: Engine Exhaust Gas Recirculation (EGR) System - Data Valid But Below Normal Operating Range - Moderately Severe Level

EGR Flow lower than normal

Monitor Operation:	
DTC	3058.18-SE7296
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine is in run state.
Ambient Air Temperature > -50 °C
Compressor Inlet Density > 0 kg/m ³
Time which all Enable Conditions have been TRUE ≥ 0 sec

Pause Conditions (any active):
VGT driver failure (See RefCond20017.)
168.17-SE4367, 27.2-SE3634, 27.4-SE1796, 2791.13-SE7321, 2791.13-SE7322, 2791.15-SE4368, 2791.5-SE1825, 2791.6-SE1826
3464.3-SE2795, 3464.3-SE3989, 3464.4-SE2796, 51.2-SE4014, 51.2-SE4015, 51.3-SE3530, 51.4-SE3529
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494
1172.2-SE4190, 1172.2-SE4746, 1172.3-SE486, 1172.4-SE484
103.16-SE3641, 103.18-SE3642
The VGT Position is not known to be good. (See RefCond20018.)
The Intake Air Throttle Valve Position is not known to be good. (See RefCond20019.)
The EGR valve position is not known to be good. (See RefCond20020.)
The EGR Bypass Valve Position is not known to be good. (See RefCond20021.)
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490
EGR Flow Command is less than a threshold.
EGR Flow Command is greater than a threshold.
EGR Valve Effective Flow Area is in a range

Charge Temperature is less than a threshold.
--

EGR Orifice Temperature is less than a threshold.

Malfunction Thresholds (all active):

The cumulative low error of the flow is greater than an allowable threshold within a time window.
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26. 5024.10-SE5246: Aftertreatment 1 Intake NOx Sensor Heater - Abnormal rate of change

Engine Out NOx sensor heater failure.

Monitor Operation:	
DTC	5024.10-SE5246
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Amount of time that heater reaches working temperature > 30 sec
Exhaust gas temperature is above a threshold representing the point at which there is no longer a concern of condensation on the NOx sensor element. (See RefCond20022.).

Abort Conditions (any active):
3216.4-SE5151
3216.4-SE5153
NOx sensor supply voltage > 16.5 V
NOx sensor supply voltage < 10.8 V
Exhaust gas velocity ≥ 50 m/sec
3216.9-SE2487
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878

Malfunction Thresholds (all active):
Percentage of time spent heating greater than a threshold in a diagnostic window.
OR the number of transitions from maintain working temperature to heating greater than a threshold in a diagnostic window.

27. 5024.10-SE5245: Aftertreatment 1 Intake NOx Sensor Heater - Abnormal rate of change

Engine Out NOx Sensor Heater malfunction.

Monitor Operation:	
DTC	5024.10-SE5245
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Exhaust gas temperature is above a threshold representing the point at which there is no longer a concern of condensation on the NOx sensor element. (See RefCond20022.).

Abort Conditions (any active):
NOx sensor supply voltage > 16.5 V
NOx sensor supply voltage < 10.8 V
3216.4-SE5151
3216.4-SE5153
Exhaust gas velocity ≥ 50 m/sec
3216.9-SE2487
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878

Malfunction Thresholds (all active):
Time for heater to reach working temperature after enable conditions are satisfied for some of time.

28. 3218.2-SE5829: Aftertreatment 1 Intake NOx Sensor Power Supply - Data erratic, intermittent or incorrect

The engine out NOx sensor circuitry has detected an intermittent power supply voltage drop that results in a reset internal to the sensor.

Monitor Operation:	
DTC	3218.2-SE5829
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Exhaust gas temperature is below dewpoint, which is a threshold representing the point at which there is a concern of condensation on the NOx sensor element. (See RefCond20023.)
Exhaust gas temperature is above a threshold representing the point at which there is no longer a concern of condensation on the NOx sensor element. (See RefCond20022.) for less than 1 seconds

Malfunction Thresholds (all active):
The number of filtered sensor reset events (sensor supply power < 6 V) is greater than 3, within a diagnostic time window (300 sec) Sensor reset events are "filtered" by ignoring consecutive reset events occurring within a calibrated time (20 sec).

29. 3218.2-SE5152: Aftertreatment 1 Intake NOx Sensor Power Supply - Data erratic, intermittent or incorrect

The engine out NOx sensor circuitry has detected that its battery supply voltage is outside the desired range.

Monitor Operation:	
DTC	3218.2-SE5152
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 seconds after sensor identifies any of the listed malfunction criteria.
MIL Activation Criteria	OBD_SOLID

Abort Conditions (any active):
3216.9-SE2487

Pause Conditions (any active):
Exhaust gas temperature is above a threshold representing the point at which there is no longer a concern of condensation on the NOx sensor element. (See RefCond20022.) for less than 160 seconds
Exhaust gas temperature is below dewpoint, which is a threshold representing the point at which there is a concern of condensation on the NOx sensor element. (See RefCond20023.)

Malfunction Thresholds (all active):
NOx sensor supply voltage > 16.5 V for 10 seconds.
or NOx sensor supply voltage < 10.8 V for 10 seconds.

30. 3216.4-SE5153: Aftertreatment 1 Intake NOx Sensor Circuit - Voltage below normal, or shorted to low source

The NOx sensor circuitry has detected a failure within the engine out NOx sensor's internal circuitry.

Monitor Operation:	
DTC	3216.4-SE5153
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 seconds after sensor identifies any of the listed malfunction criteria.
MIL Activation Criteria	OBD_SOLID

Abort Conditions (any active):
3216.9-SE2487

Pause Conditions (any active):
Exhaust gas temperature is above a threshold .
Exhaust gas temperature is below a threshold.

Malfunction Thresholds (all active):
The resistance between the electrode and ground is greater than a threshold for some of time .
Or
The resistance between the sensors air reference electrode and ground is greater than a threshold for some of time
Or
The resistance between the sensors pumping electrode and ground is greater than a threshold for some of time .
Or
The resistance between the sensors pumping electrode and ground is greater than a threshold for some of time .
Or
(The resistance between the sensors air reference electrode and the sensors electrode is less than a threshold AND the voltage between reference line and ground is less than a threshold for some of time.
Or
The resistance between the pumping electrode is is less than a threshold for some of time .
Or
The resistance between the pumping electrode and ground is less than a threshold for some of time.
Or
The resistance between the sensors top electrode is less than a threshold for some of time .
Or
The resistance between the measuring electrode and ground is less than a threshold for some of time.

Or
The resistance between the pumping electrode and ground is less than a threshold for some of time .
Or
The resistance between the measuring electrode and the supply voltage to the sensors internal heater < 0.5 ohms for 10 seconds.
Or
The resistance between the sensors internal heater supply voltage line and sensor ground is is less than a threshold for some of time.
Or
The resistance between the sensors measuring electrode is is less than a threshold for some of time
Or
The resistance between supply voltage and the sensors pumping electrode-is less than a threshold for some of time.
Or
The resistance between supply voltage and the sensors air reference electrode is less than a threshold for some of time.
Or
The resistance between supply voltage and the sensors measuring electrode is less than a threshold for some of time.
Or
The resistance between the sensors pumping electrode is less than a threshold for some of time
Or
The resistance between the sensors pumping electrode is less than a threshold for some of time.
Or
The resistance between the electrode in on the top of the sensor (exposed to the exhaust gas) and ground is less than a threshold for some of time.
Or
The resistance between supply voltage and the sensors pumping electrode is less than a threshold for some of time.
Or
The resistance between supply voltage and the sensors top electrode is less than a threshold for some of time.
Or
The resistance between supply voltage and the sensors heater supply is less than a threshold for some of time.

31. 1209.2-SE3924: Exhaust Gas Pressure 1 - Data erratic, intermittent or incorrect

Exhaust Pressure Sensor reading is In Range High

Monitor Operation:	
DTC	1209.2-SE3924
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Abort Conditions (any active):

Pause Conditions (any active):
Engine is not in Run State.
VGT Position > 85 %
1209.2-SE4442
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
Net Engine Torque rate of change is > 24,000 (n-m) OR rate of change is < 24,000 (n-m) for < 0 (sec)
1209.3-SE493, 1209.4-SE494
Fueling < 15 mg/stroke
EGR Off Engine Protection is active

Malfunction Thresholds (all active):

The cumulative high error of the sensor is greater than an allowable threshold within a time window.

32. 1209.2-SE3922: Exhaust Gas Pressure 1 - Data erratic, intermittent or incorrect

Exhaust Pressure Sensor reading is In Range Low

Monitor Operation:	
DTC	1209.2-SE3922
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Abort Conditions (any active):

Pause Conditions (any active):
Engine is not in Run State.
VGT Position > 85 %
1209.2-SE4442
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
Net Engine Torque rate of change is > 24,000 (n-m) OR rate of change is < 24,000 (n-m) for < 0 (sec)
1209.3-SE493, 1209.4-SE494
Fueling < 15 mg/stroke
EGR Off Engine Protection is active

Malfunction Thresholds (all active):

The cumulative low error of the sensor is greater than an allowable threshold within a time window..

33. 1209.3-SE493: Exhaust Gas Pressure Sensor 1 Circuit - Voltage above normal, or shorted to high source

Exhaust Pressure sensor reading greater than specified operating range for a calibrated amount of time.

Monitor Operation:	
DTC	1209.3-SE493
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	8 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):
Exhaust Pressure sensor value > 4.75V (620.52 kPa absolute)

34. 1209.4-SE494: Exhaust Gas Pressure Sensor 1 Circuit - Voltage below normal, or shorted to low source

Exhaust Pressure sensor reading less than specified operating range for a amount of time.

Monitor Operation:	
DTC	1209.4-SE494
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	8 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):
Exhaust Pressure sensor value < 0.25V (44.78 kPa absolute)

35. 102.16-SE7293: Intake Manifold 1 Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level

Charge Flow higher than normal

Monitor Operation:	
DTC	102.16-SE7293
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine is in run state.
Ambient Air Temperature > -50 °C
Compressor Inlet Density > 0 kg/m ³
Time which all Enable Conditions have been TRUE ≥ 0 sec

Abort Conditions (any active):

Pause Conditions (any active):
VGT driver failure (See RefCond20017.)
168.17-SE4367, 27.2-SE3634, 27.4-SE1796, 2791.13-SE7321, 2791.13-SE7322, 2791.15-SE4368, 2791.5-SE1825, 2791.6-SE1826
3464.3-SE2795, 3464.3-SE3989, 3464.4-SE2796, 51.2-SE4014, 51.2-SE4015, 51.3-SE3530, 51.4-SE3529
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494
1172.2-SE4190, 1172.2-SE4746, 1172.3-SE486, 1172.4-SE484
103.16-SE3641, 103.18-SE3642
The VGT Position is not known to be good. (See RefCond20018.)
The Intake Air Throttle Valve Position is not known to be good. (See RefCond20019.)
The EGR brushless motor valve position is not known to be good. (See RefCond20020.)
The EGR Bypass Valve Position is not known to be good. (See RefCond20021.)
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490
Fresh Air Flow Command is less than a threshold.

Fresh Air Flow Command is greater than a threshold
EGR Valve Effective Flow Area is less than a threshold
EGR Valve Effective Flow Area is greater than a threshold
Charge Temperature is less than a threshold
EGR Orifice Temperature is less than a threshold

Malfunction Thresholds (all active):

The cumulative high error of the flow is greater than an allowable threshold within a time window.

36. 3216.20-SE5369: Aftertreatment 1 Intake NOx Sensor - Data not Rational - Drifted High

Engine Out NOx sensor reading is stuck in range

Monitor Operation:	
DTC	3216.20-SE5369
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	30 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
The change of estimated NOx flow > 35 ppm
The change of engine speed $\geq$ 250 RPM

Pause Conditions (any active):
Aftertreatment Inlet NOx sensor reading is not valid due to the internal control loops within the sensor being unstable, or active faults detected by the sensor, or the sensor's battery supply voltage is outside the desired range or dewpoint temperature has not been met or dewpoint temperature has been meet for less than a light off time. (See RefCond20042.)
The change of estimated NOx flow < 15 ppm
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
Engine is not in run state
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728

Malfunction Thresholds (all active):
Change of NOx sensor value over the detection period < 100 ppm

37. 3216.2-SE5368: Aftertreatment 1 Intake NOx Sensor - Data erratic, intermittent or incorrect

Engine out NOx sensor reading is in range high during non motoring conditions

Monitor Operation:	
DTC	3216.2-SE5368
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Engine is in Protection state
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
Compressor Inlet Density ≤ 0.85 kg/m ³
Compressor Inlet Density ≥ 1.5 kg/m ³
Ambient Air Temperature ≥ 200 °C
Ambient Air Temperature ≤ -6.67 °C
Engine Speed $\geq 2,500$ RPM
Engine Speed ≤ 900 RPM
Net Engine Torque > RefTable18
Net Engine Torque < RefTable19
Engine is in Thermal Management state
Engine doesn't run in Alpha 1 control mode
EGR Fraction ≤ 0.05
EGR Fraction ≥ 0.8
Fueling change rate > 50 mg/stroke/sec
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
Duration for which the pause conditions are FALSE < 25 sec
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
Aftertreatment Inlet NOx sensor reading is not valid due to the internal control loops within the

sensor being unstable, or active faults detected by the sensor, or the sensor's battery supply voltage is outside the desired range or dewpoint temperature has not been met or dewpoint temperature has been meet for less than a light off time. (See RefCond20042.)

Malfunction Thresholds (all active):

The cumulative high error of the sensor is greater than an allowable threshold within a time window.

38. 3216.20-SE5365: Aftertreatment 1 Intake NOx Sensor - Data not Rational - Drifted High

Engine out NOx sensor reading is in range high during motoring condition

Monitor Operation:	
DTC	3216.20-SE5365
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Duration for having permission by OBD arbitrator < 5 sec
Fueling > 0.1 mg/stroke
Engine Speed < 600 RPM
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
Aftertreatment Inlet NOx sensor reading is not valid due to the internal control loops within the sensor being unstable, or active faults detected by the sensor, or the sensor's battery supply voltage is outside the desired range or dewpoint temperature has not been met or dewpoint temperature has been meet for less than a light off time. (See RefCond20042.)
Absolute rate of change of Exhaust Pressure $\geq 1,000,000$ kPa(absolute)/sec

Malfunction Thresholds (all active):
The cumulative high error of the sensor is greater than an allowable threshold within a time window.

39. 3216.2-SE5367: Aftertreatment 1 Intake NOx Sensor - Data erratic, intermittent or incorrect

Engine out NOx sensor reading is in range low during non motoring conditions

Monitor Operation:	
DTC	3216.2-SE5367
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Ambient Air Temperature $\geq 40\text{deg C}$
Ambient Air Temperature $\leq -20\text{deg C}$
Compressor Inlet Density $\geq 1.5\text{kg/m}^3$
Compressor Inlet Density $\leq 1\text{kg/m}^3$
Engine Speed $\geq 1,750$ RPM
Engine Speed $\leq 1,100$ RPM
Engine Torque > RefTable18
Engine Torque < RefTable19
Engine is in Thermal Management state
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4067, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4067, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
EGR Fraction ≤ 0.145
EGR Fraction ≥ 0.35
Fueling change rate > 50 mg/stroke/sec
Duration for which the pause conditions are FALSE < 5 sec
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4067, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.2-SE2847, 3251.2-SE2851, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE2984, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
Aftertreatment Inlet NOx sensor reading is not valid due to the internal control loops within the sensor being unstable, or active faults detected by the sensor, or the sensor's battery supply voltage is outside the desired range or dewpoint temperature has not been met or dewpoint temperature has been meet

for less than a light off time. (See RefCond10044.)
Engine is in Protection state
Engine is not in steady state .

Malfunction Thresholds (all active):
The cumulative low error of the sensor is greater than an allowable threshold within a time window.

40. 3216.20-SE5366: Aftertreatment 1 Intake NOx Sensor - Data not Rational - Drifted High

Engine out NOx sensor reading is in range low during motoring condition

Monitor Operation:	
DTC	3216.20-SE5366
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Fueling > 0.1 mg/stroke
Engine Speed < 600 RPM
Duration for having permission by OBD arbitrator < 5 sec
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
Aftertreatment Inlet NOx sensor reading is not valid due to the internal control loops within the sensor being unstable, or active faults detected by the sensor, or the sensor's battery supply voltage is outside the desired range or dewpoint temperature has not been met or dewpoint temperature has been meet for less than a light off time. (See RefCond20042.)
Absolute rate of change of Exhaust Pressure $\geq 1,000,000$ kPa(absolute)/sec

Malfunction Thresholds (all active):
The cumulative low error of the sensor is greater than an allowable threshold within a time window.

41. 3216.10-SE5569: Aftertreatment 1 Intake NOx Sensor - Abnormal rate of change

Engine out NOx sensor signal is not valid for a persistent period of time.

Monitor Operation:	
DTC	3216.10-SE5569
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	150 sec
MIL Activation Criteria	OBD_SOLID

Abort Conditions (any active):
NOx Sensor internal operating temperature < 800 degC
Exhaust gas temperature is below dewpoint, which is a threshold representing the point at which there is a concern of condensation on the NOx sensor element. (See RefCond20023.)
3216.9-SE2487
3216.4-SE5151
3216.4-SE5153
3218.2-SE5152
Exhaust gas temperature is above a threshold representing the point at which there is no longer a concern of condensation on the NOx sensor element. (See RefCond20022.) for less than 100 seconds

Pause Conditions (any active):
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
The rate of change of estimated engine out O2 $\geq 7\%/s$
The rate of change of exhaust pressure $\geq 5\text{ kPa/s}$
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728

Malfunction Thresholds (all active):
NOx sensor reading is not valid due to internal control loops within the sensor being unstable. (See RefCond20043.)

42. 3216.13-SE5384: Aftertreatment 1 Intake NOx - Out of Calibration

The rated NOx sensor voltage is compared to the system supply voltage. Checking for appropriate part for the appropriate system

Monitor Operation:	
DTC	3216.13-SE5384
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
NOx sensor voltage parameter is not available

Malfunction Thresholds (all active):
Rated NOx Sensor voltage does not match nominal system voltage

43. 103.16-SE3641: Turbocharger 1 Speed - Data Valid But Above Normal Operating Range - Moderately Severe Level

Turbo speed sensor reading greater than specified operating range for a calibrated amount of time.

Monitor Operation:	
DTC	103.16-SE3641
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	5 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
Raw Turbo Speed value > 2,500 Hz (150 KRPM)	

44. 103.18-SE3642: Turbocharger 1 Speed - Data Valid But Below Normal Operating Range - Moderately Severe Level

Turbo speed sensor reading less than specified operating range for a calibrated amount of time.

Monitor Operation:	
DTC	103.18-SE3642
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Ratio of Charge Pressure and Ambient Air Pressure < 1.2
Filtered Engine Speed < 1,200 RPM
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490

Malfunction Thresholds (all active):
Raw Turbo Speed < 50 Hz (3 KRPM), for 5 seconds.
OR Raw Turbo Speed = 0 Hz (0 KRPM) for 1,000 mSec.

45. 520701.31-SE8281: Air Handling Feedback Control - Condition Exists

The intake and exhaust pressures are controlled during the thermal management to increase exhaust temperature. When the monitor is enabled, the fault will be set if the manifold pressures cannot meet the target.

Monitor Operation:	
DTC	520701.31-SE8281
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Engine is not in run state.
VGT driver failure (See RefCond10009.)
168.17-SE4367, 27.2-SE3633, 27.2-SE3634, 27.2-SE3635, 27.4-SE1796, 2791.13-SE7321, 2791.13-SE7322, 2791.15-SE4368, 2791.5-SE1825, 2791.6-SE1826
3464.3-SE2795, 3464.3-SE3989, 3464.4-SE2796, 3464.7-SE4720, 51.2-SE4014, 51.2-SE4015, 51.3-SE3530, 51.4-SE3529
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
171.2-SE3799, 171.2-SE3871, 171.3-SE3802, 171.4-SE3803
The VGT Position is not known to be good. (See RefCond10010.)
The EGR brushless motor valve position is not known to be good. (See RefCond10025.)
The Intake Air Throttle Valve Position is not known to be good. (See RefCond10024.)
Ambient Air Temperature $\leq -6.67^{\circ}\text{C}$
Ambient Air Pressure $\leq 73\text{ kPa(absolute)}$
EGR is Off
1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490
105.2-SE3793, 105.2-SE4067, 105.2-SE4070, 105.3-SE487, 105.4-SE488
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4067, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
Filtered (tau = 0 sec) Charge Temperature is less than a threshold .
Filtered (tau = 0 sec) EGR Orifice Temperature is less than a threshold.
Engine Thermal Management is inactive

Malfunction Thresholds (all active):
The cumulative sum of the condition flag is greater than an allowable threshold within a time window. The condition flag will be 1 if exhaust pressure is less than the exhaust pressure command by a threshold.

46. 520701.31-SE7989: Air Handling Feedback Control - Condition Exists

EGR Flow higher than EGR Flow Command when-the monitor is enabled.

Monitor Operation:	
DTC	520701.31-SE7989
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Engine is not in run state.
VGT driver failure (See RefCond10009.)
168.17-SE4367, 27.2-SE3633, 27.2-SE3634, 27.2-SE3635, 27.4-SE1796, 2791.13-SE7321, 2791.13-SE7322, 2791.15-SE4368, 2791.5-SE1825, 2791.6-SE1826
3464.3-SE2795, 3464.3-SE3989, 3464.4-SE2796, 3464.7-SE4720, 51.2-SE4014, 51.2-SE4015, 51.3-SE3530, 51.4-SE3529
171.2-SE3799, 171.2-SE3871, 171.3-SE3802, 171.4-SE3803
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
The VGT Position is not known to be good. (See RefCond10010.)
The EGR brushless motor valve position is not known to be good. (See RefCond10025.)
The Intake Air Throttle Valve Position is not known to be good. (See RefCond10024.)
Ambient Air Temperature $\leq -6.67^{\circ}\text{C}$
Ambient Air Pressure $\leq 73\text{ kPa}$ (absolute)
EGR is Off
Engine Speed $\leq 1,000\text{ RPM}$
105.2-SE3793, 105.2-SE4067, 105.2-SE4070, 105.3-SE487, 105.4-SE488
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4067, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
Filtered (tau = 0 sec) Charge Temperature is less than a threshold .
Filtered (tau = 0 sec) EGR Orifice Temperature is less than a threshold
Engine Thermal Management is active

Malfunction Thresholds (all active):
The cumulative sum of the condition flag is greater than an allowable threshold within a time window. The condition flag will be 1 if EGR flow is greater than the EGR flow command by a threshold.

47. 520701.31-SE7987: Air Handling Feedback Control - Condition Exists

EGR Flow lower than EGR Flow Command when EGR Flow Controller used up all adjustment allowed.

Monitor Operation:	
DTC	520701.31-SE7987
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Engine is not in run state.
VGT driver failure (See RefCond20017.)
168.17-SE4367, 27.2-SE3634, 27.4-SE1796, 2791.13-SE7321, 2791.13-SE7322, 2791.15-SE4368, 2791.5-SE1825, 2791.6-SE1826
3464.3-SE2795, 3464.3-SE3989, 3464.4-SE2796, 51.2-SE4014, 51.2-SE4015, 51.3-SE3530, 51.4-SE3529
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
171.2-SE3799, 171.2-SE3871, 171.3-SE3802, 171.4-SE3803
The VGT Position is not known to be good. (See RefCond20018.)
The EGR brushless motor valve position is not known to be good. (See RefCond20020.)
The Intake Air Throttle Valve Position is not known to be good. (See RefCond20019.)
Ambient Air Temperature $\leq -6.67^{\circ}\text{C}$
Ambient Air Pressure $\leq 75\text{ kPa(absolute)}$
EGR Off
Engine Speed $\leq 1,350\text{ RPM}$
105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
Filtered (tau = 1.9 sec) Charge Temperature $\leq 0^{\circ}\text{C}$
Filtered (tau = 1.9 sec) EGR Orifice Temperature $\leq 0^{\circ}\text{C}$

Malfunction Thresholds (all active):
The cumulative sum of condition flag is greater than an allowable threshold within a time window, where the condition flag will be 1 when EGR flow is less than EGR flow command by a threshold.

48. 520701.31-SE7990: Air Handling Feedback Control - Condition Exists

Charge Flow higher than charge flow command when the monitor is enabled.

Monitor Operation:	
DTC	520701.31-SE7990
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Engine is not in run state.
VGT driver failure (See RefCond10009.)
168.17-SE4367, 27.2-SE3633, 27.2-SE3634, 27.2-SE3635, 27.4-SE1796, 2791.13-SE7321, 2791.13-SE7322, 2791.15-SE4368, 2791.5-SE1825, 2791.6-SE1826
3464.3-SE2795, 3464.3-SE3989, 3464.4-SE2796, 3464.7-SE4720, 51.2-SE4014, 51.2-SE4015, 51.3-SE3530, 51.4-SE3529
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
171.2-SE3799, 171.2-SE3871, 171.3-SE3802, 171.4-SE3803
The VGT Position is not known to be good. (See RefCond10010.)
The EGR brushless motor valve position is not known to be good. (See RefCond10025.)
The Intake Air Throttle Valve Position is not known to be good. (See RefCond10024.)
Ambient Air Temperature $\leq -6.67^{\circ}\text{C}$
Ambient Air Pressure $\leq 73\text{ kPa(absolute)}$
EGR is Off
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4067, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494
Engine Speed $\leq 1,000\text{ RPM}$
105.2-SE3793, 105.2-SE4067, 105.2-SE4070, 105.3-SE487, 105.4-SE488
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4067, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
Charge Temperature is less than a threshold
EGR Orifice Temperature is less than a threshold
Engine Thermal Management is active

Malfunction Thresholds (all active):
The cumulative sum of condition flag is greater than an allowable threshold within a time window. The condition flag will be 1 when Charge flow is greater than Charge flow command by a threshold.

49. 520701.31-SE7988: Air Handling Feedback Control - Condition Exists

Charge Flow lower than charge flow command when the monitor is enabled .

Monitor Operation:	
DTC	520701.31-SE7988
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate.
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Engine is not in run state.
VGT driver failure (See RefCond10009.)
168.17-SE4367, 27.2-SE3633, 27.2-SE3634, 27.2-SE3635, 27.4-SE1796, 2791.13-SE7321, 2791.13-SE7322, 2791.15-SE4368, 2791.5-SE1825, 2791.6-SE1826
3464.3-SE2795, 3464.3-SE3989, 3464.4-SE2796, 3464.7-SE4720, 51.2-SE4014, 51.2-SE4015, 51.3-SE3530, 51.4-SE3529
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
171.2-SE3799, 171.2-SE3871, 171.3-SE3802, 171.4-SE3803
The VGT Position is not known to be good. (See RefCond10010.)
The EGR brushless motor valve position is not known to be good. (See RefCond10025.)
The Intake Air Throttle Valve Position is not known to be good. (See RefCond10024.)
Ambient Air Temperature $\leq -6.67^{\circ}\text{C}$
Ambient Air Pressure $\leq 73\text{ kPa(absolute)}$
EGR is Off
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4067, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494
Engine Speed $\leq 1,000\text{ RPM}$
105.2-SE3793, 105.2-SE4067, 105.2-SE4070, 105.3-SE487, 105.4-SE488
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4067, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
Charge Temperature is less than a threshold
EGR Orifice Temperature is less than a threshold
Engine Thermal Management is active

Malfunction Thresholds (all active):
The cumulative sum of condition flag is greater than an allowable threshold within a time window. The condition flag will be 1 when Charge flow is less than Charge flow command by a threshold.

50. 171.2-SE3871: Ambient Air Temperature - Data erratic, intermittent or incorrect

Air Temperature sensor reading is erratic, intermittent or incorrect.

Monitor Operation:	
DTC	171.2-SE3871
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	3 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine off time ≥ 480 min
The temperature drop detected on Coolant Temperature Sensor ≤ 1.2 °C for a time period of 30 seconds after the engine is started up.

Abort Conditions (any active):
171.3-SE3802, 171.4-SE3803
251.10-SE4759
251.10-SE4760

Malfunction Thresholds (all active):
Difference between Air Temperature sensor and the most accurate alternate temperature sensor is greater than the sum of 35 and the tolerance of the most accurate alternate temperature sensor °C
Difference between Air Temperature sensor and the second most accurate alternate temperature sensor is greater than the sum of 35 and the tolerance of the second most accurate alternate temperature sensor °C
Difference between the most accurate alternate temperature sensor and the second most accurate alternate temperature sensor is less than the sum of their tolerances °C
The tolerance of the alternate temperature sensors are:
Compressor Inlet Temperature sensor tolerance = 27 °C
Charge Temperature sensor tolerance = 21 °C
Coolant Temperature sensor tolerance = 20 °C
ECM Internal Temperature sensor tolerance = 210 °C
EGR Orifice Temperature sensor tolerance = 22 °C
Oil Temperature sensor tolerance = 19 °C

51. 108.2-SE4438: Barometric Pressure - Data erratic, intermittent or incorrect

Ambient Air Pressure Sensor reading is erratic, intermittent or incorrect at keyoff.

Monitor Operation:	
DTC	108.2-SE4438
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	5 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine is in stopped state
The time since Key Switch is turned OFF $\geq$ 60 sec

Abort Conditions (any active):
108.3-SE113, 108.4-SE114
Coolant Temperature $\leq$ 70 °C

Malfunction Thresholds (all active):
Air Pressure Sensor reading $<$ 17.13 kPa(absolute)
OR
Air Pressure Sensor reading $>$ 145.19 kPa(absolute)
OR
Ambient Air Pressure sensor and Charge Pressure sensor are the only available pressure sensors and Ambient Air Pressure - Charge Pressure $>$ 21.5 kPa(absolute)
OR
Difference between Ambient Air Pressure and the most accurate alternate pressure sensor is greater than the sum of 3.19 and the tolerance of the most accurate alternate pressure sensor kPa(absolute)
Difference between Ambient Air Pressure and the second most accurate alternate pressure sensor is greater than the sum of 3.19 and the tolerance of the second most accurate alternate pressure sensor. kPa(absolute)
Difference between the most accurate alternate pressure sensor and the second most accurate alternate pressure sensor is less than the sum of their tolerances kPa(absolute)
The tolerance of the alternate pressure sensors are:
Charge Pressure sensor tolerance = 18.31 kPa(absolute)
EGR Orifice Pressure sensor tolerance = 27.59 kPa(absolute)
Exhaust Pressure sensor tolerance = 27.69 kPa(absolute)
Oil Pressure sensor tolerance = 40.5 kPa(absolute)

52. 101.2-SE3665: Crankcase Pressure - Data erratic, intermittent or incorrect

Crankcase Pressure (CCP) sensor is stuck in range.

Monitor Operation:	
DTC	101.2-SE3665
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	120 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine RPM > 0 RPM
101.2-SE2086
101.3-SE1422, 101.4-SE1424
The engine has operated both under High Power and Low Power conditions.
High Power Condition:[Engine Torque (Nm) >= 1,850 Nm and Engine Speed (RPM) >= 0 RPM and Boost Pressure (kPa (Gage)) >=190 kPa (Gage) for 10 sec] .
Low Power Condition:[Engine Torque (Nm) <= 150 Nm and Engine Speed (RPM) <= 5,000 RPM and Boost Pressure (kPa (Gage)) <=50 kPa (Gage) for atleast 10 (sec)].
Coolant Temperature is > 70 deg C for 300 seconds.

Abort Conditions (any active):
Engine RPM = 0 RPM
101.3-SE1422, 101.4-SE1424
101.2-SE2086

Pause Conditions (any active):
Coolant Temperature is < 70 deg C .

Malfunction Thresholds (all active):
Difference between observed minimum and maximum Crankcase Pressure values is less than 0.169 kPa(gauge) at least 6 (counts) number of times.

53. 101.2-SE7312: Crankcase Pressure - Data erratic, intermittent or incorrect

Crankcase Pressure breather filter is missing.

Monitor Operation:	
DTC	101.2-SE7312
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	20 seconds for the lower boost bucket OR 20 seconds for the higher boost bucket
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):	
101.3-SE1422, 101.4-SE1424	
Engine speed > 1,600 RPM AND Engine Speed <4,000 RPM	
Boost Pressure lies within the following ranges [120, 160]kPa(gage) OR [180, 500]kPa(gage)	
VGT Position < 100 %	
Coolant Temperature should be >= 71.109 (Deg C) for 300 (sec)	

Abort Conditions (any active):	
101.3-SE1422, 101.4-SE1424	

Pause Conditions (any active):	
Engine speed < 1,600 RPM OR Engine Speed >4,000 RPM	
Boost Pressure does not lie within [120, 160] kPa(gage) AND [180, 500] kPa(gage)	
VGT Position ≥ 100 %	
Coolant Temperature < 71.109 (Deg C)	

Malfunction Thresholds (all active):	
Average Crankcase Pressure is less than 0.26 kPa(gage), in the lower boost bucket, where the lower boost bucket is defined as the engine's boost pressure within the range of 120 to 160 kPa(gauge)	
OR	
Average Crankcase Pressure is less than 0.45 kPa(gage), in the higher boost bucket, where the higher boost bucket is defined as the engine's boost pressure within the range of 180 to 500 kPa(gauge)	

54. 102.2-SE4439: Intake Manifold 1 Pressure - Data erratic, intermittent or incorrect

Charge Pressure Sensor reading is erratic, intermittent or incorrect at keyoff.

Monitor Operation:	
DTC	102.2-SE4439
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	5 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine is in stopped state
The time since Key Switch is turned OFF $\geq$ 60 sec

Abort Conditions (any active):
102.3-SE489, 102.4-SE490
Coolant Temperature $\leq$ 70 °C

Malfunction Thresholds (all active):
Charge Pressure Sensor reading $<$ 17.13 kPa(absolute)
OR
Charge Pressure Sensor reading $>$ 145.19 kPa(absolute)
OR
Difference between Charge Pressure and the most accurate alternate pressure sensor is greater than the sum of 18.31 and the tolerance of the most accurate alternate pressure sensor kPa(absolute)
Difference between Charge Pressure and the second most accurate alternate pressure sensor is greater than the sum of 18.31 and the tolerance of the second most accurate alternate pressure sensor. kPa(absolute)
Difference between the most accurate alternate pressure sensor and the second most accurate alternate pressure sensor is less than the sum of their tolerances kPa(absolute)
The tolerance of the alternate pressure sensors are:
Ambient Air Pressure sensor tolerance = 3.19 kPa(absolute)
EGR Orifice Pressure sensor tolerance = 27.59 kPa(absolute)
Exhaust Pressure sensor tolerance = 27.69 kPa(absolute)
Oil Pressure sensor tolerance = 40.5 kPa(absolute)

55. 105.2-SE3793: Intake Manifold 1 Temperature - Data erratic, intermittent or incorrect

Charge Temperature sensor reading is erratic, intermittent or incorrect.

Monitor Operation:	
DTC	105.2-SE3793
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	3 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine off time ≥ 480 min
The temperature drop detected on Coolant Temperature Sensor ≤ 1.2 °C for a time period of 30 seconds after the engine is started up.

Abort Conditions (any active):
105.3-SE487, 105.4-SE488
251.10-SE4759
251.10-SE4760

Malfunction Thresholds (all active):
Difference between Charge Temperature sensor and the most accurate alternate temperature sensor is greater than the sum of 21 and the tolerance of the most accurate alternate temperature sensor °C
Difference between Charge Temperature sensor and the second most accurate alternate temperature sensor is greater than the sum of 21 and the tolerance of the second most accurate alternate temperature sensor °C
Difference between the most accurate alternate temperature sensor and the second most accurate alternate temperature sensor is less than the sum of their tolerances °C
The tolerance of the alternate temperature sensors are:
Compressor Inlet Temperature sensor tolerance = 27 °C
Air Temperature sensor tolerance = 35 °C
Coolant Temperature sensor tolerance = 20 °C
ECM Internal Temperature sensor tolerance = 210 °C
EGR Orifice Temperature sensor tolerance = 22 °C
Oil Temperature sensor tolerance = 19 °C

56. 110.3-SE75: Engine Coolant Temperature 1 Sensor Circuit - Voltage above normal, or shorted to high source

Coolant Temperature sensor circuit has its voltage above normal, or shorted to a high source

Monitor Operation:	
DTC	110.3-SE75
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	0.625 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
Coolant Temperature Sensor Value > 4.956 V (<-40 Deg C)	

57. 110.4-SE76: Engine Coolant Temperature 1 Sensor Circuit - Voltage below normal, or shorted to low source

Coolant Temperature Circuit has its voltage below normal, or is shorted to a low source.

Monitor Operation:	
DTC	110.4-SE76
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	0.625 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
Coolant Temperature Sensor Value < 0.108 V (>140 Deg C)	

58. 110.2-SE3669: Engine Coolant Temperature - Data erratic, intermittent or incorrect

Coolant Temperature Stuck In Range Error

Monitor Operation:	
DTC	110.2-SE3669
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	300 counts
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine Is Running

Pause Conditions (any active):
110.4-SE76
110.3-SE75
110.2-SE3805
110.2-SE3668
Coolant Temperature ≥ 71.109 AND Net Engine Torque ≥ 250 AND Net Engine Torque ≤ 450
Coolant Temperature < 71.109 AND Net Engine Torque ≥ 250 AND Net Engine Torque ≤ 450

Malfunction Thresholds (all active):
Coolant Temperature delta < 0.5 degrees C for 300 counts

59. 3060.18-SE3190: Engine Cooling System Monitor - Data Valid But Below Normal Operating Range - Moderately Severe Level

Engine not warming up

Monitor Operation:	
DTC	3060.18-SE3190
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Variable based on Operating Conditions, but not more than RefTable7 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):	
Engine RPM > 300 RPM	
Coolant Temperature at engine startup < 51.664 °C	
Time Elapsed Since Engine Start ≥ 10 sec	

Abort Conditions (any active):	
Engine RPM < 300 RPM	
105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 110.2-SE3668, 110.2-SE3669, 110.2-SE3805, 110.3-SE75, 110.4-SE76	
Elapsed Time that this monitor has been running ≥ RefTable7 sec	
Coolant Temperature ≤ -6.664 °C	
PTO Status = INACTIVE	

Pause Conditions (any active):	
Engine Idle Time > 50 %	

Malfunction Thresholds (all active):	
Predicted Coolant Temperature > 71.109 °C	

60. 412.2-SE3872: Exhaust Gas Recirculation Temperature - Data erratic, intermittent or incorrect

EGR Orifice Temperature sensor reading is erratic, intermittent or incorrect.

Monitor Operation:	
DTC	412.2-SE3872
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	3 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine off time ≥ 480 min
The temperature drop detected on Coolant Temperature Sensor ≤ 1.2 °C for a time period of 30 seconds after the engine is started up.

Abort Conditions (any active):
412.3-SE496, 412.4-SE495
251.10-SE4759
251.10-SE4760

Malfunction Thresholds (all active):
Difference between EGR Orifice Temperature sensor and the most accurate alternate temperature sensor is greater than the sum of 22 and the tolerance of the most accurate alternate temperature sensor °C
Difference between EGR Orifice Temperature sensor and the second most accurate alternate temperature sensor is greater than the sum of 22 and the tolerance of the second most accurate alternate temperature sensor °C
Difference between the most accurate alternate temperature sensor and the second most accurate alternate temperature sensor is less than the sum of their tolerances °C
The tolerance of the alternate temperature sensors are:
Compressor Inlet Temperature sensor tolerance = 27 °C
Charge Temperature sensor tolerance = 21 °C
Coolant Temperature sensor tolerance = 20 °C
ECM Internal Temperature sensor tolerance = 210 °C
Oil Temperature sensor tolerance = 19 °C
Air Temperature sensor tolerance = 35 °C

61. 1209.2-SE4442: Exhaust Gas Pressure 1 - Data erratic, intermittent or incorrect

Exhaust Pressure Sensor reading is erratic, intermittent or incorrect at keyoff.

Monitor Operation:	
DTC	1209.2-SE4442
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	5 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine is in stopped state
The time since Key Switch is turned OFF $\geq$ 60 sec

Abort Conditions (any active):
1209.3-SE493, 1209.4-SE494
Coolant Temperature $\leq$ 70 °C

Malfunction Thresholds (all active):
Exhaust Pressure Sensor reading $<$ 17.13 kPa(absolute)
OR
Exhaust Pressure Sensor reading $>$ 145.19 kPa(absolute)
OR
Difference between Exhaust Pressure and the most accurate alternate pressure sensor is greater than the sum of 27.69 and the tolerance of the most accurate alternate pressure sensor kPa(absolute)
Difference between Exhaust Pressure and the second most accurate alternate pressure sensor is greater than the sum of 27.69 and the tolerance of the second most accurate alternate pressure sensor. kPa(absolute)
Difference between the most accurate alternate pressure sensor and the second most accurate alternate pressure sensor is less than the sum of their tolerances kPa(absolute)
The tolerance of the alternate pressure sensors are:
Ambient Air Pressure sensor tolerance = 3.19 kPa(absolute)
Charge Pressure sensor tolerance = 18.31 kPa(absolute)
EGR Orifice Pressure sensor tolerance = 27.59 kPa(absolute)
Oil Pressure sensor tolerance = 40.5 kPa(absolute)

62. 2791.15-SE4368: EGR Valve Control Circuit Over Temperature - Data Valid But Above Normal Operating Range - Least Severe Level

Inside the ECM, the temperature of the chip that drives the EGR brushless motor device reports when it is too hot.

Monitor Operation:	
DTC	2791.15-SE4368
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	4.25 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
Sensed temperature for internal EGR driver chip is approximately greater than 150 °C	

63. 2791.5-SE1825: EGR Valve Control Circuit - Current below normal or open circuit

The ECM EGR brushless motor driver internally detects an open circuit condition existing for a calibratable time.

Monitor Operation:	
DTC	2791.5-SE1825
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	3.3 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):

The EGR driver commanded duty cycle > 30 %

Malfunction Thresholds (all active):

The ECM has detected the current through the EGR device driver circuitry is < 1.2 A

64. 168.17-SE4367: Battery 1 Voltage - Data Valid But Below Normal Operating Range - Least Severe Level

The ECM EGR brushless motor driver internally detects a low voltage condition.

+Monitor Operation:	
DTC	168.17-SE4367
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	3.2 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
Sensed voltage for EGR driver chip < 9 V	

65. 2791.6-SE1826: EGR Valve Control Circuit - Current above normal or grounded circuit

The ECM EGR brushless motor driver internally detects a short circuit condition existing for a calibratable time.

Monitor Operation:	
DTC	2791.6-SE1826
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	3.3 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
Sensed current for EGR driver chip > 12 A	

66. 2791.13-SE7321: EGR Valve Controller - Out of Calibration

If the zero position of the EGR actuator is greater than the specified upper limit, the EGR valve is considered failed.

Monitor Operation:	
DTC	2791.13-SE7321
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	3.38 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):	
EGR Temperature is valid and $> 0^{\circ}\text{C}$.	
OR	
EGR valve has been commanded to actuate.	

Abort Conditions (any active):	
The ECM has detected an electrical issue with the EGR device. It may not have matured into a fault. (See RefCond20015.)	
27.4-SE1796	
Engine is not in the run state or stopped state.	
Battery voltage $\leq 8\text{ V}$	

Malfunction Thresholds (all active):	
Zero position of EGR actuator $> 4.99\text{ mm}$	

67. RefCond20015: The ECM has detected an electrical issue with the EGR device. It may not have matured into a fault.

The ECM has detected an electrical issue with the EGR device. It may not have matured into a fault.

Conditions (all active):
Driver chip sensed temperature > 150 °C
OR
Valve driver chip current < 1.2 A while commanded duty cycle is > 30 %.
OR
Driver chip sensed voltage < 9 V
OR
Driver chip sensed current > 12 A

68. 2791.13-SE7322: EGR Valve Controller - Out of Calibration

If the zero position of the EGR actuator is lower than the specified lower limit, the EGR valve is considered failed.

Monitor Operation:	
DTC	2791.13-SE7322
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	3.38 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):	
EGR Temperature is valid and $> 0^{\circ}\text{C}$.	
OR	
EGR valve has been commanded to actuate.	

Abort Conditions (any active):	
The ECM has detected an electrical issue with the EGR device. It may not have matured into a fault. (See RefCond20015.)	
27.4-SE1796	
Engine is not in the run state or stopped state.	
Battery voltage $\leq 8\text{ V}$	

Malfunction Thresholds (all active):	
Zero position of EGR actuator $< 2.00\text{ mm}$	

69. 27.4-SE1796: EGR Valve Position Circuit - Voltage below normal, or shorted to low source

The position feedback for the EGR brushless motor is invalid.

Monitor Operation:	
DTC	27.4-SE1796
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	20 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):

The brushless motor EGR valve has three hall effect sensors which return position feedback information. Each hall effect sensor may have one of two states, "on" or "off," for a combined total of 8 unique combinations, of which six are valid. If all three states are either "on" or "off," the position is considered invalid. Furthermore, the "on" and "off" combinations must proceed from one state to another specific state according to a specific order. If the combined states for the three sensors do not proceed in this order, this also indicates that the position feedback mechanism has failed.

70. 27.2-SE3634: EGR Valve Position - Data erratic, intermittent or incorrect

The EGR position feedback is failed in range.

Monitor Operation:	
DTC	27.2-SE3634
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
The accumulated number of 27.2-SE3634 Failures in this operation cycle does not exceed 1 occurrence.
The engine is running.

Abort Conditions (any active):
A new operation cycle is detected

Pause Conditions (any active):
168.17-SE4367, 2791.15-SE4368, 2791.5-SE1825, 2791.6-SE1826
The ECM has detected an electrical issue with the EGR device. It may not have matured into a fault. (See RefCond20015.)
EGR actuator is not in closed loop control or against a mechanical stop.
EGR span check is in progress.

Malfunction Thresholds (all active):
The cumulative error of the sensor is greater than an allowable threshold within a 15 second window.

71. 3464.3-SE2795: Electronic Throttle Control Actuator Driver Circuit - Voltage above normal, or shorted to high source

The ECM has detected that the Intake Air Throttle actuator voltage is above a set value.

Monitor Operation:	
DTC	3464.3-SE2795
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	8 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
The diagnostics will continue to detect the condition for 10000 times.

Malfunction Thresholds (all active):
During PWM Off-state, if the current rises above the low-side shutdown threshold of 5A, short to battery condition will be detected after 8.0 seconds.

72. 3464.4-SE2796: Electronic Throttle Control Actuator Driver Circuit - Voltage below normal, or shorted to low source

The ECM has detected that the Intake Air Throttle actuator voltage is below a set value.

Monitor Operation:	
DTC	3464.4-SE2796
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	8 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
The diagnostics will continue to detect the condition for 10000 times.

Malfunction Thresholds (all active):
If a high-side switch is turned on and the current rises above the high-side shutdown threshold of 18A, short to ground condition will be detected after 8.0 seconds.

73. 3464.3-SE3989: Electronic Throttle Control Actuator Driver Circuit - Voltage above normal, or shorted to high source

The electrical characteristics on either side of the Intake Air Throttle motor driver are evaluated to detect an open load condition.

Monitor Operation:	
DTC	3464.3-SE3989
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	8 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):

The diagnostics will continue to detect the condition for 10000 times.

Malfunction Thresholds (all active):

During PWM On-state, if the current through the low side transistor is lower than the referenced current, which ranges from 40 to 150 mA, open load condition will be detected after 8.0 seconds.

74. 51.2-SE4014: Engine Intake Throttle Actuator Position Sensor - Data erratic, intermittent or incorrect

The Intake Air Throttle valve position feedback value is In Range, High.

Monitor Operation:	
DTC	51.2-SE4014
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):

The accumulated number of 51.2-SE4015 and 51.2-SE4014 Failures in this operation cycle does not exceed 3 occurrences.

Abort Conditions (any active):

A new operation cycle is detected.

Pause Conditions (any active):

Actuator is not in closed loop control or against a mechanical stop.

Auto zero or span check is in progress.

3464.3-SE2795

3464.4-SE2796

3464.3-SE3989

Malfunction Thresholds (all active):

The cumulative high error of the sensor is greater than an allowable threshold within a 15 second window.

75. 51.2-SE4015: Engine Intake Throttle Actuator Position Sensor - Data erratic, intermittent or incorrect

The Intake Air Throttle valve position feedback value is In Range, Low.

Monitor Operation:	
DTC	51.2-SE4015
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
The accumulated number of 51.2-SE4015 and 51.2-SE4014 Failures in this operation cycle does not exceed 3 occurrences.

Abort Conditions (any active):
A new operation cycle is detected

Pause Conditions (any active):
Actuator is not in closed loop control or against a mechanical stop.
Auto zero or span check is in progress.
3464.3-SE2795
3464.4-SE2796
3464.3-SE3989

Malfunction Thresholds (all active):
The cumulative low error of the sensor is greater than an allowable threshold within a 15 second window.

76. 51.3-SE3530: Engine Intake Throttle Actuator Position Sensor Circuit - Voltage above normal, or shorted to high source

Intake Air Throttle valve position is greater than specified operating range for a calibrated amount of time.

Monitor Operation:	
DTC	51.3-SE3530
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	1.5 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):
Measured Intake Air Throttle Valve Position > 4.887 V (111.227 %)

77. 51.4-SE3529: Engine Intake Throttle Actuator Position Sensor Circuit - Voltage below normal, or shorted to low source

Intake Air Throttle valve position is less than specified operating range for a calibrated amount of time.

Monitor Operation:	
DTC	51.4-SE3529
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	1.5 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):
Measured Intake Air Throttle Valve Position < 0.122 V (0 %)

78. 641.7-SE1606: VGT Actuator Driver Circuit (Motor) - Mechanical system not responding or out of adjustment

The turbocharger smart device actuator has determined itself to be incapable of meeting its desired position.

Monitor Operation:	
DTC	641.7-SE1606
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):	
The turbocharger smart device's commanded position is changing at a stable rate.	
The engine conditions must be appropriate to avoid a false detect of a stuck actuator. (See RefCond20100.)	

Malfunction Thresholds (all active):	
The difference between the turbocharger smart device's received commanded position and its internally measured position is greater than an allowable threshold for 1.5 seconds.	

79. RefCond20100: Slow Actuator Response: The engine conditions must be appropriate to avoid a false detect of a stuck actuator.

The engine conditions must be appropriate to avoid a false detect of a stuck actuator.

Conditions (all active):	
The Engine is Running.	
The engine is NOT in PM filter regeneration.	
ONE of the two following conditions is TRUE:	
Retarder is engaged OR vehicle speed has NOT been ≥ 3.107 mph OR vehicle speed has been ≥ 3.107 mph for more than 300 seconds.	
OR	
The engine is not meeting its intake charge flow for more than 3 seconds.	

80. 641.11-SE1627: VGT Actuator Driver Circuit - Root Cause Not Known

The turbocharger smart device actuator has not received a command message from the controlling ECM for a calibrated period.

Monitor Operation:	
DTC	641.11-SE1627
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):	
The turbocharger smart device is performing a self calibration - checking for span and end points.	

Malfunction Thresholds (all active):	
The turbocharger smart device has not received a position command message for greater than or equal to a calibrated time after previously having received a command message for 4.075 seconds.	
OR	
The turbocharger smart device has not received a message from the ECM for 12 seconds.	

81. 641.12-SE1604: VGT Actuator Controller - Bad intelligent device or component

The turbocharger smart device has detected an internal error which will prevent it from functioning normally.

Monitor Operation:	
DTC	641.12-SE1604
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	1 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):

The turbocharger smart device has detected an internal error which will prevent it from functioning normally. (See RefCond20110.)

82. RefCond20110: The turbocharger smart device has detected an internal error which will prevent it from functioning normally.

The turbocharger smart device has detected an internal error which will prevent it from functioning normally.

Conditions (all active):
The turbocharger smart device detects any of the conditions:
Invalid Hall Effect sensor state or sequence. Three Hall Effect sensors are used, and are expected to move within a known series of valid sequences. Valid Hall Effect sensors may not report HHH or LLL (all high or all low). If either the state or the sequence is invalid, the error condition is active
OR
The measured motor current indicates a short circuit condition within driver circuit.
OR
Invalid position calibration data detected during the turbocharger smart device initialization.
OR
Microprocessor internal error - the turbocharger smart device has detected an internal error such as an invalid ROM checksum, Watchdog Reset, or other similar error relating to a failed CPU or module.
OR
Severe over-temperature indicated within the turbocharger smart device Motor Driver Circuit. The turbocharger smart device has been disabled for a condition representing eminent hardware physical shutdown.

83. 641.13-SE1605: VGT Actuator Controller - Out of Calibration

The turbocharger smart device position sensing or physical endstops were not detected during initialization procedure, or the turbocharger smart device indicates it is in a condition without known calibration data.

Monitor Operation:	
DTC	641.13-SE1605
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	1 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):
The turbocharger smart device has not detected a physical stop during the powerup process. (See RefCond20112.)
OR
The VGT device reports that it is in a state with no known calibration data.
OR
The VGT device reports that it is in the process of doing an installation.

84. RefCond20112: The turbocharger smart device has not detected a physical stop during the powerup process.

The turbocharger smart device has not detected a physical stop during the powerup process.

Conditions (all active):
The turbocharger smart device detected a motor movement of > 239.5 degrees without detecting the physical travel limits.
OR
The turbocharger smart device detected a calibrated span of < 30 degrees or span of > 200 degrees.

85. 102.10-SE5043: Intake Manifold 1 Pressure - Abnormal rate of change

The VGT position feedback is failed in range.

Monitor Operation:	
DTC	102.10-SE5043
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Number of in range turbocharger failures this drive cycle < 3.
Turbocharger not failed (except for in-range failures as described by other enable condition)
Turbocharger smart device is in closed loop control state.
The engine is running.
The engine conditions must be appropriate to avoid a false detect of a stuck actuator. (See RefCond20115.)
Coolant Temperature > -10 deg C

Malfunction Thresholds (all active):
The cumulative error of the sensor is greater than an allowable threshold within a 30 second window.

86. RefCond20115: The engine conditions must be appropriate to avoid a false detect of a stuck actuator.

The engine conditions must be appropriate to avoid a false detect of a stuck actuator.

Conditions (all active):
The Engine is Running.
The engine is NOT in PM filter regeneration.
One of the two following conditions is TRUE:
Retarder is engaged OR vehicle speed has NOT been ≥ 3.107 mph OR vehicle speed has been ≥ 3.107 mph for more than 300 seconds
OR
The engine is not meeting its intake charge flow for more than 3 seconds.

87. 3597.4-SE1602: ECU Power Output Supply Voltage 1 - Voltage below normal, or shorted to low source

The ECM has detected the voltage to the turbocharger smart device is less than an allowable value.

Monitor Operation:	
DTC	3597.4-SE1602
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	6 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):
The power supply to the turbocharger smart device is < 6.7 V.

88. 3597.18-SE1626: ECU Power Output Supply Voltage 1 - Data Valid But Below Normal Operating Range - Moderately Severe Level

The turbocharger smart device has detected a low voltage condition.

Monitor Operation:	
DTC	3597.18-SE1626
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	30 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
The turbocharger smart device is operable and in communication with the ECM.
Engine Speed >= 575 RPM

Malfunction Thresholds (all active):
The turbocharger smart device voltage is < 9 V for > 10 seconds.

89. 3216.2-SE5368: Aftertreatment 1 Intake NOx Sensor - Data erratic, intermittent or incorrect

Engine out NOx sensor reading is in range high during non motoring conditions

Monitor Operation:	
DTC	3216.2-SE5368
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Engine is in Protection state
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
Compressor Inlet Density ≤ 0.85 kg/m ³
Compressor Inlet Density ≥ 1.5 kg/m ³
Ambient Air Temperature ≥ 200 °C
Ambient Air Temperature ≤ -6.67 °C
Engine Speed $\geq 2,500$ RPM
Engine Speed ≤ 900 RPM
Net Engine Torque > RefTable18
Net Engine Torque < RefTable19
Engine is in Thermal Management state
Engine doesn't run in Alpha 1 control mode
EGR Fraction ≤ 0.05
EGR Fraction ≥ 0.8
Fueling change rate > 50 mg/stroke/sec
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
Duration for which the pause conditions are FALSE < 25 sec
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
Aftertreatment Inlet NOx sensor reading is not valid due to the internal control loops within the

sensor being unstable, or active faults detected by the sensor, or the sensor's battery supply voltage is outside the desired range or dewpoint temperature has not been met or dewpoint temperature has been met for less than a light off time. (See RefCond20042.)

Malfunction Thresholds (all active):

Cumulative sum of the ratio of (Measured Value - Estimated Value) to a Threshold in 300 seconds is ever $\geq 1,450$, which is equivalent to $[\text{Average of ratio} - \text{Tolerance}] \geq 0.967$. where, Tolerance is defined as: 0, Threshold is defined as: $\max(1\text{ppm}, 1 * \text{Estimated Value})$.

90. 5298.18-SE4719: Aftertreatment 1 Diesel Oxidation Catalyst Conversion Efficiency - Data Valid But Below Normal Operating Range - Moderately Severe Level

Decrease in the NMHC conversion capability of the DOC that would cause tailpipe out NMHC emissions to exceed the applicable OBD threshold.

Monitor Operation:	
DTC	5298.18-SE4719
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	420 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Conditions that enable the calculation of conversion efficiency of a oxidation catalyst. (See RefCond20008.)

Abort Conditions (any active):
System errors that could abort the calculation of conversion efficiency of a oxidation catalyst. (See RefCond20009.)
The percentage of time when the DOC inlet temperature is > 250 °C is < 60 %.

Pause Conditions (any active):
Conditions that pause the calculation of conversion efficiency of a oxidation catalyst. (See RefCond20010.)

Malfunction Thresholds (all active):
Filtered value of HC dosing efficiency < 53 %, where HC dosing efficiency is defined as DOC Heat / DOC Dosing Heat

91. 3936.16-SE4758: Aftertreatment 1 Diesel Particulate Filter System - Data Valid But Above Normal Operating Range - Moderately Severe Level

The system has detected a malfunction in the filtering capability of the DPF.

Monitor Operation:	
DTC	3936.16-SE4758
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	50 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
3242.15-SE1759
3242.0-SE3591
Active regeneration of DPF not disabled due to Active errors within the SCR system that will disable active/intrusive injection of HC's into the exhaust in order to protect the SCR system (See RefCond20012.)
3246.0-SE3592
4795.31-SE1752
3246.15-SE1754
3251.0-SE2097
5319.31-SE3036
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3251.3-SE2849, 3251.4-SE2857
3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883
DPF Inlet temperature < 900 °C
(Elapsed time since last active regeneration > 30 sec) AND (exhaust flow rate > 0.2 m3/sec)
Elapsed time since last active regeneration > 1,200 sec
(0.2m3/sec) < Exhaust flow < (1 m3/sec)
The system detects that the DPF is no longer new, or "green". New DPF temporarily exhibits high backpressure during their first hours of use which can lead to a false high estimation of soot load. (See

RefCond20013.)
Ambient Air pressure $\geq$ 75 kPa(absolute)
5319.31-SE3036
5298.18-SE4719

Abort Conditions (any active):
3242.15-SE1759
3242.0-SE3591
Active errors within the SCR system that will disable active/intrusive injection of HC's into the exhaust in order to protect the SCR system (See RefCond20012.)
3246.0-SE3592
4795.31-SE1752
3246.15-SE1754
3251.0-SE2097
5319.31-SE3036
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3251.3-SE2849, 3251.4-SE2857
3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883
Elapsed time since last active regeneration > 2,400 sec
DPF Inlet temperature > 900 °C
The system considers that the DPF is new, or "green". New DPF temporarily exhibits high backpressure during their first hours of use which can lead to a false high estimation of soot load. (See RefCond20014.)
Ambient Air pressure < 75 kPa(absolute)
5319.31-SE3036
5298.18-SE4719

Pause Conditions (any active):
Exhaust flow < (0.2 m3/sec) OR Exhaust flow > (1 m3/sec)

Malfunction Thresholds (all active):

Mean of the DPF flow resistance during a period of time after successful active regeneration ≤ 7
kPa/m³/sec

92. 5319.31-SE3036: Aftertreatment Diesel Particulate Filter Incomplete Regeneration - Condition Exists

System has detected incomplete regeneration of aftertreatment DPF

Monitor Operation:	
DTC	5319.31-SE3036
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3251.3-SE2849, 3251.4-SE2857
3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883
Active regeneration of the DPF is requested
The system detects that the DPF is no longer new, or "green". New DPF temporarily exhibits high backpressure during their first hours of use which can lead to a false high estimation of soot load. (See RefCond20013.)

Abort Conditions (any active):
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721,

5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3251.3-SE2849, 3251.4-SE2857
3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883
Time in active regeneration < 300 seconds, AND percentage of time during the active regeneration when the DPF inlet temperature within 100 degC of target temperature < 40 %
The time period during active regeneration that DPF volumetric flow rate is > 0.18 m3/sec is less than 10 seconds.
At the end of the active regeneration, the Diagnostic Model Based Soot Load Estimate > 3 g/L
The system considers that the DPF is new, or "green". New DPF temporarily exhibits high backpressure during their first hours of use which can lead to a false high estimation of soot load. (See RefCond20014.)

Malfunction Thresholds (all active):
DPF differential pressure based soot load estimate > RefTable11
Immediately after the end of active DPF regeneration in which no abort conditions occurred

93. 3251.0-SE2097: Aftertreatment Diesel Particulate Filter Differential Pressure - Data valid but above normal operational range - Most Severe Level

Aftertreatment DPF Soot Load Estimate has increased above the Most Severe Level

Monitor Operation:	
DTC	3251.0-SE2097
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately after malfunction criteria is met
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
Soot Load Estimate > 9 g/L	

94. 5397.31-SE3590: Aftertreatment Diesel Particulate Filter Regeneration too Frequent - Condition Exists

Aftertreatment DPF system active regeneration occurring more frequently than intended.

Monitor Operation:	
DTC	5397.31-SE3590
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine speed > 50 RPM
5298.18-SE4719
3242.15-SE1759
3242.0-SE3591
4765.16-SE3068
3242.16-SE3069
3242.16-SE3070
5298.17-SE3545
Active regeneration of DPF not disabled due to Active errors within the SCR system that will disable active/intrusive injection of HC's into the exhaust in order to protect the SCR system (See RefCond20012.)
3246.0-SE3592
3246.15-SE1754
3246.16-SE3071
3246.16-SE3072
3251.0-SE2097
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114

190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3251.3-SE2849, 3251.4-SE2857
3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
3597.2-SE294
The system detects that the DPF is no longer new, or "green". New DPF temporarily exhibits high backpressure during their first hours of use which can lead to a false high estimation of soot load. (See RefCond20013.)

Abort Conditions (any active):
5298.18-SE4719
3242.15-SE1759
3242.0-SE3591
4765.16-SE3068
3242.16-SE3069
3242.16-SE3070
5298.17-SE3545
Active errors within the SCR system that will disable active/intrusive injection of HC's into the exhaust in order to protect the SCR system (See RefCond20012.)
3246.0-SE3592
3246.15-SE1754
3246.16-SE3071
3246.16-SE3072
3251.0-SE2097
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070,

105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3251.3-SE2849, 3251.4-SE2857
3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
3597.2-SE294
The system considers that the DPF is new, or "green". New DPF temporarily exhibits high backpressure during their first hours of use which can lead to a false high estimation of soot load. (See RefCond20014.)

Pause Conditions (any active):

Engine speed < 50 RPM

Malfunction Thresholds (all active):

Elapsed time since the last active regeneration of the DPF completed and the next active regeneration is requested < RefTable14 hr

Number of failed decisions out of 3 updates made >=2

95. 4765.3-SE6729: Aftertreatment 1 Diesel Oxidation Catalyst Intake Temperature Sensor Circuit - Voltage above normal, or shorted to high source

The Smart Exhaust Gas Temperature Module has detected a sensor short to battery or open circuit condition that causes too high of an input voltage condition in the intake DOC thermocouple sensor circuit.

Monitor Operation:	
DTC	4765.3-SE6729
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	4.2 sec
MIL Activation Criteria	OBD_SOLID

Abort Conditions (any active):
5742.9-SE6686, 5742.9-SE6687

Malfunction Thresholds (all active):
Aftertreatment intake DOC gas temperature sensor input voltage ≥ 5 V
OR intake DOC gas temperature thermocouple impedance ≥ 10 Ohms

96. 4765.4-SE6730: Aftertreatment 1 Diesel Oxidation Catalyst Intake Temperature Sensor Circuit - Voltage below normal, or shorted to low source

The Smart Exhaust Gas Temperature Module has detected a sensor short to ground that causes too low of an input voltage condition in the intake DOC thermocouple sensor circuit.

Monitor Operation:	
DTC	4765.4-SE6730
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	4.2 sec
MIL Activation Criteria	OBD_SOLID

Abort Conditions (any active):
5742.9-SE6686, 5742.9-SE6687

Malfunction Thresholds (all active):
Aftertreatment intake DOC gas temperature sensor input voltage ≤ 1 V

97. 3242.3-SE6731: Aftertreatment 1 Diesel Particulate Filter Intake Temperature Sensor Circuit - Voltage above normal, or shorted to high source

The Smart Exhaust Gas Temperature Module has detected a sensor short to battery or open circuit condition that causes too high of an input voltage condition in the outlet DOC thermocouple sensor circuit.

Monitor Operation:	
DTC	3242.3-SE6731
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	4.2 sec
MIL Activation Criteria	OBD_SOLID

Abort Conditions (any active):
5742.9-SE6686, 5742.9-SE6687

Malfunction Thresholds (all active):
Aftertreatment outlet DOC gas temperature sensor input voltage ≥ 5 V
OR outlet DOC gas temperature thermocouple impedance ≥ 10 Ohms

98. 3242.4-SE6732: Aftertreatment 1 Diesel Particulate Filter Intake Temperature Sensor Circuit - Voltage below normal, or shorted to low source

The Smart Exhaust Gas Temperature Module has detected a sensor short to ground that causes too low of an input voltage condition in the outlet DOC thermocouple sensor circuit.

Monitor Operation:	
DTC	3242.4-SE6732
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	4.2 sec
MIL Activation Criteria	OBD_SOLID

Abort Conditions (any active):
5742.9-SE6686, 5742.9-SE6687

Malfunction Thresholds (all active):
Aftertreatment outlet DOC gas temperature sensor input voltage ≤ 1 V

99. 3246.3-SE6733: Aftertreatment 1 Diesel Particulate Filter Outlet Temperature Sensor Circuit - Voltage above normal, or shorted to high source

The Smart Exhaust Gas Temperature Module has detected a sensor short to battery or open circuit condition that causes too high of an input voltage condition in the outlet DPF thermocouple sensor circuit.

Monitor Operation:	
DTC	3246.3-SE6733
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	4.2 sec
MIL Activation Criteria	OBD_SOLID

Abort Conditions (any active):
5742.9-SE6686, 5742.9-SE6687

Malfunction Thresholds (all active):
Aftertreatment outlet DPF gas temperature sensor input voltage ≥ 5 V
OR outlet DPF gas temperature thermocouple impedance ≥ 10 Ohms

100. 3246.4-SE6734: Aftertreatment 1 Diesel Particulate Filter Outlet Temperature Sensor Circuit - Voltage below normal, or shorted to low source

The Smart Exhaust Gas Temperature Module has detected a sensor short to ground that causes too low of an input voltage condition in the outlet DPF thermocouple sensor circuit.

Monitor Operation:	
DTC	3246.4-SE6734
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	4.2 sec
MIL Activation Criteria	OBD_SOLID

Abort Conditions (any active):
5742.9-SE6686, 5742.9-SE6687

Malfunction Thresholds (all active):
Aftertreatment outlet DPF gas temperature sensor input voltage ≤ 1 V

101. 4363.3-SE6762: Aftertreatment 1 SCR Outlet Temperature Sensor Circuit - Voltage above normal, or shorted to high source

The Smart Exhaust Gas Temperature Module has detected a sensor short to battery or open circuit condition that causes too high of an input voltage condition in the outlet SCR thermocouple sensor circuit.

Monitor Operation:	
DTC	4363.3-SE6762
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	3.8 sec
MIL Activation Criteria	OBD_SOLID

Abort Conditions (any active):
5743.9-SE6683, 5743.9-SE6685

Malfunction Thresholds (all active):
Aftertreatment outlet SCR gas temperature sensor input voltage ≥ 5 V
OR outlet SCR gas temperature thermocouple impedance ≥ 10 Ohms

102. 4363.4-SE6763: Aftertreatment 1 SCR Outlet Temperature Sensor Circuit - Voltage below normal, or shorted to low source

The Smart Exhaust Gas Temperature Module has detected a sensor short to ground condition that causes too low of an input voltage condition in the outlet SCR thermocouple sensor circuit.

Monitor Operation:	
DTC	4363.4-SE6763
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	3.8 sec
MIL Activation Criteria	OBD_SOLID

Abort Conditions (any active):
5743.9-SE6683, 5743.9-SE6685

Malfunction Thresholds (all active):
Aftertreatment outlet SCR gas temperature sensor input voltage ≤ 1 V

103. 5848.21-SE7632: Aftertreatment 1 SCR Intermediate NH3 - Data not Rational - Drifted Low

The system detects an ammonia sensor in range low error by comparing internal sensor value to a threshold

Monitor Operation:	
DTC	5848.21-SE7632
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	100 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
5848.4-SE6496
5848.4-SE6497
5848.4-SE6498
5848.4-SE6493
5848.4-SE6494
5848.4-SE6495
5851.18-SE6500
5851.16-SE6499
5848.13-SE6505
5848.13-SE6506
5848.12-SE6488
5848.4-SE6503
5848.4-SE6504
5848.4-SE6502
5848.4-SE6501
5848.4-SE6489
5848.4-SE6490
5848.4-SE6491
5848.4-SE6492
5851.2-SE6486
5853.10-SE6509
5853.10-SE6508
5853.10-SE6507
5848.10-SE6487
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878

102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5862.2-SE2895, 5862.2-SE6545, 5862.3-SE6760, 5862.4-SE6761
3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3361.2-SE6960, 3361.2-SE6961, 3361.2-SE6962, 3361.2-SE6963, 3361.2-SE6964, 3361.2-SE6965
Ammonia Storage Timer >= 100 sec.

Abort Conditions (any active):
5848.4-SE6496
5848.4-SE6497
5848.4-SE6498
5848.4-SE6493
5848.4-SE6494
5848.4-SE6495
5851.18-SE6500
5851.16-SE6499
5848.13-SE6505
5848.13-SE6506
5848.12-SE6488
5848.4-SE6503
5848.4-SE6504
5848.4-SE6502
5848.4-SE6501
5848.4-SE6489
5848.4-SE6490
5848.4-SE6491
5848.4-SE6492
5851.2-SE6486
5853.10-SE6509
5853.10-SE6508
5853.10-SE6507
5848.10-SE6487
Engine is Not Running. (See RefCond20036.)
NH3 sensor is NOT ready (See RefCond20037.)
Aftertreatment operation mode is NOT base mode

102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5862.2-SE2895, 5862.2-SE6545, 5862.3-SE6760, 5862.4-SE6761
3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3361.2-SE6960, 3361.2-SE6961, 3361.2-SE6962, 3361.2-SE6963, 3361.2-SE6964, 3361.2-SE6965

Pause Conditions (any active):
Exhaust mass flow rate $\geq 0\text{g/sec}$ AND Exhaust mass flow rate $\leq 300\text{g/sec}$
SCR mid bed temperature rate of change $> 0.05\text{degC/sec}$ OR DPF out temperature $>$ SCR mid bed temperature + 30 degC
Rate of change of SCR First Brick Bed Temperature $\leq -0.1\text{ degC/sec}$
Estimated O2 mole fraction in % at SCR Inlet $\geq 10\%$
SCR Mid Bed Controller Feed Forward Reference $< 25\text{ ppm}$

Malfunction Thresholds (all active):
Internal sensor value $\geq -40\text{ mV}$

104. 5848.10-SE6487: Aftertreatment 1 SCR Intermediate NH3 Sensor - Abnormal rate of change

The NH3 (Ammonia) Sensor status is not valid.

Monitor Operation:	
DTC	5848.10-SE6487
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	600 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
The exhaust flow rate and exhaust temperature are within the range for valid NH3 measurement. (See RefCond20032.)
5848.12-SE6488, 5848.13-SE6505, 5848.13-SE6506, 5848.4-SE6489, 5848.4-SE6490, 5848.4-SE6491, 5848.4-SE6492, 5848.4-SE6493, 5848.4-SE6494, 5848.4-SE6495, 5848.4-SE6496, 5848.4-SE6497, 5848.4-SE6498, 5848.4-SE6501, 5848.4-SE6502, 5848.4-SE6503, 5848.4-SE6504, 5848.9-SE6639, 5848.9-SE6640, 5848.9-SE6641, 5851.16-SE6499, 5851.18-SE6500, 5851.2-SE6486, 5853.10-SE6507, 5853.10-SE6508, 5853.10-SE6509
The NH3 sensor finished light off. (See RefCond20038.)
Hydrocarbon dosing rate ≤ 0.2 g/sec
Engine operation mode is Normal Mode or SCR Thermal Management Mode.
3361.2-SE6960, 3361.2-SE6961, 3361.2-SE6962, 3361.2-SE6963, 3361.2-SE6964, 3361.2-SE6965
All the enable conditions are satisfied for 20 seconds.

Abort Conditions (any active):
Any of the enable conditions is not satisfied.

Pause Conditions (any active):
Exhaust flow < 40 g/sec for 5 seconds.
Diesel exhaust fluid injection rate < 0.03 ml/sec for 5 seconds.
The exhaust gas temperature as measured by the sensor closest to the NH3 sensor < 260 °C
The decrease rate of the exhaust gas temperature as measured by the sensor closest to the NH3 sensor < -0.5 DegC/sec for 10 seconds.

Malfunction Thresholds (all active):
The percent of time that the NH3 sensor is in a NH3 Not Valid Condition (See RefCond20039.), within a moving time window of 600 seconds, > 90 %

105. 3226.4-SE5990: Aftertreatment 1 Outlet NOx Sensor Circuit - Voltage below normal, or shorted to low source

The NOx sensor circuitry has detected a failure affecting the aftertreatment outlet NOx sensor's heater circuit.

Monitor Operation:	
DTC	3226.4-SE5990
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 seconds
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):

Processing of fail messages from the sensor enabled 160 seconds after Exhaust gas temperature is above a threshold representing the point at which there is no longer a concern of condensation on the NOx sensor element. (See RefCond20022.)

Abort Conditions (any active):

3226.9-SE2488

Pause Conditions (any active):

Exhaust gas temperature is below dewpoint, which is a threshold representing the point at which there is a concern of condensation on the NOx sensor element. (See RefCond20023.)

Malfunction Thresholds (all active):

[Open H-] The resistance between the sensors heater connection to Ground and a 3rd heater electrode > 1,000,000 ohms for 10 seconds.

or

[Open H+] The resistance between the sensors heater supply and a 3rd heater electrode > 1,000,000 ohms for 10 seconds.

or

[H-/Tmp] The voltage between the 3rd electrode within the sensors internal heater and ground < 0.5 V for 10 seconds.

or

[M2/Tmp] The resistance between the sensors measuring electrode in the 2nd pumping chamber and the 3rd electrode within the sensors internal heater is < 0.5 ohms for 10 seconds.

or

[P-/Tmp] The resistance between the sensors pumping electrode in the 1st pumping chamber and the 3rd electrode within the sensors internal heater is < 0.5 ohms for 10 seconds.

or

[M1/Tmp] The resistance between the sensors pumping electrode in the 2nd pumping chamber and

the 3rd electrode within the sensors internal heater is < 0.5 ohms for 10 seconds.
or
[Ref/Tmp] (The resistance between the sensors air reference electrode and the sensors 3rd electrode within its internal heater is < 0.5 ohms AND the voltage between reference line and ground < 1 V) for 40 seconds.
or
[H+/H-] The resistance between the sensors internal heater supply voltage line and sensor ground is < 0.5 ohms for 10 seconds.
or
[Vbatt/P-] The resistance between supply voltage and the sensors pumping electrode in the 1st pumping chamber is < 0.5 ohms for 10 seconds.
or
[Vbatt/P+] The resistance between supply voltage and the sensors top electrode (directly exposed to exhaust gas) is < 0.5 ohms for 10 seconds.
or
[Vbatt/M1] The resistance between supply voltage and the sensors pumping electrode in the 2nd pumping chamber is < 0.5 ohms for 10 seconds.
or
[H+/Tmp] The voltage between the 3rd electrode within the internal heater and ground < 2.19 V AND the sensors internal heater resistance < 20.97 Ohms for 40 seconds.
or
[Vbatt/M2] The resistance between supply voltage and the sensors measuring electrode in 2nd chamber is < 0.5 ohms for 10 seconds.
or
[P+/Tmp] The resistance between the sensors top electrode (directly exposed to exhaust gas) and the 3rd electrode within the sensors internal heater is < 0.5 ohms for 10 seconds.
or
[Vbatt/Ref] The resistance between supply voltage and the sensors air reference electrode is < 0.5 ohms for 10 seconds.
or
[Vbatt/H+] The resistance between supply voltage and the sensors heater supply is < 0.5 ohms for 10 seconds.
or
[Open Tmp] The resistance between the sensors 3rd electrode within its internal heater is > 1,000,000 ohms for 10 seconds.
or
[M1/M2] 5 mV < the voltage between the measuring electrode in the 2nd chamber with respect to the air reference electrode < 500 mV AND the voltage between the pumping electrode in the 2nd chamber and the air reference electrode = the voltage between the measuring electrode in the 2nd chamber with respect to the air reference electrode for 40 seconds.
or
[Vbatt/Tmp] The voltage at the 3rd electrode within the sensors internal heater > 8 V for 10 seconds.
or
[Open M2] The resistance between the sensors measuring electrode in the 2nd chamber and ground > 0 ohms for 10 seconds.

106. 5031.10-SE5051: Aftertreatment 1 Outlet NOx Sensor Heater - Abnormal rate of change

Aftertreatment outlet NOx sensor heater malfunction.

Monitor Operation:	
DTC	5031.10-SE5051
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Exhaust gas velocity < 60 m/sec
Exhaust gas temperature is above a threshold representing the point at which there is no longer a concern of condensation on the NOx sensor element. (See RefCond20022.)
SCR outlet temperature < 800 °C
4363.2-SE3785, 4363.3-SE6762, 4363.3-SE6765, 4363.4-SE6763, 5742.9-SE6687, 5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5743.9-SE6685, 5862.2-SE2895
3226.13-SE5986, 3226.4-SE5987, 3226.4-SE5990, 3226.9-SE2488, 3228.2-SE5988
Nox sensor battery supply voltage is within the desired range of [10.8, 16.5] V for more than 0.2 seconds.
Key switch is turned ON
NOx Sensor status is not equal to data not available and NOx Sensor status is not equal to no value.

Abort Conditions (any active):
Exhaust gas velocity ≥ 60 m/sec
SCR outlet temperature ≥ 800 °C
4363.2-SE3785, 4363.3-SE6762, 4363.3-SE6765, 4363.4-SE6763, 5742.9-SE6687, 5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5743.9-SE6685, 5862.2-SE2895
3226.13-SE5986, 3226.4-SE5987, 3226.4-SE5990, 3226.9-SE2488, 3228.2-SE5988
Exhaust gas temperature is below dewpoint, which is a threshold representing the point at which there is a concern of condensation on the NOx sensor element. (See RefCond20023.)
Nox sensor battery supply voltage is outside the desired range of [10.8, 16.5] V.
Key switch is turned OFF
NOx Sensor status is data not available or NOx Sensor status has no value.

Malfunction Thresholds (all active):
Time for NOx sensor heater to warm up after enable conditions are satisfied ≥ 120 sec

107. 3226.20-SE5976: Aftertreatment 1 Outlet NOx Sensor - Data not Rational - Drifted High

Aftertreatment outlet NOx sensor in-range but reading inappropriately high.

Monitor Operation:	
DTC	3226.20-SE5976
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	2 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine total fueling ≤ 0.01 mg/stroke
NOx sensor reading is valid since the internal control loops within the sensor have stabilized. (See RefCond20044.)
Engine is operating in base mode.
Exhaust Flow ≥ 10 g/sec
Commanded DEF injection rate < 5 ml/sec
The OBD arbitrator allows the Tail Pipe NOx Sensor gain diagnostics to run.
None of the Abort Conditions are satisfied
The other Enable Conditions must be true for at least 8 seconds
The OBD Arbitrator allows the diagnostic to run.

Abort Conditions (any active):
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
5031.10-SE5051
3228.2-SE5988
3226.4-SE5990
3226.4-SE5987
3228.2-SE6021
3226.13-SE5986
5031.10-SE5982
3226.10-SE5989

Pause Conditions (any active):

If any of the enable conditions are not satisfied.

Estimated SCR catalyst bed temperature rate of change is > RefTable20. Pause condition is active for a minimum cumulative time of 280 seconds. Pause condition is exited if the estimated SCR catalyst bed temperature has decreased by at least 25 °C from its maximum temperature value for a minimum cumulative time of 280 seconds.

Estimated SCR catalyst bed temperature rate of change is > RefTable20. Pause condition is active for a minimum cumulative time of 240 seconds. Pause condition is exited if the estimated SCR catalyst bed temperature rate of change is < RefTable20 for a minimum cumulative time of 240 seconds.

Malfunction Thresholds (all active):

The EWMA filtered value of average NOx sensor offset measurement at the decision point > 40ppm

108. 3226.20-SE5978: Aftertreatment 1 Outlet NOx Sensor - Data not Rational - Drifted High

Aftertreatment outlet NOx sensor in-range but reading inappropriately low.

Monitor Operation:	
DTC	3226.20-SE5978
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	2 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine total fueling ≤ 0.01 mg/stroke
NOx sensor reading is valid since the internal control loops within the sensor have stabilized. (See RefCond20044.)
Engine is operating in base mode.
Exhaust Flow ≥ 10 g/sec
Commanded DEF injection rate < 5 ml/sec
The OBD Arbitrator allows the Tail Pipe NOx Sensor gain diagnostics to run.
None of the Abort Conditions are satisfied
The other Enable Conditions must be true for at least 8 seconds
The OBD Arbitrator allows the diagnostic to run.

Abort Conditions (any active):
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
5031.10-SE5051
3228.2-SE5988
3226.4-SE5990
3226.4-SE5987
3228.2-SE6021
3226.13-SE5986
5031.10-SE5982
3226.10-SE5989

Pause Conditions (any active):

If any of the enable conditions are not satisfied.

Estimated SCR catalyst bed temperature rate of change is > RefTable20. Pause condition is active for a minimum cumulative time of 280 seconds. Pause condition is exited if the estimated SCR catalyst bed temperature has decreased by at least 25 °C from its maximum temperature value for a minimum cumulative time of 280 seconds.

Estimated SCR catalyst bed temperature rate of change is > RefTable20. Pause condition is active for a minimum cumulative time of 240 seconds. Pause condition is exited if the estimated SCR catalyst bed temperature rate of change is < RefTable20 for a minimum cumulative time of 240 seconds.

Malfunction Thresholds (all active):

The EWMA filtered value of average NOx sensor offset measurement at the decision point < -40ppm

109. 3226.10-SE5989: Aftertreatment 1 Outlet NOx Sensor - Abnormal rate of change

Aftertreatment outlet NOx sensor status is not valid for a persistent period of time.

Monitor Operation:	
DTC	3226.10-SE5989
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	70 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine total fueling > 5 AND Rate of active/intrusive injection of HC's in exhaust < 0.2 g/sec for 30 seconds.
3226.4-SE5987, 3226.4-SE5990, 3226.9-SE2488, 3228.2-SE5988
Internal NOx sensor temperature > 800 °C
The changing range of exhaust O2 concentration within a 12 second moving window <= 7
The changing range of exhaust O2 concentration within a 6 second moving window <= 7
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
Exhaust gas temperature is above a threshold representing the point at which there is no longer a concern of condensation on the NOx sensor element. (See RefCond20022.) AND sensor supply power >= 6 V for 150 seconds

Abort Conditions (any active):
3226.4-SE5987, 3226.4-SE5990, 3226.9-SE2488, 3228.2-SE5988
Sensor operating temperature < 800 degC
The changing range of exhaust O2 concentration within a 12 second moving window > 7
The changing range of exhaust O2 concentration within a 6 second moving window > 7
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
Exhaust gas temperature is below dewpoint, which is a threshold representing the point at which there is a concern of condensation on the NOx sensor element. (See RefCond20023.) OR sensor supply power

< 6 V

Pause Conditions (any active):

Engine total fueling ≤ 5 mg/stroke

Rate of active/intrusive injection of HC's in exhaust ≥ 0.2 g/sec
--

Malfunction Thresholds (all active):

Percent of time > 50 % when NOx sensor reading is valid since the internal control loops within the sensor have stabilized. (See RefCond20044.) is invalid
--

110. 3228.2-SE5988: Aftertreatment 1 Outlet NOx Sensor Power Supply - Data erratic, intermittent or incorrect

The aftertreatment outlet NOx sensor circuitry has detected that its battery supply voltage is outside the desired range.

Monitor Operation:	
DTC	3228.2-SE5988
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 seconds
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):

Processing of fail messages from the sensor enabled 160 seconds after dewpoint reached. Dewpoint is defined as: Exhaust gas temperature is above a threshold representing the point at which there is no longer a concern of condensation on the NOx sensor element. (See RefCond20022.)

Abort Conditions (any active):

3226.9-SE2488

Pause Conditions (any active):

Exhaust gas temperature is below dewpoint, which is a threshold representing the point at which there is a concern of condensation on the NOx sensor element. (See RefCond20023.)

Malfunction Thresholds (all active):

NOx sensor supply voltage > 16.5 V for 10 seconds.

OR

NOx sensor supply voltage < 10.8 V for 10 seconds.

111. 3228.2-SE6021: Aftertreatment 1 Outlet NOx Sensor Power Supply

- Data erratic, intermittent or incorrect

The system out NOx sensor circuitry has detected an intermittent power supply voltage drop that results in a reset internal to the system out NOx sensor.

Monitor Operation:	
DTC	3228.2-SE6021
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):

Exhaust gas temperature is above a threshold representing the point at which there is no longer a concern of condensation on the NOx sensor element. (See RefCond20022.) for less than 5 seconds

Abort Conditions (any active):

Exhaust gas temperature is below dewpoint, which is a threshold representing the point at which there is a concern of condensation on the NOx sensor element. (See RefCond20023.)

Malfunction Thresholds (all active):

The number of filtered sensor reset events (sensor supply power < 6 V) is greater than 12, within a diagnostic time window (300 sec). Sensor reset events are "filtered" by ignoring consecutive reset events occurring within a calibrated time (20 sec).

112. 3226.4-SE5987: Aftertreatment 1 Outlet NOx Sensor Circuit - Voltage below normal, or shorted to low source

The NOx sensor circuitry has detected a failure within the aftertreatment outlet NOx sensor's internal circuitry that causes the sensed NOx value to be suspect.

Monitor Operation:	
DTC	3226.4-SE5987
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 seconds
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):

Processing of fail messages from the sensor enabled 160 seconds after dewpoint reached. Dewpoint is defined as: Exhaust gas temperature is above a threshold representing the point at which there is no longer a concern of condensation on the NOx sensor element. (See RefCond20022.)

Abort Conditions (any active):

3226.9-SE2488

Pause Conditions (any active):

Exhaust gas temperature is below dewpoint, which is a threshold representing the point at which there is a concern of condensation on the NOx sensor element. (See RefCond20023.)

Malfunction Thresholds (all active):

[Open P+] The resistance between the electrode on the top of the sensor (directly exposed to exhaust gas) and ground > 1,000,000 ohms for 10 seconds.

or

[Open Ref] The resistance between the sensors air reference electrode and ground > 1,000,000 ohms for 10 seconds.

or

[Open M1] The resistance between the sensors pumping electrode in the 2nd chamber and ground > 1,000,000 ohms for 10 seconds.

or

[Open P-] The resistance between the sensors pumping electrode in 1st pumping chamber and ground > 1,000,000 ohms for 10 seconds.

or

[Ref/M2] (The resistance between the sensors air reference electrode and the sensors measuring electrode in the 2nd chamber is < 0.5 ohms AND the voltage between the pumping electrode in the 2nd chamber and reference is within 20mV of a 420mV setpoint AND the voltage between the measuring electrode in the 2nd chamber and the reference < 15mV) for 40 seconds.

or
[P-/M2] (The binary voltage between the electrode on the top of the sensor (exposed to the exhaust gas) and the air reference electrode > 900 mV AND the voltage across the electrode in the 1st chamber and reference = the voltage across the measuring electrode in the 2nd chamber and reference) for 40 seconds.
or
[P+/M2] (The resistance between the sensors top electrode (directly exposed to exhaust gas) and the measuring electrode within the 2nd chamber is < 0.5 ohms AND the voltage between the measuring electrode in the 2nd chamber and reference < 120 mV) for 40 seconds.
or
[P-/M1] (The binary voltage between the electrode on the top of the sensor (exposed to the exhaust gas) and the air reference electrode > 900 mV AND the voltage across the electrode in the 1st chamber and reference = the voltage across the pumping electrode in the 2nd chamber and reference) for 40 seconds.
or
[Open M2] The resistance between the sensors measuring electrode in the 2nd chamber and ground > 1,000,000 ohms for 10 seconds.
or
[H-/Tmp] The voltage between the 3rd electrode within the sensors internal heater and ground < 0.5 V for 10 seconds.
or
[H+/Tmp] (the voltage between the 3rd electrode within the internal heater and ground < 2.19 V AND the sensors internal heater resistance < 20.97 Ohms) for 40 seconds.
or
[Ref/H+] The resistance between the air reference electrode and the sensors internal heater supply < 0.5 ohms for 10 seconds.
or
[Vbatt/Tmp] The voltage at the 3rd electrode within the sensors internal heater > 8 for 10 seconds.
or
[Ref/H-] The resistance between the air reference electrode and ground < 0.5 ohms for 10 seconds.
or
[Ref/M1] The resistance between the sensors air reference electrode and the sensors pumping electrode in the 2nd chamber is < 0.5 ohms for 10 seconds.
or
[M1/H+] (The resistance between the pumping electrode in the 2nd chamber and the supply voltage to the sensors internal heater < 0.5 ohms AND the voltage between the electrode in the 1st chamber and the air reference electrode < 25.6 mV) for 40 seconds.
or
[P+/P-] (The resistance between the sensors top electrode (directly exposed to exhaust gas) and the pumping electrode within the 1st chamber is < 0.5 ohms AND the current entering the pumping electrode in the 2nd chamber > -19.5 uA AND the voltage between the pumping electrode in the 2nd chamber and the reference < 100 mV) for 40 seconds.
or
[Ref/Tmp] (The resistance between the sensors air reference electrode and the sensors 3rd electrode within its internal heater is < 0.5 ohms AND the voltage between reference line and ground < 1 V) for 40 seconds.

or
[P-/H+] The resistance between the pumping electrode in the 1st chamber and the sensors internal heater supply is < 0.5 ohms for 10 seconds.
or
[M1/H-] The resistance between the pumping electrode in the 2nd chamber and ground < 0.5 ohms for 10 seconds.
or
[P+/Tmp] The resistance between the sensors top electrode (directly exposed to exhaust gas) and the 3rd electrode within the sensors internal heater is < 0.5 ohms for 10 seconds.
or
[M2/H-] The resistance between the measuring electrode in the 2nd chamber and ground < 0.5 ohms for 10 seconds.
or
[P-/H-] The resistance between the pumping electrode in the 1st chamber and ground is < 0.5 ohms for 10 seconds.
or
[M2/H+] The resistance between the measuring electrode in the 2nd chamber and the supply voltage to the sensors internal heater < 0.5 ohms for 10 seconds.
or
[H+/H-] The resistance between the sensors internal heater supply voltage line and sensor ground is < 0.5 ohms for 10 seconds.
or
[M2/Tmp] The resistance between the sensors measuring electrode in the 2nd pumping chamber and the 3rd electrode within the sensors internal heater is < 0.5 ohms for 10 seconds.
or
[Vbatt/M1] The resistance between supply voltage and the sensors pumping electrode in the 2nd pumping chamber is < 0.5 ohms for 10 seconds.
or
[P+/M1] (The resistance between the sensors top electrode (directly exposed to exhaust gas) and the pumping electrode within the 2nd chamber is < 0.5 ohms AND the binary voltage between the sensors top electrode and reference < 200 mV AND ((the current entering the pumping electrode in the 2nd chamber > -19.5 uA AND the voltage between the pumping electrode in the 2nd chamber and the reference < 100 mV) OR (binary voltage between the sensors top electrode and reference = the voltage between the pumping electrode in the 2nd chamber and reference)) for 40 seconds.
or
[Vbatt/Ref] The resistance between supply voltage and the sensors air reference electrode is < 0.5 ohms for 10 seconds.
or
[Vbatt/M2] The resistance between supply voltage and the sensors measuring electrode in 2nd chamber is < 0.5 ohms for 10 seconds.
or
[P-/Tmp] The resistance between the sensors pumping electrode in the 1st pumping chamber and the 3rd electrode within the sensors internal heater is < 0.5 ohms for 10 seconds.
or
[M1/Tmp] The resistance between the sensors pumping electrode in the 2nd pumping chamber and the 3rd electrode within the sensors internal heater is < 0.5 ohms for 10 seconds.

or
[P+/H-] The resistance between the electrode in on the top of the sensor (exposed to the exhaust gas) and ground is < 0.5 ohms for 10 seconds.
or
[Ref/P-] (The resistance between the air reference electrode and pumping electrode in the 1st chamber < 0.5 ohms AND the voltage between the electrode in the 1st chamber and the air reference electrode < 25.6 mV) for 40 seconds.
or
[Vbatt/P-] The resistance between supply voltage and the sensors pumping electrode in the 1st pumping chamber is < 0.5 ohms for 10 seconds.
or
[Vbatt/P+] The resistance between supply voltage and the sensors top electrode (directly exposed to exhaust gas) is < 0.5 ohms for 10 seconds.
or
[Vbatt/H+] The resistance between supply voltage and the sensors heater supply is < 0.5 ohms for 10 seconds.
or
[M1/M2] (5 mV < the voltage between the measuring electrode in the 2nd chamber with respect to the air reference electrode < 500 mV AND the voltage between the pumping electrode in the 2nd chamber and the air reference electrode = the voltage between the measuring electrode in the 2nd chamber with respect to the air reference electrode) for 40 seconds.

113. 3226.20-SE7613: Aftertreatment 1 Outlet NOx Sensor - Data not Rational - Drifted High

The system has detected that the aftertreatment outlet NOx sensor output is in-range, but not varying as expected (i.e. stuck-in-range)

Monitor Operation:	
DTC	3226.20-SE7613
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):	
SCR-inlet NOx flow rate > 0.25 g/sec	
Rate of change of SCR-inlet NOx flow rate > 0.01 g/sec/sec	
Exhaust mass flow rate > 200 g/sec	
Aftertreatment Outlet NOx sensor reading is valid.	
None of the Abort Conditions are satisfied	

Abort Conditions (any active):	
Aftertreatment Inlet NOx sensor reading is not valid	
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878	
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728	
5031.10-SE5051	
3228.2-SE5988	
3226.4-SE5990	
3226.4-SE5987	
3228.2-SE6021	
3226.13-SE5986	
5031.10-SE5982	
3226.10-SE5989	

Malfunction Thresholds (all active):

The difference between the maximum and minimum NOx sensor output < 5 ppm during 1 valid monitoring events

114. 5298.17-SE3545: Aftertreatment Diesel Oxidation Catalyst Conversion Efficiency - Data Valid But Below Normal Operating Range - Least Severe Level

Active regeneration of the DPF aborted due to the system detecting a malfunction with the closed loop temperature controller using up all of the adjustment allowed.

Monitor Operation:	
DTC	5298.17-SE3545
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate after malfunction criteria are met
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Rate of active/intrusive injection of HC's into exhaust > 0.2 g/sec
Ambient Air Temperature > -7 °C
Enable conditions for the algorithm that detects an ineffective regeneration of the DPF. (See RefCond20046.)
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728

Abort Conditions (any active):
Rate of active/intrusive injection of HC's into exhaust ≤ 0.2 g/sec
Ambient Air Temperature ≤ -7 °C
Abort conditions for the algorithm that detects an ineffective regeneration of the DPF. (See RefCond20047.)
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728

3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728

Pause Conditions (any active):

Pause conditions for the algorithm that detects an ineffective regeneration of the DPF. (See RefCond20048.)

Torque Fueling < 0 mg/stroke

Malfunction Thresholds (all active):

Malfunction criteria for the algorithm that detects an ineffective regeneration of the DPF. (Detection of ineffective regeneration aborts the current active regeneration of the DPF.) (See RefCond20011.)

3 unique occurrences of the following conditions during an active regeneration of the DPF, with each occurrence persisting for a minimum of 60 seconds: (desired DOC outlet temperature - actual DOC outlet temperature > 15 degC) AND (allowed HC injection command {limited due to tailpipe HC slip concerns} - desired HC injection command calculated from feed forward control > 0 g/sec) AND [(total HC injection rate command - allowed HC injection rate > 0 g/sec) OR (HC injection rate before feedback adjustment - actual HC injection rate after feedback adjustment > 0 g/sec)]

115. 4794.31-SE5979: Aftertreatment 1 SCR Catalyst System Missing - Condition Exists

The system has detected that the NOx converting catalyst has no detectable amount of NOx conversion capability.

Monitor Operation:	
DTC	4794.31-SE5979
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	8 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
EGR Off Engine Protection is not active
250 degC <= estimated SCR catalyst bed temperature <= 400 deg C
-0.8 C/sec <= estimated rate of change of absolute SCR catalyst bed temperature <= 0.2 C/sec
45 g/s <= Exhaust flow rate <= 494.07 g/s
61 PPM <= Aftertreatment inlet NOx <= 840 PPM
0 PPM <= Aftertreatment outlet NOx <= 1,407 PPM
DEF injection rate > 0.03 mL/sec
0.1 < Ammonia to NOx ratio < 0.95
0 kPa (absolute) <= Ambient pressure <= 160 kPa (absolute)
Ambient air temperature ≥ -6.7 °C
Rate of change of SCR NOx In < 7.47 ppm/sec
Aftertreatment Outlet NOx sensor reading is valid.
Rate of change of estimated SCR bed temperature ≤ 0.2 °C/sec
3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
171.2-SE3799, 171.2-SE3871, 171.3-SE3802, 171.4-SE3803
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728

5848.21-SE7632
Rate of change of estimated exhaust mass flow < 0.94 g/sec
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
4363.0-SE2889
5862.16-SE5294
4363.16-SE5295
5862.0-SE5292
4363.0-SE5293

Abort Conditions (any active):
5848.21-SE7632
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
EGR Off Engine Protection is active
171.2-SE3799, 171.2-SE3871, 171.3-SE3802, 171.4-SE3803
3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114,

1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
4363.0-SE2889
5862.16-SE5294
4363.16-SE5295
5862.0-SE5292
4363.0-SE5293
The SCR system's NOx conversion efficiency has fallen below 75 % OR the Urea Deposit Timer exceeds 101 hr OR the DPF outlet pressure sensor high error is present for longer than 15 s AND This condition considers the fault due to Inhibit Switch timed regeneration. (See RefCond20049.)

Pause Conditions (any active):
Estimated SCR catalyst bed temperature < 250 degC OR estimated SCR catalyst bed temperature > 400 degC
Aftertreatment inlet NOx < 61 PPM OR Aftertreatment inlet NOx > 840 PPM
Aftertreatment outlet NOx < 0 PPM OR Aftertreatment outlet NOx > 1,407 PPM
Ambient air temperature < -6.7 °C
Exhaust flow rate < 45 g/s OR Exhaust flow rate > 494.07 g/s
Ambient pressure < 0 kPa (absolute) OR Ambient pressure > 160 kPa (absolute)
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
Aftertreatment Outlet NOx sensor reading is not valid.
Rate of change of estimated SCR bed temperature > 0.2 °C/sec
Rate of change of estimated exhaust mass flow ≥ 0.94 g/sec
Rate of change of SCR NOx In ≥ 7.47 ppm/sec
Exhaust Flow Rate is ≤ 40g/sec for a minimum cumulative time of 600 sec. The timer to exit this pause condition is enabled if the Ammonia to NOx Ratio (ANR) feedback is greater than 78.43g/sec

for 448.48 sec
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
Estimated SCR catalyst bed temperature rate of change is > RefTable22. Pause condition is active for a minimum cumulative time of 500 seconds. The timer to exit this pause condition is enabled if the estimated SCR catalyst bed temperature has decreased by at least 60 °C from its maximum temperature value.
Estimated SCR catalyst bed temperature rate of change is > RefTable22. Pause condition is active for a minimum cumulative time of 600 seconds. The timer to exit this pause condition is enabled if the estimated SCR catalyst bed temperature rate of change is < 0.5 multiplied by RefTable22.

Malfunction Thresholds (all active):
Normalized DeNOx efficiency < 10 %

116. 4364.18-SE5980: Aftertreatment SCR Catalyst Conversion Efficiency - Data Valid But Below Normal Operating Range - Moderately Severe Level

The system has detected a decrease of the NOx converting catalyst's conversion capability resulting in tailpipe out NOx emissions exceeding the applicable threshold.

Monitor Operation:	
DTC	4364.18-SE5980
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	8 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
EGR Off Engine Protection is not active
250 degC <= estimated SCR catalyst bed temperature <= 400 deg C
-0.8 C/sec <= estimated rate of change of absolute SCR catalyst bed temperature <= 0.2 C/sec
45 g/s <= Exhaust flow rate <= 494.07 g/s
61 PPM <= Aftertreatment inlet NOx <= 840 PPM
0 PPM <= Aftertreatment outlet NOx <= 1,407 PPM
DEF injection rate > 0.03 mL/sec
0.1 < Ammonia to NOx ratio < 0.95
0 kPa (absolute) <= Ambient pressure <= 160 kPa (absolute)
Rate of change of SCR NOx In < 7.47 ppm/sec
Ambient air temperature ≥ -6.7 °C
Aftertreatment Outlet NOx sensor reading is valid.
Rate of change of estimated SCR bed temperature ≤ 0.2 °C/sec
-1.87 g/sec < Rate of change of exhaust mass flow rate < 0.94 g/sec
3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
171.2-SE3799, 171.2-SE3871, 171.3-SE3802, 171.4-SE3803
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-

SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
5848.21-SE7632
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
4363.0-SE2889
5862.16-SE5294
4363.16-SE5295
5862.0-SE5292
4363.0-SE5293
The SCR system's NOx conversion efficiency is not below 75 % AND the Urea Deposit Timer is not greater than 101 hr AND the DPF outlet pressure sensor high error is not present for longer than 15 s OR This condition considers the fault due to Inhibit Switch timed regeneration. (See RefCond20049.) is not active

Abort Conditions (any active):
5848.21-SE7632
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114
EGR Off Engine Protection is active
171.2-SE3799, 171.2-SE3871, 171.3-SE3802, 171.4-SE3803

3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
4363.0-SE2889
5862.16-SE5294
4363.16-SE5295
5862.0-SE5292
4363.0-SE5293
The SCR system's NOx conversion efficiency has fallen below 75 % OR the Urea Deposit Timer exceeds 101 hr OR the DPF outlet pressure sensor high error is present for longer than 15 s AND This condition considers the fault due to Inhibit Switch timed regeneration. (See RefCond20049.)

Pause Conditions (any active):
Estimated SCR catalyst bed temperature < 250 degC OR estimated SCR catalyst bed temperature > 400 degC
Aftertreatment inlet NOx < 61 PPM OR Aftertreatment inlet NOx > 840 PPM
Aftertreatment outlet NOx < 0 PPM OR Aftertreatment outlet NOx > 1,407 PPM
Ambient air temperature < -6.7 °C
Exhaust flow rate < 45 g/s OR Exhaust flow rate > 494.07 g/s
Ambient pressure < 0 kPa (absolute) OR Ambient pressure > 160 kPa (absolute)
NOx sensor reading is not valid
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
Aftertreatment Outlet NOx sensor reading is not valid.

Rate of change of estimated SCR bed temperature > 0.2 °C/sec
Exhaust Flow Rate is <= 40g/sec for a minimum cumulative time of 600 sec. The timer to exit this pause condition is enabled if the Ammonia to NOx Ratio (ANR) feedback is greater than 78.43g/sec for 448.48 sec
Rate of change of exhaust mass flow rate > 0.94 g/sec OR Rate of change of exhaust mass flow rate < - 1.87 g/sec
Ammonia to NOx Ratio (ANR) Feedback is <= 0.36 (unitless) for a minimum cumulative time of 407.85 sec. The timer to exit this pause condition is enabled if Ammonia to NOx Ratio (ANR) Feedback is greater than 0.4 (unitless) for 391.53 sec
Rate of change of SCR NOx In $\geq$ 7.47 ppm/sec
Estimated SCR catalyst bed temperature rate of change is > RefTable22. Pause condition is active for a minimum cumulative time of 600 seconds. The timer to exit this pause condition is enabled if the estimated SCR catalyst bed temperature rate of change is < 0.5 multiplied by RefTable22.
Estimated SCR catalyst bed temperature rate of change is > RefTable22. Pause condition is active for a minimum cumulative time of 500 seconds. The timer to exit this pause condition is enabled if the estimated SCR catalyst bed temperature has decreased by at least 60 °C from its maximum temperature value.
Ammonia Storage Timer < 360 sec.

Malfunction Thresholds (all active):

Normalized DeNOx efficiency < 70 %

117. 4363.0-SE2889: Aftertreatment 1 SCR Outlet Temperature - Data valid but above normal operational range - Most Severe Level

The SCR catalyst exhibits an exothermic behavior (i.e. there is a large temperature difference across the SCR catalyst) for a sustained period of time.

Monitor Operation:	
DTC	4363.0-SE2889
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	60 sec
MIL Activation Criteria	NON_OBD

Entry Conditions (all active):
4363.2-SE3785, 4363.3-SE6762, 4363.3-SE6765, 4363.4-SE6763, 5742.9-SE6687, 5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5743.9-SE6685, 5862.2-SE2895
4360.3-SE6764, 5742.9-SE6687, 5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5743.9-SE6685, 5862.2-SE2895, 5862.3-SE6760, 5862.4-SE6761
SCR outlet temperature ≥ 200 °C
SCR inlet temperature ≥ 200 °C
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878

Abort Conditions (any active):
4363.2-SE3785, 4363.3-SE6762, 4363.3-SE6765, 4363.4-SE6763, 5742.9-SE6687, 5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5743.9-SE6685, 5862.2-SE2895
4360.3-SE6764, 5742.9-SE6687, 5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5743.9-SE6685, 5862.2-SE2895, 5862.3-SE6760, 5862.4-SE6761
SCR outlet temperature < 200 °C
SCR inlet temperature < 200 °C
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878

Malfunction Thresholds (all active):
Calculated mass flow rate of oxidant reaching the SCR catalyst > 0.4 g/sec

118. 520669.31-SE7834: Aftertreatment 1 Outlet NH3 Sensor Closed Loop Operation - Condition Exists

The reference NH3 concentration and the measured NH3 concentration at the mid bed of the SCR is over a calibratable threshold.

Monitor Operation:	
DTC	520669.31-SE7834
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	90 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5862.2-SE2895, 5862.2-SE6545, 5862.3-SE6760, 5862.4-SE6761
Ambient Air Density ≥ 0 kg/m3
Ambient Air Temperature ≥ -6.7 °C
Ambient Air Pressure ≥ 75 kPa(gauge)
conditions are met for SCR dosing (See RefCond20051.)
The DEF Supply Module (SM) has completed pump pressure control and is ready to dose. (See RefCond20052.)
NH3 sensor status is valid (See RefCond20040.)
Ammonia Storage Timer $\geq 1,200$ sec.
Exhaust flow rate ≥ 50 g/sec for 5 sec.
Injection rate command ≥ 0.07 g/sec for 5 sec.

Abort Conditions (any active):
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
Aftreatment operation mode is not base mode
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5862.2-SE2895, 5862.2-SE6545, 5862.3-SE6760, 5862.4-SE6761

Pause Conditions (any active):
SCR Bed Temperature < 225 °C
Closed loop control of DEF dosing is not allowed (See RefCond20041.)
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
SCR Bed temperature rate of change is > RefTable23. Pause condition is active for a minimum cumulative time of 100 seconds. The timer to exit this pause condition is enabled if the SCR bed temperature rate of change is < RefTable24.
SCR Bed temperature is > RefTable23. Pause condition is active for a minimum cumulative time of 10 seconds. The timer to exit this pause condition is enabled if the SCR bed temperature has decreased by at least 100 Deg C from its maximum temperature value.
SCR Mid Bed Controller Adjusted ammonia reference < RefTable25. OR high DEF dosing is being commanded
NH3 sensor signal contains valid data
High DEF dosing is being commanded for 200 seconds

Malfunction Thresholds (all active):

119. 520668.31-SE7835: Aftertreatment 1 Outlet NOx Sensor Closed Loop Operation - Condition Exists

NOx loop correction factor (NOx loop correction /NOx loop pre-correction) is less than calibrated threshold AND NOx loop pre-correction is over a calibratable threshold.

Monitor Operation:	
DTC	520668.31-SE7835
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	65 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728
5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5862.2-SE2895, 5862.2-SE6545, 5862.3-SE6760, 5862.4-SE6761
Ambient Air Density ≥ 0 kg/m ³
Ambient Air Temperature ≥ -6.7 °C
Ambient Air Pressure ≥ 75 kPa(gauge)
conditions are met for SCR dosing (See RefCond20051.)
The DEF Supply Module (SM) has completed pump pressure control and is ready to dose. (See RefCond20052.)
NH ₃ sensor status is valid (See RefCond20040.)
Mid Bed Ammonia controller NOx loop health is good (See RefCond20055.)
Ammonia Storage Timer $\geq 1,200$ sec.
Exhaust flow rate ≥ 50 g/sec for 5 sec.
Injection rate command ≥ 0.07 g/sec for 5 sec.

Abort Conditions (any active):

102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878

Aftreatment operation mode is not base mode

102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878

102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728

3246.2-SE2852, 3246.3-SE6733, 3246.3-SE6737, 3246.4-SE6734, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728

5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5862.2-SE2895, 5862.2-SE6545, 5862.3-SE6760, 5862.4-SE6761

Pause Conditions (any active):

SCR Bed Temperature < 225 °C

Closed loop control of DEF dosing is not allowed (See RefCond20041.)

102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 108.2-SE3796, 108.2-SE3797, 108.2-SE4438, 108.3-SE113, 108.4-SE114, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 3216.4-SE5151, 3216.4-SE5153, 3216.9-SE2487, 3218.2-SE5152, 3242.2-SE2844, 3242.3-SE6731, 3242.3-SE6736, 3242.4-SE6732, 3251.3-SE2849, 3251.4-SE2857, 3610.2-SE2983, 3610.2-SE3284, 3610.3-SE2882, 3610.4-SE2883, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878, 4765.2-SE2858, 4765.3-SE6729, 4765.3-SE6735, 4765.4-SE6730, 5742.11-SE7168, 5742.12-SE6721, 5742.12-SE6722, 5742.12-SE6724, 5742.12-SE6725, 5742.12-SE6726, 5742.3-SE6727, 5742.4-SE6728

SCR Bed temperature rate of change is > RefTable23. Pause condition is active for a minimum cumulative time of 100 seconds. The timer to exit this pause condition is enabled if the SCR bed temperature rate of change is < RefTable24.

SCR Bed temperature is > RefTable23. Pause condition is active for a minimum cumulative time of 10 seconds. The timer to exit this pause condition is enabled if the SCR bed temperature has decreased by at least 100 °C from its maximum temperature value.

Engine out NOx < 100ppm

Malfunction Thresholds (all active):

((Percent of time (Estimated NOx (ppm) / Measured NOx reduction levels (ppm)) < 10 ppm) / (Percent of time all enable conditions are active)) > 95(%)

120. 4363.2-SE3785: Aftertreatment 1 SCR Outlet Temperature Sensor - Data erratic, intermittent or incorrect

Aftertreatment SCR outlet gas temperature is in-range but not rational.

Monitor Operation:	
DTC	4363.2-SE3785
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	350 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
150 g/sec < Exhaust flow < 1,000 g/sec
Engine Speed > 200 RPM
4360.3-SE6764, 5742.9-SE6687, 5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5743.9-SE6685, 5862.3-SE6760, 5862.4-SE6761
4363.3-SE6762, 4363.3-SE6765, 4363.4-SE6763, 5742.9-SE6687, 5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5743.9-SE6685
Elapsed time since last active regeneration > 1,200 sec
(100 degC < SCR inlet temperature < 400 degC) OR (100 degC < SCR outlet temperature < 400 degC)
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878
(300 seconds have elapsed since OBD Arbitrator allows Quantity and Timing Diagnostics (See RefCond20007.) was active) OR (300 seconds have elapsed since OEM datalink requested Engine intrusive diagnostics was active)

Abort Conditions (any active):
4363.3-SE6762, 4363.3-SE6765, 4363.4-SE6763, 5742.9-SE6687, 5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5743.9-SE6685
4360.3-SE6764, 5742.9-SE6687, 5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5743.9-SE6685, 5862.3-SE6760, 5862.4-SE6761
102.2-SE3651, 102.2-SE3652, 102.2-SE4439, 102.3-SE489, 102.4-SE490, 105.2-SE3793, 105.2-SE4070, 105.3-SE487, 105.4-SE488, 1209.2-SE3922, 1209.2-SE3924, 1209.2-SE4442, 1209.3-SE493, 1209.4-SE494, 411.2-SE1911, 411.3-SE485, 411.4-SE483, 412.2-SE3872, 412.2-SE3876, 412.2-SE3877, 412.2-SE3878

Pause Conditions (any active):
Engine Speed < 200 RPM
Exhaust flow < 150 g/sec OR Exhaust flow > 1,000 g/sec
(SCR inlet temperature < 100 degC OR SCR inlet temperature > 400 degC) AND (SCR outlet temperature < 100 degC OR SCR outlet temperature > 400 degC)
OEM datalink requested Engine intrusive diagnostics is active

Malfunction Thresholds (all active):
(Average of the temperature drop across the SCR catalyst > 80 degC) OR (average of the temperature drop across the SCR catalyst < -70 degC)
-70 degC < average of (DPF outlet temperature - SCR inlet temperature) < 80 degC

121. 5031.10-SE5982: Aftertreatment 1 Outlet NOx Sensor Heater - Abnormal rate of change

Aftertreatment outlet NOx sensor heater malfunction.

Monitor Operation:	
DTC	5031.10-SE5982
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	180 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
4363.2-SE3785, 4363.3-SE6762, 4363.3-SE6765, 4363.4-SE6763, 5742.9-SE6687, 5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5743.9-SE6685, 5862.2-SE2895
Time after the sensor has reached it working temperature and has warmed up > 30 sec
3226.13-SE5986, 3226.4-SE5987, 3226.4-SE5990, 3226.9-SE2488, 3228.2-SE5988
Exhaust gas velocity < 60 m/sec
SCR outlet temperature < 800 °C
Exhaust gas temperature is above a threshold representing the point at which there is no longer a concern of condensation on the NOx sensor element. (See RefCond20022.)
Nox sensor battery supply voltage is within the desired range of [10.8, 16.5] V for more than 0.2 seconds.

Abort Conditions (any active):
4363.2-SE3785, 4363.3-SE6762, 4363.3-SE6765, 4363.4-SE6763, 5742.9-SE6687, 5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5743.9-SE6685, 5862.2-SE2895
3226.13-SE5986, 3226.4-SE5987, 3226.4-SE5990, 3226.9-SE2488, 3228.2-SE5988
Exhaust gas velocity ≥ 60 m/sec
SCR outlet temperature ≥ 800 °C
Exhaust gas temperature is below dewpoint, which is a threshold representing the point at which there is a concern of condensation on the NOx sensor element. (See RefCond20023.)
Nox sensor battery supply voltage is outside the desired range of [10.8, 16.5] V.

Malfunction Thresholds (all active):
Either the percentage of time when sensor has not warmed up is > 50% of diagnostic window time or if sensor transitions from being warm to not warm > 10 counts

122. 4363.16-SE5295: Aftertreatment 1 SCR Outlet Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level

Aftertreatment SCR outlet gas temperature is continuously above a high threshold for a calibrated period of time while active regeneration of the DPF is not occurring.

Monitor Operation:	
DTC	4363.16-SE5295
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	60 sec
MIL Activation Criteria	NON_OBD

Entry Conditions (all active):	
Rate of active/intrusive injection of hydrocarbons in exhaust < 0.2 g/sec	
4363.2-SE3785, 4363.3-SE6762, 4363.3-SE6765, 4363.4-SE6763, 5742.9-SE6687, 5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5743.9-SE6685, 5862.2-SE2895	
Elapsed time since last active regeneration > 540 sec	

Abort Conditions (any active):	
Rate of active/intrusive injection of hydrocarbons in exhaust > 0.2 g/sec	
4363.2-SE3785, 4363.3-SE6762, 4363.3-SE6765, 4363.4-SE6763, 5742.9-SE6687, 5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5743.9-SE6685, 5862.2-SE2895	

Malfunction Thresholds (all active):	
SCR outlet temperature > 650 °C	

123. 4363.0-SE5293: Aftertreatment 1 SCR Outlet Temperature - Data valid but above normal operational range - Most Severe Level

Aftertreatment SCR outlet gas temperature continuously above a severe, high threshold for a calibrated period of time

Monitor Operation:	
DTC	4363.0-SE5293
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	60 sec
MIL Activation Criteria	NON_OBD

Entry Conditions (all active):
4363.2-SE3785, 4363.3-SE6762, 4363.3-SE6765, 4363.4-SE6763, 5742.9-SE6687, 5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5743.9-SE6685, 5862.2-SE2895

Abort Conditions (any active):
4363.2-SE3785, 4363.3-SE6762, 4363.3-SE6765, 4363.4-SE6763, 5742.9-SE6687, 5743.11-SE7180, 5743.12-SE6752, 5743.12-SE6753, 5743.12-SE6755, 5743.12-SE6756, 5743.12-SE6757, 5743.3-SE6758, 5743.4-SE6759, 5743.9-SE6685, 5862.2-SE2895

Malfunction Thresholds (all active):
SCR outlet temperature > 700 °C

124. 4094.31-SE4894: NOx limits exceeded due to Insufficient Reagent Quality - Condition Exists

The system has detected a malfunction due to improper reductant being used in the reductant tank.

Monitor Operation:	
DTC	4094.31-SE4894
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	After a refill of the DEF tank is detected, this monitor will make a decision once the update of SCR catalyst efficiency monitor has occurred AND a minimum volume of reductant has been delivered.
MIL Activation Criteria	NON_OBD

Entry Conditions (all active):	
1761.11-SE8293, 1761.3-SE2896, 1761.4-SE2897, 639.9-SE7665	
Rate of active/intrusive injection of HC's in exhaust ≤ 0.01 g/sec	
If the last refill of the DEF tank occurred with the key off, 0.05 L of reductant has been delivered since the refill occurred (System has determined that the DEF tank has been refilled. Detection can occur across key-cycles or with the engine running and vehicle not moving. (See RefCond20056.)).	
If the last refill of the DEF tank occurred with the key on, 0.15 L of reductant has been delivered since the refill occurred (System has determined that the DEF tank has been refilled. Detection can occur across key-cycles or with the engine running and vehicle not moving. (See RefCond20056.)).	

Abort Conditions (any active):	
1761.11-SE8293, 1761.3-SE2896, 1761.4-SE2897, 639.9-SE7665	
Rate of active/intrusive injection of HC's in exhaust > 0.01 g/sec	
A new refill (System has determined that the DEF tank has been refilled. Detection can occur across key-cycles or with the engine running and vehicle not moving. (See RefCond20056.)) of the DEF tank has occurred	
If the last refill of the DEF tank occurred with the key off, amount of reductant delivered since the refill occurred > 20 L	
If the last refill of the DEF tank occurred with the key on, amount of reductant delivered since the refill occurred > 20 L	
number of updates of SCR catalyst efficiency monitor since enable conditons met ≥ 20 counts	

Malfunction Thresholds (all active):	
Whenever 4364.18-SE5980 is active.	

125. 4376.4-SE6099: Aftertreatment Diesel Exhaust Fluid Return Valve - Voltage below normal, or shorted to low source

DEF reverting valve driver control line is shorted to ground.

Monitor Operation:	
DTC	4376.4-SE6099
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	2 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
The DEF reverting valve command is ON.

Abort Conditions (any active):
The DEF reverting valve command is OFF.

Malfunction Thresholds (all active):
The resistance between the DEF reverting valve driver line and ground < 0.2 Ohms

126. 3361.3-SE6095: Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit - Voltage above normal, or shorted to high source

DEF pump motor driver control line is shorted to high voltage.

Monitor Operation:	
DTC	3361.3-SE6095
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	2 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
The DEF pump motor command is ON.
The system has passed the DEF Supply Module temperature reading phase, and start controlling the DEF pump motor.
DEF Supply Module power channel is ON.

Abort Conditions (any active):
The DEF pump motor command is OFF.
The system is in DEF Supply Module temperature reading phase, and not controlling the DEF pump motor.
DEF Supply Module power channel is OFF.

Malfunction Thresholds (all active):
The resistance between the DEF pump motor driver line and Vehicle Battery < 0.2 Ohms

127. 3361.4-SE6094: Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit - Voltage below normal, or shorted to low source

DEF pump motor driver control line is shorted to ground or open circuit.

Monitor Operation:	
DTC	3361.4-SE6094
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	2 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
The system has passed the DEF Supply Module temperature reading phase, and start controlling the DEF pump motor.
DEF Supply Module power channel is ON.

Abort Conditions (any active):
The system is in DEF Supply Module temperature reading phase, and not controlling the DEF pump motor.
DEF Supply Module power channel is OFF.

Malfunction Thresholds (all active):
The resistance between the DEF pump motor driver line and Vehicle Battery > 1,000,000 Ohms

128. 4334.16-SE5807: Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Data Valid But Above Normal Operating Range - Moderately Severe Level

Checks whether the DEF pump motor has failed, by detecting the condition that the pump is unable to maintain the proper DEF pressure in the dosing system.

Monitor Operation:	
DTC	4334.16-SE5807
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	20 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
3361.3-SE6095, 3361.4-SE6094, 4334.2-SE6966, 4334.3-SE5579, 4334.4-SE5580
DEF Supply Module defrost is not required OR DEF Supply Module defrost is completed.

Abort Conditions (any active):
3361.3-SE6095, 3361.4-SE6094, 4334.2-SE6966, 4334.3-SE5579, 4334.4-SE5580
DEF Supply Module defrost is required.
DEF Supply Module defrost is not completed.
DEF Supply Module is in OFF mode

Malfunction Thresholds (all active):
DEF Supply Module (SM) pressure > 1,185 kPa(gauge)

129. 4334.18-SE5808: Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Data Valid But Below Normal Operating Range - Moderately Severe Level

Checks whether the DEF pump motor has failed, by detecting the condition that the pump is unable to maintain the proper DEF pressure in the dosing system.

Monitor Operation:	
DTC	4334.18-SE5808
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	200 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
3361.3-SE6095, 3361.4-SE6094, 4334.2-SE6966, 4334.3-SE5579, 4334.4-SE5580
The DEF Supply Module (SM) has been filled with DEF fluid (See RefCond20057.)
The DEF tank has been defrosted (See RefCond20058.)
The DEF supply line has been defrosted (See RefCond20059.)
The Supply Module (SM) has been defrosted (See RefCond20060.)
The engine is running

Abort Conditions (any active):
3361.3-SE6095, 3361.4-SE6094, 4334.2-SE6966, 4334.3-SE5579, 4334.4-SE5580
The engine is not running

Malfunction Thresholds (all active):
DEF Supply Module (SM) pressure < 700 kPa(gauge)

130. 4334.2-SE5806: Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Data erratic, intermittent or incorrect

Checks whether the DEF pump motor has failed, by detecting the condition that the pump is unable to maintain a stable DEF pressure in the dosing system.

Monitor Operation:	
DTC	4334.2-SE5806
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	240 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):	
3361.3-SE6095, 3361.4-SE6094, 4334.2-SE6966, 4334.3-SE5579, 4334.4-SE5580	
The DEF Supply Module (SM) has been filled with DEF fluid (See RefCond20057.)	
The DEF tank has been defrosted (See RefCond20058.)	
The DEF supply line has been defrosted (See RefCond20059.)	
The Supply Module (SM) has been defrosted (See RefCond20060.)	
The engine is running	

Abort Conditions (any active):	
3361.3-SE6095, 3361.4-SE6094, 4334.2-SE6966, 4334.3-SE5579, 4334.4-SE5580	
The engine is not running	

Malfunction Thresholds (all active):	
DEF Supply module pump pressure > 1,100 kPa(gauge) OR supply module pump pressure < 700 kPa(gauge)	

131. 4334.2-SE6966: Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Data erratic, intermittent or incorrect

Checks whether the DEF Supply Module pressure sensor has failed at a value that is within a valid range but not rational.

Monitor Operation:	
DTC	4334.2-SE6966
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	2 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):	
3361.3-SE6095, 3361.4-SE6094, 4334.3-SE5579, 4334.4-SE5580	
4376.3-SE6098, 4376.4-SE6099	
The DEF Supply Module has been purged of DEF fluid (See RefCond20061.)	
The DEF Supply Module has begun filling with DEF (See RefCond20062.) has not been satisfied within the current key cycle	
DEF Supply Module defrost is not required OR DEF Supply Module defrost is completed.	

Abort Conditions (any active):	
3361.3-SE6095, 3361.4-SE6094, 4334.3-SE5579, 4334.4-SE5580	
4376.3-SE6098, 4376.4-SE6099	
DEF Supply Module defrost is required.	
DEF Supply Module defrost is not completed.	

Malfunction Thresholds (all active):	
DEF Supply Module pump pressure > 200kPa(gauge) OR Supply DEF Module pump pressure < - 50kPa(gauge)	

132. 4334.3-SE5579: Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Voltage above normal, or shorted to high source

DEF Pump Pressure Sensor reading greater than specified operating range for a calibrated amount of time.

Monitor Operation:	
DTC	4334.3-SE5579
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	8 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
DEF Pump Pressure signal value > 4.79 V (1,300 kPa(gauge))	

133. 4334.4-SE5580: Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Voltage below normal, or shorted to low source

DEF Pump Pressure Sensor reading lower than specified operating range for a calibrated amount of time.

Monitor Operation:	
DTC	4334.4-SE5580
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	8 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
DEF Pump Pressure signal value < 0.2 V (-100kPa(gauge))	

134. 3362.31-SE6980: Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Input Lines - Condition Exists

The diagnostic checks whether the DEF dosing system fails to prime after a calibrated number of attempts.

Monitor Operation:	
DTC	3362.31-SE6980
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):

The DEF Supply Module has begun filling with DEF (See RefCond20062.)

Abort Conditions (any active):

3361.3-SE6095, 3361.4-SE6094, 4334.2-SE6966, 4334.3-SE5579, 4334.4-SE5580

Key switch is turned OFF

Engine is not running

Malfunction Thresholds (all active):

(DEF supply pressure does not exceed 200 kPa(gauge) within 200 sec from the time that The DEF Supply Module has begun filling with DEF (See RefCond20062.)) OR (200 sec has elapsed since The DEF Supply Module has begun filling with DEF (See RefCond20062.), and during this time the DEF supply pressure does not remain greater than 800 kPa(gauge) and less than 1,000kPa(gauge) for 3 sec or longer) for a number of occurrences > 5 counts

135. 5394.7-SE5803: Aftertreatment Diesel Exhaust Fluid Dosing Valve - Mechanical system not responding or out of adjustment

The diagnostic checks whether the DEF Dosing Module Injector valve is mechanically stuck closed or mechanically stuck open by detecting that the doser system fails to respond when the doser is commanded on and off for an extended intrusive injection period.

Monitor Operation:	
DTC	5394.7-SE5803
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
3361.3-SE6095, 3361.4-SE6094, 4334.16-SE5807, 4334.18-SE5808, 4334.2-SE5806, 4334.2-SE6966, 4334.3-SE5579, 4334.4-SE5580, 5394.5-SE5102
Exhaust temperature ≥ 200 °C for 10 sec
The engine is running
Exhaust Mass flow rate ≥ 100 g/hr
DEF dosing command ≥ 19.6 %
DEF dosing command ≤ 88.2 %
the DEF Supply Module pressure is high enough to maintain closed loop pressure control. (See RefCond20068.)
Supply Module Pressure ≥ 400 kPa(gauge)
The OBD arbitrator allows the diagnostic to run

Abort Conditions (any active):
Inverse of Enable conditions.

Malfunction Thresholds (all active):
The doser system fails to respond when the doser is commanded on and off for an extended intrusive injection period.

136. 5394.5-SE5102: Aftertreatment Diesel Exhaust Fluid Dosing Valve - Current below normal or open circuit

DEF dosing valve driver control line is shorted to ground, shorted to high voltage or open circuit.

Monitor Operation:	
DTC	5394.5-SE5102
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	1 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
For malfunction criteria #1, #2, #4 and #5, the DEF dosing valve command is OFF.
For malfunction criteria #6, the DEF dosing valve command is ON.

Abort Conditions (any active):
For malfunction criteria #1, #3, #4 and #5, the DEF dosing valve command is ON.
For malfunction criteria #6, the DEF dosing valve command is OFF.

Malfunction Thresholds (all active):
#1 - For open circuit detection, the resistance between DEF dosing valve high side driver line and DEF dosing valve low side driver line > 1,000,000 Ohms
#2 - For shorted to ground detection on the high side, the resistance between DEF dosing valve high side driver line and ground < 0.2 Ohms
#3 - For shorted to battery detection on the high side, the resistance between DEF dosing valve high side driver line and ground > 500,000 Ohms
#4 - For shorted to ground detection on the low side, the resistance between DEF dosing valve low side driver line and battery > 1,000,000 Ohms
#5 - For shorted to battery detection on the low side, the resistance between DEF dosing valve low side driver line and battery < 0.2 Ohms

137. 4376.7-SE6955: Aftertreatment Diesel Exhaust Fluid Return Valve - Mechanical system not responding or out of adjustment

The diagnostic checks whether the DEF reverting valve has failed, by detecting the condition that the DEF reverting valve is commanded open, but the doser system fails to respond to the opening of the reverting valve.

Monitor Operation:	
DTC	4376.7-SE6955
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediate
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):	
DEF supply module pump command $\geq 5\%$	
DEF supply module pressure sampled when the reverting valve was opened > 800 kPa(gauge)	
DEF Pump Purge Valve ON command. (See RefCond20070.)	
5394.5-SE5102	
4376.4-SE6099	
4376.3-SE6098	
4334.3-SE5579	
4334.4-SE5580	
4334.2-SE6966	
3361.4-SE6094	
3361.3-SE6095	

Abort Conditions (any active):	
DEF supply module pump command $\leq 5\%$	
DEF Pump Purge Valve ON command. (See RefCond20070.) has not been satisfied	
5394.5-SE5102	
4376.4-SE6099	
4376.3-SE6098	
4334.3-SE5579	
4334.4-SE5580	
4334.2-SE6966	
3361.4-SE6094	
3361.3-SE6095	

Malfunction Thresholds (all active):	
Supply Module pump pressure sampled when the reverting valve is opened - The DEF Supply Module pressure sampled at 5sec after the reverting valve is opened < 500 kPa(gauge)	

138. 3363.16-SE2965: Aftertreatment 1 Diesel Exhaust Fluid Tank Heater - Data Valid But Above Normal Operating Range - Moderately Severe Level

The monitor checks whether the DEF tank temperature is too high when tank heating is not active.

Monitor Operation:	
DTC	3363.16-SE2965
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
3363.3-SE6102, 3363.4-SE6103
3031.3-SE2898, 3031.4-SE2899, 3031.9-SE7666
3031.2-SE3650, 3031.3-SE2898, 3031.4-SE2899, 3031.9-SE7666
DEF tank heater not active
The engine is running

Abort Conditions (any active):
3363.3-SE6102, 3363.4-SE6103
3031.3-SE2898, 3031.4-SE2899, 3031.9-SE7666
3031.2-SE3650, 3031.3-SE2898, 3031.4-SE2899, 3031.9-SE7666

Pause Conditions (any active):
DEF tank heater is active
The engine is not running

Malfunction Thresholds (all active):
DEF tank temperature > 58 °C

139. 5571.0-SE914: High Pressure Common Rail Fuel Pressure Relief Valve - Data valid but above normal operational range - Most Severe Level

Monitor the fuel pressure to check the status of the Mechanical Dump Valve (MDV) when the fuel pressure exceeds a calibrated threshold or the pressure drop across a calibrated interval exceeds a calibrated threshold.

Monitor Operation:	
DTC	5571.0-SE914
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	1.5 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine is running.
The number of failed MDV reset events < 5
(Peak pressure > 1,900 bar) OR (((pressure difference across 40 crank teeth) < RefTable1 bar) AND (pressure at 40 counts of crank teeth ago > 1,400 bar))

Abort Conditions (any active):
633.31-SE915
157.3-SE525

Pause Conditions (any active):
Engine is stopped.
The number of failed MDV reset events = 5

Malfunction Thresholds (all active):
(Fuel pressure command $\geq$ 1,530 bar and Peak pressure < (fuel pressure command – 200) bar) OR (Fuel pressure command == 1,530 bar and Peak pressure < 1,330 bar)
The number of failed MDV reset events $\geq$ 2

140. 157.16-SE522: Injector Metering Rail 1 Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level

Monitor Fuel System Performance when measured fuel pressure goes above commanded fuel pressure by a calibrated threshold when Cold Start Emissions Reduction Strategy is not active.

Monitor Operation:	
DTC	157.16-SE522
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine Speed > 125 RPM
Coolant Temperature > -50 °C
Battery Voltage > 5 V
The crankshaft target synchronization gap is identified and the crankshaft sensor signal is used to calculate engine speed.
Total fueling command $\geq$ 4 mg/stroke for 7 sec
(Total fueling command < 75 mg/stroke) OR (157.16-SE522 is not present) for 7 sec
157.7-SE7209, 157.7-SE7211, 157.7-SE7212
Fuel pressure sensor voltage $\geq$ 0.25 V
Fuel pressure sensor voltage $\leq$ 4.815 V
Cold Start Emissions Reduction Strategy is not active.

Pause Conditions (any active):
Coolant Temperature $\leq$ -50 °C
Battery Voltage $\leq$ 5 V
The crankshaft target synchronization gap is not identified and the camshaft sensor signal is used to calculate engine speed.
Engine Speed $\leq$ 125 RPM
157.7-SE7212
Fuel pressure sensor voltage < 0.25 V
Fuel pressure sensor voltage > 4.815 V
(Total fueling command $\geq$ 75 mg/stroke) AND (157.16-SE522 is present)
Total fueling command < 4 mg/stroke
Total fueling command $\geq$ 4 mg/stroke for less than 7 sec
(Total fueling command < 75 mg/stroke) OR (157.16-SE522 is not present) for less than 7 sec
Cold Start Emissions Reduction Strategy is active.

Malfunction Thresholds (all active):

The value by which the measured fuel pressure exceeds the pressure command > 100 bar

The high pressure fuel pump flow command ≤ 0.01 g/sec

141. 157.18-SE523: Injector Metering Rail 1 Pressure - Data Valid But Below Normal Operating Range - Moderately Severe Level

Monitor Fuel System Performance when fuel pressure error is greater than a calibrated threshold or when the measured fuel pressure is less than a calibrated threshold.

Monitor Operation:	
DTC	157.18-SE523
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	7 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine Speed > 125 RPM
The crankshaft target synchronization gap is identified and the crankshaft sensor signal is used to calculate engine speed.
Coolant temperature > -50 °C
Battery Voltage > 5 V
157.7-SE7209, 157.7-SE7211, 157.7-SE7212
Fuel pressure sensor voltage ≥ 0.25 V
Fuel pressure sensor voltage ≤ 4.815 V
Mechanical Dump Valve is not tripped

Pause Conditions (any active):
Engine Speed ≤ 125 RPM
The crankshaft target synchronization gap is not identified and the camshaft sensor signal is used to calculate engine speed.
Coolant temperature ≤ -50 °C
Battery Voltage ≤ 5 V
157.7-SE7209, 157.7-SE7211, 157.7-SE7212
Fuel pressure sensor voltage < 0.25 V
Fuel pressure sensor voltage > 4.815 V
Mechanical Dump Valve is tripped

Malfunction Thresholds (all active):
(Fuel pressure error > 100 bar) OR (measured fuel pressure < 0 bar).

142. 157.3-SE525: Injector Metering Rail 1 Pressure Sensor Circuit - Voltage above normal, or shorted to high source

Fuel pressure sensor input voltage is greater than the specified sensor operating range.

Monitor Operation:	
DTC	157.3-SE525
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	3 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
fuel pressure sensor value > 4.815 V (2,157.373 bar).	

143. 157.4-SE526: Injector Metering Rail 1 Pressure Sensor Circuit - Voltage below normal, or shorted to low source

Fuel pressure sensor input voltage is less than the specified sensor operating range.

Monitor Operation:	
DTC	157.4-SE526
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	3 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
Fuel pressure sensor value < 0.25 V (-124.87 bar)	

144. 633.31-SE915: Electronic Fuel Injection Control Valve Circuit - Condition Exists

Monitor the fuel pressure to check the status of the Mechanical Dump Valve (MDV) and determine if an intermittent open-circuit Inlet Metering Valve (IMV) was the reason for the MDV to open.

Monitor Operation:	
DTC	633.31-SE915
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	1.5 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine is running.
(Peak pressure > 1,900 bar) OR (((pressure difference across 40 crank teeth) < RefTable1 bar) AND (pressure at 40 counts of crank teeth ago > 1,400 bar))
There is IMV open circuit error condition.
The number of failed MDV reset events < 5

Abort Conditions (any active):
157.3-SE525

Pause Conditions (any active):
Engine is stopped.
The number of failed MDV reset events = 5

Malfunction Thresholds (all active):
(Fuel pressure command $\geq$ 1,530 bar and Peak pressure < (fuel pressure command – 200) bar) OR (Fuel pressure command == 1,530 bar and Peak pressure < 1,330 bar)
The number of failed MDV reset events $\geq$ 2

145. 1347.3-SE965: Engine Fuel Pump Pressurizing Assembly 1 Circuit - Voltage above normal, or shorted to high source

Detect the inlet-metering valve (IMV) circuit open error when IMV high side driver IC report open load or short to battery error in the fault status register

Monitor Operation:	
DTC	1347.3-SE965
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	5 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
IMV circuit open load or short to battery : IMV high side terminal voltage > 1.7V when high side output is turned off	
IMV circuit low side current low : IMV low side current < 0.301A when IMV current command > 0.6A	

146. 633.31-SE518: Electronic Fuel Injection Control Valve Circuit - Condition Exists

Detect the Inlet-metering valve (IMV) resistance error when measured IMV resistance is out of calibrated range

Monitor Operation:	
DTC	633.31-SE518
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	20 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):	
Commanded IMV current ≥ 0.6 A	
1347.3-SE965, 1347.4-SE966	
Time since Key ON ≥ 0.13 sec	

Pause Conditions (any active):	
Commanded IMV current < 0.6 A	
1347.3-SE965, 1347.4-SE966	
Time since Key ON < 0.13 sec	

Malfunction Thresholds (all active):	
(Measured IMV resistance ≤ 1.85 Ohm) OR (Measured IMV resistance ≥ 4.85 Ohm)	

147. 1347.4-SE966: Engine Fuel Pump Pressurizing Assembly 1 Circuit - Voltage below normal, or shorted to low source

Detect the inlet-metering valve (IMV) circuit short error when IMV high side driver IC report short to ground error in the fault status register

Monitor Operation:	
DTC	1347.4-SE966
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	0.2 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):	
IMV circuit short to ground (IMV high side terminal voltage < (battery voltage - 1) V when high side output is enabled)	

148. 1239.16-SE8484: Engine Fuel Leakage - Data Valid But Above Normal Operating Range - Moderately Severe Level

Detect fuel system leakage error when the percentage of data with leakage exceeds a calibrated threshold.

Monitor Operation:	
DTC	1239.16-SE8484
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Enable conditions for the tests run during motoring. (See RefCond20001.)

Pause Conditions (any active):
Pause conditions for the tests run during motoring. (See RefCond20003.)

Malfunction Thresholds (all active):
Any of the following Malfunction Criteria is met:
Percentage of test data with leakage (i.e. measured leakage > 2,500 bar/sec OR (measured leakage - predicted leakage) > 4,000 bar/sec) in 20 test points >= 85 % for 2 times.
Percentage of motoring events with very high leakage such that there is not enough time to collect any fueling measurement >= 85 % in 20 data points for 2 times.

149. 157.15-SE8485: Injector Metering Rail 1 Pressure - Data Valid But Above Normal Operating Range - Least Severe Level

Detect fuel system pumping error when the percentage of data with self pumping exceeds a calibrated threshold.

Monitor Operation:	
DTC	157.15-SE8485
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):

Enable conditions for the tests run during motoring. (See RefCond20001.)

Pause Conditions (any active):

Pause conditions for the tests run during motoring. (See RefCond20003.)

Malfunction Thresholds (all active):

Percentage of test data with pumping (i.e. measured leakage < -4,095.5 bar/sec OR measured pressure rise > 15 bar OR (predicted leakage - measured leakage) > 4,000 bar/sec) in 20 data points >= 85 % for 2 times

150. 1323.31-SE2344: Engine Misfire Cylinder 1 - Condition Exists

Cylinder 1 misfire is detected when an increase in its commanded fueling does not yield an expected increase in torque.

Monitor Operation:	
DTC	1323.31-SE2344
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine is in WARM State.
Engine is at IDLE State.
188.16-SE3775, 188.18-SE3781
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
OBD system allows Misfire Monitor to run.
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921
157.3-SE525, 157.4-SE526
1349.3-SE6690, 1349.4-SE6691
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
Engine is operating in any of the following modes:
Engine is operating in base mode

Pause Conditions (any active):
Engine is not in WARM State.
Engine is not at IDLE State.
188.16-SE3775, 188.18-SE3781
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
OBD system doesn't allow Misfire Monitor to run.
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921
157.3-SE525, 157.4-SE526
1349.3-SE6690, 1349.4-SE6691
633.31-SE518
157.16-SE522
157.18-SE523

1347.3-SE965, 1347.4-SE966
633.31-SE915
Engine is performing in DENOX Mode.
Engine is performing in DESOOT Mode.
Engine is performing in DESOX Mode.
Engine is performing in Hydrocarbon Desorption Mode.
Engine runs in SCR Thermal Management mode .

Malfunction Thresholds (all active):
Normalized-crankshaft acceleration of the test cylinder <= RefTable10 for 5 tests.

151. 1324.31-SE2346: Engine Misfire Cylinder 2 - Condition Exists

Cylinder 2 misfire is detected when an increase in its commanded fueling does not yield an expected increase in torque.

Monitor Operation:	
DTC	1324.31-SE2346
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine is in WARM State.
Engine is at IDLE State.
188.16-SE3775, 188.18-SE3781
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
OBD system allows Misfire Monitor to run.
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921
157.3-SE525, 157.4-SE526
1349.3-SE6690, 1349.4-SE6691
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
Engine is operating in any of the following modes:
Engine is operating in base mode

Pause Conditions (any active):
Engine is not in WARM State.
Engine is not at IDLE State.
188.16-SE3775, 188.18-SE3781
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
OBD system doesn't allow Misfire Monitor to run.
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921
157.3-SE525, 157.4-SE526
1349.3-SE6690, 1349.4-SE6691
633.31-SE518
157.16-SE522
157.18-SE523

1347.3-SE965, 1347.4-SE966
633.31-SE915
Engine is performing in DENOX Mode.
Engine is performing in DESOOT Mode.
Engine is performing in DESOX Mode.
Engine is performing in Hydrocarbon Desorption Mode.
Engine runs in SCR Thermal Management mode .

Malfunction Thresholds (all active):
Normalized crankshaft acceleration of the test cylinder <= RefTable10 for 5 tests.

152. 1325.31-SE2347: Engine Misfire Cylinder 3 - Condition Exists

Cylinder 3 misfire is detected when an increase in its commanded fueling does not yield an expected increase in torque.

Monitor Operation:	
DTC	1325.31-SE2347
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine is in WARM State.
Engine is at IDLE State.
188.16-SE3775, 188.18-SE3781
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
OBD system allows Misfire Monitor to run.
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921
157.3-SE525, 157.4-SE526
1349.3-SE6690, 1349.4-SE6691
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
Engine is operating in any of the following modes:
Engine is operating in base mode

Pause Conditions (any active):
Engine is not in WARM State.
Engine is not at IDLE State.
188.16-SE3775, 188.18-SE3781
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
OBD system doesn't allow Misfire Monitor to run.
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921
157.3-SE525, 157.4-SE526
1349.3-SE6690, 1349.4-SE6691
633.31-SE518
157.16-SE522
157.18-SE523

1347.3-SE965, 1347.4-SE966
633.31-SE915
Engine is performing in DENOX Mode.
Engine is performing in DESOOT Mode.
Engine is performing in DESOX Mode.
Engine is performing in Hydrocarbon Desorption Mode.
Engine runs in SCR Thermal Management mode .

Malfunction Thresholds (all active):
Normalized crankshaft acceleration of the test cylinder <= RefTable10 for 5 tests.

153. 1326.31-SE2345: Engine Misfire Cylinder 4 - Condition Exists

Cylinder 4 misfire is detected when an increase in its commanded fueling does not yield an expected increase in torque.

Monitor Operation:	
DTC	1326.31-SE2345
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine is in WARM State.
Engine is at IDLE State.
188.16-SE3775, 188.18-SE3781
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
OBD system allows Misfire Monitor to run.
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921
157.3-SE525, 157.4-SE526
1349.3-SE6690, 1349.4-SE6691
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
Engine is operating in any of the following modes:
Engine is operating in base mode

Pause Conditions (any active):
Engine is not in WARM State.
Engine is not at IDLE State.
188.16-SE3775, 188.18-SE3781
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
OBD system doesn't allow Misfire Monitor to run.
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921
157.3-SE525, 157.4-SE526
1349.3-SE6690, 1349.4-SE6691
633.31-SE518
157.16-SE522
157.18-SE523

1347.3-SE965, 1347.4-SE966
633.31-SE915
Engine is performing in DENOX Mode.
Engine is performing in DESOOT Mode.
Engine is performing in DESOX Mode.
Engine is performing in Hydrocarbon Desorption Mode.
Engine runs in SCR Thermal Management mode .

Malfunction Thresholds (all active):
Normalized crankshaft acceleration of the test cylinder <= RefTable10 for 5 tests.

154. 1327.31-SE2348: Engine Misfire Cylinder 5 - Condition Exists

Cylinder 5 misfire is detected when an increase in its commanded fueling does not yield an expected increase in torque.

Monitor Operation:	
DTC	1327.31-SE2348
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine is in WARM State.
Engine is at IDLE State.
188.16-SE3775, 188.18-SE3781
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
OBD system allows Misfire Monitor to run.
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921
157.3-SE525, 157.4-SE526
1349.3-SE6690, 1349.4-SE6691
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
Engine is operating in any of the following modes:
Engine is operating in base mode

Pause Conditions (any active):
Engine is not in WARM State.
Engine is not at IDLE State.
188.16-SE3775, 188.18-SE3781
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
OBD system doesn't allow Misfire Monitor to run.
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921
157.3-SE525, 157.4-SE526
1349.3-SE6690, 1349.4-SE6691
633.31-SE518
157.16-SE522
157.18-SE523

1347.3-SE965, 1347.4-SE966
633.31-SE915
Engine is performing in DENOX Mode.
Engine is performing in DESOOT Mode.
Engine is performing in DESOX Mode.
Engine is performing in Hydrocarbon Desorption Mode.
Engine runs in SCR Thermal Management mode .

Malfunction Thresholds (all active):
Normalized crankshaft acceleration of the test cylinder <= RefTable10 for 5 tests.

155. 1328.31-SE2349: Engine Misfire Cylinder 6 - Condition Exists

Cylinder 6 misfire is detected when an increase in its commanded fueling does not yield an expected increase in torque.

Monitor Operation:	
DTC	1328.31-SE2349
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine is in WARM State.
Engine is at IDLE State.
188.16-SE3775, 188.18-SE3781
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
OBD system allows Misfire Monitor to run.
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921
157.3-SE525, 157.4-SE526
1349.3-SE6690, 1349.4-SE6691
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
Engine is operating in any of the following modes:
Engine is operating in base mode

Pause Conditions (any active):
Engine is not in WARM State.
Engine is not at IDLE State.
188.16-SE3775, 188.18-SE3781
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
OBD system doesn't allow Misfire Monitor to run.
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921
157.3-SE525, 157.4-SE526
1349.3-SE6690, 1349.4-SE6691
633.31-SE518
157.16-SE522
157.18-SE523

1347.3-SE965, 1347.4-SE966
633.31-SE915
Engine is performing in DENOX Mode.
Engine is performing in DESOOT Mode.
Engine is performing in DESOX Mode.
Engine is performing in Hydrocarbon Desorption Mode.
Engine runs in SCR Thermal Management mode .

Malfunction Thresholds (all active):
Normalized crankshaft acceleration of the test cylinder <= RefTable10 for 5 tests.

156. 723.2-SE422: Engine Camshaft Speed / Position Sensor - Data erratic, intermittent or incorrect

Monitor the camshaft tooth edge pulse signal for intermittent unexpected sync tooth.

Monitor Operation:	
DTC	723.2-SE422
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	20 rev
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):	
723.2-SE415, 723.2-SE45	
Camshaft tooth edge is detected.	
Engine speed > 1,200 RPM	

Pause Conditions (any active):	
Engine speed ≤ 1,200 RPM	
723.2-SE415, 723.2-SE45	
Camshaft tooth edge is not detected.	

Malfunction Thresholds (all active):	
Camshaft sync tooth, as detected by the camshaft sensor, doesn't match the expected sync tooth location at most once every 2 camshaft revolutions.	

157. 723.2-SE415: Engine Camshaft Speed / Position Sensor - Data erratic, intermittent or incorrect

Monitor the tooth edge pulse signal for loss of pulses from the engine camshaft sensor.

Monitor Operation:	
DTC	723.2-SE415
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 sec
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Engine speed $\leq$ 100 RPM
Crankshaft tooth edge is not detected.

Malfunction Thresholds (all active):
(If Engine speed < 100 rpm, amount of time since a pulse was seen on camshaft sensor >0.8 sec) OR (If Engine speed $\geq$ 100 rpm and < 200 rpm, amount of time since a pulse was seen on camshaft sensor > 0.4 sec) OR (If Engine speed $\geq$ 200 rpm and < 400 rpm, amount of time since a pulse was seen on camshaft sensor > 0.2 sec) OR (If Engine speed $\geq$ 400 rpm, amount of time since a pulse was seen on camshaft sensor > 0.1 sec)

158. 723.2-SE45: Engine Camshaft Speed / Position Sensor - Data erratic, intermittent or incorrect

Monitor the tooth edge pulse signal for the missing sync tooth expected from the engine camshaft sensor.

Monitor Operation:	
DTC	723.2-SE45
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):
Absence of Sync tooth pulse in the generated pulse signal waveform from the camshaft sensor, when Engine speed > 100 RPM

159. 612.2-SE460: Engine Magnetic Speed/Position Lost Both of Two Signals - Data erratic, intermittent or incorrect

Monitor the tooth edge pulse signal for complete loss of pulses from the engine crankshaft and camshaft sensors.

Monitor Operation:	
DTC	612.2-SE460
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 sec
MIL Activation Criteria	OBD_SOLID

Malfunction Thresholds (all active):
(Crankshaft pulse signals are not detected) OR (Crankshaft sync signal is not detected) OR (Camshaft half cycle is unknown)
(Camshaft pulse signals are not detected) OR (Camshaft sync signal is not detected) OR (engine is turning in the reverse direction)
At least one of the two sensors (crankshaft sensor and camshaft sensor) has pulse signal

160. 190.2-SE419: Engine Crankshaft Speed/Position - Data erratic, intermittent or incorrect

Monitor the crankshaft tooth edge pulse signal for intermittent unexpected sync gap.

Monitor Operation:	
DTC	190.2-SE419
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	10 rev
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
190.2-SE417, 190.2-SE54
Crankshaft tooth edge is detected.
Engine speed > 1,200 RPM

Pause Conditions (any active):
Engine speed ≤ 1,200 RPM
190.2-SE417, 190.2-SE54
Crankshaft tooth edge is not detected.

Malfunction Thresholds (all active):
Crankshaft tooth gap, as detected by the crankshaft sensor, doesn't match the expected sync gap location at most once every 2 crankshaft revolutions.

161. 190.2-SE417: Engine Crankshaft Speed/Position - Data erratic, intermittent or incorrect

Monitor the tooth edge pulse signal for loss of pulses from the engine crankshaft sensor.

Monitor Operation:	
DTC	190.2-SE417
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	6 sec
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Engine speed $\leq$ 100 RPM
Camshaft tooth edge is not detected.

Malfunction Thresholds (all active):
(If Engine speed < 100 rpm, amount of time since a pulse was seen on crankshaft sensor > 1 sec) OR (If Engine speed $\geq$ 100 rpm and < 200 rpm, amount of time since a pulse was seen on crankshaft sensor > 0.5 sec) OR (If Engine speed $\geq$ 200 rpm and < 400 rpm, amount of time since a pulse was seen on crankshaft sensor > 0.25 sec) OR (If Engine speed $\geq$ 400 rpm, amount of time since a pulse was seen on crankshaft sensor > 0.125 sec)

162. 190.2-SE54: Engine Crankshaft Speed/Position - Data erratic, intermittent or incorrect

Monitor the tooth edge pulse signal for the sync gap (2 missing teeth) pulse expected from the engine crankshaft sensor.

Monitor Operation:	
DTC	190.2-SE54
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	6 sec
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Engine Speed $\leq$ 100 RPM

Malfunction Thresholds (all active):
Absence of an expected synchronization gap in the generated pulse signal waveform from the crankshaft sensor.

163. 723.7-SE389: Engine Speed / Position Camshaft and Crankshaft Misalignment - Mechanical system not responding or out of adjustment

Monitor tooth edge pulse signals to detect a phase misalignment between the engine crankshaft and camshaft targets.

Monitor Operation:	
DTC	723.7-SE389
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	60 rev
MIL Activation Criteria	OBD_SOLID

Pause Conditions (any active):
Engine Speed $\leq$ 100 RPM
Engine Speed $>$ 1,200 RPM

Malfunction Thresholds (all active):
(Difference between the detected and expected backup sync tooth location $<$ -1 counts) OR (Difference between the detected and expected backup sync tooth location $>$ 1 counts)

164. 5357.31-SE8483: Engine Fuel Injection Quantity Error for Multiple Cylinders - Condition Exists

Detect equally failed injectors fueling error when the estimated injector fuel quantity for all the injectors deviates from the desired injector fuel commanded quantity by more than the calibrated threshold limit.

Monitor Operation:	
DTC	5357.31-SE8483
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine Speed > 100 RPM
The accumulated consecutive time that the total fueling command < 0.01 mg/stroke is less than 240 sec.
Engine is in WARM State.
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921
157.3-SE525, 157.4-SE526
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
5571.0-SE914
157.7-SE7209, 157.7-SE7211
Engine is operating in any of the following modes:
Engine runs in SCR Thermal Management mode .
Engine is operating in base mode
Engine is in any of the following States:
Engine is in either RUN State or BRAKING State.
OBD system allows Quantity Timing Diagnostics to run

Pause Conditions (any active):
Engine Speed ≤ 100 RPM
The accumulated consecutive time that the total fueling command < 0.01 mg/stroke is greater than or equal to 240 sec.
Engine is not in WARM State.
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921

157.3-SE525, 157.4-SE526
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
5571.0-SE914
157.7-SE7209, 157.7-SE7211
Engine is performing in DENOX Mode
Engine is performing in DESOOT Mode
Engine is performing in DESOX Mode
Engine is performing in Hydrocarbon Desorption Mode.
Engine is not in RUN State and engine is not in BRAKING State.
OBD system does not allow Quantity Timing Diagnostics to run

Malfunction Thresholds (all active):

For all the injectors, ((Estimated Average Fuel Quantity Deviation ≥ 11)mg/stroke) OR ((Estimated Average Fuel Quantity Deviation ≤ -13.5) mg/stroke)

165. 5585.18-SE8369: Engine Injector Metering Rail 1 Cranking Pressure - Data Valid But Below Normal Operating Range - Moderately Severe Level

Fuel pressure is below a calibrated threshold when the Engine is Cranking

Monitor Operation:	
DTC	5585.18-SE8369
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	40 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine Speed > 80 RPM
Ambient Air temperature $\geq -6.7^{\circ}\text{C}$
Fuel Pressure Command > 170 bar
RefTable17 - Pump Flow Command ≤ 0.5 g/sec
157.3-SE525, 157.4-SE526
157.7-SE7209, 157.7-SE7211
1347.3-SE965, 1347.4-SE966

Pause Conditions (any active):
Engine Speed ≤ 80 RPM
Ambient Air temperature $< -6.7^{\circ}\text{C}$
RefTable17 - Pump Flow Command > 0.5 g/sec
Fuel Pressure Command ≤ 170 bar
157.3-SE525, 157.4-SE526
157.7-SE7209, 157.7-SE7211
1347.3-SE965, 1347.4-SE966

Malfunction Thresholds (all active):
Fuel Pressure ≤ 150 bar

166. 157.7-SE7209: Injector Metering Rail 1 Pressure - Mechanical system not responding or out of adjustment

Detect fuel pressure rationality high error by comparing the first fuel pressure signal to the second fuel pressure signal.

Monitor Operation:	
DTC	157.7-SE7209
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	11 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):	
157.3-SE525	
157.4-SE526	
1349.3-SE6690	
1349.4-SE6691	
157.7-SE7212	
The absolute change of the first fuel pressure output between 2 consecutive cycles of the fuel pressure sensor's output $2 \leq 200$ bar	
The absolute change of the second fuel pressure output between 2 consecutive cycles of the fuel pressure sensor's output $2 \leq 200$ bar	
The pressure signal1 and the pressure signal2 are both valid.	

Pause Conditions (any active):	
157.3-SE525	
157.4-SE526	
1349.3-SE6690	
1349.4-SE6691	
157.7-SE7212	
The absolute change of the first fuel pressure output between 2 consecutive cycles of the fuel pressure sensor's output $2 > 200$ bar	
The absolute change of the second fuel pressure output between 2 consecutive cycles of the fuel pressure sensor's output $2 > 200$ bar	
The pressure signal1 or the pressure signal2 is invalid or both are invalid.	

Malfunction Thresholds (all active):	
The first fuel pressure output - the second fuel pressure output > 105 bar	

167. 157.7-SE7211: Injector Metering Rail 1 Pressure - Mechanical system not responding or out of adjustment

Detect fuel pressure rationality low error by comparing the first fuel pressure signal to the second fuel pressure signal.

Monitor Operation:	
DTC	157.7-SE7211
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	11 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):	
157.3-SE525	
157.4-SE526	
1349.3-SE6690	
1349.4-SE6691	
157.7-SE7212	
The absolute change of the first fuel pressure output between 2 consecutive cycles of the fuel pressure sensor's output $2 \leq 200$ bar	
The absolute change of the second fuel pressure output between 2 consecutive cycles of the fuel pressure sensor's output $2 \leq 200$ bar	
The pressure signal1 and the pressure signal2 are both valid.	

Pause Conditions (any active):	
157.3-SE525	
157.4-SE526	
1349.3-SE6690	
1349.4-SE6691	
157.7-SE7212	
The absolute change of the first fuel pressure output between 2 consecutive cycles of the fuel pressure sensor's output $2 > 200$ bar	
The absolute change of the second fuel pressure output between 2 consecutive cycles of the fuel pressure sensor's output $2 > 200$ bar	
The pressure signal1 or the pressure signal2 is invalid or both are invalid.	

Malfunction Thresholds (all active):	
The first fuel pressure output - the second fuel pressure output < -105 bar	

168. 651.5-SE916: Injector Solenoid Driver Cylinder 1 Circuit - Current below normal or open circuit

Detect injector 1 circuit errors when Fuel System ASIC reports errors in the fault registers

Monitor Operation:	
DTC	651.5-SE916
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	0.34 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Injector 1 was commanded non-zero fueling during last engine cycle

Pause Conditions (any active):
Injector 1 was commanded zero fueling during last engine cycle

Malfunction Thresholds (all active):
Fuel system ASIC reports injector 1 circuit errors in the fault registers.

169. 652.5-SE917: Injector Solenoid Driver Cylinder 2 Circuit - Current below normal or open circuit

Detect injector 2 circuit errors when Fuel System ASIC reports errors in the fault registers

Monitor Operation:	
DTC	652.5-SE917
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	0.34 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Injector 2 was commanded non-zero fueling during last engine cycle

Pause Conditions (any active):
Injector 2 was commanded zero fueling during last engine cycle

Malfunction Thresholds (all active):
Fuel system ASIC reports injector 2 circuit errors in the fault registers.

170. 653.5-SE918: Injector Solenoid Driver Cylinder 3 Circuit - Current below normal or open circuit

Detect injector 3 circuit errors when Fuel System ASIC reports errors in the fault registers

Monitor Operation:	
DTC	653.5-SE918
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	0.34 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Injector 3 was commanded non-zero fueling during last engine cycle

Pause Conditions (any active):
Injector 3 was commanded zero fueling during last engine cycle

Malfunction Thresholds (all active):
Fuel system ASIC reports injector 3 circuit errors in the fault registers.

171. 654.5-SE919: Injector Solenoid Driver Cylinder 4 Circuit - Current below normal or open circuit

Detect injector 4 circuit errors when Fuel System ASIC reports errors in the fault registers

Monitor Operation:	
DTC	654.5-SE919
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	0.34 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Injector 4 was commanded non-zero fueling during last engine cycle

Pause Conditions (any active):
Injector 4 was commanded zero fueling during last engine cycle

Malfunction Thresholds (all active):
Fuel system ASIC reports injector 4 circuit errors in the fault registers.

172. 655.5-SE920: Injector Solenoid Driver Cylinder 5 Circuit - Current below normal or open circuit

Detect injector 5 circuit errors when Fuel System ASIC reports errors in the fault registers

Monitor Operation:	
DTC	655.5-SE920
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	0.34 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Injector 5 was commanded non-zero fueling during last engine cycle

Pause Conditions (any active):
Injector 5 was commanded zero fueling during last engine cycle

Malfunction Thresholds (all active):
Fuel system ASIC reports injector 5 circuit errors in the fault registers.

173. 656.5-SE921: Injector Solenoid Driver Cylinder 6 Circuit - Current below normal or open circuit

Detect injector 6 circuit errors when Fuel System ASIC reports errors in the fault registers

Monitor Operation:	
DTC	656.5-SE921
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	0.34 sec
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Injector 6 was commanded non-zero fueling during last engine cycle

Pause Conditions (any active):
Injector 6 was commanded zero fueling during last engine cycle

Malfunction Thresholds (all active):
Fuel system ASIC reports injector 6 circuit errors in the fault registers.

174. 1322.31-SE2350: Engine Misfire for Multiple Cylinders - Condition Exists

A multiple cylinder misfire fault is detected whenever more than one cylinder is failing to produce expected torque in response to a calibrated increase in its commanded fueling.

Monitor Operation:	
DTC	1322.31-SE2350
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine is in WARM State.
Engine is at IDLE State.
188.16-SE3775, 188.18-SE3781
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
OBD system allows Misfire Monitor to run.
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921
157.3-SE525, 157.4-SE526
1349.3-SE6690, 1349.4-SE6691
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
Engine is operating in any of the following modes:
Engine is operating in base mode

Pause Conditions (any active):
Engine is not in WARM State.
Engine is not at IDLE State.
188.16-SE3775, 188.18-SE3781
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
OBD system doesn't allow Misfire Monitor to run.
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921
157.3-SE525, 157.4-SE526
1349.3-SE6690, 1349.4-SE6691
633.31-SE518
157.16-SE522

157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
Engine is performing in DENOX Mode.
Engine is performing in DESOOT Mode.
Engine is performing in DESOX Mode.
Engine is performing in Hydrocarbon Desorption Mode.
Engine runs in SCR Thermal Management mode .

Malfunction Thresholds (all active):
Total number of misfiring cylinders > 1 counts

175. 651.7-SE3104: Injector Solenoid Driver Cylinder 1 - Mechanical system not responding or out of adjustment

Detect fuel system injection fueling error when the estimated injector fuel quantity for injector 1 deviates from the desired injector fuel commanded quantity by more than the calibrated threshold limit.

Monitor Operation:	
DTC	651.7-SE3104
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine Speed > 100 RPM
The accumulated consecutive time that the total fueling command < 0.01 mg/stroke is less than 240 sec.
Engine is in WARM State.
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
651.5-SE916
157.3-SE525, 157.4-SE526
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
5571.0-SE914
157.7-SE7209, 157.7-SE7211
Engine is operating in any of the following modes:
Engine runs in SCR Thermal Management mode .
Engine is operating in base mode
Engine is in any of the following States:
Engine is in either RUN State or BRAKING State.
OBD system allows Quantity Timing Diagnostics to run

Pause Conditions (any active):
Engine Speed ≤ 100 RPM
The accumulated consecutive time that the total fueling command < 0.01 mg/stroke is greater than or equal to 240 sec.
Engine is not in WARM State.
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
651.5-SE916

157.3-SE525, 157.4-SE526
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
5571.0-SE914
157.7-SE7209, 157.7-SE7211
Engine is performing in DENOX Mode
Engine is performing in DESOOT Mode
Engine is performing in DESOX Mode
Engine is performing in Hydrocarbon Desorption Mode.
Engine is not in RUN State and engine is not in BRAKING State.
OBD system does not allow Quantity Timing Diagnostics to run

Malfunction Thresholds (all active):

((Estimated Average Fuel Quantity Deviation ≥ 11)mg/stroke) OR ((Estimated Average Fuel Quantity Deviation ≤ -13.5) mg/stroke)

176. 652.7-SE3105: Injector Solenoid Driver Cylinder 2 - Mechanical system not responding or out of adjustment

Detect fuel system injection fueling error when the estimated injector fuel quantity for injector 2 deviates from the desired injector fuel commanded quantity by more than the calibrated threshold limit.

Monitor Operation:	
DTC	652.7-SE3105
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine Speed > 100 RPM
The accumulated consecutive time that the total fueling command < 0.01 mg/stroke is less than 240 sec.
Engine is in WARM State.
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
652.5-SE917
157.3-SE525, 157.4-SE526
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
5571.0-SE914
157.7-SE7209, 157.7-SE7211
Engine is operating in any of the following modes:
Engine runs in SCR Thermal Management mode .
Engine is operating in base mode
Engine is in any of the following States:
Engine is in either RUN State or BRAKING State.
OBD system allows Quantity Timing Diagnostics to run

Pause Conditions (any active):
Engine Speed ≤ 100 RPM
The accumulated consecutive time that the total fueling command < 0.01 mg/stroke is greater than or equal to 240 sec.
Engine is not in WARM State.
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
652.5-SE917

157.3-SE525, 157.4-SE526
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
5571.0-SE914
157.7-SE7209, 157.7-SE7211
Engine is performing in DENOX Mode
Engine is performing in DESOOT Mode
Engine is performing in DESOX Mode
Engine is performing in Hydrocarbon Desorption Mode.
Engine is not in RUN State and engine is not in BRAKING State.
OBD system does not allow Quantity Timing Diagnostics to run

Malfunction Thresholds (all active):

((Estimated Average Fuel Quantity Deviation ≥ 11)mg/stroke) OR ((Estimated Average Fuel Quantity Deviation ≤ -13.5) mg/stroke)

177. 653.7-SE3102: Injector Solenoid Driver Cylinder 3 - Mechanical system not responding or out of adjustment

Detect fuel system injection fueling error when the estimated injector fuel quantity for injector 3 deviates from the desired injector fuel commanded quantity by more than the calibrated threshold limit.

Monitor Operation:	
DTC	653.7-SE3102
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine Speed > 100 RPM
The accumulated consecutive time that the total fueling command < 0.01 mg/stroke is less than 240 sec.
Engine is in WARM State.
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
653.5-SE918
157.3-SE525, 157.4-SE526
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
5571.0-SE914
157.7-SE7209, 157.7-SE7211
Engine is operating in any of the following modes:
Engine runs in SCR Thermal Management mode .
Engine is operating in base mode
Engine is in any of the following States:
Engine is in either RUN State or BRAKING State.
OBD system allows Quantity Timing Diagnostics to run

Pause Conditions (any active):
Engine Speed ≤ 100 RPM
The accumulated consecutive time that the total fueling command < 0.01 mg/stroke is greater than or equal to 240 sec.
Engine is not in WARM State.
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
653.5-SE918

157.3-SE525, 157.4-SE526
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
5571.0-SE914
157.7-SE7209, 157.7-SE7211
Engine is performing in DENOX Mode
Engine is performing in DESOOT Mode
Engine is performing in DESOX Mode
Engine is performing in Hydrocarbon Desorption Mode.
Engine is not in RUN State and engine is not in BRAKING State.
OBD system does not allow Quantity Timing Diagnostics to run

Malfunction Thresholds (all active):

((Estimated Average Fuel Quantity Deviation ≥ 11)mg/stroke) OR ((Estimated Average Fuel Quantity Deviation ≤ -13.5) mg/stroke)

178. 654.7-SE3106: Injector Solenoid Driver Cylinder 4 - Mechanical system not responding or out of adjustment

Detect fuel system injection fueling error when the estimated injector fuel quantity for injector 4 deviates from the desired injector fuel commanded quantity by more than the calibrated threshold limit.

Monitor Operation:	
DTC	654.7-SE3106
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine Speed > 100 RPM
The accumulated consecutive time that the total fueling command < 0.01 mg/stroke is less than 240 sec.
Engine is in WARM State.
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
654.5-SE919
157.3-SE525, 157.4-SE526
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
5571.0-SE914
157.7-SE7209, 157.7-SE7211
Engine is operating in any of the following modes:
Engine runs in SCR Thermal Management mode .
Engine is operating in base mode
Engine is in any of the following States:
Engine is in either RUN State or BRAKING State.
OBD system allows Quantity Timing Diagnostics to run

Pause Conditions (any active):
Engine Speed ≤ 100 RPM
The accumulated consecutive time that the total fueling command < 0.01 mg/stroke is greater than or equal to 240 sec.
Engine is not in WARM State.
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
654.5-SE919

157.3-SE525, 157.4-SE526
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
5571.0-SE914
157.7-SE7209, 157.7-SE7211
Engine is performing in DENOX Mode
Engine is performing in DESOOT Mode
Engine is performing in DESOX Mode
Engine is performing in Hydrocarbon Desorption Mode.
Engine is not in RUN State and engine is not in BRAKING State.
OBD system does not allow Quantity Timing Diagnostics to run

Malfunction Thresholds (all active):

((Estimated Average Fuel Quantity Deviation ≥ 11)mg/stroke) OR ((Estimated Average Fuel Quantity Deviation ≤ -13.5) mg/stroke)

179. 655.7-SE3107: Injector Solenoid Driver Cylinder 5 - Mechanical system not responding or out of adjustment

Detect fuel system injection fueling error when the estimated injector fuel quantity for injector 5 deviates from the desired injector fuel commanded quantity by more than the calibrated threshold limit.

Monitor Operation:	
DTC	655.7-SE3107
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine Speed > 100 RPM
The accumulated consecutive time that the total fueling command < 0.01 mg/stroke is less than 240 sec.
Engine is in WARM State.
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
655.5-SE920
157.3-SE525, 157.4-SE526
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
5571.0-SE914
157.7-SE7209, 157.7-SE7211
Engine is operating in any of the following modes:
Engine runs in SCR Thermal Management mode
Engine is operating in base mode
Engine is in any of the following States:
Engine is in either RUN State or BRAKING State.
OBD system allows Quantity Timing Diagnostics to run

Pause Conditions (any active):
Engine Speed ≤ 100 RPM
The accumulated consecutive time that the total fueling command < 0.01 mg/stroke is greater than or equal to 240 sec.
Engine is not in WARM State.
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
655.5-SE920

157.3-SE525, 157.4-SE526
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
5571.0-SE914
157.7-SE7209, 157.7-SE7211
Engine is performing in DENOX Mode
Engine is performing in DESOOT Mode
Engine is performing in DESOX Mode
Engine is performing in Hydrocarbon Desorption Mode.
Engine is not in RUN State and engine is not in BRAKING State.
OBD system does not allow Quantity Timing Diagnostics to run

Malfunction Thresholds (all active):

((Estimated Average Fuel Quantity Deviation ≥ 11)mg/stroke) OR ((Estimated Average Fuel Quantity Deviation ≤ -13.5) mg/stroke)

180. 656.7-SE3108: Injector Solenoid Driver Cylinder 6 - Mechanical system not responding or out of adjustment

Detect fuel system injection fueling error when the estimated injector fuel quantity for injector 6 deviates from the desired injector fuel commanded quantity by more than the calibrated threshold limit.

Monitor Operation:	
DTC	656.7-SE3108
Monitor Execution	Continuous
Monitor Sequence	None
Sensors OK	None
Typical Monitoring Duration	Immediately
MIL Activation Criteria	OBD_SOLID

Entry Conditions (all active):
Engine Speed > 100 RPM
The accumulated consecutive time that the total fueling command < 0.01 mg/stroke is less than 240 sec.
Engine is in WARM State.
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
656.5-SE921
157.3-SE525, 157.4-SE526
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
5571.0-SE914
157.7-SE7209, 157.7-SE7211
Engine is operating in any of the following modes:
Engine runs in SCR Thermal Management mode
Engine is operating in base mode
Engine is in any of the following States:
Engine is in either RUN State or BRAKING State.
OBD system allows Quantity Timing Diagnostics to run

Pause Conditions (any active):
Engine Speed ≤ 100 RPM
The accumulated consecutive time that the total fueling command < 0.01 mg/stroke is greater than or equal to 240 sec.
Engine is not in WARM State.
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
656.5-SE921

157.3-SE525, 157.4-SE526
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
5571.0-SE914
157.7-SE7209, 157.7-SE7211
Engine is performing in DENOX Mode
Engine is performing in DESOOT Mode
Engine is performing in DESOX Mode
Engine is performing in Hydrocarbon Desorption Mode.
Engine is not in RUN State and engine is not in BRAKING State.
OBD system does not allow Quantity Timing Diagnostics to run

Malfunction Thresholds (all active):

((Estimated Average Fuel Quantity Deviation ≥ 11)mg/stroke) OR ((Estimated Average Fuel Quantity Deviation ≤ -13.5) mg/stroke)

181. RefCond20001: Enable conditions for the tests run during motoring.

Enable conditions for the tests run during motoring.

Conditions (all active):
OBD system allows Quantity Timing Diagnostic to run in engine motoring condition.
Engine Speed > 100 RPM
The accumulated consecutive time that the total fueling command < 0.01 mg/stroke is less than 240 sec.
Engine is in WARM State.
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921
157.3-SE525, 157.4-SE526
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
5571.0-SE914
157.7-SE7209, 157.7-SE7211
Engine runs in SCR Thermal Management mode .
Engine is operating in base mode
Engine is in any of the following States:
Engine is in either RUN State or BRAKING State.

182. RefCond20003: Pause conditions for the tests run during motoring.

Pause conditions for the tests run during motoring.

Conditions (all active):
OBD system doesn't allow Quantity Timing Diagnostic to run in the motoring condition.
Engine Speed $\leq$ 100 RPM
Total fueling command $\geq$ 0.01 mg/stroke
The accumulated consecutive time that the total fueling command $<$ 0.01 mg/stroke is greater than or equal to 240 sec.
Engine is not in WARM State.
190.2-SE417, 190.2-SE419, 190.2-SE54, 612.2-SE460, 723.2-SE415, 723.2-SE422, 723.2-SE45, 723.7-SE389
651.5-SE916, 652.5-SE917, 653.5-SE918, 654.5-SE919, 655.5-SE920, 656.5-SE921
157.3-SE525, 157.4-SE526
633.31-SE518
157.16-SE522
157.18-SE523
1347.3-SE965, 1347.4-SE966
633.31-SE915
5571.0-SE914
157.7-SE7209, 157.7-SE7211
Engine is performing in DENOX Mode
Engine is performing in DESOOT Mode
Engine is performing in DESOX Mode
Engine is performing in Hydrocarbon Desorption Mode.
Engine is not in RUN State and engine is not in BRAKING State.

183. RefCond20007: OBD Arbitrator allows Quantity and Timing Diagnostics

OBD Arbitrator allows Quantity and Timing Diagnostics

Conditions (all active):
OBD Arbitrator allows any of the following monitors to run:
651.7-SE3104, 652.7-SE3105, 653.7-SE3102, 654.7-SE3106, 655.7-SE3107, 656.7-SE3108