Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Actuator Solenoid Circuit Open - Bank 1	P0010	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K Q impedance between signal and controller ground.	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft System Performance - Bank 1	P0011	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated.	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive.	(Intake cam Bank 1) Cam Position Error > ( P0011_CamPosError LimId )deg	Intake Cam Phsr Enable System Voltage Engine Running Power Take Off (PTO) active Desired cam position Desired AND Measured cam position	= TRUE > 11.00 Volts = TRUE = FALSE > 0 deg > ( P0011_CamPosErrorLim Ic1 ) deg AND < (CalculatedPerfMaxId) deg	79.00 failures out of 279.00 samples 100 ms /sample	Type A, 1 Trips
					Desired cam position variation	< 4.50 deg for ( P0011_P05CC_StablePo sitionTimeld ) seconds		
					No Active DTCs	P0010 P2088 P2089		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Actuator Solenoid Circuit Open - Bank 1	P0013	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K Q impedance between signal and controller ground.	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft System Performance - Bank 1	P0014	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated.	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive.	(Exhaust cam Bank 1) Cam Position Error > ( P0014_CamPosError LimEd )deg	Exhaust Cam Phsr EnableSystem VoltageEngine RunningPower Take Off (PTO) activeDesired cam positionDesired AND Measured cam positionDesired cam positionDesired cam positionNo Active DTCs	= TRUE > 11.00 Volts = TRUE = FALSE > 0 deg > 0 deg > (P0014_CamPosErrorLim Ec1 )deg AND (CalculatedPerfMaxEd) deg <4.50 deg for (P0014_P05CE_StablePo sitionTimeEd )seconds P0013 P2090 P2091	79.00 failures out of 279.00 samples 100 ms /sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position (CKP)- Camshaft Position (CMP) Correlation Bank 1 SensorA	P0016	Detects cam to crank misalignment by monitoring if the cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position, diagnostic passes when the cam sensor pulse is in the expected range	Out of range cam edge measurements in one engine cycle Out of range values are: cam edge measurement OR cam edge measurement from the expeced nominal cam position	>= 2 cam edges < -6.9 Crank Degrees > 12.8 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser control indcates the phaser is 'parked' No Active DTCs: Time since last execution of a test IntCamECC_OilPresLow	Testis Enabled CrankSensor_FA P0340, P0341 > 5.0 sec = FALSE	4 cam edge measurements and 1 test sample per engine cycle Test failure is 4 fails in 5 samples Diagnostic failure is 2 failed tests out of 3 If the first test fails, the next test is delayed to confirm the phaser 'parked' This delay time is defined by P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold For mid-park phasers, an additional delay P0016-0019 Mid-Park Phaser Delay is applied	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position (CKP)- Camshaft Position (CMP) Correlation Bank 1 Sensor B	P0017	Detects cam to crank misalignment by monitoring if the cam sensor pulse for bank 1 sensor B occurs during the incorrect crank position, diagnostic passes when the cam sensor pulse is in the expected range	Out of range cam edge measurements in one engine cycle Out of range values are: cam edge measurement OR cam edge measurement from the expeced nominal cam position	>= 2 cam edges < -6.9Crank Degrees > 12.8 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser control indcates the phaser is 'parked' No Active DTCs: Time since last execution of a test ExhCamECC_OilPresLow	Test is Enabled CrankSensor_FA P0365, P0366 > 5.0 sec = FALSE	4 cam edge measurements and 1 test sample per engine cycle Test failure is 4 fails in 5 samples Diagnostic failure is 2 failed tests out of 3 If the first test fails, the next test is delayed to confirm the phaser 'parked' This delay time is defined by P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold For mid-park phasers, an additional delay P0016-0019 Mid-Park Phaser Delay is apolied	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft - Sprocket Correlation Diagnostic	P0017 and P0016	On engines with a dual intermediate sprocket between the crankshaft and the camshafts, this diagnostic detects a timing misalignment between the crankshaft, sprocket and camshafts that will cause the bank 1 camshafts to be misaligned.	Out of range cam edge measurements in one engine cycle Out or range values are: (Bank 1 Cam Sensor A) cam edge measurement OR (Bank 1 Cam Sensor B) cam edge measurement OR cam edge measurement from the expected nominal cam position	<ul> <li>&gt;= 8 cam edges</li> <li>&lt; -6.9 Crank Degrees</li> <li>&gt; 12.8 Crank Degrees</li> <li>&lt; -6.9 Crank Degrees</li> <li>&gt; 12.8 Crank Degrees</li> </ul>	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser control indcates the phasers are 'parked' No Active DTCs: Time since last execution of a test IntCamECC_OilPresLow ExhCamECC_OilPresLow	Testis Disabled CrankSensor_FA P0340, P0341 P0365, P0366 > 5.0 sec = FALSE = FALSE	<ul> <li>8 cam edge measurements and 1 test sample per engine cycle</li> <li>Test failure is 1 fail(s) in 10 samples.</li> <li>Diagnostic failure is 2 failed tests out of 3</li> <li>If the first test fails, the next test is delayed to confirm the phasers 'parked'</li> <li>This delay time is defined by P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold</li> <li>For mid-park phasers, an additional delay P0016-0019 Mid-Park Phaser Delay is applied</li> </ul>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position (CKP)- Camshaft Position (CMP) Correlation Bank 2 SensorA	P0018	Detects cam to crank misalignment by monitoring if the cam sensor pulse for bank 2 sensor A occurs during the incorrect crank position, diagnostic passes when the cam sensor pulse is in the expected range	Out of range cam edge measurements in one engine cycle Out or range values are: cam edge measurement OR cam edge measurement from the expeced nominal cam position	>= 2 cam edges < -6.9Crank Degrees > 12.8 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser control indcates the phaser is 'parked' No Active DTCs: Time since last execution of a test IntCamECC_OilPresLow	Testis Enabled CrankSensor_FA P0345, P0346 > 5.0 sec = FALSE	4 cam edge measurements and 1 test sample per engine cycle Test failure is 4 fails in 5 samples Diagnostic failure is 2 failed tests out of 3 If the first test fails, the next test is delayed to confirm the phaser 'parked' This delay time is defined by P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold For mid-park phasers, an additional delay P0016-0019 Mid-Park Phaser Delay is applied	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position (CKP)- Camshaft Position (CMP) Correlation Bank 2 Sensor B	P0019	Detects cam to crank misalignment by monitoring if the cam sensor pulse for bank 2 sensor B occurs during the incorrect crank position, diagnostic passes when the cam sensor pulse is in the expected range	Out of range cam edge measurements in one engine cycle Out or range values are: cam edge measurement OR cam edge measurement from the expeced nominal cam position	>= 2 cam edges < -6.9 Crank Degrees > 12.8 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser control indcates the phaser is 'parked' No Active DTCs: Time since last execution of a test ExhCamECC_OilPresLow	Testis Enabled CrankSensor_FA P0390, P0391 > 5.0 sec = FALSE	4 cam edge measurements and 1 test sample per engine cycle Test failure is 4 fails in 5 samples Diagnostic failure is 2 failed tests out of 3 If the first test fails, the next test is delayed to confirm the phaser 'parked' This delay time is defined by P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold For mid-park phasers, an additional delay P0016-0019 Mid-Park Phaser Delay is applied	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft - Sprocket Correlation Diagnostic	P0019 and P0018	On engines with a dual intermediate sprocket between the crankshaft and the camshafts, this diagnostic detects a timing misalignment between the crankshaft, sprocket and camshafts that will cause the bank 2 camshafts to be misaligned.	Out of range cam edge measurements in one engine cycle Out or range values are: (Bank 2 Cam Sensor A) cam edge measurement OR (Bank 2 Cam Sensor B) cam edge measurement OR cam edge measurement from the expected nominal cam position	>= 8 cam edges < -6.9 Crank Degrees > 12.8 Crank Degrees < -6.9 Crank Degrees > 12.8 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser control indcates the phasers are 'parked' No Active DTCs: Time since last execution of a test IntCamECC_OilPresLow ExhCamECC_OilPresLow	Testis Disabled CrankSensor_FA P0345, P0346 P0390, P0391 > 5.0 sec = FALSE = FALSE	8 cam edge measurements and 1 test sample per engine cycle Test failure is 1 fail(s) in 10 samples. Diagnostic failure is 2 failed tests out of 3 If the first test fails, the next test is delayed to confirm the phasers 'parked' This delay time is defined by P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold For mid-park phasers, an additional delay P0016-0019 Mid-Park Phaser Delay is applied	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Actuator Solenoid Circuit Open - Bank 2	P0020	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K Q impedance between signal and controller ground.	System supply voltage is within limits. Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft System Performance - Bank 2	P0021	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated.	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive.	(Intake cam Bank 2) Cam Position Error > ( P0021_CamPosError LimIc2 )deg	Intake Cam Phsr Enable System Voltage Engine Running Power Take Off (PTO) active Desired cam position Desired AND Measured cam position	= TRUE > 11.00 Volts = TRUE = FALSE > 0 deg > ( P0021_CamPosErrorLim Ic2 )deg AND < (CalculatedPerfMaxIc2) deg	79.00 failures out of 279.00 samples 100 ms /sample	Type A, 1 Trips
					Desired cam position variation No Active DTCs	<4.50 deg for ( P0021_P05CD_StablePo sitionTimelc2 ) seconds P0020 P2092 P2093		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Actuator Solenoid Circuit Open - Bank 2	P0023	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K Q impedance between signal and controller ground.	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft System Performance - Bank 2	P0024	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Exhaust cam Bank 2) Cam Position Error > ( P0024_CamPosError LimEc2 )deg	Exhaust Cam Phsr Enable System Voltage Engine Running Power Take Off (PTO) active Desired cam position Desired AND Measured cam position	<pre>= TRUE &gt; 11.00 volts = TRUE = TRUE = FALSE &gt; 0 deg &gt; ( P0024_CamPosErrorLim Ec2 )deg AND &lt; (CalculatedPerfMaxEc2) deg</pre>	79.00 failures out of 279.00 samples 100 ms /sample	Type A, 1 Trips
					Desired cam position variation	<4.50 deg for ( P0024_P05CF_StablePo sitionTimeEc2 ) seconds		
					No Active DTCs	P0023 P2094 P2095		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	Controller specific output driver circuit diagnoses the heater output low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K Q impedance between output and controller ground.	Ignition Voltage Engine Speed	= Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controlle rs P0031 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bankl Sensori	P0031	Controller specific output driver circuit diagnoses the heater output low sided driver fora short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 0.5 Q impedance between output and controller ground.	Ignition Voltage Engine Speed	= Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controlle rs P0030 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bankl Sensori	P0032	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 0.5 Q impedance between output and controller power.	Ignition Voltage Engine Speed	= Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank 1 Sensor 2	P0036	Controller specific output driver circuit diagnoses the heater output low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K Q impedance between output and controller ground.	Ignition Voltage Engine Speed	= Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controlle rs P0037 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bankl Sensor2	P0037	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 0.5 Q impedance between output and controller ground.	Ignition Voltage Engine Speed	= Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controlle rs P0036 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bankl Sensor2	P0038	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 0.5 Q impedance between output and controller power.	Ignition Voltage Engine Speed	= Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank 2 Sensor 1	P0050	Controller specific output driver circuit diagnoses the heater output low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K Q impedance between output and controller ground.	Ignition Voltage Engine Speed	= Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controlle rs P0051 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank2 Sensori	P0051	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 0.5 Q impedance between output and controller ground.	Ignition Voltage Engine Speed	= Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controlle rs P0050 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank2 Sensori	P0052	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 0.5 Q impedance between output and controller power.	Ignition Voltage Engine Speed	= Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
HO2S Heater Resistance Bank 1 Sensor 1	P0053	Detects an oxygen sensor heater having an incorrect or out of range resistance value. This test calculates the heater's resistance (using voltage and current) at engine start after a longer soak condition and compares it to the expected values for the released sensor. This fault is set if the heater resistance is outside the expected range.	Heater Resistance outside of the expected range of	3.8 < ohms < 10.5	No Active DTC's Coolant - IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P262B IAT_SensorFA <8.0 °C >28,800 seconds > -30.0 °C < 32.0 volts <0.06 seconds	Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
HO2S Heater Resistance Bank 1 Sensor 2) (For Dual Bank Exhaust Only	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value. This test calculates the heater's resistance (using voltage and current) at engine start after a soak condition and compares it to the expected values for the released sensor. This fault is set if the heater resistance is outside the expected range.	Heater Resistance outside of the expected range of	3.8< ohms <10.5	No Active DTC's Coolant - IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P262B IAT_SensorFA < 8.0 °C >28,800 seconds > -30.0 °C < 32.0 volts < 0.06 seconds	Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank 2 Sensor 2	P0056	Controller specific output driver circuit diagnoses the heater output low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K Q impedance between output and controller ground.	Ignition Voltage Engine Speed	= Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controlle rs P0057 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank2 Sensor2	P0057	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 0.5 Q impedance between output and controller ground.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controlle rs P0056 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank2 Sensor2	P0058	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 0.5 Q impedance between output and controller power.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
HO2S Heater Resistance Bank 2 Sensor 1	P0059	Detects an oxygen sensor heater having an incorrect or out of range resistance value This test calculates the heater's resistance (using voltage and current) at engine start after a soak condition and compares it to the expected values for the released sensor. This fault is set if the heater resistance is outside the expected range.	Heater Resistance outside of the expected range of	3.8< ohms <10.5	No Active DTC's Coolant - IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P262B IAT_SensorFA <8.0°C >28,800 seconds > -30.0 °C < 32.0 volts <0.09 seconds	Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
HO2S Heater Resistance Bank 2 Sensor 2	P0060	Detects an oxygen sensor heater having an incorrect or out of range resistance value. This test calculates the heater's resistance (using voltage and current) at engine start after a soak condition and compares it to the expected values for the released sensor. This fault is set if the heater resistance is outside the expected range.	Heater Resistance outside of the expected range of	3.8 < ohms < 10.5	No Active DTC's Coolant - IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P262B IAT_SensorFA <8.0 °C >28,800 seconds > -30.0 °C < 32.0 volts <0.09 seconds	Once per valid cold start	Type B, 2 Trips

Component/ Fault System Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
MAP / MAF / Throttle Position Correlation	Detect when MAP and MAF do not match estimated engine airflow as established by the TPS	Difference between MAP and estimated MAP exceeds threshold (kPa), or P0651 (5 Volt Ref), or P0107 (MAP circuit low), or P0108 (MAP circuit high) have failed this key cycle, then MAP portion of diagnostic fails Absolute difference between MAF and estimated MAF exceed threshold (grams/sec), or P0102 (MAF circuit low), or P0103 (MAF circuit hi) have failed this key cycle, or maximum MAF versus RPM (Table) is greater than or equal to maximum MAF versus battery voltage, then MAF portion of diagnostic fails	Table, f(TPS). See supporting tables: P0068_Delta MAP Threshold f(TPS) Threshold f(TPS) Table, f(TPS). See supporting tables: P0068_Delta MAF Threshold f(TPS) Table, f(RPM). See supporting tables: P0068_Maximum MAF f(RPM) Table, f(Volts). See supporting tables: P0068_Maximum MAF f(Volts). See	Engine Speed Run/Crank voltage	> 800 RPM > 6.41 Volts	Continuously fail MAP and MAF portions of diagnostic for 0.1875 s Continuous in MAIN processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Outside Air Temperature (OAT) Sensor Circuit	P0071	Detects an Outside Air Temperature (OAT) sensorthat is stuck in range. There are two components to the test:	Engine Off: If IAT >= OAT: IAT - OAT	> 15.0 deg C	Time between current ignition cycle and the last time the engine was running	>= 28,800.0 seconds	Executed every 100 msec until a pass or fail decision is made	Type B, 2 Trips
Performance (OAT wired to ECM)		an engine off component, and an engine running component.	IFIAT < OAT: OAT - IAT	> 15.0 deg C	Engine is not running Vehicle Speed	>= 15.5 MPH		
		If the engine has been	If either of the following		Coolant Temperature - IAT	< 20.0 deg C		
		period of time, and the coolant temperature	diagnostic will pass:		IAT - Coolant Temperature	< 15.0 deg C		
		Temperature (IAT) values are similar, then		<= 15.0 deg C	equilibrium counter	>= 300.0 counts		
		the air temperature values in the engine compartment of the vehicle are considered to have equalized. In this case, the engine off component of the diagnostic can be enabled. If the IAT and the OAT values are similar, then the OAT Performance Diagnostic passes. If the IAT and OAT values are not similar, the diagnostic will continue to monitor the IAT and the OAT as the vehicle	If IAT < OAT: OAT - IAT	<= 15.0 deg C	The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table <b>P0071: OAT</b> <b>Performance Drive</b> <b>Equilibrium Engine Off</b>			
		starts to move. For applications that have ability to move without engaging the internal combustion			No Active DTCs:	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngineModeNotRunTimer Error		

Component/ Factoria System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		engine, the engine off test will continue. If the vehicle has been moving quickly enough fora long enough period of time, the IAT and OAT values should have reached an equilibrium. This period of time is defined by the "OAT-to- IAT engine off equilibrium counter". The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. While the "OAT-to-IAT engine off equilibrium counter" is counting, IAT and OAT are monitored for similarity. If they are similar, the OAT Performance Diagnostic passes. If the counter reaches an equilibrium and the IAT and OAT values are not similar, the OAT Performance Diagnostic will fail.	Engine Running: If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT If either of the following conditions are met, this diagnostic will pass: If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT	> 15.0 degC > 15.0 deg C <= 15.0 deg C <= 15.0 deg C	Time between current ignition cycle and the last time the engine was running Engine is running Vehicle Speed Engine airflow OAT-to-IAT engine running equilibrium counter The "OAT-to-IAT engine running equilibrium counter" is a counter that is incremented or decremented based on vehicle speed and engine air flow when the engine is running. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table <b>P0071: OAT</b> <b>Performance Drive Equilibrium Engine Running</b> No Active DTCs:	<pre>&gt;= 28,800.0 seconds &gt;= 15.5 MPH &gt;= 10.0 grams/second &gt;= 300.0 counts VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngineModeNotRunTimer Error</pre>	Executed every 100 msec until a pass or fail decision is made	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System	Fault Code	Monitor Strategy Description If the engine off component of the diagnostic was enabled, but did not make a pass or fail decision, the engine running component will begin executing when the internal combustion engine starts to run. If the vehicle has been moving quickly enough for a long enough period of time, the IAT and OAT values should have reached an equilibrium. This period of time is defined by the "OAT-to- IAT engine running equilibrium counter". The "OAT-to-IAT engine running equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is running. When this counter is high enough, the vehicle has reached an	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL llium.
		while the "OAT-to-IAT equilibrium where IAT and OAT can be compared. While the "OAT-to-IAT engine running equilibrium counter" is counting, IAT and OAT						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		similarity. If they are similar, the OAT Performance Diagnostic passes. If the counter reaches an equilibrium and the IAT and OAT values are not similar, the OAT Performance Diagnostic will fail.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Outside Air Temperature (OAT) Sensor Circuit Low	P0072	Detects a continuous short to ground in the Outside Air Temperature (OAT) signal circuit by monitoring the OAT sensor output resistance and failing the diagnostic when the OAT resistance is too low. The OAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A lower resistance is equivalent to a higher temperature.	Raw OAT Input	<= 52 Ohms (-150 deg C)	Continuous		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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Outside Air Temperature (OAT) Sensor Circuit High	P0073	Detects a continuous open circuit in the Outside Air Temperature (OAT) signal circuit by monitoring the OAT sensor output resistance and failing the diagnostic when the OAT resistance is too high. The OAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A higher resistance is equivalent to a lower temperature.	Raw OAT Input	>= 403,672 Ohms (~-60 deg C)	Continuous		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Outside Air Temperature (OAT) Sensor Intermittent In-Range	P0074	Detects a noisy or erratic signal in the OAT circuit by monitoring the OAT sensor and failing the diagnostic when the OAT signal has a noisier output than is expected. When the value of the OAT signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of OAT readings. The result of this summation is called a "string length". Since the OAT signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic OAT signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current OAT reading - OAT reading from 100 milliseconds previous)	> 100 deg C 10 consecutive OAT readings		Continuous	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module SIDI High Pressure Pump min/ max authority	P0089	This DTC determines when the high pressure pump control has reached to its max or min authority	High Pressure Fuel Pump OR High Pressure Fuel Pump Delivery Angle	>= 240° <= 0°	High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Low Side Fuel Pressure Barometric Pressure Inlet Air Temp Fuel Temp Fuel Temp Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or Crank Sensor Not FA and IAT.IAT2.ECTNot FA and IAT.IAT2.ECTNot FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In	True >=11 Volts > 0.275 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking >= 70.0 KPA >= -20.0 degC -12 <= Temp degC <= 127	Windup High/ Low 10.00 seconds failures out of 12.50 Seconds samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
High Pressure Pump Control Solenoid Enable Low Side Open Circuit	P0090	Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground	Engine Speed Battery Voltage	>= 50 RPM >=11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
High Pressure Pump Control Solenoid Enable Low Side Short to Ground	P0091	Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 0.1 Amps between signal and controller ground	Engine Speed Battery Voltage	>=50 RPM >=11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
High Pressure Pump Cntrl Solenoid Enable Low Side Short to Power	P0092	Controller specific output driver circuit diagnoses diagnoses High Pressure pump Control Solenoid Iow sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1.1 or 15 Amps selectable thershold based on High pressure Pump .	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 2 Circuit Performance (applications with humidity sensor, but no manifold temperature sensor)	P0096	Detects an Intake Air Temperature 2 (IAT2) sensor value that is stuck in range by comparing the IAT2 sensor value against the IAT and coolant temperature sensor values and failing the diagnostic if the IAT2 value is more different than the IAT and coolant temperature values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled. The diagnostic will fail if the IAT and coolant temperature values are similar, and the IAT2 value is not similar to the IAT and coolant temperature values. This diagnostic is executed once per ignition cycle if the enable conditions are met.	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up ECT - Power Up IAT2) >= ABS(Power Up ECT - Power Up IAT)	> 10 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit 2 Low (applications with humidity)	P0097	Detects a continuous short to ground in the Intake Air Temperature 2 (IAT2) signal circuit or an IAT2 sensorthat is outputting a frequency signal that is too low. The diagnostic monitors the IAT2 sensor output frequency and fails the diagnostic when the IAT2 frequency is too low. The IAT2 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is converted by the sensor to a frequency value in Hertz. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the frequency of the square wave signal and converts that frequency to a temperature value. A lower frequency is equivalent to a lower temperature. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Raw IAT 2 Input	< 13 Hertz (60 deg C)	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit 2 High (applications with humidity)	P0098	Detects an Intake Air Temperature 2 (IAT2) sensor that is outputting a frequency signal that is too high. The diagnostic monitors the IAT2 sensor output frequency and fails the diagnostic when the IAT2 frequency is too high. The IAT2 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is converted by the sensor to a frequency value in Hertz. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the frequency of the square wave signal and converts that frequency to a temperature value. A higher frequency is equivalent to a higher temperature. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Raw IAT 2 Input	> 390 Hertz (-150 deg C)	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 2 Intermittent In-Range (applications with humidity)	P0099	Detects a noisy or erratic signal in the Intake Air Temperature 2 (IAT2) circuit by monitoring the IAT2 sensor and failing the diagnostic when the IAT2 signal has a noisier output than is expected. When the value of the IAT2 signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT2 readings. The result of this summation is called a "string length". Since the IAT2 signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT2 signal. The diagnostic will fail if the string length is too high. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT2 reading - IAT 2 reading from 100 milliseconds previous)	> 100.00 deg C 10 consecutive IAT 2 readings	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
High Pressure Start Diagnostic	P00C6	The DTC Diagnoses the high side fuel pressure during engine cranking.	The ECM detects that the fuel pressure is not rising or has fallen beyond acceptable limits during engine cranking Pressure Rise Test: Sensed High Pressure Fuel Rail Pressure value Pressure Fall Test: Sensed High Pressure Fuel Rail Pressure value	< P00C6 - Minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery (see Supporting Table) <= P00C6 - Minimum acceptable value of fuel rail pressure after High Pressure Start (see Supporting Table)	High Pressure Rise Diagnostic During Start High Pressure Fall Diagnostic During Start Low side feed fuel pressure Engine Run Time Run/Crank Voltage Engine Coolant For each engine start, only 1 diagnostic is performed. The pressure rise test will run if High side fuel pressure is less than KtFHPC_p_HighPressSta rt, otherwise, the pressure fall diagnostic will run The pressure fall runs when the engine is cranking.	Enabled Disabled >= 0 KPA < = 0 sec > 8 Volts -100 <= °C<= 150 All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT, IAT2 and ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control	Pressure Rise Test: Crank Time >= <b>P00C6 - High</b> <b>Pressure Pump</b> <b>Control Mode</b> <b>timeout</b> (see Supporting Table) 6.25 ms per sample Pressure Fall Test: Injected cylinder events >= <b>P00C6 -</b> <b>maximum</b> <b>acceptable</b> <b>counts of fuel</b> <b>rail pressure</b> <b>below</b> <b>KtFHPD_p_HPS</b> <b>_PressFallLoTh</b> <b>rsh after High</b> <b>Pressure Start</b> (see Supporting Table) 6 samples per engine rotation	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Barometric Pressure Inlet Air Temp	commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active >= 70.0 KPA >= -20.0 DegC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Pressure Measuremen t System - Multiple Sensor Correlation (naturally aspirated with TIAP/ Baro sensor)	P00C7	Detects an inconsistency between pressure sensors in the induction system in which a particular sensor cannot be identified as the failed sensor. If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The Manifold Pressure (MAP) and Barometric Pressure (BARO) sensors values are checked to see if they are within the normal expected atmospheric pressure range. If they are, then MAP and BARO are compared to see if their values are similar. If the MAP and BARO values are not similar, there are no other pressure sensors to compare against to identify which sensor is not rational. The Multiple Pressure Sensor Correlation Diagnostic will fail in this case.	ABS(Manifold Pressure - Baro Pressure)	> 10.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating Manifold Pressure Baro Pressure Baro Pressure No Active DTCs: No Pending DTCs:	> 10.0 seconds >= 50.0 kPa <= 115.0 kPa >= 50.0 kPa <= 115.0 kPa EngineModeNotRunTimer Error MAP_SensorFA AAP_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Press Regulator Solenoid Supply Voltage Control High Side Circuit Short to ground	P00C9	Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 1.1 or 15 Amps selectable thershold based on High pressure Pump.	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Press Regulator Solenoid Supply Voltage Control High Side Circuit Short to power	POOCA	Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.1 Amps between signal and controller power	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Humidity Sensor Circuit Low	P00F4	Detects a continuous short to ground in the humidity signal circuit o ra humidity sensor that is outputting a duty cycle that is too low. The diagnostic monitors the humidity sensor duty cycle output and fails the diagnostic when the humidity duty cycle is too low. The humidity sensor converts the capacitance across the sensor to a relative humidity value is converted by the sensor to a duty cycle value in %. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the duty cycle of the square wave signal and converts that duty cycle to a relative humidity value in % through a transfer function. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Humidity Duty Cycle	<= 5.0 %	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Humidity Sensor Circuit High	P00F5	Detects a humidity sensor that is outputting a duty cycle signal that is too high. The diagnostic monitors the humidity sensor duty cycle output and fails the diagnostic when the humidity duty cycle is too high. The humidity sensor converts the capacitance across the sensor to a relative humidity. The relative humidity value is converted by the sensor to a duty cycle value in %. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the duty cycle of the square wave signal and converts that duty cycle to a relative humidity value in % through a transfer function.	Humidity Duty Cycle	>= 95.0 %	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Humidity Sensor Circuit Intermittent	P00F6	Detects a noisy or erratic signal in the humidity circuit by monitoring the humidity sensor and failing the diagnostic when the humidity signal has a noisier output than is expected. When the value of relative humidity in % is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of humidity readings. The result of this summation is called a "string length". Since the humidity signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic humidity signal. The diagnostic will fail if the string length is too high. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current Humidity reading - Humidity reading from 100 milliseconds previous)	> 80 % 10 consecutive Humidity readings	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Mass Air Flow System Performance (naturally aspirated)	P0101	Detects a performance failure in the Mass Air Flow (MAF) sensor, such as when a MAF value is stuck in range. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Manifold Pressure (MAP) sensor and Throttle Position sensor (TPS). These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the MAF sensor. In this case, the MAF Performance diagnostic will fail.	Filtered Throttle Model Error AND ABS(Measured Flow - Modeled Air Flow) Filtered AND ABS(Measured MAP - MAP Model 2) Filtered	<= 300 kPa*(g/s) > 14.0 grams/sec > 10.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	<ul> <li>&gt;= 400 RPM</li> <li>&lt;= 6,800 RPM</li> <li>&gt;= -9 Deg C</li> <li>= TRUE)</li> <li>&lt;= 150 Deg C</li> <li>= FALSE)</li> <li>&gt;= -20 Deg C</li> <li>&lt;= 125 Deg C</li> <li>&gt;= 0.50</li> <li>Filtered Throttle Model Error multiplied by</li> <li>P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</li> <li>Modeled Air Flow Error multiplied by</li> <li>P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual</li> <li>Weight Factor based on RPM and</li> <li>P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual</li> <li>Weight Factor based on MAF Est</li> </ul>	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						MAP Model 2 Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM		
					No Active DTCs:	MAP_SensorCircuitFA EGRValvePerformance_F A MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA		
					No Pending DTCs:	EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Mass Air Flow Sensor Circuit Low Frequency	P0102	Detects a continuous short to ground in the MAF sensor circuit or a MAF sensor that is outputting a frequency that is too low. The diagnostic monitors the MAF sensor frequency output and fails the diagnostic when the MAF frequency is too low. The MAF sensor monitors the temperature of a circuit in the airflow of the engine. The temperature of this circuit is related to the air velocity across the sensor. The MAF sensor converts this air velocity to a mass air flow value. The mass airflow value is converted by the sensor to a frequency value in Hertz. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the frequency of the square wave signal and converts that frequency to a mass air flow value in grams/second through a transfer function.	MAF Output	<= 500 Hertz (~ 0.46 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 0.0 seconds >= 300 RPM >= 10.0 Volts >= 1.0 seconds	300 failures out of 375 samples 1 sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a MAF sensor that is outputting a frequency signal that is too high. The diagnostic monitors the MAF sensor frequency output and fails the diagnostic when the MAF frequency is too high. The MAF sensor monitors the temperature of a circuit in the airflow of the engine. The temperature of this circuit is related to the air velocity across the sensor. The MAF sensor converts this air velocity to a mass air flow value. The mass airflow value is converted by the sensor to a frequency value in Hertz. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the frequency of the square wave signal and converts that frequency to a mass air flow value in grams/second through a transfer function.	MAF Output	>= 14,500 Hertz (~ 674.3 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 0.0 seconds >= 300 RPM >= 10.0 Volts >= 1.0 seconds	300 failures out of 375 samples 1 sample every cylinder firing event	Type B, 2 Trips

Component/ Fault System Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Manifold Absolute Pressure Sensor Performance (naturally aspirated)	Detects a performance failure in the Manifold Pressure (MAP) sensor, such as when a MAP value is stuck in range. If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The MAP sensor value is checked to see if it is within the normal expected atmospheric pressure range. If it is not, then the MAP performance diagnostic will fail. The engine running portion of this diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors are the Mass Air Flow (MAF) sensor and Throttle Position sensor (TPS). These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model	Engine Running: Filtered Throttle Model Error AND ABS(Measured MAP - MAP Model 1) Filtered AND ABS(Measured MAP - MAP Model 2) Filtered	<= 300 kPa*(g/s) > 20.0 kPa > 10.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	<ul> <li>&gt;= 400 RPM</li> <li>&lt;= 6,800 RPM</li> <li>&gt;= -9 Deg C</li> <li>= TRUE)</li> <li>&lt;= 150 Deg C</li> <li>= FALSE) <ul> <li>-20 Deg C</li> <li>= 125 Deg C</li> </ul> </li> <li>&gt;= 0.50</li> <li>Filtered Throttle Model Error multiplied by</li> <li>P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</li> <li>MAP Model 1 Error multiplied by</li> <li>P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM</li> <li>MAP Model 2 Error multiplied by</li> <li>P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM</li> <li>MAP Model 2 Error multiplied by</li> <li>P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM</li> <li>MAP Model 2 Error multiplied by</li> <li>P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM</li> </ul>	Continuous Calculations are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Reguired	MIL Ilium.
		passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with			No Pending DTCs:	EGRValvePerformance_F A MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP		
		the MAP sensor. In this case, the MAP Performance diagnostic will fail.	the MAP sensor. In this case, the MAP Performance diagnostic will fail.  Engine Not Rotating: Manifold Pressure OR Manifold Pressure >	< 50.0 kPa > 115.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	<ul> <li>&gt; 10.0 seconds</li> <li>EngineModeNotRunTimer Error</li> <li>MAP_SensorCircuitFA AAP_SnsrCktFA</li> <li>MAP_SensorCircuitFP AAP_SnsrCktFP</li> </ul>	<ul><li>4 failures out of</li><li>5 samples</li><li>1 sample every</li><li>12.5 msec</li></ul>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Manifold Absolute Pressure Sensor Circuit Low (Gen III)	P0107	Detects a continuous short to ground in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too low. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	< 3.0 % of 5 Volt Range (This is equal to 6.1 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Manifold Absolute Pressure Sensor Circuit High (Gen III)	P0108	Detects a continuous short to power or open circuit in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too high. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	> 90.0% of 5 Volt Range (This is equal to 115.1 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit Performance (applications with humidity sensor, but no manifold temperature sensor)	P0111	Detects an Intake Air Temperature (IAT) sensor value that is stuck in range by comparing the IAT sensor value against the IAT2 and coolant temperature sensor values and failing the diagnostic if the IAT value is more different than the IAT2 and coolant temperature values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled. The diagnostic will fail if the IAT2 and coolant temperature values are similar, and the IAT value is not similar to the IAT2 and coolant temperature values. This diagnostic is executed once per ignition cycle if the enable conditions are met.	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up ECT - Power Up IAT) > ABS(Power Up ECT - Power Up IAT2)	> 10 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit Low	P0112	Detects a continuous short to ground in the Intake Air Temperature (IAT) signal circuit by monitoring the IAT sensor output resistance and failing the diagnostic when the IAT resistance is too low. The IAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A lower resistance is equivalent to a higher temperature.	Raw IAT Input	< 58.00 Ohms (-150 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit High	P0113	Detects a continuous open circuit in the Intake Air Temperature (IAT) signal circuit by monitoring the IAT sensor output resistance and failing the diagnostic when the IAT resistance is too high. The IAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A higher resistance is equivalent to a lower temperature.	Raw IAT Input	> 142,438 Ohms (~-60 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ F System C	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Intermittent In-Range	P0114	Detects a noisy or erratic signal in the Intake Air Temperature (IAT) circuit by monitoring the IAT sensor and failing the diagnostic when the IAT signal has a noisier output than is expected. When the value of the IAT signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT readings. The result of this summation is called a "string length". Since the IAT signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT reading - IAT reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT readings	Continuous		4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temp Sensor Circuit Low	P0117	Circuit Continuity This DTC detects a short to ground in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@150°C)	< 55 Ohms			5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temp Sensor Circuit High	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ -60°C)	> 134,000 Ohms	Engine run time OR IAT min	> 10.0 seconds > -9.0 °C	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature (ECT) Sensor Circuit Intermittent	P0119	Circuit Erratic This DTC detects large step changes in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. Allowable high and low limits are calculated for the next sample based on the previous sample and sensor time constant. If the sensor responds faster than should be possible the DTC is set.	ECT temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. The calculated high and low limits for the next reading use the following calibrations: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last ECT reading was 90 Deg C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 Deg C and the high limit was calibrated to 200 Deg C the calculated limits are 101 Deg C and 73 Deg C. The next reading (after the 90 Deg C reading) must be between 73 Deg C and 101 Deg C to be valid.	7.4 seconds -60.0 Deg C 200.0 Deg C	No Active DTC's	ECT_Sensor_Ckt_FP	3 failures out of 4 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Throttle Position Sensor Performance (naturally aspirated)	P0121	Detects a performance failure in the Throttle Position sensor (TPS) sensor, such as when a TPS value is stuck in range. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Manifold Pressure (MAP) sensor and Mass Air Flow (MAF) sensor. These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the TPS sensor. In this case, the TPS Performance diagnostic will fail.	Filtered Throttle Model Error AND ABS(Measured MAP - MAP Model 2) Filtered	> 300 kPa*(g/s) <= 10.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	<ul> <li>&gt;= 400 RPM</li> <li>&lt;= 6,800 RPM</li> <li>&gt;= -9 Deg C</li> <li>= TRUE)</li> <li>&lt;= 150 Deg C</li> <li>= FALSE)</li> <li>&gt;= -20 Deg C</li> <li>&lt;= 125 Deg C</li> <li>&gt;= 0.50</li> <li>Filtered Throttle Model Error multiplied by</li> <li>P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</li> <li>MAP Model 2 Error multiplied by</li> <li>P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</li> <li>MAP Model 2 Error multiplied by</li> <li>P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM</li> <li>MAP_SensorCircuitFA EGRValvePerformance_F A</li> <li>MAF_SensorCircuitFA ECT_Sensor_FA</li> <li>ECT_Sensor_FA</li> <li>IAT_SensorFA</li> </ul>	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No Pending DTCs:	EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP		
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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TPS1 Circuit Low	P0122	Detects a continuous or intermittent short low or open in TPS1 circuit by monitoring the TPS 1 sensor percent Vref and failing the diagnostic when the TPS percent Vref is too low. This diagnostic only runs when battery voltage is high enough.	TPS1 % Vref<	0.3250 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
TPS1 Circuit High	P0123	Detects a continuous or intermittent short high in TPS1 circuit by monitoring the TPS 1 sensor percent Vref and failing the diagnostic when the TPS percent Vref is too high. This diagnostic only runs when battery voltage is high enough.	TPS1 % Vref>	4.750 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the ECT (EngineCoolant temperature) does not achieve the required target temperature after an allowed energy accumulation by the engine. This can be caused by an ECT sensor biased low or a cooling system that is not warming up correctly because of a stuck open thermostat or other fault.	Energy is accumulated after the first conbustion event using Range #1 or #2 below: Thermostat type is divided into normal (non-heated) and electrically heated. For this application the "type" cal (KeTHMG_b_TMS_ElecT hstEquipped) = 0 If the type cal is equal to one, the application has an electrically heated t- stat, if equal to zero the		No Active DTC's	ECT_Sensor_Ckt_FA ECT_Sensor_Perf_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA IAT_SensorCircuitFA MAF_SensorFA THMR_AWP_AuxPumpF A THMR_AHV_FA THMR_SWP_Control_FA THMR_SWP_NoFlow_FA THMR_SWP_FlowStuckO n_FA EngineTorqueEstInaccura te	1 failure to set DTC 1 sec/ sample Once per ignition key cycle	Type B, 2 Trips
			the application has an non heated t-stat. See appropiate section below.		(soaking time before current trip)	>1,800 seconds		
			**************************************		Engine run time	30 < Eng Run Tme < 1,450 seconds		
			(Electrically heated t-stat)	See the two tables	Fuel Condition	Ethanol < 87 %		
			Range #1 (Primary) ECT reaches Commanded	named: P0128_Maximum	Distance traveled	> 1.49 miles		
			when Ambient min is < 52 °C and >10 °C.	for Start-up ECT conditions - Primary	**************************************	******		
			Note: Warm up target for range #1 will be at least 80 °C	and P0128_Maximum Accumulated Energy	continuously greater than for this time period	9,999 rpm 5.0 seconds		
			== == == == Range #2 (Alternate) ECT reaches Commanded temperature minus 36 °C	for Start-up ECT conditions - Alternate in the Supporting tables section.	The diagnostic test for this key cycle will abort	*****		
			when Ambient min is < 10 °C and >-9°C. Note: Warm up target for range #2 will be at least	This diagnostic models the net energy into and out of the cooling	If T-Stat Heater commanded duty cycle for this time period	<ul><li>&gt; 20.0 % duty cycle</li><li>&gt; 5.0 seconds</li></ul>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			$55 \circ C$ Type cal above = 0 (non - heated t-stat) == == == Range #1 (Primary) ECT reaches 80 °C when Ambient min is < $52 \circ C$ and >10 °C. == == == Range #2 (Alternate) ECT reaches $55 \circ C$ when Ambient min is < $10 \circ C$ and >-9°C.	system during the warm-up process. The five energy terms are: heat from combustion (with AFM correction), heat from after-run, heat loss to enviroment, heat loss to cabin and heat loss to DFCO.	The diagnostic test for this key cycle will abort ************************* ECT at start run	**************************************		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit Low Voltage Bank 1 Sensor 1	P0131	This DTC determines if the 02 sensor signal circuit is shorted low. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold. The diagnostic failure counter is incremented if the 02S signal is below the threshold value. This DTC is set based on the fail and sample counters.	Oxygen Sensor Signal	< 40.0 mVolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Idle Device Control AIR Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Commanded Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active	TPS_ThrottleAuthorityDef aulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit _FA EvapFlowDuringNonPurg e_FA EvapVentSolenoidCircuit_ FA EvapVentSolenoidCircuit_ FA EvapSmallLeak_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt _FA FuelInjectorCircuit_FA = Not active = Not act	320 failures out of 400 samples Frequency: Continuous in 100 milli- second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					All Fuel Injectors for active Cylinders Fuel Condition Ethanol Estimation in Progress Fuel State All of the above met for	Enabled (On) Ethanol < 87 % = Not Active (Please see <b>"Ethanol</b> <b>Estimation in Progress"</b> in Supporting Tables). DFCO not active > 5.0 seconds		

Component/ F System C	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	This DTC determines if the 02 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold. The diagnostic failure counter is incremented if the 02S signal is above the threshold value. This DTC is set based on the fail and sample counters.	Oxygen Sensor Signal	>1,050 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Diag Only when FuelLevelDataFault ************************************	TPS_ThrottleAuthorityDef aulted MAF_SensorFA EvapExcessPurgePsbl_F A FuellnjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA 10.0 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False = False ***************** > 150.0 seconds when engine soak time > 28,800 seconds > 150.0 seconds when engine soak time < 28,800 seconds < 1.100 EQR ************************************	70 failures out of 88 samples Frequency: Continuous in 100 milli- second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Performance Bank 1 Sensor 1	P0135	This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor. The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters.	Heater Current outside of the expected range of	0.4 < Amps < 4.3	No Active DTC's System Voltage Heater Warm-up delay 02S Heater device control B181 02S Heater Duty Cycle All of the above met for	ECT_Sensor_FA >10.0 Volts = Complete = Not active > zero >120 seconds	8 failures out of 10 samples Frequency: 3 tests per trip 10 seconds delay between tests and 1 second execution rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit Low Voltage Bank 1 Sensor 2) (For Dual Bank Exhaust Only	P0137	This DTC determines if the 02 sensor signal circuit is shorted low. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold. The diagnostic failure counter is incremented if the 02S signal is below the threshold value. This DTC is set based on the fail and sample counters.	Oxygen Sensor Signal	< 50 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Idle Device Control AIR Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Commanded Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active	TPS_ThrottleAuthorityDef aulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit _FA EvapFlowDuringNonPurg e_FA EvapVentSolenoidCircuit_ FA EvapSmallLeak_FA EvapSmallLeak_FA EvapEmissionSystem_FA FueITankPressureSnsrCkt _FA FueIInjectorCircuit_FA = Not active = Not activ	320 failures out of 400 samples Frequency: Continuous in 100 milli- second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					All Fuel Injectors for active Cylinders Fuel Condition Ethanol Estimation in Progress Fuel State All of the above met for	Enabled (On) Ethanol < 87 % = Not Active (Please see <b>"Ethanol</b> <b>Estimation in Progress"</b> in Supporting Tables). DFCO not active >5.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit High Voltage Bank 1 Sensor 2) (For Dual Bank Exhaust Only	P0138	This DTC determines if the 02 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold. The diagnostic failure counter is incremented if the 02S signal is above the threshold value. This DTC is set based on the fail and sample counters.	Oxygen Sensor Signal	>1,050 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Only when FuelLevelDataFault ************************************	TPS_ThrottleAuthorityDef aulted MAF_SensorFA EvapExcessPurgePsbl_F A FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA 10.0 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False = False ***************** > 150.0 seconds when engine soak time > 28,800 seconds > 150.0 seconds when engine soak time < 28,800 seconds < 1.100 EQR ************************************	100 failures out of 125 samples Frequency: Continuous in 100 milli- second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Slow Response Rich to Lean Bank 1 Sensor 2	P013A	The P013A diagnostic is the third in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor has an slow response to an A/F change from Rich to Lean and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. Note: The Primary method is used when the secondary 02 sensor signal transitions from above the upper threshold to below the lower threshold, otherwise the Secondary method is used. <u>Primary method:</u> The P013A diagnostic measures the secondary 02 sensor voltage response rate	Primary Method: The EWMA of the Post 02 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.35 coefficient. OR Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	<ul> <li>9.0 units</li> <li>7.2 units</li> <li>20.0 grams (upper voltage threshold is 450 mvolts and lower voltage threshold is 150 mvolts)</li> </ul>	No Active DTCs B1S2 DTCs Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDef aulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuellnjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_F A Ethanol Composition Sensor FA O2S_Bank_ 1_TFTKO O2S_Bank_ 2_TFTKO P013B, P013E, P013F, P2270 or P2271 >10.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" ) = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than Multiple DTC Use_Green Sensor Delay Criteria - Limit for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.	Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_Rap idResponseActiv e = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		between an upper and lower voltage threshold. The response rate is then normalized to mass air			Low Fuel Condition Only when FuelLevelDataFault	= False = False		
		flow rate and scaled resulting in a normalized intregral value. The normalized integral is fed into a 1st order lag filter to			Post fuel cell	= Enabled, refer to Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests for additional info.		
		update the final EWMA result. DTCP013Ais			Crankshaft Torque	<100.0Nm		
		set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two			DTC's Passed	P2270 (and P2272 if applicable) P013E (and P014Aif applicable)		
		Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a			After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
		code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR						
		feature is used when a step change in the test result is identified. Both these temporary						
		features improve the EWMA result following a non-typical event by allowing multiple						
		intrusive tests on a given trip until the total number of tests reach a calibration value.						
		Secondarv method:						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		This fault is set if the secondary 02 sensor does not achieve the required lower voltage threshold before the accumulated mass air flow threshold is reached.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Slow Response Lean to Rich Bank 1 Sensor 2	P013B	The P013B diagnostic is the sixth in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor has an slow response to an A/F change from Lean to Rich and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. Note: The Primary method is used when the secondary 02 sensor signal transitions from below the lower threshold to above the upper threshold, otherwise the Secondary method is used. <u>Primary method:</u> The P013B diagnostic measures the secondary 02 sensor voltage response rate	Primary Method: The EWMA of the Post 02 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.35 coefficient. OR Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	<ul> <li>&gt; 7.0 units</li> <li>&lt; 6.0 units</li> <li>&gt; 75 grams (lower voltage threshold is 350 mvolts and upper voltage threshold is 600 mvolts)</li> </ul>	No Active DTCs B1S2 DTCs Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDef aulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AIR System FA FuellnjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_F A Ethanol Composition Sensor FA 02S_Bank_ 1_TFTKO 02S_Bank_ 2_TFTKO P013A, P013E, P013F, P2270 or P2271 >10.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" ) = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green</b> <b>Sensor Delay Criteria -</b> <b>Limit</b> for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_Rap idResponseActiv e = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

Component/ Fau System Cod	ult Monitor Strategy de Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System Cod	de Description between an lower and upper voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized intregral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTCP013Bis set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a			Green Cat System Condition	<ul> <li>is above 22.0 grams/sec.</li> <li>= Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/ sec. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).</li> <li>= False</li> <li>= False</li> <li>= Enabled, refer to Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests for additional info.</li> <li>P2270 P013E P013A P2271 P013F</li> </ul>		llium.
	calibration value. Secondarv method:			continued.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		This fault is set if the secondary 02 sensor does not achieve the required upper voltage threshold before the accumulated mass air flow threshold is reached.			During this test the following must stay TRUE or the test will abort: 0.960 < Base Commanded EQR < 1.080			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Slow Response Rich to Lean Bank 2 Sensor 2	P013C	The P013C diagnostic is the third in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, &P013D. ThisDTC determines if the secondary 02 sensor has an slow response to an A/F change from Rich to Lean and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. Note: The Primary method is used when the secondary 02 sensor signal transitions from above the upper threshold to below the lower threshold, otherwise the Secondary method is used. <u>Primary method:</u> The P013C diagnostic measures the secondary 02 sensor voltage response rate	Primary Method: The EWMA of the Post 02 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.35 coefficient. OR Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	<ul> <li>9.0 units</li> <li>7.2 units</li> <li>&gt;20.0 grams (upper voltage threshold is 450 mvolts and lower voltage threshold is 150 mvolts)</li> </ul>	No Active DTCs B2S2 DTCs Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDef aulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuellnjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_F A Ethanol Composition Sensor FA 02S_Bank_ 1_TFTKO 02S_Bank_ 2_TFTKO P013D, P014A, P014B, P2272 or P2273 >10.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" ) = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green</b> <b>Sensor Delay Criteria -</b> <b>Limit</b> for the following locations: B1S2, B2S2 in Supporting Tables tab. Airflow accumulation is only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_Rap idResponseActiv e = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		between an upper and				is above 22.0 grams/sec.		
		lower voltage						
		threshold. The			Low Fuel Condition	= False		
		response rate is then			Only when			
		normalized to mass air			FuelLevelDataFault	= False		
		flow rate and scaled						
		resulting in a			Post fuel cell	= Enabled, refer to		
		normalized intregral				Multiple DTC Use -		
		value. The normalized				Block learn cells to		
		Integral is fed into a 1st				enable Post oxygen		
		order lag lilter to				sensor tests		
					Grankah aft Tarawa			
		result. DICPUI3CIS			Crankshaft Torque	<100.0INM		
		set when the EVVIVIA			DTC's Deseed	D0070		
					DICSPassed	P2272		
		EVVIVIA INTESNOID.				PUI4A		
		diagnostia amplava two						
		footuros East Initial			After above conditions are			
		Posponso (EIP) and			Aller above conditions are			
		Response (FIR) and Ranid Step Response			DECO modo is continued			
		(PSP) The EIP feature			(we driver initiated pedal			
		is used following a			(we driver initiated pedal			
		code clear event or any			input).			
		event that results in						
		erasure of the engine						
		controller's non-volatile						
		memory. The RSR						
		feature is used when a						
		step change in the test						
		result is identified. Both						
		these temporary						
		features improve the						
		EWMA result following						
		a non-typical event by						
		allowing multiple						
		intrusive tests on a						
		given trip until the total						
		number of tests reach a						
		calibration value.						
		Secondarv method:						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		This fault is set if the secondary 02 sensor does not achieve the required lower voltage threshold before the accumulated mass air flow threshold is reached.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Slow Response Lean to Rich Bank 2 Sensor 2	P013D	The P013D diagnostic is the sixth in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, &P013D. ThisDTC determines if the secondary 02 sensor has an slow response to an A/F change from Lean to Rich and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. Note: The Primary method is used when the secondary 02 sensor signal transitions from below the lower threshold to above the upper threshold, otherwise the Secondary method is used. <u>Primary method:</u> The P013D diagnostic measures the secondary 02 sensor voltage response rate	Primary Method: The EWMA of the Post 02 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.35 coefficient. OR Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	<ul> <li>&gt; 7.0 units</li> <li>&lt; 6.0 units</li> <li>&gt; 75 grams (lower voltage threshold is 350 mvolts and upper voltage threshold is 600 mvolts)</li> </ul>	No Active DTCs B2S2 DTCs Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDef aulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AIR System FA FuellnjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_F A Ethanol Composition Sensor FA 02S_Bank_ 1_TFTKO 02S_Bank_ 2_TFTKO P013C, P014A, P014B, P2272 or P2273 >10.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" ) = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green</b> <b>Sensor Delay Criteria -</b> <b>Limit</b> for the following locations: B1S2, B2S2 in Supporting Tables tab. Airflow accumulation is only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_Rap idResponseActiv e = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System	Code	between an lower and upper voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized intregral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTCP013Dis set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a			Green Cat System Condition	<ul> <li>is above 22.0 grams/sec.</li> <li>Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/ sec.</li> <li>(Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).</li> <li>False</li> <li>False</li> <li>Enabled, refer to Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests for additional info.</li> </ul>		
		step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. Secondary method:			DTC's Passed	P2272 P014A P013C P2273 P014B		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		This fault is set if the secondary 02 sensor does not achieve the required upper voltage threshold before the accumulated mass air flow threshold is reached.			following must stay TRUE or the test will abort: 0.960 < Base Commanded EQR < 1.080			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Rich to Lean Bank 1 Sensor 2	P013E	The P013E diagnostic is the second in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor has an initial delayed response to an A/F change from Rich to Lean and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required voltage before the accumulated mass airflow threshold is reached.	Post 02 sensor voltage AND The Accumulated mass airflow monitored during the Delayed Response Test under DFCO DFCO begins after: 1) Catalyst has been rich for a minimum of AND 2) Catalyst Rich Accumulation Air Flow is	> 450 mvolts > 40 grams > 2 secs > 3.0 grams	No Active DTCs B182 DTCs Not Active this key cycle System Voltage Learned heater resistance Green 02S Condition	TPS_ThrottleAuthorityDef aulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AIR System FA FuellnjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_F A Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0 P013A, P013B, P013F, P2270 or P2271 >10.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" ) = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green</b> <b>Sensor Delay Criteria -</b> <b>Limit</b> for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_Rap idResponseActiv e = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Low Fuel Condition Only when FuelLevelDataFault Post fuel cell Crankshaft Torque DTC's Passed Number of fueled cylinders ====================================	is above 22.0 grams/sec. = False = False = Enabled, refer to Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests for additional info. < 100.0Nm P2270 <5 cylinders ====================================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Lean to Rich Bank 1 Sensor 2	P013F	The P013F diagnostic is the fifth in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor has an initial delayed response to an A/F change from Lean to Rich and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required voltage before the accumulated mass airflow threshold is reached.	Post 02 sensor voltage AND The Accumulated mass airflow monitored during the Delayed Response Test	< 350 mvolts	No Active DTCs B182 DTCs Not Active this key cycle System Voltage Learned heater resistance Green 02S Condition	TPS_ThrottleAuthorityDef aulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AIR System FA FuellnjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_F A Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0 P013A, P013B, P013E, P2270 or P2271 >10.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" ) = Not Valid, Green 02S condition is considered valid until the accumulated air flow is greater than Multiple DTC Use_Green Sensor Delay Criteria - Limit for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_Rap idResponseActiv e = TRUE, multiple tests per trip are allowed	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Green Cat System Condition	is above 22.0 grams/sec. = Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/ sec. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).		
					Low Fuel Condition Only when FuelLevelDataFault	= False = False		
					Post fuel cell	= Enabled, refer to Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests for additional info.		
					DTC's Passed	P2270 P013E P013A P2271		
					Number of fueled cylinders ====================================	> 1 cylinders		
					After above conditions are met: Fuel Enrich mode entered. ====================================			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					following must stay TRUE or the test will abort: 0.960 < Base Commanded EQR < 1.080			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Performance Bank 1 Sensor 2) (For Dual Bank Exhaust Only	P0141	This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor. The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters.	Heater Current outside of the expected range of	0.4> amps > 4.3	No Active DTC's System Voltage Heater Warm-up delay 02S Heater device control B181 02S Heater Duty Cycle All of the above met for	ECT_Sensor_FA >10.0 Volts = Complete = Not active > zero >120 seconds	8 failures out of 10 samples Frequency: 3 tests per trip 10 seconds delay between tests and 1 second execution rate.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Rich to Lean Bank 2 Sensor 2	P014A	The P014A diagnostic is the second in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, &P013D. ThisDTC determines if the secondary 02 sensor has an initial delayed response to an A/F change from Rich to Lean and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required voltage before the accumulated mass airflow threshold is reached.	Post 02 sensor voltage AND The Accumulated mass airflow monitored during the Delayed Response Test under DFCO DFCO begins after: 1) Catalyst has been rich for a minimum of AND 2) Catalyst Rich Accumulation Air Flow is	<ul> <li>&gt; 450 mvolts</li> <li>&gt; 40 grams</li> <li>&gt; 2 secs</li> <li>&gt; 3.0 grams</li> </ul>	No Active DTCs B282 DTCs Not Active this key cycle System Voltage Learned heater resistance Green 02S Condition	TPS_ThrottleAuthorityDef aulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AIR System FA FuellnjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_F A Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0 P013C, P013D, P014B, P2272 or P2273 >10.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" ) = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green</b> <b>Sensor Delay Criteria -</b> <b>Limit</b> for the following locations: B1S2, B2S2 in Supporting Tables tab. Airflow accumulation is only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_Rap idResponseActiv e = TRUE, multiple tests per trip are allowed	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Low Fuel Condition Only when FuelLevelDataFault Post fuel cell Crankshaft Torque DTC's Passed Number of fueled cylinders ====================================	is above 22.0 grams/sec. = False = False = Enabled, refer to Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests for additional info. < 100.0Nm P2272 < 5 cylinders ====================================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Lean to Rich Bank 2 Sensor 2	P014B	The P014B diagnostic is the fifth in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, &P013D. ThisDTC determines if the secondary 02 sensor has an initial delayed response to an A/F change from Lean to Rich and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required voltage before the accumulated mass airflow threshold is reached.	Post 02 sensor AND The Accumulated mass airflow monitored during the Delayed Response Test	< 350mvolts	No Active DTCs B282 DTCs Not Active this key cycle System Voltage Learned heater resistance Green 02S Condition	TPS_ThrottleAuthorityDef aulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AIR System FA FuellnjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0 P013C, P013D, P014A, P2272 or P2273 >10.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "H02S Heater Resistance DTCs" ) = Not Valid, Green 02S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green</b> <b>Sensor Delay Criteria - Limit</b> for the following locations: B1S2, B2S2 in Supporting Tables tab. Airflow accumulation is only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_Rap idResponseActiv e = TRUE, multiple tests per trip are allowed	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Green Cat System Condition	is above 22.0 grams/sec. = Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/ sec. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).		
					Low Fuel Condition Only when FuelLevelDataFault	= False = False		
					Post fuel cell	= Enabled, refer to Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests for additional info.		
					DTC's Passed	P2272 P014A P013C P2273		
					Number of fueled cylinders ====================================	> 1 cylinders		
					After above conditions are met: Fuel Enrich mode entered. ====================================			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					following must stay TRUE or the test will abort: 0.960 < Base Commanded EQR < 1.080			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit Low Voltage Bank 2 Sensor 1	P0151	This DTC determines if the 02 sensor signal circuit is shorted low. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold. The diagnostic failure counter is incremented if the 02S signal is below the threshold value. This DTC is set based on the fail and sample counters.	Oxygen Sensor Signal	< 40 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Idle Device Control AIR Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Commanded Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active	TPS_ThrottleAuthorityDef aulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit _FA EvapFlowDuringNonPurg e_FA EvapVentSolenoidCircuit_ FA EvapVentSolenoidCircuit_ FA EvapSmallLeak_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt _FA FuelInjectorCircuit_FA = Not active = Not act	320 failures out of 400 samples Frequency: Continuous in 100 milli- second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					All Fuel Injectors for active Cylinders Fuel Condition Ethanol Estimation in Progress Fuel State All of the above met for	Supporting Tables). Enabled (On) < 87% Ethanol = Not Active (Please see "Ethanol Estimation in Progress" in Supporting Tables). DFCO not active > 5.0 seconds		
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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O2S Circuit High Voltage Bank 2 Sensor 1	P0152	This DTC determines if the 02 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold. The diagnostic failure counter is incremented if the 02S signal is above the threshold value. This DTC is set based on the fail and sample counters.	Oxygen Sensor Signal	> 1,050 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Only when FuelLevelDataFault  Secondary delay after above conditions are complete (cold start condition) Secondary delay after above conditions are complete (not cold start condition) Commanded Equivalence Ratio 	TPS_ThrottleAuthorityDef aulted MAF_SensorFA EvapExcessPurgePsbl_F A FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA 10.0 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False = False ***************** > 210.0 seconds when engine soak time > 28,800 seconds > 210.0 seconds when engine soak time < 28,800 seconds < 1.100 EQR ************************************	70 failures out of 88 samples Frequency: Continuous in 100 milli- second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Performance Bank 2 Sensor 1	P0155	This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor. The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters.	Heater Current outside of the expected range of	0.4 > amps > 4.3	No Active DTC's System Voltage Heater Warm-up delay 02S Heater device control B181 02S Heater Duty Cycle All of the above met for	ECT_Sensor_FA >10.0 Volts = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 3 tests per trip 10 seconds delay between tests and 1 second execution rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit Low Voltage Bank 2 Sensor 2	P0157	This DTC determines if the 02 sensor signal circuit is shorted low. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold. The diagnostic failure counter is incremented if the 02S signal is below the threshold value. This DTC is set based on the fail and sample counters.	Oxygen Sensor Signal	< 50 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Idle Device Control AIR Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Commanded Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active	TPS_ThrottleAuthorityDef aulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit _FA EvapFlowDuringNonPurg e_FA EvapVentSolenoidCircuit_ FA EvapVentSolenoidCircuit_ FA EvapSmallLeak_FA EvapSmallLeak_FA EvapEmissionSystem_FA FueITankPressureSnsrCkt _FA FueIInjectorCircuit_FA = Not active = Not act	320 failures out of 400 samples Frequency: Continuous in 100 milli- second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					All Fuel Injectors for active Cylinders Fuel Condition Ethanol Estimation in Progress Fuel State All of the above met for	Enabled (On) < 87 % Ethanol = Not Active (Please see <b>"Ethanol</b> Estimation in Progress" in Supporting Tables). DFCO not active > 5.0 seconds		

Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
<ul> <li>Bescription</li> <li>This DTC determines if the 02 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold.</li> <li>The diagnostic failure counter is incremented if the 02S signal is above the threshold value. This DTC is set based on the fail and sample counters.</li> </ul>	Oxygen Sensor Signal	> 1,050 mvolts	System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Only when FuelLevelDataFault	TPS_ThrottleAuthorityDef aulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_F A FuellnjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA 10.0 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False = False	100 failures out of 125 samples Frequency: Continuous in 100 milli- second loop	Ilium. Type B, 2 Trips
			Secondary delay after above conditions are complete (cold start condition) Secondary delay after above conditions are complete (not cold start condition) Commanded Equivalence Ratio	<ul> <li>&gt; 210.0 seconds when engine soak time &gt; 28,800 seconds</li> <li>&gt; 210.0 seconds when engine soak time &lt; 28,800 seconds</li> <li>&lt; 1.100 EQR</li> </ul>		
	<ul> <li>Description</li> <li>This DTC determines if the 02 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold.</li> <li>The diagnostic failure counter is incremented if the 02S signal is above the threshold value. This DTC is set based on the fail and sample counters.</li> </ul>	<ul> <li>Description</li> <li>This DTC determines if the 02 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold.</li> <li>The diagnostic failure counter is incremented if the 02S signal is above the threshold value. This DTC is set based on the fail and sample counters.</li> </ul>	Description         Oxygen Sensor Signal           8         This DTC determines if the 02 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold.         Oxygen Sensor Signal         > 1,050 mvolts           The diagnostic failure counter is incremented if the 02S signal is above the threshold value. This DTC is set based on the fail and sample counters.         The diagnostic failure counter is incremented if the 02S signal is above the threshold         Image: Counter is incremented if the 02S signal is above the threshold         Image: Counter is incremented if the 02S signal is above the threshold         Image: Counter is incremented if the 02S signal is above the threshold         Image: Counter is incremented if the 02S signal is above the threshold         Image: Counter is incremented if the 02S signal is above the threshold         Image: Counter is incremented if the 02S signal is above the threshold         Image: Counter is incremented if the 02S signal is above the threshold         Image: Counter is incremented if the 02S signal is above the threshold         Image: Counter is incremented is the counter is incremented	Description         Comparison           8         This DTC determines if the 02 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold.         Oxygen Sensor Signal         > 1,050 mvolts         No Active DTC's           The diagnostic failure counter is incremented if the 02S signal is above the threshold         System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum         System Voltage AFM Status Heater Warm-up delay Engine Run Accum           Low Fuel Condition Only when FuelLevelDataFault         Secondary delay after above conditions are complete (cold start condition)         Secondary delay after above conditions are complete (not cold start condition)           Secondary delay after above conditions are complete (not cold start condition)         Commanded Equivalence Ratio	Description         Oxygen Sensor Signal         > 1,050 mvolts         No Active DTC's         TPS_ThrottleAuthorityDef auted auted           8         This DTC determines if the 02 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold.         Oxygen Sensor Signal         > 1,050 mvolts         No Active DTC's         TPS_ThrottleAuthorityDef auted           10.050 mvolts         No Active DTC's         TPS_ThrottleAuthorityDef auted         HAF_SensorFA           signal and compares it to the threshold.         The diagnostic failure counter is incremented if the 02S signal is above the threshold value. This DTC is set based on the fail and sample counters.         System Voltage AFM Status Heater Warm-up delay Engine Run Accum         10.0 < Volts	Description         C         C         C           8         This DTC determines if the 02 sensor signal or open. When enabled, the diagnostic monitors the 023 signal and compares it to the threshold.         Oxygen Sensor Signal         > 1,050 mvolts         No Active DTC's         TPS_ThrottleAuthortlyDef aulted MAP_SensorFA MAP_SensorFA A EvapExcessPurgePsbLF A all of the 025 signal is above the threshold value. This DTC is set based on the fail and sample counters.         IO failures out 100 failures out 100 railines sensor FA A AIR System FA           10.0 < Volts

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Rich to Lean Bank 1 Sensor 1) (For use w/o WRAF	P015A	DTC P015A detects that the primary oxygen sensor for Bank 1 has delayed response when the air fuel ratio transitions from rich to lean condition. This diagnostic runs simultaneously with the intrusive secondary 02 monitor rich to lean tests (P013E / P013A/ P2271), which commands fuel cut off. Note: The Primary method is used when the primary 02 sensor signal transitions from above to below the 02 voltage threshold, otherwise the Secondary method is used. Primary method: The P015A diagnostic measures the primary 02 sensor response time between a rich condition above a starting voltage threshold and a lower voltage threshold. The response time is then scaled and normalized to mass air flow rate, engine speed, Baro, and intake air temperature resulting in a normalized delay	Primary Method: The EWMA of the Pre 02 sensor normalized R2L time delay value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient. This method calculates the result when the Pre 02 sensor voltage is OR Secondary Method: The Accumulated time monitored during the R2L Delayed Response Test. AND Pre 02 sensor voltage is	<ul> <li>&gt; 0.80 EWMA (sec)</li> <li>&lt; 0.55 EWMA (sec)</li> <li>&lt; 450mvolts</li> <li>&gt; 2.5 Seconds</li> <li>&gt; 100.0 mvolts</li> </ul>	No Active DTC's System Voltage EGR Device Control Idle Device Control Fuel Device Control Fuel Device Control AIR Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Green O2S Condition	TPS_ThrottleAuthorityDef aulted MAP_SensorFA IAT_SensorFA ECT_SensorFA ECT_SensorFA EvapPurgeSolenoidCircuit _FA EvapFlowDuringNonPurg e_FA EvapVentSolenoidCircuit_ FA EvapSmallLeak_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt _FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSens or_FA EngineMisfireDetected_F A P0131, P0132, P013A, P013B, P013E, P013F, P2270, P2271 >10.0 Volts = Not active = Not active = Not active = False = False = Not Valid, Green O2S condition is	Frequency: Once per trip Note: if NaESPD_b_Fast InitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_Rap idResponselsAct ive = TRUE, multiple tests per trip are allowed	Type A, 1 Trips EWMA

Component/ Fa System Co	ault ode	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		value. The normalized delay is fed into a 1st order lag filter to update the final EWMA result. DTC P015Ais set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR			02 Heater (pre sensor) on for Learned Htr resistance	considered valid until the accumulated air flow is greater than Multiple DTC Use_Green Sensor Delay Criteria - Limit for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. > 30 seconds = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's" )		
		feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. Secondary method: This fault is set if the primary 02 sensor does not achieve the required lower voltage threshold before a delay time threshold is reached.			Engine Coolant ( Or OBD Coolant Enable Criteria IAT Engine run Accum Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) Closed loop integral	<ul> <li>&gt; 55 °C</li> <li>=TRUE)</li> <li>&gt; -40 °C</li> <li>&gt; 30 seconds</li> <li>850 &lt; RPM &lt; 2,500</li> <li>800 &lt; RPM &lt; 2,550</li> <li>3.2 &lt; gps &lt; 11.5</li> <li>42.3 &lt; MPH &lt; 80.2</li> <li>38.5 &lt; MPH &lt; 82.0</li> <li>0.90 &lt; C/L lnt &lt; 1.07</li> </ul>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Closed Loop Active	= TRUE (Please see " <b>Closed</b> <b>Loop Enable</b> <b>Clarification</b> " in Supporting Tables).		
					Evap	notin control of purge		
					Ethanol Estimation in Progress	= Not Active (Please see <b>"Ethanol</b> <b>Estimation in Progress"</b> in Supporting Tables).		
					Baro Post fuel cell	> 70kpa = enabled		
					EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State	= not active = not active > 60.0 sec 575 < °C < 900 = DFCO possible		
					All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.			
					Pre O2S voltage B1S1 at end of Cat Rich stage Fuel State Number of fueled cylinders	<ul><li>&gt; 710mvolts</li><li>= DFCO active</li><li>&lt; 5 cylinders</li></ul>		
					After above conditions are met: DFCO Mode is _entered (wo driver			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					initiated pedal input).			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Lean to Rich Bank 1 Sensor 1) (For use w/o WRAF	P015B	DTC P015B detects that the primary oxygen sensor for Bank 1 has delayed response when the air fuel ratio transitions from lean to rich condition. This diagnostic runs simultaneously with the intrusive secondary 02 monitor lean to rich tests (P013F / P013B), which commands fuel enrichment. Note: The Primary method is used when	Primary method: The EWMA of the Pre 02 sensor normalized L2R time delay value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient. OR Secondary method: The Accumulated time monitored during the L2R Delayed Response Test. AND	<ul> <li>&gt; 0.85 EWMA (sec)</li> <li>&lt; 0.55 EWMA (sec)</li> <li>&gt; 2.0 Seconds</li> </ul>	No Active DTC's	TPS_ThrottleAuthorityDef aulted MAP_SensorFA IAT_SensorFA ECT_SensorFA ECT_SensorFA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit _FA EvapFlowDuringNonPurg e_FA EvapVentSolenoidCircuit_ FA EvapSmallLeak_FA EvapEmissionSystem_FA FueITankPressureSnsrCkt _FA	Frequency: Once per trip Note: if NaESPD_b_Fast InitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_Rap idResponselsAct ive = TRUE, multiple tests per trip are allowed	Type A, 1 Trips EWMA
		the primary 02 sensor signal transitions from lean condition to above the 02 voltage threshold, otherwise the Secondary method is used.	Pre 02 sensor voltage is OR At end of Cat Rich stage the Pre 02 sensor output is	< 450mvolts		FuellnjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSens or_FA EngineMisfireDetected F		
		Primary method: The P015B diagnostic measures the primary 02 sensor response time between a lean condition and a higher voltage threshold. The response time is then scaled and normalized to mass air flow rate, engine speed, Baro, and intake air temperature resulting in a normalized delay value. The normalized delay is fed into a 1st			P015Atest is complete and System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault	A P0131, P0132, P013A, P013B, P013E, P013F, P015A, P2270, P2271 = Passed >10.0 Volts = Not active = Not active = Not active = Not active = Not active = False = False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System		order lag filter to update the final EWMA result. DTC P015B is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. <u>Secondary method:</u> This fault is set if the primary 02 sensor does not achieve the required higher voltage threshold before a delay time threshold is reached.			Green 02S Condition 02 Heater (pre sensor) on for Learned Htr resistance Engine Coolant ( Or OBD Coolant Enable Criteria IAT Engine run Accum Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed range to Keep test or initially enable test Engine Airflow Vehicle Speed range to Vehicle Speed range to Keep test or initially Contended to initially Contended to initially Engine Airflow Vehicle Speed range to Contended to initially Contended to initially Contended to initially Engine Airflow Contended to initially Engine Airflow Contended to initially Contended to	= Not Valid, Green 02S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green</b> Sensor Delay Criteria - Limit for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. > 30 seconds = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's" ) > 55 °C =TRUE) > -40 °C > 30 seconds 850 < RPM < 2,500 800 < RPM < 2,550 3.2 < gps < 11.5 42.3 < MPH < 80.2		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					initially enabled)	38.5 < MPH < 82.0		
					Closed loop integral Closed Loop Active	0.90 < C/L Int < 1.07 = TRUE (Please see " <b>Closed</b> Loop Enable Clarification" in Supporting Tables).		
					Evap	notin control of purge		
					Ethanol Estimation in Progress	= Not Active (Please see <b>"Ethanol</b> Estimation in Progress" in Supporting Tables).		
					Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time	<ul> <li>&gt; 70kpa</li> <li>= enabled</li> <li>= not active</li> <li>&gt; 60.0 sec</li> </ul>		
					Predicted Catalyst temp Fuel State Number of fueled cylinders	575 <°C < 900 = DFCO inhibit > 1 cylinders		
					When above conditions are met: Fuel Enrich mode is entered.			
					============ During this test: Engine Airflow must stay between: and the delta Engine Airflow over 12.5msec	======================================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					must be :	< 2.0 gps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Rich to Lean Bank 2 Sensor 1) (For use w/o WRAF	P015C	DTC P015C detects that the primary oxygen sensor for Bank 2 has delayed response when the air fuel ratio transitions from rich to lean condition. This diagnostic runs simultaneously with the intrusive secondary 02 monitor rich to lean tests (P014AZ P013C / P2273), which	Primary method: The EWMA of the Pre 02 sensor normalized R2L time delay value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient. This method calculates the result when the Pre 02 sensor voltage is OR	<ul> <li>&gt; 0.80 EWMA (sec)</li> <li>&lt; 0.55 EWMA (sec)</li> <li>&lt; 450mvolts</li> </ul>	No Active DTC's	TPS_ThrottleAuthorityDef aulted MAP_SensorFA IAT_SensorFA ECT_SensorFA ECT_SensorFA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit _FA EvapFlowDuringNonPurg e_FA EvapVentSolenoidCircuit_ FA	Frequency: Once per trip Note: if NaESPD_b_Fast InitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_Rap idResponselsAct ive = TRUE, multiple tests per trip are allowed	Type A, 1 Trips EWMA
		commands fuel cut off. Note: The Primary method is used when the primary 02 sensor signal transitions from above to below the 02 voltage threshold, otherwise the	Secondary method: The Accumulated time monitored during the R2L Delayed Response Test. AND Pre 02 sensor voltage is above	<ul> <li>&gt; 2.5 Seconds</li> <li>&gt; 100mvolts</li> </ul>		EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt _FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSens		
		Secondary method is used. <u>Primary method:</u> The P015C diagnostic measures the primary 02 sensor response				or_FA EngineMisfireDetected_F A P0151, P0152, P013C, P013D, P014A, P014B, P2272, P2273		
		time between a rich condition above a starting voltage threshold and a lower voltage threshold. The response time is then			System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control	>10.0 Volts = Not active = Not active = Not active = Not active		
		scaled and normalized to mass air flow rate, engine speed, Baro, and intake air temperature resulting in a normalized delay			Low Fuel Condition Only when FuelLevelDataFault Green 02S Condition	= False = False = Not Valid, Green O2S condition is		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		value. The normalized delay is fed into a 1st order lag filter to update the final EWMA result. DTC P015C is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a			02 Heater (pre sensor) on for Learned Htr resistance	considered valid until the accumulated air flow is greater than Multiple DTC Use_Green Sensor Delay Criteria - Limit for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. > 30 seconds = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's" )		
		step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. <u>Secondary method:</u> This fault is set if the primary 02 sensor does not achieve the required lower voltage threshold before a delay time threshold is reached.			Engine Coolant (Or OBD Coolant Enable Criteria IAT Engine run Accum Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)	<ul> <li>&gt; 55 °C</li> <li>= TRUE)</li> <li>&gt; -40 °C</li> <li>&gt; 30 seconds</li> <li>850 &lt; RPM &lt; 2,500</li> <li>800 &lt; RPM &lt; 2,550</li> <li>3.2 &lt; gps &lt; 11.5</li> <li>42.3 &lt; MPH &lt; 80.2</li> <li>38.5 &lt; MPH &lt; 82.0</li> </ul>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Closed loop integral Closed Loop Active	0.90 < C/L Int < 1.07 = TRUE (Please see "Closed Loop Enable Clarification" in Supporting Tables).		
					Evap	notin control of purge		
					Ethanol Estimation in Progress	= Not Active (Please see " <b>Ethanol</b> <b>Estimation in Progress"</b> in Supporting Tables).		
					Baro Post fuel cell	> 70kpa = enabled		
					EGR Intrusive diagnostic All post sensor heater	= not active		
					delays O2S Heater (post sensor) on Time	= not active		
					Predicted Catalyst temp Fuel State	575 < °C < 900 = DFCO possible		
					All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.			
					Pre O2S voltage B1S1 at end of Cat Rich stage Fuel State Number of fueled cylinders ====================================	<ul> <li>&gt; 710mvolts</li> <li>= DFCO active</li> <li>&lt;= 5 cylinders</li> <li>====================================</li></ul>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					met: DFCO Mode is entered (wo driver initiated pedal input).			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System 02 Sensor Delayed Response Lean to Rich Bank 2 Sensor 1) (For use w/o WRAF	Code P015D	Description DTC P015D detects that the primary oxygen sensor for Bank 2 has delayed response when the air fuel ratio transitions from lean to rich condition. This diagnostic runs simultaneously with the intrusive secondary 02 monitor lean to rich tests (P014B / P013D), which commands fuel enrichment. Note: The Primary method is used when the primary 02 sensor	Primary method: The EWMA of the Pre 02 sensor normalized L2R time delay value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient. OR Secondary method: The Accumulated time monitored during the L2R Delayed Response Test. AND Pre 02 sensor voltage is	<ul> <li>&gt; 0.85 EWMA (sec)</li> <li>&lt; 0.55 EWMA (sec)</li> <li>&gt; 2.0 Seconds</li> <li>&lt; 450 mvolts</li> </ul>	No Active DTC's	TPS_ThrottleAuthorityDef aulted MAP_SensorFA IAT_SensorFA ECT_SensorFA ECT_SensorFA EvapPurgeSolenoidCircuit _FA EvapFlowDuringNonPurg e_FA EvapVentSolenoidCircuit_ FA EvapSmallLeak_FA EvapEmissionSystem_FA FueITankPressureSnsrCkt _FA FueIInjectorCircuit_FA	Frequency: Once per trip Note: if NaESPD_b_Fast InitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_Rap idResponselsAct ive = TRUE, multiple tests per trip are allowed	Ilium. Type A, 1 Trips EWMA
		ine primary 02 sensor signal transitions from lean condition to above the 02 voltage threshold, otherwise the Secondary method is used. <u>Primary method:</u> The P015D diagnostic measures the primary 02 sensor response time between a lean condition and a higher voltage threshold. The response time is then scaled and normalized to mass air flow rate, engine speed, Baro, and intake air temperature resulting in a normalized delay value. The normalized delay is fed into a 1st	OR At end of Cat Rich stage the Pre 02 sensor output is	< 710 mvolts	P015C test is complete and System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault	AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSens or_FA EngineMisfireDetected_F A P0151, P0152, P013C, P013D, P014A, P014B, P015C, P2272, P2273 = Passed >10.0 Volts = Not active = Not active = Not active = False = False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System	Fault Code	Monitor Strategy Description order lag filter to update the final EWMA result. DTC P015D is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. <u>Secondary method:</u> This fault is set if the primary 02 sensor does not achieve the required higher voltage threshold before a delay time threshold is reached.		Inreshold Value	Secondary Parameters         Green 02S Condition         02 Heater (pre sensor) on for         Learned Htr resistance         Engine Coolant (Or OBD Coolant Enable Criteria         IAT         Engine run Accum         Engine Speed to initially enable test         Engine Speed range to keep test enabled (after initially enabled)         Engine Airflow         Vehicle Speed to initially enable test	Enable Conditions = Not Valid, Green 02S condition is considered valid until the accumulated air flow is greater than Multiple DTC Use_Green Sensor Delay Criteria - Limit for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. > 30 seconds = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's" ) > 55 °C = TRUE) > -40 °C > 30 seconds 850 < RPM < 2,500 800 < RPM < 2,550 3.2 < gps < 11.5 42.3 < MPH < 80.2	Time Required	
					Vehicle Speed range to keep test enabled (after _initiallv enabled)	38.5 < MPH < 82.0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Closed loop integral Closed Loop Active	0.90 < C/L Int < 1.07 = TRUE (Please see " <b>Closed</b> Loop Enable Clarification" in Supporting Tables).		
					Evap	notin control of purge		
					Ethanol Estimation in Progress	= Not Active (Please see <b>"Ethanol</b> Estimation in Progress" in Supporting Tables).		
					Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time	<ul> <li>&gt; 70kpa</li> <li>= enabled</li> <li>= not active</li> <li>&gt; 60.0 sec</li> </ul>		
					Predicted Catalyst temp Fuel State Number of fueled cylinders	575 < °C < 900 = DFCO inhibit > 1 cylinders		
					When above conditions are met: Fuel Enrich mode is entered.			
					=======	======		
					During this test: Engine Airflow must stay between: and the delta Engine Airflow over 12.5msec must be :	0 gps < 13		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Performance Bank 2 Sensor 2	P0161	This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor. The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters.	Heater Current outside of the expected range of	0.4> amps > 4.3	No Active DTC's System Voltage Heater Warm-up delay 02S Heater device control B181 02S Heater Duty Cycle All of the above met for	ECT_Sensor_FA >10.0 Volts = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 3 tests per trip 10 seconds delay between tests and 1 second execution rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel System Too Lean Bank 1	P0171	Determines if the primary fuel control system for Bank 1 is in a lean condition, based on the filtered long- term and short-term fuel trim. A normally operating system operates centered around long-term fuel trim metric of 1.0. For lean conditions extra fuel trim is required therefor values > 1.0 indicate a Lean condition. A fault is determined, when the long term fuel metric exceeds the threshold value. In addition to the long- term fuel trim limit the	The filtered long-term fuel trim metric AND The filtered short-term fuel trim metric (Note: any value below 0.95 effectively nullifies the short-term fuel trim criteria)	>= 1.380 >= 0.100 If a fault has been detected the long-term fuel trim metric must be < 1.240 and the short-term fuel trim metric must be < 1.280 to repass the diagnostic.	The primary fuel trim diagnostic is enabled Engine speed BARO Coolant Temp Coolant Temp MAP Inlet Air Temp MAF Fuel Level	400 <rpm< 6,600<br="">&gt; 70 kPa &gt; -20 °C (or OBD Coolant Enable Criteria = TRUE) &lt; 150 °C 5 <kpa< 255<br="">-20 &lt;°C&lt; 150 1 <g 1,000<br="" s<="">&gt; 10% or if fuel sender is faulty the diagnostic will bypass the fuel level criteria. &gt; 19.0 seconds of data must accumulate on each trip, with at least 10.0 seconds of data in the current fuel trim cell before a pass or fail</g></kpa<></rpm<>	Frequency: 100 ms Continuous Loop	Type B, 2 Trips
		short-term fuel trim metric can be monitored and the fault sets once both threshold values are exceeded. The short- term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority.			Sometimes, certain Long- Term Fuel Trim Cells are not utilized for control and/or diagnosis Closed Loop Long Term FT	decision can be made. (Please see <b>P0171_P0172_P0174_P0</b> <b>175 Long-Term Fuel</b> <b>Trim Cell Usage</b> in Supporting Tables for a list of cells utilized for diagnosis) Enabled Enabled (Please see "Closed Loop Enable Clarification" and "Long		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					EGR Diag. Catalyst Diag. Post 02 Diag. Device Control EVAP Diag. No active DTC:	Term FT Enable Criteria" in Supporting Tables.) Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active Large Leak Diagnostic (P0455) Not Active IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapExcessPurgePsbI_F A Ethanol Composition Sensor FA FuelInjectorCircuit_FA EGRValvePerformance_F A EGRValvePerformance_F A EGRValveCircuit_FA MAP_EngineVacuumStat us AmbPresDfltdStatus TC_BoostPresSnsrFA 02S_Bank_1_Sensor_1_ FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long- term fuel trim metric.A normally operating system operates	Passive Test: The filtered Non-Purge Long Term Fuel Trim metric AND	<= 0.720		Secondary Parameters and Enable Conditions are identical to those for P0171, with the exception that fuel level is not considered.	Frequency: 100 ms Continuous Loop	Type B, 2 Trips
		centered around long- term fuel trim metric of 1.0. For rich conditions less fuel trim is required therefor values < 1.0 indicate a rich condition	The filtered Short Term Fuel Trim metric (Note: any value above 1.05 effectively nullifies the short-term fuel trim criteria)	<= 1.996				
		There are two methods to determine a Rich	Intrusive Test: For 2 out of 3 intrusive	*****	Purge Vapor Fuel	<= 15.00%	Segment	
		fault. They are Passive and Intrusive.	segments The filtered Purge Long	<= 0.730		Intrusive Test is inhibited when Purge Vapor	<b>Definition:</b> Segments can last up to 45	
		A Passive Test decision can be made up until the time that purge is first enabled. From that	Term Fuel Trim metric AND			percentage is greater than this threshold. (Note: values greater than 50% indicate the Purge Vapor	seconds and are separated by the lesser of 10.0 seconds of	
		point forward, rich faults can only be detected by turning	The filtered Non-Purge Long Term Fuel Trim metric	<= 0.720		Fuel requirement is not being used)	purge-on time or enough time to purge 11 grams	
		purge off intrusively. If during this period of time the filtered long- term fuel trim metric exceeds the threshold	AND The filtered Short Term Fuel Trim metric	<= 1.996		A minimum number of accumlated Fuel Trim Data samples are required to adequately learn a correct Purge	of vapor. A maximum of 3 completed segments or 15 attempts are	
		a fault will be set. In addition to the long- term fuel trim limit, the	(Note: any value above 1.05 effectively nullifies the short-term fuel trim	<i></i>		Vapor Fuel value. See the table Minimum Non-Purge	allowed for each intrusive test. After an intrusive	
		snort-term fuel frim metric can be monitored and the fault sets once both threshold values are	criteria)	detected (by the passive or intrusive test) the long-term fuel trim metric must be >		Samples for Purge (Vapor Fuel ) for the Purge Off cells used to validate the Purge Vapor Fuel parameter.	completed, another intrusive test cannot occur for 250 seconds	
		exceeded. The short-		0.810 and the short-			to allow sufficient	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority. Once purge is enabled if the filtered Purge Long Term Fuel Trim metric > 0.730, the test passes without intrusively checking the filtered Non-Purge Long Term Fuel Trim metric. However if the filtered Purge Long Term Fuel Trim metric is <= 0.730, the Intrusive test is invoked. The purge is ramped off to determine if excess purge vapor is the cause of the rich condition. If during 2 out of 3 intrusive segments, the filtered Purge Long Term Fuel Trim metric <= 0.720 the fault will set. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics. This is why the intrusive test is operated over several_		term fuel trim metric must be > 0.750 to repass the diagnostic. The intrusive test will be enabled at long- term fuel metric values < 0.81 until the diagnostic repasses after a failure.		If the accumulated purge volume is > 200.0 grams, the intrusive test will not be inhibited even if Purge Vapor Fuel is >15.0%.	time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge Long Term Fuel Trim metric > 0.730 for at least 200.0 seconds, indicating that the canister has been purged.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		segments allowing Purge to renable between segments. Likewise, for these reasons, if after the 3 intrusive segments the diagnostic continues to pass, there is a delay period of 250 seconds to allow sufficient time to purge excess vapors from the canister, before re-evaluating a Rich condition if it still exists.						

Component/ F System (	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel System Too Lean Bank 2	P0174	Determines if the primary fuel control system for Bank 2 is in a lean condition, based on the filtered long- term and short-term fuel trim. A normally operating system operates centered around long-term fuel trim metric of 1.0. For lean conditions extra fuel trim is required therefor values > 1.0 indicate a Lean condition. A fault is determined, when the long term fuel metric exceeds the threshold value. In addition to the long- term fuel trim limit, the short-term fuel trim metric can be monitored and the fault	The filtered long-term fuel trim metric AND The filtered short-term fuel trim metric (Note: any value below 0.95 effectively nullifies the short-term fuel trim criteria)	>= 1.380 >= 0.100 If a fault has been detected the long-term fuel trim metric must be < 1.240 and the short-term fuel trim metric must be < 1.280 to repass the diagnostic.	The primary fuel trim diagnostic is enabled Engine speed BARO Coolant Temp MAP Inlet Air Temp MAF Fuel Level Long Term Fuel Trim data accumulation:	400 <rpm< 6,600<br="">&gt; 70 kPa &gt; -20 °C (or OBD Coolant Enable Criteria = TRUE) &lt; 150 °C 5 <kpa< 255<br="">-20 &lt;°C&lt; 150 1 <g 1,000<br="" s<="">&gt; 10% or if fuel sender is faulty the diagnostic will bypass the fuel level criteria. &gt; 19.0 seconds of data must accumulate on each trip, with at least 10.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made.</g></kpa<></rpm<>	Frequency: 100 ms Continuous Loop	Type B, 2 Trips
		sets once both threshold values are exceeded. The short- term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority.			Sometimes, certain Long- Term Fuel Trim Cells are not utilized for control and/or diagnosis Closed Loop Long Term FT	(Please see P0171_P0172_P0174_P0 175 Long-Term Fuel Trim Cell Usage in Supporting Tables for a list of cells utilized for diagnosis) Enabled Enabled (Please see "Closed Loop Enable Clarification" and "Long Term FT Enable Criteria"		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					EGR Diag. Catalyst Diag. Post 02 Diag. Device Control EVAP Diag. No active DTC:	Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active Large Leak Diagnostic (P0455) Not Active IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapExcessPurgePsbl_F A Ethanol Composition Sensor FA FuellnjectorCircuit_FA EngineMisfireDetected_F A EGRValvePerformance_F A EGRValveCircuit_FA MAP_EngineVacuumStat us AmbPresDfltdStatus TC_BoostPresSnsrFA O2S_Bank_2_Sensor_1_ FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel System Too Rich Bank 2	P0175	Determines if the fuel control system is in a rich condition, based on the filtered long- term fuel trim metric.A normally operating system operates	Passive Test: The filtered Non-Purge Long Term Fuel Trim metric AND	<= 0.720		Secondary Parameters and Enable Conditions are identical to those for P0174, with the exception that fuel level is not considered.	Frequency: 100 ms Continuous Loop	Type B, 2 Trips
		centered around long- term fuel trim metric of 1.0. For rich conditions less fuel trim is required therefor values < 1.0 indicate a rich condition	The filtered Short Term Fuel Trim metric (Note: any value above 1.05 effectively nullifies the short-term fuel trim criteria)	<= 1.996				
		There are two methods to determine a Rich fault. They are Passive	<b>Intrusive Test:</b> For 2 out of 3 intrusive segments,	******	Purge Vapor Fuel	************************************	Segment Definition: Segments can	
		A Passive Test decision can be made up until the time that purge is	the filtered Purge Long Term Fuel Trim metric AND	<= 0.730		this threshold. (Note: values greater than 50% indicate the Purge Vapor Fuel requirement is not	seconds and are separated by the lesser of 10.0 seconds of	
		point forward, rich faults can only be detected by turning purge off intrusively. If during this period of	The filtered Non-Purge Long Term Fuel Trim metric AND	<= 0.720		A minimum number of accumlated Fuel Trim Data samples are required to adequately	enough time to purge 11 grams of vapor. A maximum of 3 completed	
		time the filtered long- term fuel trim metric exceeds the threshold a fault will be set. In addition to the long- term fuel trim limit the	The filtered Short Term Fuel Trim metric (Note: any value abovel.05 effectively	<= 1.996		learn a correct Purge Vapor Fuel value. See the table Minimum Non-Purge Samples for Purge	segments or 15 attempts are allowed for each intrusive test. After an intrusive	
		short-term fuel trim metric can be monitored and the fault sets once both threshold values are exceeded. The short-	fuel trim criteria)	If a fault has been detected (by the passive or intrusive test) the long-term fuel trim metric must be >		for the Purge Off cells used to validate the Purge Vapor Fuel parameter. If the accumulated purge volume is > 200.0 grams,	completed, another intrusive test cannot occur for 250 seconds to allow sufficient time to	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority. Once purge is enabled if the filtered Purge Long Term Fuel Trim metric > 0.730, the test passes without intrusively checking the filtered Non-Purge Long Term Fuel Trim metric. However if the filtered Purge Long Term Fuel Trim metric is <= 0.730, the Intrusive test is invoked. The purge is ramped off to determine if excess purge vapor is the cause of the rich condition. If during 2 out of 3 intrusive segments, the filtered Purge Long Term Fuel Trim metric <= 0.720 the fault will set. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics. This is why the intrusive test is operated over several_		0.810 and the short- term fuel trim metric must be > 0.750 to repass the diagnostic. The intrusive test will be enabled at long- term fuel metric values < 0.81 until the diagnostic repasses after a failure.		the intrusive test will not be inhibited even if Purge Vapor Fuel is >15.0%. (Note: values greater than 50% indicate the Purge Vapor Fuel requirement is not being used)	purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge Long Term Fuel Trim metric > 0.730 for at least 200.0 seconds, indicating that the canister has been purged.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		segments allowing Purge to renable between segments. Likewise, for these reasons, if after the 3 intrusive segments the diagnostic continues to pass, there is a delay period of 250 seconds to allow sufficient time to purge excess vapors from the canister, before re-evaluating a Rich condition if it still exists.						

Threshold value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
r < 145	Fuel Temperature Out of Range Diagnoistic Enabled No Fault Active on No Fault Pending on	True Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (P16E4, P16E5) SENT Intenal Error Fault Active (P126E) Fuel Temperature Sensor SENT Message Error Fault Active (P128C) SENT Intenal Error Fault Pending (P126E) Fuel Temperature Sensor SENT Message Error	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
O J.(	or < 145	or Je     < 145	Intestion value       Secondary Parameters       Enable Conditions         or Je       < 145	Intestidut value     Secondary Parameters     Enable Conditions     Intervenueu       or Je     < 145

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Temperature Sensor 1 Circuit High Fault	P0183	This DTC diagnose SENT fuel rail temperature sensor 1 that is too high out of range. If the sensor digital value (representing the	Fuel Temperature Sensor 1 SENT digital read value	> 1,865	Fuel Temperature Out of Range Diagnoistic Enabled	True Enabled when a code clear is not active or not	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
		reference voltage) is above the upper digital threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if			No Fault Active on	exiting device control SENT Communication Fault Active (P16E4, P16E5) SENT Intenal Error Fault Active (P126E)		
		the high sample counter reaches its threshold.				Fuel Temperature Sensor SENT Message Error Fault Active (P128C)		
					No Fault Pending	SENT Intenal Error Fault Pending (P126E)		
						Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)		

System Code Description	n C	Time Required	llium.
SENT Fuel Rail Temperature Sensor 2 Circuit Low Fault       P0187       This DTC diagnose SENT fuel rail temperature sensor 2 that is too low out of range.       Fuel Temperature Sensor 1 SENT digital read value       < 145.00	Fuel P rature r 2 Low	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Temperature Sensor 2 Circuit High Fault	P0188	This DTC diagnose SENT fuel rail temperature sensor 2 that is too high out of range. If the sensor digital value (represnting the refernce voltage) is above the upper digital read threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported for this DTC if the high sample counter reaches its threshold.	Fuel Temperature Sensor 1 SENT digital read value	> 1,865.00	Fuel Temperature Out of Range Diagnoistic Enabled No Fault Active on	True Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (P16E4, P16E5) SENT Intenal Error Fault Active (P126F) Fuel Temperature Sensor SENT Message Error FaultActive (P128D) SENT Intenal Error Fault Pending (P126F) Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
Component/ Fa System C	<sup>F</sup> ault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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Fuel P Pressure Sensor "B" Circuit Range/ Performance	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range using an intrusive test (as follows) a] Intrusive Test Trigger: 1] Fuel Pump Duty Cycle Clamped Time (min or max duty cycle) >= 5 sec Or 2] Fuel Pres Err Variance <= calibration value KeFDBR_cmp_FPSS_ MinPres Variance ; Otherwise, Report status as Pass b] Intrusive test freq limit: 60 sec between intrusive test sthat pass, c] Intrusive test Fuel Flow limit: Fuel Flow Actual < Max allowed Fuel Flow rate	Sensed fuel pressure change [absolute value, during intrusive test]	<= 30 kPa	<ul> <li>a) Diagnostic enabled [FDBR b FP8S DiagEnb Id]</li> <li>b) Timer Engine Running [FDBR_t_EngModeRunC oarse]</li> <li>c1) Fuel Flow Rate Valid</li> <li>c2) FDB_FuelPresSnsrCktFA</li> <li>c3) Reference Voltage Fault Status [DTC P0641]</li> <li>c4) FAB_FuelPmpCktFA</li> <li>c5) Fuel Control Enable Fault Active [DTC P12A6]</li> <li>c6) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255]</li> <li>c7) Fuel Pump Speed Fault Active [DTCP129F]</li> <li>c8) CAN Sensor Bus message \$0C3 Comm Fault [CFMR_b_FTZM_Info1_U codeCmFA DTC P165C]</li> <li>c9) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_ UcodeCmFA DTC]</li> </ul>	a) == TRUE b) >= 5.00 seconds c1) == TRUE c2) <> TRUE c3) <> TRUE c4] <> TRUE c5) <> TRUE c6) <> TRUE c6) <> TRUE c7) <> TRUE c8) <> TRUE c8) <> TRUE	1 sample/ 12.5 millisec Intrusive Test Duration: Fuel Flow - related ( 5 to 12 sec)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					c10) Fuel Pump Duty Cycle Fault Active	c10) <> TRUE		
					c11) Sensor Configuration [FDBR_e_FuelPresSnsrC onfig]	c11) == CeFDBR_e_WiredTo_EC M		
					c12) Sensor Bus Relay On	<sub>c</sub> 12) == TRUE		
					d) Emissions Fuel Level Low [Message \$3FB]	d) <> TRUE		
					e) Fuel Control Enable	e) == TRUE		
					f) Fuel Pump Control State	f) == Normal Control OR == Fuel Pres Sensor Stuck Control		
					g) Instantaneous Fuel Flow [FCBR_dm_InstFuelFlow]	g) >= 0.05 gm/sec		
					h) Diagnostic System Disabled [DRER_b_DiagSysDsb]	h) <> TRUE		
					j1) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B \$0CE] [CFMR_b_FTZM_Cmd1_ ARC_ChkErr DTC]	j1)<> TRUE		
					j2) CAN Sensor Bus message \$0C3_Available	j2) == TRUE		
					j3) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and	j3) <> TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Checksum Error [CAN Bus B \$0C3] [CFMR_b_FTZM_Info1_A RC ChkErr DTC]			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Sensor "B" Circuit Low	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low Values are analyzed as percent of sensor reference voltage [[Abs [5.0V - SensorVoltsActual]/ 5.0V] *100%]	Fuel Pressure Sensor output % [re. full range as percent of 5.0V reference]	< 4.00 % or [0 kPa gauge]	<ul> <li>a) Diagnostic enabled [FDBR_b_FPSnsrCktLoDi agEnbl]</li> <li>b) Run_Crank Active [PMDR_b_RunCrankActiv e</li> <li>c) Diagnostic System Disabled [DRER_b_DiagSysDsbl]</li> <li>d) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrC onfig]</li> </ul>	a) == TRUE b) == TRUE c) <> TRUE d1) IF calibration CeFDBR_e_WiredTo_EC M == WiredTo ECM d2) IF NOT, then see Case2	64.00 failures/ 80.00 samples 1 sample/12.5 ms	Type B, 2 Trips
			Fuel Pressure Sensor output % [re. full range as percent of 5.0V reference]	< 4.00 % or [0 kPa gauge]	<ul> <li>a) Diagnostic enabled [FDBR_b_FPSnsrCktLoDi agEnbl]</li> <li>b) Run_Crank Active [PMDR_b_RunCrankActiv e</li> <li>c) Diagnostic System Disabled [DRER_b_DiagSysDsbl]</li> <li>d1) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrC onfig]</li> <li>d2) Sensor Bus Relay On</li> <li>d3) CAN Sensor Bus message \$0C3_Available</li> <li>d4) Fuel Pres Sensor Ref</li> </ul>	a) == TRUE b) == TRUE c) <> TRUE d1) IF calibration CeFDBR_e_WiredTo_EC M == WiredTo FTZM d2) == TRUE d3) == TRUE d4) <> TRUE	64.00 failures/ 80.00 samples 1 sample/12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B \$0C3] [CFMR_b_FTZM_Info1_A RC ChkErr DTC]	d2) IF calibration CeFDBR_e_WiredTo_EC M <> WiredTo FTZM, then see Casel		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Sensor "B" Circuit High	P018D	This DTC detects if the fuel pressure sensor circuit is shorted High Values are analyzed as percent of sensor reference voltage [[Abs [5.0V - SensorVoltsActual]/ 5.0V] *100%]	Fuel Pressure Sensor output % [re. full range as percent of 5.0V reference]	> 96.00 % or [743 kPa ga]	<ul> <li>a) Diagnostic enabled [FDBR_b_FPSnsrCktLoDi agEnbl]</li> <li>b) Run_Crank Active [PMDR_b_RunCrankActiv e</li> <li>c) Diagnostic System Disabled [DRER_b_DiagSysDsbl]</li> <li>d) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrC onfig]</li> </ul>	a) == TRUE b) == TRUE c) <> TRUE d1) IF calibration CeFDBR_e_WiredTo_EC M == WiredTo ECM d2) IF NOT, then see Case2	64.00 failures/ 80.00 samples 1 sample/12.5 ms	Type B, 2 Trips
			Fuel Pressure Sensor output % [re. full range as percent of 5.0V reference]	> 96.00 % or [743 kPa ga]	<ul> <li>a) Diagnostic enabled [FDBR_b_FPSnsrCktLoDi agEnbl]</li> <li>b) Run_Crank Active [PMDR_b_RunCrankActiv e</li> <li>c) Diagnostic System Disabled [DRER_b_DiagSysDsbl]</li> <li>d1) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrC onfig]</li> <li>d2) Sensor Bus Relay On</li> <li>d3) CAN Sensor Bus message \$0C3_Available</li> <li>d4) Fuel Pres Sensor Ref</li> </ul>	<ul> <li>a) == TRUE</li> <li>b) == TRUE</li> <li>c) &lt;&gt; TRUE</li> <li>d1) IF calibration CeFDBR_e_WiredTo_EC M == WiredTo FTZM</li> <li>d2) == TRUE</li> <li>d3) == TRUE</li> <li>d4) &lt;&gt; TRUE</li> </ul>	64.00 failures/ 80.00 samples 1 sample/12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B \$0C3] [CFMR_b_FTZM_Info1_A RC ChkErr DTC]	d2) IF calibration CeFDBR_e_WiredTo_EC M <> WiredTo FTZM, then see Casel		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT SIDI High Pressure Sensor Performance	P0191	The DTC determines if there is a skewed control fuel rail sensor (Sensori) via a comparison to diagnostic sensor (sensor2) continuously when the engine is running and the commanded pressure is steady.	Primary sensor (P1) vs. Secondary sensor (P2) performance rationality ((Low Limit fail Filtered Fuel Control Error ) OR	<= P0191 - Low fail limit of fuel control due to pressure sensor skewed low (See supporting table)	Commanded Pressure rate of change (increasing or dercresing) for a period of time	<3.00 mpa >= 1.25 seconds	Filter Fuel Control Error term and Absolute delta between sensori and sensor2 exceed Low or High Fail limit for a duration >= 1.50 seconds	Type A, 1 Trips
			(High Limit Fail: Filtered Fuel Control Error)) AND (Filtered Absolute delta between sensori and sensor2	>= P0191 - High fail limit of fuel control due to high pressure sensor skewed High (see Supporting table) >= 1.00 mpa		Enabled when a code clear is not active or not exiting device control	This is diagnostic runs Continuous	
				Note: fuel control error is calcuated based on the squreroot of senorl divided by sensor2, this value is filter to ensure proper failure detection. Absolute delta between concert and				
				between sensori and sensor2 value is filter to ensure proper failure detection.				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Pressure Sensor 1 Out of Range	P0192	This DTC diagnose SENT high pressure sensor 1 that is too low out of range. If the sensor digital value (repressing the refernce voltage) is below the lower digital threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold.	High Pressure Rail Sensor 1 SENT digital read value	=< 76			Time Based: 400 Failuerout of 500 Samples 6.25 ms per Sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Coolant Temperature Dropped Below Diagnostic Monitoring Temperature	P01F0	This DTC detects an unexplained cooling system cool down below the OBD monitoring threshold during normal operating conditions. This check is run throughout the key cycle.	For this application the "type" cal (KeTHMG_b_TM8_ElecT hstEquipped) = 0 If the type cal is equal to one, the application has an electrically heated t- stat, if equal to zero the the application has an non heated t-stat. See appropriate.section.below. Type cal above = 0 (non - heated t-stat) == == == Engine coolant temperature Type cal above = 1 (Electrically heated t-stat) == == == Engine coolant temperature	< 78.9 Deg C < 73.9 Deg C	No Active DTC's Engine Runtime Distance traveled this key cycle Ambient air pressure Ambient air temperature  Engine coolant temperature At least once during the key cycle Type 0 (non-heated t-stat) Type 1 (Electrically heated T:stat) Heat to coolant DFCO time Thermostat duty cycle RPM Active Fuel Management is not in	ECT_Sensor_Ckt_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA THMR_AWP_AuxPumpF A THMR_SWP_Control_FA EngineTorqueEstInaccura te ECT_Sensor_Perf_FA THMR_SWP_NoFlow_FA THMR_SWP_FlowStuckO n_FA > 30.0 seconds > 1.2 km > 55.0 kPa > -9.0 Deg C > 80 Deg C > 79.9 to 94.4 DegC Cool Down Diagnostic > Min Heat to Coolant <0.0 seconds <100.0% <8,192 Half Cylinder Mode	30 seconds out of a 60 seconds window Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 Open Circuit - (SIDI)	P0201	Controller specific output driver circuit diagnoses Injector 1 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 1 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 Open Circuit - (SIDI)	P0202	Controller specific output driver circuit diagnoses Injector 2 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 2 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector3 Open Circuit - (SIDI)	P0203	Controller specific output driver circuit diagnoses Injector3 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injectors high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 Open Circuit - (SIDI)	P0204	Controller specific output driver circuit diagnoses Injector 4 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 4 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injectors Open Circuit - (SIDI)	P0205	Controller specific output driver circuit diagnoses Injectors low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injectors high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >= 1 Sec P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 Open Circuit - (SIDI)	P0206	Controller specific output driver circuit diagnoses Injector 6 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 6 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short low or open in TPS2 circuit by monitoring the TPS 2 sensor percent Vref and failing the diagnostic when the TPS percent Vref is too low. This diagnostic only runs when battery voltage is high enough.	TPS2 % Vref<	0.250 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
TPS2 Circuit High	P0223	Detects a continuous or intermittent short high in TPS2 circuit by monitoring the TPS 2 sensor percent Vref and failing the diagnostic when the TPS percent Vref is too high. This diagnostic only runs when battery voltage is high enough.	TPS2 % Vref>	4.590 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Secondary Circuit Low [FPPM applications only]	P0231	This DTC detects if the fuel pump control circuit is shorted to low. Fuel Pump Power Driver device reports a Faulted state enumeration if current >= 18A [25A for high performance variants. FPDCM reports Not Faulted enumeration if current < 18A FPDCM reports Indeterminate state enumeration if the circuit is not being evaluated during current decision loop due to other conditions.	Power driver output current ( Fuel Pump Power Module Driver Circuit Ground Short enumeration)	Current >= 18.0 A	<ul> <li>a) Chassis Fuel Pres Sys Type configuration selection</li> <li>b) Diagnostic Enabled</li> <li>c) Fuel Pump Control Enable command</li> <li>d) Fuel Pump Control Enable time [FAFR FPPM GshtDlyThr]</li> <li>e) System Voltage</li> <li>f) FPDCM Driver Status Alive Rolling Count Sample Faulted</li> <li>g) Diagnostic feedback received</li> </ul>	<ul> <li>a) == FCBR Gas ECM FPPM Sys</li> <li>b) == TRUE</li> <li>c) == TRUE</li> <li>d) &gt;= 40.00 seconds</li> <li>e) &gt; 7.00 Volts</li> <li>f) &lt;&gt;TRUE</li> <li>g) == TRUE</li> </ul>	64.00 failures/ 80.00 samples 1 sample/12.5 millisec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Secondary Circuit High [FPPM applications only]	P0232	This DTC detects if the fuel pump control circuit is shorted to high voltage by measuring voltage offset relative to low state level of duty cycle pulse. Fuel Pump Power device reports a Faulted state enumeration if circuit voltage >= 4V. FPPM reports Not Faulted enumeration if circuit voltage < 4V. FPPM reports Indeterminate state enumeration if the circuit is not being evaluated during current decision loop due to other conditions.	Voltage offset relative to low state level of duty cycle pulse measured at fuel pump circuit	>4.0 V	<ul> <li>a) Chassis Fuel Pres Sys Type configuration selection</li> <li>b) Diagnostic Enabled</li> <li>c) Diagnostic System Disabled</li> <li>d) Fuel Pump Control Enabled</li> <li>e] Arbitrated Fuel Pump Duty Cycle Rate of Change [FCBR]</li> <li>f] System voltage</li> <li>g] FPPM Driver Status Alive Rolling Count Sample Faulted</li> <li>h] Diagnostic serial data received</li> </ul>	<ul> <li>a) == FCBR Gas ECM FPPM Sys</li> <li>b) == TRUE</li> <li>c) &lt;&gt; True</li> <li>d) == TRUE</li> <li>e] &gt;= -100.0 % / sec</li> <li>f] &gt; 7.0 volts</li> <li>g] &lt;&gt; True</li> <li>h] == TRUE</li> </ul>	64 failures/ 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Secondary Circuit Open [FPPM applications only]	P023F	This DTC detects if the fuel pump control circuit is open Fuel Pump Power device reports a Faulted state enumeration if current <= 1A. FPPM reports Not Faulted enumeration if current > 1A. FPPM reports Indeterminate state enumeration if the circuit is not being evaluated during current decision loop due to other conditions.	Output driver current (Fuel Pump Power Module Driver Circuit Open enumeration)	Current <= 1.0 A	<ul> <li>a] Chassis Fuel Pres Sys Type configuration selection</li> <li>b] Diagnostic Enabled</li> <li>c] Arbitrated Fuel Pump Duty Cycle (%)</li> <li>d] Fuel Pump Control Enable Faulted</li> <li>e] FPPM Fuel Pmp Driver Over-temperature Faulted</li> <li>f] FPPM Driver Status Alive Rolling Count Sample Faulted</li> <li>g] Diagnostic feedback received</li> <li>h] System Voltage</li> </ul>	<ul> <li>a] == FCBR Gas ECM FPPM Sys</li> <li>b] == TRUE</li> <li>c] &gt; 59.25 %</li> <li>d] &lt;&gt; TRUE</li> <li>e] &lt;&gt; TRUE</li> <li>f] &lt;&gt; TRUE</li> <li>g] == TRUE</li> <li>h] &gt; 11.00 Volts</li> </ul>	40 failures/ 80 samples 1 sample/12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 Low side circuit shorted to ground (SIDI)	P0261	Controller specific output driver circuit diagnoses Injector 1 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 Low side circuit shorted to power (SIDI)	P0262	Controller specific output driver circuit diagnoses Injector 1 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 Low side circuit shorted to ground (SIDI)	P0264	Controller specific output driver circuit diagnoses Injector 2 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 Low side circuit shorted to power (SIDI)	P0265	Controller specific output driver circuit diagnoses Injector 2 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector3 Low side circuit shorted to ground (SIDI)	P0267	Controller specific output driver circuit diagnoses Injector3 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector3 Low side circuit shorted to power (SIDI)	P0268	Controller specific output driver circuit diagnoses Injector3 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 Low side circuit shorted to ground (SIDI)	P0270	Controller specific output driver circuit diagnoses Injector 4 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 Low side circuit shorted to power (SIDI)	P0271	Controller specific output driver circuit diagnoses Injector 4 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injectors Low side circuit shorted to ground (SIDI)	P0273	Controller specific output driver circuit diagnoses Injectors low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injectors Low side circuit shorted to power (SIDI)	P0274	Controller specific output driver circuit diagnoses Injectors low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 Low side circuit shorted to ground (SIDI)	P0276	Controller specific output driver circuit diagnoses Injector 6 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 Low side circuit shorted to power (SIDI)	P0277	Controller specific output driver circuit diagnoses Injector 6 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position System Variation Not Learned	P0315	This DTC determines if the crankshaft sensor learn values that are stored in memory are valid. The angle between each tooth of the reluctor wheel is learned, and the sum of all angles together should sum to 360° (one revolution of the reluctor wheel). Default values, or corrupted values will not sum to 360°.	The Crankshaft target wheel should be 360 degrees around in circumference. Loss or controller non-volitile memory or an error in memory will cause the values of individual teeth learn to be defaulted or incorrect. Set the DTC if the Difference between the sum of the reluctor wheel's teeth and 360 degrees is greater than:	> 0.001 degrees	OBD Manufacturer Enable Counter	MEC = 0	0.50 seconds Frequency Continuous100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Performance Per Cylinder	P0324	This diagnostic checks for knock sensor performance out of the normal expected range on a per cylinder basis due to Excessive Knock (either real or false knock). In the knock detection algorithm, the term "Knock Intensity" (KI) is used to define the relative size of a knock event, and is calculated as (KI = current knock event - knock threshold). This results in a KI amplitude that is proportional to the size of the knock event (as seen by the knock sensor). In addition, Knock Intensity cannot be less than zero as it is forced/limited to be = 0 with no knock detected (i.e. whenever the current knock event < knock threshold, KI = 0). This diagnostic calculates a first-order lag filter version of the Knock Intensity and sets a fault when: (Filtered KI) > (Excessive Knock Diagnostic Threshold)	Filtered Knock Intensity (where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock)	> P0324_PerCyl_Exces siveKnock_Threshol d (no units)	Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	Yes > 2.0 seconds > 400 RPM AND < 8,500 RPM >50 mg/cylinder AND < 2,000 mg/cylinder > -40 deg's C = TRUE > -40 deg's C > 84 revs	First Order Lag Filters with Weight Coefficient = 0.0480 Updated each engine event	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic checks for an open in the knock sensor circuit Sensor 1/Bank 1. There are two possible methods used: <b>1.20 kHz Method:</b> This method injects a 20 kHz signal (internal to the ECU) onto one of the Knock Sensor inputs. For a normal/ good circuit the 20 kHz signal will propogate through the Knock sensor and back to the	Open Circuit Method chosen (2 possible methods: 20 kHz or Normal Noise): Filtered FFT Output	= P0325_P0330_OpenM ethod_2 <u>Case 1 (20 kHz</u> <u>Method):</u> > P0325_P0330_OpenC ktThrshMin (20 kHz) AND < P0325_P0330_OpenC ktThrshMax (20 kHz)	Diagnostic Enabled? Engine Run Time Engine Speed Cumulative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow	Yes > 2.0 seconds > 550 RPM and < 8,500 RPM > 67 revs > 50 mg/cylinder	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	Type A, 1 Trips
		ECU through the sensor return circuit. The 20 kHz signal is processed through the Fast Fourier Transform (FFT) and then filtered with a first-order lag filter. Since the Knock Detection algorithm uses a Differential Op- Amp to compare the input from the two	Filtered FFT Output	Case 2 (Normal Noise Method): > P0325_P0330_OpenC ktThrshMin (Normal Noise) AND < P0325_P0330_OpenC ktThrshMax (Normal	Engine Coolant Temperature or OBD Coolant Enable Criteria	and < 2,000 mg/cylinder > -40 deg's C = TRUE		
		knock sensor wires, the FFT 20 kHz diagnostic signal will have either: A. Low output with a good circuit (because the 20 kHz injected signal is detected on both of the sensor inputs) or B, High output for an Open Circuit (because		Noise)	Inlet Air Ternperature	> -40 deg's C		
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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		the 20 kHz injected signal is detected only on one of the sensor inputs). The 20 kHz method is typically used for the entire operating region of the engine. However, some engines may not have adequate separation between good and bad circuits at high engine speed. In these cases the 20 kHz method is used at low and medium engine speeds, and the "Normal Noise" method is used at high engine speed only.						
		2. Normal Noise: The Normal Noise method monitors the background engine noise level for a selected frequency range output of the knock detection FFT. The background noise (i.e. Normal Noise) is filtered with a first-order lag filter. A good circuit is determined when the filtered Normal Noise signal is greater than the threshold. See Supporting Tables for method definition: <b>P0325 P0330 OcenM</b>						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		ethod defines which of the two diagnostic methods is used as a fucntion of engine speed (RPM). Typical implementations: A. Use 20 kHz method at allengine RPM (used when acceptable separation achieved at all RPM) or B. Use 20 kHz method at low/medium RPM and Normal Noise at high RPM						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Performance Bank 1	P0326	This diagnostic checks for knock sensor performance out of the normal expected range, on a per sensor basis. This diagnostic is specifically designed to identify the fault condition where the knock sensor is properly attached electrically, but produces an abnormally low output due to being unattached (or loosely attached) with the mounting bolt (and thus unable to properly transfer the engine vibration energy from the engine block to the knock sensor). The term "Abnormal (engine) Noise" is used to define this diagnostic method. A fault condition is identified when a first-order lag filtered version of the Abnormal Noise signal falls below the diagnostic threshold.	Filtered FFT Intensity (where 'FFT Intensity' = Non-knocking, background engine noise for a selected frequency) Filtered FFT Intensity	Case 1: Engine not in AFM mode	Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature Individual Cylinders enabled for Abnormal Noise	Yes > 2.0 seconds > 2,000 RPM (not in AFM mode) OR > 2,000 (in AFM mode) AND < 8,500 RPM > 50mg/cylinder AND < 2,000 mg/cylinder > -40 deg's C = TRUE > -40 deg's C P0326_P0331_Abnormal NoiseCyIsEnabled (Supporting Table) > 334 Revs	First Order Lag Filters with Weight Coefficient = 0.0034 Updated each engine event	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Circuit Low Bank 1	P0327	This diagnostic checks for an out of range low knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage.	Sensor Input or Return Signal Line	< 8.0 Percent (of 5.0 Volt reference)	Diagnostic Enabled? Engine Speed	Yes > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Circuit High Bank 1	P0328	This diagnostic checks for an out of range high knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage.	Sensor Input or Return Signal Line	> 39.0 Percent (of 5 Volt Reference)	Diagnostic Enabled? Engine Speed	Yes > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Circuit Bank 2	P0330	This diagnostic checks for an open in the knock sensor circuit Sensor 2/Bank 2 There are two possible methods used: <b>1.20 kHz Method:</b> This method injects a 20 kHz signal (internal to the ECU) onto one of the Knock Sensor inputs. For a normal/ good circuit the 20 kHz signal will propogate through the Knock sensor and back to the ECU through the sensor return circuit. The 20 kHz signal is processed through the Fast Fourier Transform (FFT) and then filtered with a first-order lag filter. Since the Knock Detection algorithm uses a Differential Op- Amp to compare the input from the two knock sensor wires, the FFT 20 kHz diagnostic signal will have either: A. Low output with a good circuit (because the 20 kHz injected signal is detected on both of the sensor inputs) or B, High output for an	Individual Sensor Thresholds Enabled? Open Circuit Method chosen (2 possible methods: 20 kHz or Normal Noise): Filtered FFT Output	<pre>= 0, Use Case 1 and 2 = P0325_P0330_OpenM ethod_2 (supporting table) Case 1 (20 kHz Method): &gt; P0325_P0330_OpenC ktThrshMin (20 kHz) AND &lt; P0325_P0330_OpenC ktThrshMax (20 kHz) Case 2 (Normal Noise Method): &gt; P0325_P0330_OpenC ktThrshMin (Normal Noise) AND &lt; P0325_P0330_OpenC ktThrshMax (Normal Noise) Case 3 (20 kHz Method):</pre>	Diagnostic Enabled? Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Ternperature	Yes > 2.0 seconds > 550 RPM and < 8,500 RPM ≥ 67 revs > 50 mg/cylinder and < 2,000 mg/cylinder > -40 deg's C = TRUE > -40 deg's C	First Order Lag Filter with Weight Coefficient Coefficient = 0.0100 Updated each engine event	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System	Fault Code	Monitor Strategy DescriptionOpen Circuit (because the 20 kHz injected signal is detected only on one of the sensor inputs).The 20 kHz method is typically used for the entire operating region of the engine. However, some engines may not have adequate separation between good and bad circuits at high engine speed. In these cases the 20 kHz method is used at low and medium engine speeds, and the 	Malfunction Criteria Filtered FFT Output Filtered FFT Output	Threshold Value  P0330_OpenCktThrs hMin2 (20 kHz) AND <p0330_opencktthrs (20khz)="" (nn)="" (nn)<="" (normal="" 4="" <p0330_opencktthrs="" and="" case="" hmax2="" hmin2="" method):="" noise="" p0330_opencktthrs="" td=""><td>Secondary Parameters</td><td>Enable Conditions</td><td>Time Required Case 3 &amp; 4 Weight Coefficient = 0.01 Updated each engine event</td><td>MIL Ilium.</td></p0330_opencktthrs>	Secondary Parameters	Enable Conditions	Time Required Case 3 & 4 Weight Coefficient = 0.01 Updated each engine event	MIL Ilium.
		range output of the knock detection FFT. The background noise (i.e. Normal Noise) is filtered with a first-order lag filter. A good circuit is determined when the filtered Normal Noise signal is greater than the threshold. See Suooorting Tables_						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		for method definition: <b>P0325_P0330_OpenM</b> <b>ethod</b> defines which of the two diagnostic methods is used as a fucntion of engine speed (RPM). Typical implementations: A. Use 20 kHz method at allengine RPM (used when acceptable separation achieved at all RPM) or B. Use 20 kHz method at low/medium RPM and Normal Noise at high RPM For each method the failure thresholds can be the same for both sensors (in a 2 sensor application), or the failure thresholds can be unique to each sensor.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Performance Bank 2	P0331	This diagnostic checks for knock sensor performance out of the normal expected range, on a per sensor basis. This diagnostic is specifically designed to identify the fault condition where the knock sensor is properly attached electrically, but produces an Abnormally low output due to being unattached (or loosely attached) with the the mounting bolt (and thus unable to properly transfer the engine vibration energy from the engine block to the knock sensor). The term "Abnormal (engine) Noise" is used to define this diagnostic method. A fault condition is identified when a first-order lag filtered version of the Abnormal Noise signal falls below the diagnostic thresholds can be the same for both sensors (in a 2 sensor application), or the failure thresholds can be unique to each sensor	Individual Sensor Thresholds Enabled? Filtered FFT Intensity (where 'FFT Intensity' = Non-knocking, background engine noise) Filtered FFT Intensity	= 0, Use Case 1 and 2 Case 1: Engine not in AFM mode P0326_P0331_Abnor malNoise_Threshold (Supporting Table) OR Case 2: Engine is in AFM mode P0326_P0331_Abnor malNoise_Thresh_AF M (Supporting Table) Case 3: Engine not in AFM mode P0331_AbnormalLo2 (Supporting Table) OR Case 4: Engine is in AFM mode P0331_AbnormalLoA FM_2 (Supporting Table)	Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature Individual Cylinders enabled for Abnormal Noise Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	Yes > 2.0 seconds > 2,000 RPM (not in AFM mode) OR > 2,000 (in AFM mode) AND < 8,500 RPM > 50mg/cylinder AND < 2,000 mg/cylinder > -40 deg's C = TRUE > -40 deg's C P0326_P0331_Abnormal NoiseCylsEnabled (Supporting Table) > 334 Revs	First Order Lag Filter with Weight Coefficient = 0.0100 Updated each engine event Case 3 & 4: Weight Coefficient = 0.01 Updated each engine eventFirst	Type A, 1 Trips

Threshold value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Circuit Low Bank 2	P0332	This diagnostic checks for an out of range low knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage.	Sensor Input or Return Signal Line	<8.0 Percent (of 5 Volt Reference)	Diagnostic Enabled? Engine Speed	Yes > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Circuit High Bank 2	P0333	This diagnostic checks for an out of range high knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage.	Sensor Input or Return Signal Line	> 39.00 Percent (of 5 Volt Reference)	Diagnostic Enabled? Engine Speed	Yes > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position (CKP) SensorA Circuit	P0335	Diagnostic will fail if a crank sensor pulse was not received during a period of time; if crank sensor pulses are received the diagnostic will pass.	Time since last crankshaft position sensor pulse received	>= 4.0 seconds	Starter engaged AND (cam pulses being received OR ( MAF_SensorFA AND Engine Air Flow	Test is Enabled = FALSE > 3.0 grams/second ) )	Continuous every 100 msec	Type B, 2 Trips
			No crankshaft pulses received	>= 0.1 seconds	Engine is Running Starter is not engaged	Testis Enabled	Continuous every 12.5 msec	
			No crankshaft pulses received		Engine is Running OR Starter is engaged No DTC Active:	Testis Enabled P0365 P0366	2 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position (CKP) SensorA Performance	P0336	1. Fail counts will occur if the engine goes out of synchronization repeatedly over a period of time and will pass if the engine stays in synchronization. 2. Diagnostic will fail if synchronization gap is not found in a specified period of time and will pass if the synchronization gap is found. 3. Diagnostic will fail if the incorrect number of crank sensor teeth are detected in- between detecting the synchronization gap and will pass if the correct number of teeth are seen.	Time in which 10 or more crank re- synchronizations occur	< 10.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	Testis Enabled >= 3.0 grams/second > 450 RPM P0335	Continuous every 250 msec	Type B, 2 Trips
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running Starter is not engaged	Testis Enabled	Continuous every 12.5 msec	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Starter engaged AND (cam pulses being received OR ( MAF_SensorFA AND Engine Air Flow	Testis Enabled = FALSE > 3.0 grams/second ) )	Continuous every 100 msec	
			Crank pulses received in one engine revolution OR Crank pulses received in one engine revolution	< 1 pulses > 65,535 pulses	Engine is Running OR Starter is engaged No DTC Active:	Testis Enabled P0365 P0366	8 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Diagnostic will fail if a cam sensor pulse was not received during a period of time; if cam sensor pulses are received the diagnostic will pass.	Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (crank pulses being received OR ( MAF_SensorFA AND Engine Air Flow	Testis Enabled = FALSE > 3.0 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged	Testis Enabled	Continuous every 100 msec	
			No camshaft pulses received during 12 MEDRES events (There are 12 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	= region 3 >= 0 counts	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	Testis Enabled CrankSensor_FA	Continuous, every MEDRES event unitl test completes, one test at every start attempt	
			The number of camshaft pulses received during 100 engine cycles	= 0 pulses	Crankshaft is synchronized No DTC Active:	Testis Enabled CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Camshaft Position (CMP) Sensor Performance Bank 1 SensorA	P0341	Diagnostic will fail if an incorrect number of cam sensor pulses are detected over a number of engine cycles and will pass if the number of cam pulses is correct.	The number of camshaft pulses received during 12 MEDRE8 events is OR (There are 12 MEDRE8 events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	< 4 pulses > 6 pulses = region 3 >= 0 counts	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	Testis Enabled CrankSensor_FA	Continuous, every MEDRES event unitl test completes, one test at every start attempt	Type B, 2 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 pulses > 402 pulses	Crankshaft is synchronized No DTC Active:	Testis Enabled CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Camshaft Position (CMP) Sensor Circuit Bank 2 Sensor A	P0345	Diagnostic will fail if a cam sensor pulse was not received during a period of time; if cam sensor pulses are received the diagnostic will pass.	Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (crank pulses being received OR ( MAF_SensorFA AND Engine Air Flow	Testis Enabled = FALSE > 3.0 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged	Testis Enabled	Continuous every 100 msec	
			No camshaft pulses received during 12 MEDRES events (There are 12 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	= region 3 >= 0 counts	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	Testis Enabled CrankSensor_FA	Continuous, every MEDRES event unitl test completes, one test at every start attempt	
			The number of camshaft pulses received during 100 engine cycles	= 0 pulses	Crankshaft is synchronized No DTC Active:	Test is Enabled CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Camshaft Position (CMP) Sensor Performance Bank 2 SensorA	P0346	Diagnostic will fail if an incorrect number of cam sensor pulses are detected over a number of engine cycles and will pass if the number of cam pulses is correct.	The number of camshaft pulses received during 12 MEDRE8 events is OR (There are 12 MEDRE8 events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	< 4 pulses > 6 pulses = region 3 >= 0 counts	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	Test is Enabled CrankSensor_FA	Continuous, every MEDRES event unitl test completes, one test at every start attempt	Type B, 2 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 pulses > 402 pulses	Crankshaft is synchronized No DTC Active:	Testis Enabled CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #1 CIRCUIT	P0351	Diagnoses Cylinder #1 Ignition Control (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #2 CIRCUIT	P0352	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #3 CIRCUIT	P0353	Diagnoses Cylinder #3 Ignition Control (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	>11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #4 CIRCUIT	P0354	Diagnoses Cylinder #4 Ignition Control (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	>11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #5 CIRCUIT	P0355	Diagnoses Cylinder #5 Ignition Control (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	>11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #6 CIRCUIT	P0356	Diagnoses Cylinder #6 Ignition Control (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	>11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor B	P0365	Diagnostic will fail if a cam sensor pulse was not received during a period of time; if cam sensor pulses are received the diagnostic will pass.	Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (crank pulses being received OR ( MAF_SensorFA AND Engine Air Flow	Test is Enabled = FALSE > 3.0 grams/second ) )	Continuous every 100 msec	2 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged	Testis Enabled	Continuous every 100 msec	
			No camshaft pulses received during 12 MEDRES events (There are 12 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	= region 3 >= 0 counts	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	Test is Enabled CrankSensor_FA	Continuous, every MEDRES event unitl test completes, one test at every start attempt	
			The number of camshaft pulses received during 100 engine cycles	= 0 pulses	Crankshaft is synchronized No DTC Active:	Testis Enabled CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor B	P0366	Diagnostic will fail if an incorrect number of cam sensor pulses are detected over a number of engine cycles and will pass if the number of cam pulses is correct.	The number of camshaft pulses received during 12 MEDRES events is OR (There are 12 MEDRES events per engine cycle) Testbegins when MEDRES region AND accumulated number of MEDRES events	< 4 pulses > 6 pulses = region 3 >= 0 counts	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	Testis Enabled CrankSensor_FA	Continuous, every MEDRES event unitl test completes, one test at every start attempt	Type B, 2 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 pulses > 402 pulses	Crankshaft is synchronized No DTC Active:	Testis Enabled CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Camshaft Position (CMP) Sensor Circuit Bank 2 Sensor B	P0390	Diagnostic will fail if a cam sensor pulse was not received during a period of time; if cam sensor pulses are received the diagnostic will pass.	Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (crank pulses being received OR ( MAF_SensorFA AND Engine Air Flow	Testis Enabled = FALSE > 3.0 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged	Testis Enabled	Continuous every 100 msec	
			No camshaft pulses received during 12 MEDRES events (There are 12 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	= region 3 >= 0 counts	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	Testis Enabled CrankSensor_FA	Continuous, every MEDRES event unitl test completes, one test at every start attempt	
			The number of camshaft pulses received during 100 engine cycles	= 0 pulses	Crankshaft is synchronized No DTC Active:	Test is Enabled CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Camshaft Position (CMP) Sensor Performance Bank 2 Sensor B	P0391	Diagnostic will fail if an incorrect number of cam sensor pulses are detected over a number of engine cycles and will pass if the number of cam pulses is correct.	The number of camshaft pulses received during 12 MEDRES events is OR (There are 12 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	< 4 pulses > 6 pulses = region 3 >= 0 counts	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	Test is Enabled CrankSensor_FA	Continuous, every MEDRES event unitl test completes, one test at every start attempt	Type B, 2 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 pulses > 402 pulses	Crankshaft is synchronized No DTC Active:	Testis Enabled CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Catalyst System Low Efficiency Bank 1	P0420	NOTE: The information below applies to applications that use the Decel Catalyst Monitor Algorithm Oxygen Storage. The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and 02 during lean A/F excursions to store the excess oxygen (Le. Cerium Oxidation). During rich A/F excursions, Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (Le. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Rich (intrusive rich) and Lean (decel fuel cutoff) A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat 02 Resp time) 2. BestFailing OSC value from a calibration	Normalized Ratio OSC Value The EWMA calculation uses a 0.20 coefficient.	< 0.30	All enable criteria associated with P0420 can be found under P2270 - (02 Sensor Signal Stuck Lean Bank 1 Sensor 2) Rapid Step Response (RSR) feature will initiate multiple tests: If the difference between current EWMA value and the current OSC Normalized Ratio value is and the current OSC Normalized Ratio value is Maximum number of RSR tests to detect failure when RSR is enabled. MAF Predicted catalyst temperature Front 02 Sensor or Front WRAF Rear 02 Sensor General Enable Criteria In addition to the p-codes listed under P2270, the following DTC's shall also	>0.51 <0.50 6 > 2.00 g/s < 20.00 g/s < 900 ° C >710.00 mV or >1.25 EQR >800.00 mV	1 test attempted per valid decel period Minimum of 1 test per trip Maximum of 4 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System	Fault Code	Monitor Strategy Description table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2)/ (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part. Refer to the P0420_WorstPassing OSCTableBI and P0420_BestFailingOS CTableBI in Supporting Tables tab for details The Catalyst Monitoring Test is completed during a decel fuel cutoff event. This fuel cutoff event instrusive fueling event instrusive fueling event initiated by the 02	Malfunction Criteria	Threshold Value	Secondary Parameters not be set: For switching 02 sensors: For WRAF 02 sensors:	Enable Conditions	Time Required	MIL llium.
		Sensor Signal Stuck Lean Bank 1 Sensor 2 test (P2270). Several conditions must be met in order to execute this test. Additional conditions and their related values						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		are listed in the "Secondary Parameters" and "Enable Conditions" section of this document for P2270 (02 Sensor Signal Stuck Lean Bank 1 Sensor 2)						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Catalyst System Low Efficiency Bank 2	P0430	Note: The information below applies to applications that use the Decel Catalyst Monitor Algorithm Oxygen Storage. The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and 02 during lean A/F excursions to store the excess oxygen (Le. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (Le. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Rich (intrusive rich) and Lean (decel fuel cutoff) A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat 02 Resp time) 2. BestFailing OSC value from a calibration	Normalized Ratio OSC Value The EWMA calculation uses a 0.20 coefficient.	< 0.30	All enable criteria associated with P0430 can be found under P2272 - (02 Sensor Signal Stuck Lean Bank 2 Sensor 2) Rapid Step Response (RSR) feature will initiate multiple tests: If the difference between current EWMA value and the current OSC Normalized Ratio value is and the current OSC Normalized Ratio value is Maximum number of RSR tests to detect failure when RSR is enabled. MAF Predicted catalyst temperature Front 02 Sensor or Front WRAF Rear 02 Sensor General Enable Criteria In addition to the p-codes listed under P2272, the following DTC's shall also	<0.59 <0.50 6 > 2.00 g/s < 20.00 g/s < 20.00 mV or >710.00 mV or >1.25 EQR > 800.00 mV	1 test attempted period Minimum of 1 test per trip Maximum of 4 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System	Fault Code	Monitor Strategy Description table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2)/ (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part. Refer to the P0430_WorstPassing OSCTableB2 and P0430_BestFailingOS CTableB2 in Supporting Tables tab for details The Catalyst Monitoring Tables	Malfunction Criteria	Threshold Value	Secondary Parameters not be set: For switching 02 sensors: For WRAF 02 sensors:	Enable Conditions	Time Required	MIL llium.
		Monitoring Test is completed during a decel fuel cutoff event. This fuel cutoff event occurs following a rich instrusive fueling event initiated by the 02 Sensor Signal Stuck Lean Bank 2 Sensor 2 test (P2272). Several conditions must be met in order to execute this test. Additional conditions and their related values						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		are listed in the "Secondary Parameters" and "Enable Conditions" section of this document for P2272 (02 Sensor Signal Stuck Lean Bank 2 Sensor 2)						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission (EVAP) System Small Leak Detected (No ELCP - Conventional EVAP Diagnostic - with EAT using OAT Sensor - without Fuel Tank Zone Module (FTZM))	P0442	This DTC will detect a small leak (> 0.020") in the EVAP system between the fuel fill cap and the purge solenoid. On some applications a small leak is defined as > 0.025", 0.030", or 0.150". The engine off natural vacuum method (EONV) is used. EONV is an evaporative system leak detection diagnostic that runs when the vehicle is shut off when enable conditions are met. Prior to sealing the system and performing the diagnostic, the fuel volatility is analyzed. In an open system (Canister Vent Solenoid [CVS] open) high volatility fuel creates enough flow to generate a measurable pressure differential relative to atmospheric.After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools. When	The total delta from peak pressure to peak vacuum during the test is normalized against a calibration pressure threshold table that is based upon fuel level and ambient temperature. (Please see <b>P0442 EONV Pressure</b> <b>Threshold (Pascals)</b> in Supporting Tables). The normalized value is calculated by the following equation: 1 - (peak pressure - peak vacuum) / pressure threshold. The normalized value is entered into EWMA (with 0= perfect pass and 1= perfect fail). When EWMA is the DTC light is illuminated. The EVMA calculation uses a 0.13 weighting coefficient. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 3 additional consecutive trips.	< 0.35 (EWMA Fail Threshold), < 0.35 (EWMA Re- Pass Threshold)	Fuel Level Drive Time Drive length (ECT OR OBD Coolant Enable Criteria Baro Distance since assembly plant Engine not run time before key off must be Time since last complete test if normalized result and EWMA is passing OR Time since last complete test if normalized result or EWMA is failing Estimated Ambient Temperature (EAT) using OAT sensor at end of drive Conditions for Estimated Ambient Temperature Using OAT Sensor to be	10 % < Percent < 90 % > 600 seconds > 5.0 miles > 63 °C = TRUE) > 70 kPa > 10.0 miles < refer to P0442 Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature in Supporting Tables. > 8 hours > 8 hours 0 °C <temperature<35 td="" °c<=""><td>Once per trip, during hot soak (upto 2,400 sec.). No more than 2 unsuccessful attempts between completed tests.</td><td>Type A, 1 Trips EWMA Average run length is 8 to 12 trips under normal condition s Run length is 3 to 6 trips after code clear or non- volatile reset</td></temperature<35>	Once per trip, during hot soak (upto 2,400 sec.). No more than 2 unsuccessful attempts between completed tests.	Type A, 1 Trips EWMA Average run length is 8 to 12 trips under normal condition s Run length is 3 to 6 trips after code clear or non- volatile reset

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		the pressure drops (-62) Pa from peak pressure, the vent is then opened for 60 seconds to normalize the system pressure. The vent is again closed to begin the			Valid 1. Startup OAT is less than previous trip EAT OR 2. Startup ECT - previous trip EAT	**************************************		
		test (phase-2). As the fuel temperature continues to fall, a vacuum will begin forming. The vacuum			OR 3. Engine off time OR 4. At startup, time since	> 7,200 seconds		
		will continue until it reaches a vacuum peak. When the pressure rises 62 Pa from vacuum peak, the test then completes. If			previous EAT valid and able to learn OR 5. EAT - current OAT	< 3,600 seconds 0 °C < difference < 2 °C		
		the key is turned on while the diagnostic test is in progress, the test will abort.			OR 6. EAT < current OAT and speed timer and current OAT - EAT	> 240 seconds < 2 °C		
					Speed timer increments at 100 msec rate and increments vary based on vehicle speed as follows:			
					vehicle speed < 10mph 10mph <speed<35mph 35mph<speed<124 124mph<speed<124< td=""><td>-0.2 seconds 0.10 seconds 0.20 seconds 0.20 seconds</td><td></td><td></td></speed<124<></speed<124 </speed<35mph 	-0.2 seconds 0.10 seconds 0.20 seconds 0.20 seconds		
					Speed timer can never be less than 0 seconds	*****		
					<ol> <li>High Fuel Volatility</li> <li>During the volatility</li> </ol>			
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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					phase, pressure in the fuel tank is integrated vs. volatility time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented. This value equates to an average integrated fuel tank pressure > 1,245 Pa. Please see <b>P0442 Volatility Time as</b> <b>a Function of Estimate</b> <b>of Ambient Temperature</b> in Supporting Tables. OR 2. Vacuum Refueling	< -5		
					Detected See P0454 Fault Code for information on vacuum refueling algorithm. OR 3. Fuel Level Refueling			
					Detected See P0464 Fault Code for information on fuel level refueling. OR 4. Vacuum Out of Range			
					and No Refueling See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR 5. Vacuum Out of Range and Refueling Detected			
					See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling.			
					OR 6. Vent Valve Override Failed			
					Device control using an off-board tool to control the vent solenoid, cannot exceed during the EONV test	0.50 seconds		
					OR 7. Key up during EONV test			
					No active DTCs:	MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_FA IgnitionOffTimeValid AmbientAirDefault FuelLeveIDataFault		
					No Active DTCs TFTKO	P0443 P0446 P0449 P0452 P0453 P0455 P0458 P0459		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission (EVAP) Canister Purge Solenoid Valve Circuit (ODM) (No ELCP - Conventional EVAP Diagnostic)	P0443	Controller specific output driver circuit diagnoses the canister purge solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K Q impedance between output and controller ground.	Powertrain relay voltage	Voltage >11.0 volts	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controlle rs P0458 may also set (Caniste r Purge Solenoid Short to Ground)

Component/ F System C	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission (EVAP) Vent System Performance (No ELCP - Conventional EVAP Diagnostic - without Fuel Tank Zone Module (FTZM))	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister. This diagnostic runs with normal purge control and canister vent solenoid commanded open. The diagnostic fails when the FTP sensor vacuum measurement is above a vacuum threshold before it accumulates purge volume above a threshold. The diagnostic passes when it accumulates purge volume above a threshold before the FTP sensor vacuum measurement is above a vacuum threshold.	Vent Restriction Prep Test: Vented Vacuum for OR Vented Vacuum for Vent Restriction Test: Tank Vacuum for before Purge Volume After setting the DTC for the first time, 0 liters of fuel must be consumed before setting the DTC for the second time.	< -623 Pa 60 seconds > 1,245 Pa 60 seconds > 2,989 Pa 5 seconds > 6 liters	Fuel Level System Voltage Startup IAT Startup ECT BARO No active DTCs:	10 % < Percent < 90% >10.0 volts 4 °C <temperature<35 °c<br="">&lt;35 °C &gt;70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited FuelLevelDataFault P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0499</temperature<35>	Once per Cold Start Time is dependent on driving conditions Maximum time before test abort is 1,400 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission (EVAP) Vent Solenoid Control Circuit (ODM) (No ELCP - Conventional EVAP Diagnostic - without Fuel Tank Zone Module (FTZM))	P0449	Controller specific output driver circuit diagnoses the vent solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K Q impedence between output and controller ground			50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips Note: In certain controlle rs P0498 may also set (Vent Solenoid Short to Ground)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Tank Pressure (FTP) Sensor Circuit Performance (No ELCP - Conventional EVAP Diagnostic)	P0451	The DTC will be set if the fuel tank vacuum sensor is out of range when it tries to re-zero prior to the phase-1 or phase-2 portions of the engine-off natural vacuum small leak test. During the EONV test, the fuel tank vacuum sensor is re-zeroed. A re-zero occurs: 1) At the transition from the volatility phase to the pressure phase. 2) At the transition from the volatility phase to the pressure phase. 2) At the transition from the vacuum phase. The re-zero test determines if the tank vacuum signal falls within a calibratable window about atmospheric pressure. If after some time, the tank vacuum signal does not fall to within the window, the re-zero test exits to the refueling rationality test. The refueling rationality test. The re-zero problem. If so, the re-zero problem. If so, the re-zero problem.	The tank vacuum sensor voltage is compared to a window about the nominal sensor voltage offset (~1.5 volts) Upper voltage threshold (voltage addition above the nominal voltage) Lower voltage threshold (voltage subtraction below the nominal voltage) The difference between tank vacuum sensor voltage and the nominal offset voltage is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail). When EWMA is the DTC light is illuminated. The EWMA calculation uses a 0.20 weighting coefficient. The DTC light can be turned off if the EWMA is and stays below the	0.2 volts 0.2 volts > 0.73 (EWMA Fail Threshold), <0.40 (EWMA Re-Pass Threshold)	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The number of times that it executes can range from zero to two per engine-off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.	Type A, 1 Trips EWMA Average run length: 6 Run length is 2 trips after code clear or non- volatile reset

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		detected, then the results of the re-zero test are used to determine if there is a re-zero problem. 1) An individual re-zero test generates a re- zero ratio. The ratio goes from 0.0 to 1.0. 2) A 0.0 means that the re-zero pressure signal achieved exactly atmospheric pressure. 3) A ratio of 1.0 means that the re-zero pressure did not get within the window. 4) Re-zero pressure within the window. 4) Re-zero pressure within the window generates values between 0.0 and 1.0. If a refueling event is not detected, then the resulting re-zero ratio is filtered using an exponentially weighted moving average (EWMA). When the EWMA exceeds a fail threshold, the vacuum re-zero test reports a failure. Once the vacuum re-zero test fails, the EWMA fall below a lower re-pass threshold before it can pass the vacuum re- zero test again.	EWMA fail threshold for 3 additional consecutive trips.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage (No ELCP - Conventional EVAP Diagnostic - without Fuel Tank Zone Module (FTZM))	P0452	This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too low out of range. The FTP sensor circuit out of range diagnostic compares the raw sensor voltage to a lower voltage threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake. If the sensor voltage is below the lower voltage threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported for P0452 DTC. A pass is reported for P0452 DTC if the low sample counter reaches its threshold.	FTP sensor signal The normal operating range of the FTP sensor is 0.5 volts (-1245 Pa) to 4.5 volts (3736 Pa).	< 0.15 volts (3.0 % of Vref or -1,495 Pa)			640 failures out of 800 samples 12.5 ms /sample	Type B, 2 Trips

Component/ Fau System Cod	Ilt Monitor Strategy de Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage (No ELCP - Conventional EVAP Diagnostic - without Fuel Tank Zone Module (FTZM))	<ul> <li>This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too high out of range.</li> <li>The FTP sensor circuit out of range diagnostic compares the raw sensor voltage to an upper voltage threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake.</li> <li>If the sensor voltage is above the upper voltage threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported for P0453 DTC. A pass is reported for P0453 DTC if the high sample counter reaches its threshold.</li> </ul>	FTP sensor signal The normal operating range of the FTP sensor is 0.5 volts (-1245 Pa) to 4.5 volts (~ -3736 Pa).	> 4.85 volts (97.0 % ofVref or3,985 Pa)			640 failures out of 800 samples 12.5 ms /sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent (No ELCP - Conventional EVAP Diagnostic)	P0454	This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event. During the EONV test, an abrupt change in fuel tank vacuum is identified as a possible refueling event. If the abrupt change occurs while the vent valve is closed, the EONV small-leak test aborts and the refueling rationality test starts. If the refueling rationality test detects a refueling event, then the vacuum change is considered "rational." If the refueling event, then the vacuum change is considered "irrational." The vacuum change rationality diagnostic is an "X out of Y" test. 1) Each time the EONV test completes, the (Y) sample counter is incremented. 2) Each time the	If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. An abrupt change is defined as a change in vacuum in the span of 1.0 seconds. But in 12.5 msec. A refueling event is confirmed if the fuel level has a persistent change of for 30 seconds during a 600 second refueling rationality test.	> 112 Pa < 249 Pa >15 %	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes and the canister vent solenoid is closed		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine- off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.The test will report a failure if 2 out of 3 samples are failures. 12.5 ms /sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		rationality test has an irrational result; the (X) fail counter is incremented. 3) If the (X) fail counter reaches the fail limit before the (Y) sample counter reaches the sample limit, the vacuum change rationality test fails. 4) If the (Y) sample counter reaches the limit before the (X) fail counter fails, the vacuum change rationality test passes.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission (EVAP) System Large Leak Detected (No ELCP - Conventional EVAP Diagnostic - without Fuel Tank Zone Module (FTZM))	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system. This mode checks for large leaks and blockages when proper driving conditions are met. If these conditions are met, the diagnostic commands the vent valve closed and controls the purge duty cycle to allow purge flow to purge the fuel tank and canister system while monitoring the fuel tank vacuum level. The algorithm accumulates purge flow during the test to determine a displaced purge volume as the test proceeds. If the displaced purge volume reaches a threshold before the fuel tank vacuum level reaches its passing threshold, then a large leak failure is detected. On fuel systems with fuel caps If the first failure of	Purge volume while Tank vacuum After setting the DTC for the first time, 0 liters of fuel must be consumed before setting the DTC for the second time. Weak Vacuum Follow-up Test (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	> 15 liters < 2,740 Pa > 2,740 Pa	Fuel Level System Voltage BARO Purge Flow No active DTCs: No Active DTCs TFTKO If ECT > IAT, Startup temperature delta (ECT- IAT): Startup IAT Startup IAT Startup ECT Weak Vacuum Follow-up Test This test can run following a weak vacuum failure or on a hot restart.	10% < Percent < 90% >10.0 volts >70 kPa >1.50% MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited FuelLevelDataFault P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0499 <8 °C 4 °C <temperature<35 °c<br="">&lt;35 °C</temperature<35>	Once per cold start Time is dependent on driving conditions Maximum time before test abort is 1,400 seconds Weak Vacuum Follow-up Test With large leak detected, the follow-up test is limited toO seconds. Once the MIL is on, the follow-up test runs indefinitely.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		P0455 occurred after a refueling event was detected and the MIL is off for P0455, the MIL will be commanded off after the first pass of P0455 is reported. If the first failure of P0455 did not occur after a refueling event was detected, the MIL will be commanded off on the ignition cycle after the third consecutive pass of P0455 is reported.the MIL will be commanded off on the ignition cycle after the third consecutive pass of P0455 is reported.the MIL will be commanded off on the ignition cycle after the third consecutive pass of P0455 is reported. On fuel systems without fuel caps The P0455 MIL will be commanded off on the ignition cycle after the third consecutive pass of P0455 is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission System Purge Control Valve Circuit Low (No ELCP - Conventional EVAP Diagnostic)	P0458	Controller specific output driver circuit diagnoses the canister purge solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 0.5 Q impedence between output and controller ground	Powertrain relay voltage	Voltage >11.0 volts	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controlle rs P0443 may also set (Caniste r Purge Solenoid Open Circuit)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission System Purge Control Valve Circuit High (No ELCP - Conventional EVAP Diagnostic)	P0459	Controller specific output driver circuit diagnoses the canister purge solenoid low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 0.5 Q impedence between output and controller power	Powertrain relay voltage	Voltage >11.0 volts	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 1 Performance (For use on vehicles with two fuel senders and mechanical transfer pump)	P0461	This DTC will detect a primary fuel tank level sensor stuck in-range.	<ul> <li>1)</li> <li>Fuel Level in Primary and Secondary Tanks Remain in an Unreadable Range too Long.</li> <li>Ia) If Deadband diagnostic subtest enabled</li> <li>Ib) If fuel volume in primary tank is Ic) and if fuel volume in secondary tank is Id) and if 1b and 1c indications do not change while fuel volume consumed by engine is</li> <li>OR</li> <li>2)</li> <li>Fuel consumed without a Primary Fuel Level Change.</li> <li>2a) If indicated fuel volume change is 2b) while fuel consumed by the engine is</li> </ul>	<ul> <li>Ia) == Enabled status</li> <li>Ib) &gt;33.0 liters</li> <li>Ic) &lt;2.8 liters</li> <li>Id) &gt; 15.0 liters</li> <li>2a) &lt; 3 liters</li> <li>2b) &gt; 11.7 liters</li> </ul>	Ia) Diagnostic Enabled Ib) Engine Operational State	Ia) ==True Ib) == Running	250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 1 Circuit Low Voltage (For use on vehicles with a fuel float connected directly to the ECM)	P0462	This DTC will detect a primary fuel tank sensor out-of-range low.	Fuel level Sender % of 5V range	<10%	a) Diagnostic enabled status	a) –– True	100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 1 Circuit High Voltage (For use on vehicles with a fuel float connected directly to the ECM)	P0463	This DTC will detect a primary fuel tank level sensor out-of-range high.	Fuel level Sender % of 5V range	> 60 %	a) Diagnostic enabled status	a) –– True	100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 1 Circuit Intermittent (No ELCP - Conventional EVAP Diagnostic)	P0464	This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event. During the EONV test, a change in fuel level is identified as a possible refueling event. If the change occurs while the vent valve is closed, the EONV small-leak test aborts and the refueling rationality test starts. If the refueling rationality test detects a refueling event, the fuel level change is considered "rational." If the refueling rationality test does not detect refueling, the fuel level change is considered "irrational." The fuel level change rationality diagnostic is an "X out of Y" test. 1) Each time the EONV test completes, the (Y) sample counter is incremented. 2) Each time the rationality test has an	If a change in fuel level is detected, the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that an actual refueling event occurred. If a refueling event is confirmed, then the test sample is considered passing. Otherwise, if a refueling event is not confirmed, then the test sample is considered failing which indicates an intermittent signal problem. An intermittent fuel level signal problem is defined as: The fuel level changes by and does not remain for 30 seconds during a 600 second refueling rationality test.	>15% >15%	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine- off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.The test will report a failure if 2 out of 3 samples are failures. 100 ms / sample	Type A, 1 Trips

Component/ Fau System Cod	Ilt Monitor Strategy de Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
	<ul> <li>irrational result; the (X) fail counter is incremented.</li> <li>3) If the (X) fail counter reaches the fail limit before the (Y) sample counter reaches the sample limit, the fuel level change rationality test fails.</li> <li>4) If the (Y) sample counter reaches the limit before the (X) fail counter fails, the fuel level change rationality test fails the fuel level change rationality test fails the fuel level change rationality test fails.</li> </ul>						

Component/ Fa System Cc	ault ;ode	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan Speed Low [LIN Bus Electric PWM Fans Only - Internal or External controller]	0494	Measured actual fan speed is monitored against a calibrated lower acceptable limit for the cooling fan RPM under normal operating conditions. The diagnostic is set when the threshold is crossed. This diagnostic ensures that the fan is not under cooling.	Measured Fan Speed	<= Speed Low Limit [Supporting Table] P0494_LIN_Threshol d	<ul> <li>a) Diagnostic Enabled</li> <li>b) Configuration</li> <li>calibration for number of</li> <li>fans</li> <li>c) Diagnostic System</li> <li>Disabled</li> <li>d) Battery Voltage In-Range</li> <li>e) LIN Bus based Fan</li> <li>Operation Enabled</li> <li>f] LIN Bus Lost</li> <li>Communication Fault</li> <li>Active</li> <li>g] LIN Bus Continuous</li> <li>Operation Fault Active</li> <li>h] Vehicle Road Speed</li> <li>Validity</li> </ul>	a] == 1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <> True g] <> True h] == TRUE	16.00 failures/ 20.00 samples; 1000 millisec/ sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission (EVAP) System Flow During Non- Purge (No ELCP - Conventional EVAP Diagnostic - without Fuel Tank Zone Module (FTZM))	P0496	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum. This test checks for purge valve leaks to intake manifold vacuum such that there would always be a small amount of purge flow present. It does this by sealing the EVAP system (purge and vent valve closed) and then monitors fuel tank vacuum level. The fuel tank vacuum level should not increase. If tank vacuum increases above a threshold, a malfunction is indicated. Additional Information This diagnostic test detects purge valve leaks to intake manifold vacuum. It is not intended to detect purge valve leaks to the atmosphere which are monitored by the EONV small leak diagnostic (P0442). The purge valve leaks	Tank Vacuum for Test time	<ul> <li>&gt; 2,491 Pa</li> <li>5 seconds</li> <li>&lt; refer to</li> <li>P0496 Purge Valve Leak Test Engine</li> <li>Vacuum Test Time (Cold Start) as a</li> <li>Function of Fuel</li> <li>Level in</li> <li>Supporting Tables.</li> <li>Test time only</li> <li>increments when</li> <li>engine vacuum &gt; 10.0</li> <li>kPa.</li> </ul>	Fuel Level System Voltage BARO Startup IAT Startup ECT Engine Off Time No active DTCs: No Active DTCs TFTKO	10% < Percent < 90% >10.0 volts >70 kPa 4°C <temperature<35°c &lt;35°C &gt;28,800.0 seconds MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited FuelLevelDataFault P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0499</temperature<35°c 	Once per cold start Cold start: max time is 1,400 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		leaking purge valves that could otherwise be detected with the EONV small leak diagnostic (P0442).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission System Vent Solenoid Control Circuit Low (No ELCP - Conventional EVAP Diagnostic - without Fuel Tank Zone Module (FTZM))	P0498	Controller specific output driver circuit diagnoses the vent solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 0.5 Q impedence between output and controller ground			50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips Note: In certain controlle rs P0449 may also set (Vent Solenoid Open Circuit)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission System Vent Solenoid Control Circuit High	P0499	Controller specific output driver circuit diagnoses the vent solenoid low sided driver for a short to power failure when the output is powered off	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.				50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips
(No ELCP - Conventional EVAP Diagnostic - without Fuel Tank Zone Module (FTZM))		by comparing a voltage measurement to controller specific voltage thresholds. If the P0499 is active, an intrusive test is performed with the vent solenoid commanded closed for 15 seconds.	Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 0.5 Q impedence between output and controller power				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Low Engine Speed Idle System	P0506	This DTC indicates that actual engine speed is lower than desired	Filtered Engine Speed Error. It is calculated with a calibrated filter	> 94.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
		that it is out of speed control capability. Testing is performed when basic conditions are met. If filtered	Filter coefficient	0.00350	Coolant Temp	> 60 °C and < 128 °C	Diagnostic reports pass or fail in 10 seconds once all enable	
		engine speed error exceeds a calibrated			Engine run time	> 30 sec	conditions are met	
		threshold for a calibrated duration,			Ignition voltage	32 > volts > 11		
		code is set. This testing is performed			Time since gear change	> 3 sec		
		continuously per trip if basic conditions are met	ip if e		Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	< 1.24 mph, 2kph		
					Commanded RPM delta	< 25 rpm		
					Idle time	> 5 sec		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 5.00 pct < 5.00 pct		
						PTC not active		
						Transfer Case not in 4WD LowState		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions Off-vehicle device control (service bay control) must not be active. following conditions not TRUE: (VeTES R_e_EngSpd Req1 ntvType = CeTESR_e_EngSpdMinLi mitAND VeTESR_e_EngSpdReqR espType = CeTESR_e_NoSuggestio n) Clutch is not depressed TC_BoostPresSnsrFA ECT_Sensor_FA EnginePowerLimited EGRValvePerformance_F A IAT_SensorCircuitFA EvapFlowDuringNonPurg e_FA FueITrimSystemB1_FA FueITrimSystemB1_FA FueIInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_F A IgnitionOutputDriver_FA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA EvapIoneTable	Time Required	MIL Ilium.
						LowFuelConditionDiagnos tic Clutch Sensor FA AmbPresDfltdStatus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					All of the above met for Idle time	P2771 > 5 sec The diagnostic does not run during autostop as engine is shutdown during that time (occurs in a hybrid or 12v start stop vehicle)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
High Engine Speed Idle System	P0507	This DTC indicates that actual engine speed is higher than desired engine speed at idle so	Filtered Engine Speed Error. It is calculated with a calibrated filter coefficient	< -188.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
		that it is out of speed control capability. Testing is performed when basic conditions	Filter coefficient	0.00350	Coolant Temp	> 60 °C and < 128 °C Must verify	Diagnostic reports pass or fail in 10 seconds once all	
		are met. If filtered engine speed error			Engine run time	> 30 sec	enable conditions are	
		exceeds a calibrated threshold for a			Ignition voltage	32 > volts > 11	met	
		calibrated duration,			Time since gear change	> 3 sec		
		is performed continuously per trip if basic conditions are			Time since a TCC mode change	> 3 sec		
		met			IAT	> -20 °C		
					Vehicle speed	< 1.24 mph, 2kph		
					Commanded RPM delta	< 25 rpm		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 5.00 pct < 5.00 pct		
						PTC not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System	Code	Description			No active DTCs	following conditions not TRUE: (VeTES R_e_EngSpd Req1 ntvType = CeTESR_e_EngSpdMinLi mitAND VeTESR_e_EngSpdReqR espType = CeTESR_e_NoSuggestio n) Clutch is not depressed TC_BoostPresSnsrFA ECT_Sensor_FA EnginePowerLimited EGRValveCircuit.FA EGRValvePerformance_F A IAT_SensorCircuitFA EvapFlowDuringNonPurg e_FA FuelTrimSystemB1_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_F A IgnitionOutputDriver_FA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA FuelLevelDataFaultLow FuelConditionDiagnostic		llium.
						Clutch SensorFA AmbPresDfltdStatus P2771		
1					All of the above met	> 5 SEC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					for Idle time	The diagnostic does not run during autostop as engine is shutdown during that time (occurs in a hybrid or 12v start stop vehicle)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Rough Idle	P050D	Monitors the combustion performance when the cold start emission reduction strategy is active by accumulating and determining the percentage of engine cycles that have less than complete combustion relative to the total number of engine cycles in which Dual Pulse is active.	Deceleration index vs. Engine Speed Vs Engine load Deceleration index calculation is tailored to specific vehicle. Tables used are 1st tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point. Incomplete combustion identified by P0300 threshold tables:	(>Idle SCDAND >Idle SCD ddt Tables) OR (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables)	Misfire Algorithm Enabled (Refer to P0300 for Enablement Requirements) OBD Manufacturer Enable Counter To enable the diagnostic, the Cold Start Emission Reduction Strategy Must Be Active per the following: Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure AND NumCLOEvents In addition, Dual Pulse Strategy Is Enabled and Active Per the following: Engine Speed Accel Position Engine Run Time For the engine speeds and loads in which Dual	= 0 < 500.00 degC > -12.00 degC <= 66.00 degC >= 72.00 KPa < 1.00 >= 450.00 RPM <= 1,800.00 RPM <= 0.30 Pct < 22 seconds	Runs once per trip when the cold start emission reduction strategy is active and Dual Pulse is enabled and active. Frequency: 100ms Test completes after Dual Pulse is no longer active OR The first 500 engine cycles have been reached	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Pulse is active: Dual Pulse Error induced misfires percentage	>= catalyst damaging misfire		
					Dual Pulse Error induced misfires percentage	< 90% of the maximum achieveable catalyst damaging misfire.		
					Engine Cycles	>= 50.00 <501		
					The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:			
					Catalyst Temperature AND	>= 1,000.00 degC		
					OR	>= 20.00 seconds		
					Engine Run Time	> P050D_P1400_CatalystL ightOffExtendedEngine RunTimeExit		
					OR	This Extended Engine run time exit table is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details.		
					Barometric Pressure	< 72.00 KPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Dual Pulse Strategy will exit per the following:			
					Engine Speed OR	> 2,400.00 RPM		
					Accel Position	> 0.50 Pct		
					Engine Run Time	>= 22 seconds		
					Dual Pulse Strategy will also exit if the any of the "Additional Dual Pulse Enabling Criteria" is not satisfied:			
					"Additional Dual Pulse Enabling Criteria":			
					Green Engine Enrichment	Not Enabled		
					Misfire Converter Protection strategy	Not being requested		
					Engine Metal Overtemp	Not being requested		
					Fuel control state	Open Loop		
					Output State Control	Not being requested for fuel		
					DOD Or DFCO	Not Active		
					Power Enrichment	Not Active		
					Dynamic Power Enrichment	Not Active		
					Piston Protection	Not Active		
					Hot Coolant Enrichment	Not Active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Injector Flow Test	Not Active		
					General Enable			
					DTC's Not Set:	EngineMisfireDetected_F A AcceleratorPedalFailure ECT_Sensor_FA IAT_SensorCircuitFA MnfdTempSensorCktFA CrankSensor_FA FuelInjectorCircuit_FA MAF_SensorFA AnyCamPhaser_TFTKO ClutchPstnSnsr FA IAC_SystemRPM_FA IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA FuelInjectorCircuit TFTK 0 FHPR_b_FRP_SnsrCkt_F A FHPR_b_FRP_SnsrCkt_T FTKO FHPR_b_PumpCkt_FA FHPR_b PumpCkt TFTK 0 TransmissionEngagedStat e_FA EngineTorqueEstInaccura te FuelPumpRlyCktFA		
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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Engine Oil Pressure (EOP) Sensor Performance	P0521	Determines if the Engine Oil Pressure (EOP) Sensor is stuck or biased in range. The engine oil pressure is compared against	Two Stage Oil Pump EOP Sensor Test with Engine Running, High Pressure State		Two Stage Oil Pump is Present = TRUE Pump is in high pressure state	TRUE Enabled		Type B, 2 Trips
Oil Pump		thresholds when engine is running and when engine is off. The	To Fail when previously passing with the engine running:	Filtered Oil Pressure < (	Engine Running Diagnostic Status	Test not report a fail state		
		engine oil pressure rationality diagnostic has two parts: engine runing test and engine	Filtered Engine Oil Pressure below expected threshold	P0521_P06DD_P06D E_OP_HiStatePressu re	Engine Off Rationality Test Diagnostic Reporting Status	Yes	<ul> <li>&gt; 40 errors</li> <li>out of 50</li> <li>samples.</li> </ul>	
		off test. The engine running test	OR	* 1.00 - 165.0 kPa) OR	Oil Pressure Sensor In Use	>30.0 seconds		
		compares the measured oil pressure to threshold. If the	Filtered Engine Oil Pressure above expected	Filtered Oil Pressure >	Engine Running Ambient Air Pressure	>70.0 kPa	Performed every 100 msec	
		measured oil pressure is out of the thresholds, then the error counter increments. The engine off test compares the measured oil pressure	threshold	( <b>P0521_P06DD_P06D</b> <b>E_OP_HiStatePressu</b> re * 1.00 + 165.0 kPa)	Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than 30.0 seconds)	FALSE		
		against thresholds after the engine has stopped rotating. If the			Filtered Engine Speed within range	1,750 RPM < Filtered Engine Speed < 3,500 RPM		
		is out of the thresholds, then the error counter increments.	To pass when previously failing:	Filtered Oil Pressure > P0521_P06DD_P06D	Modelled Oil Temperature within range	40.0 deg C < Oil Temp < 100.0 deg C	> 10passes out of 50 samples.	
			Filtered Engine Oil Pressure above low threshold plus an offset	E_OP_HiStatePressu (re * 1.00 - 165.0kPa +	Pump state change complete	Time since state change > 0.50 s		
				20.0 kPa) OR	No active DTC's	Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCkt	Performed every 100 msec	
			OR	Filtered Oil Pressure <(		FA AmbientAirDefault		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Filtered Engine Oil Pressure below high threshold minus an offset	P0521_P06DD_P06D E_OP_HiStatePressu re * 1.00 + 165.0 kPa - 20.0 kPa) (Details on Supporting Tables Tab: P0521_P06DD_P06D E_OP_HiStatePressu re )		EngOilTempFA CrankSensor_FA		
			Two Stage Oil Pump EOP Sensor Test with Engine Running, Low Pressure State		Two Stage Oil Pump is Present = TRUE Pump is in low pressure state	TRUE Enabled		
			To Fail when previously passing with the engine running: Filtered Engine Oil Pressure below expected threshold OR Filtered Engine Oil Pressure above expected threshold	Filtered Oil Pressure P0521_P06DD_P06D  E_OP_LoStatePressure  OR  Filtered Oil Pressure  ( P0521_P06DD_P06D  E_OP_LoStatePressure  * 1.00 + 133.0 kPa)	Engine Running Diagnostic Status Engine Off Rationality Test Diagnostic Reporting Status Oil Pressure Sensor In Use Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than 30.0 seconds) Filtered Engine Speed within range	Test not report a fail state Yes >30.0 seconds >70.0 kPa FALSE 1,750 RPM < Filtered Engine Speed < 3,500 RPM	<ul> <li>&gt; 40 errors out of 50 samples.</li> <li>Performed every 100 msec</li> </ul>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			To pass when previously failing: Filtered Engine Oil Pressure above low threshold plus an offset OR Filtered Engine Oil Pressure below high threshold minus an offset	Filtered Oil Pressure ( P0521_P06DD_P06D E_OP_LoStatePressu re * 0.90 - 110.0 kPa + 20.0 kPa) OR Filtered Oil Pressure <( P0521_P06DD_P06D E_OP_LoStatePressu re * 1.00 + 133.0 kPa - 20.0 kPa) (Details on Supporting Tables Tab: P0521_P06DD_P06D E_OP_LoStatePressu re )	Modelled Oil Temperature within range Pump state change complete No active DTC's	40.0 deg C < Oil Temp < 100.0 deg C Time since state change > 0.50 s Fault bundles: MAF_SensorFA ECT_SensorFA IAT_SensorFA EngOilPressureSensorCkt FA AmbientAirDefault EngOilTempFA CrankSensor_FA	<ul> <li>&gt; 10passes out of 50 samples.</li> <li>Performed every 100 msec</li> </ul>	
			Two Stage Oil Pump EOP Sensor Test with Engine Off If enabled: <u>To Fail when previously</u> passing with the engine off: Filtered Engine Oil Pressure greater than threshold	Filtered Oil Pressure > 40.0 kPa	Two Stage Oil Pump is Present = TRUE Engine Off Rationality Test Diagnostic Status Engine Running Rationality Test Diagnostic Status Modelled Oil Temperature No Engine Movement No active DTC's	TRUE Enabled Test not report a fail state > 70.0 deg C > 10.0 seconds EngineModeNotRunTimer _FA EngOilTempFA	<ul> <li>&gt; 20 errors out of 40 samples.</li> <li>Run once per trip</li> </ul>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						EngOilPressureSensorCkt FA CrankSensor_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure (EOP) Sensor Circuit Low Voltage	P0522	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too low. This diagnostic compares the EOP circuit voltage to the reference voltage.	(Engine Oil Pressure Sensor Circuit Voltage) - 5 Volts) *100	< 5.00 percent Deadband: < 5 percent or > 95 percent	Engine Speed Enable Engine Speed Disable Oil Pressure Sensor In Use Diagnostic Status	> 400 rpm < 350 rpm Yes Enabled	1,280 failures out of 1,600 samples Performed every 3.125 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure (EOP) Sensor Circuit High Voltage	P0523	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too high. This diagnostic compares the EOP circuit voltage to the reference voltage.	(Engine Oil Pressure Sensor Circuit Voltage) - 5 Volts) *100	<ul> <li>95.00 percent</li> <li>Deadband: &lt; 5 percent</li> <li>or &gt; 95 percent</li> </ul>	Oil Pressure Sensor In Use Diagnostic Status	Yes Enabled	1,280 failures out of 1,600 samples Performed every 3.125 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Mutil- Functon Switch Circuit	P0564	Detect when cruise control multi-function switch circuit (analog) voltage is in an invalid range. "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is in an invalid range, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."Detect when cruise control multi- function switch circuit (analog) voltage is in an invalid range	Cruise Control analog circuit voltage must be "between ranges" for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considerred to be "between ranges" when the ratio is measured in the following ranges: 0.28 -0.31, 0.415-0.445, 0.585-0.615 0.78-0.81, 1.005- 1.035	Diagnostic is Enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 0.500 seconds	Type C, 1 Trip No MIL Emissio ns Neutral Jiagnost ics - special type C" "Neutral Default State - When the BCM tells the ECM that the cruise control analog input voltage is in an invalid range, ECM sets the code and cruise control is disabled I

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control On Switch Circuit	P0565	Detects a failure of the cruise on/off switch in a continously applied state "Emissions Neutral Default Action - When the BCM tells the ECM that the cruise control analog input voltage is in the Momentary Cruise On/Off range for too long, the code is set and cruise control is disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a	Cruise Control On switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 20.00 seconds	Diagnostic is Enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 20.00 seconds	Type C, 1 Trip No MIL Emissio ns Neutral Diagnost ics - special type C"
		momentary on/off cruise switch architecture.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Resume Circuit	P0567	Detects a failure of the cruise resume switch in a continously applied state "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is in the Resume range for too long, the code is set and cruise control is disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control Resume switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 89.000 seconds	Diagnostic is Enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, 1 Trip No MIL Emissio ns Neutral , "Emissio ns Neutral Diagnost ics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continously applied state "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is in the Set range for too long, the code is set and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control Set switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 89.000 seconds	Diagnostic is Enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, 1 Trip No MIL Emissio ns Neutral , "Emissio ns Neutral Diagnost ics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Cancel Switch Circuit	P056C	Detects a failure of the cruise cancel switch in a continously applied state "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is in the Cancel range for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control Cancel switch remains applied for greater than a calibratable period of time.	fail continously in the applied state for greater than 20.00 seconds	Diagnostic is Enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 20.00 seconds	Type C, 1 Trip No MIL Emissio ns Neutral , "Emissio ns Neutral Diagnost ics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Input Circuit	P0575	Determines if cruise switch state received from the BCM is valid. "Emissions Neutral Default Action : When the ECM determines that a serial communication fault from the BCM has occurred with frame \$1E1, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	If x of y rolling count/ protection value faults occur, disable cruise for duration of fault	Message <> 2's complement of message Message rolling countoprevious message rolling count value plus one	Diagnostic is Enabled. Cruise Control Switch Serial Data Error Diagnostic Enable Serial communication to BCM Power Mode Engine Running	1.00 No loss of communication = RUN = TRUE	<ul> <li>9 failures out of Z17 samples</li> <li>Performed on every received message</li> <li>9 rolling count failures out of Z17 samples</li> <li>Performed on every received messagw</li> </ul>	Type C, 1 Trip No MIL Emissio ns Neutral Diagnost ics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake Pedal Position Sensor Circuit Range/ Performance	P057B	3 This diagnostic monitors the Brake Pedal Position Sensor for a stuck in range failure	Brake pedal position sensor movement diagnostic cal is enabled 1.00	True	Diagnostic is Enabled. Brake Pedal Position Sensor Circuit Range / Performance Diagnostic Enable	1.00 ignition voltage > 10.00		MIL: Type A, 1 Trips
		Calculated EWMA value must be greater than calibratable theshold after calibratable number of tests have completed to report a "test passed" for P057B	EWMA value looked up in supporting table <b>P057B</b> <b>KtBRKI_K_FastTestP</b> <b>ointWeight</b> P057B as a function of calculated brake pedal position delta EWMA value is > 0.80	calculated brake pedal position delta sample counter > 50.00 for fast test OR calculated brake pedal position delta sample counter > 1,000.00 for slow test	calculated brake pedal position delta > 3.95 OR (for slow test) shift lever has been in park once this key cycle vehicle speed >= 6.00 accelerator pedal position < 5.00	total number of EWMA tests > 20.00		
			Calculated EWMA Value must be less than calibratable threshold after calibratable number of tests have completed to report a "test failed" for P057B. This test runs once per key cycle	EWMA value looked up in supporting table <b>P057B</b> <b>KtBRKI_K_CmpltTest</b> <b>Pointweight</b> P057B as a function of calculated brake pedal position delta EWMA value is less thatn 0.40	no DTC's active (P057C, P057D)	shift lever has been in park once this key cycle vehicle speed >= 6.00 accelerator pedal position < 5.00	total number of EWMA tests > 2.00	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake Pedal Position Sensor Circuit Low	P057C	detects short to ground for brake pedal position sensor	If x of y samples are observed below failure threshold, default brake pedal position to zero percent.	5.00	Diagnostic is Enabled. Brake Pedal Position Sensore Low Voltage Diagnostic Enable	1.00	20 / 32.00 counts	MIL: Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake Pedal Position Sensor Circuit High	P057D	detects open circuit for brake pedal position sensor	If x of y samples are observed above failure threshold, default brake pedal position to zero percent and set DTC	95.00	Diagnostic is Enabled. Brake Pedal Position Sensore High Voltage Diagnostic Enable	1.00	20.00/ 32.00 counts	MIL: Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake Pedal Position Sensor Circuit Intermittent/ Erratic	P057E	detects noisy / erratic ouput for brake pedal position sensor	If x of y samples are observed above failure threshold, default brake pedal position to zero percent and set DTC	15.00	Diagnostic is Enabled. Brake Pedal Position Sensor Circuit Intermittent / Erratic Diagnostic Enable	1.00	5.00/ 20.00 counts	MIL: Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi- function Circuit Low Voltage	P0580	detects short to ground failure for cruise multi- function switch circuit "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch circuit voltage is too low for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a momentary on/off cruise switch architecture.	Cruise Control analog circuit voltage must be in an "Open Short To Ground" range for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considerred to be "open short to ground when the ratio is measured in the following rangs: 0-0.185	Diagnostic is Enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, 1 Trip No MIL Emissio ns Neutral , "Emissio ns Neutral Diagnost ics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi- function Circuit High Voltage	P0581	detects short to power failure for cruise multi- function switch circuit "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch circuit voltage is too high for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a momentary on/off cruise switch architecture.	Cruise Control analog circuit voltage must be in "Short To Power" range for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considered to be "short to power" when the ratio is measured in the following range: 1.005- 1.035	Diagnostic is Enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, 1 Trip No MIL Emissio ns Neutral , "Emissio ns Neutral Diagnost ics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control P060 Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code.	The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5.00 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	Type A, 1 Trips
			The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	254 failures detected via Error Correcting Code			Diagnostic runs continuously via the flash hardware.	
			The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations.	2 consecutive failures detected or 5 total failures detected.			Diagnostic runs continuously. Will report a detected fault within 200 ms.	
			The Secondary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	
				In all cases, the failure count is cleared when controller shuts down				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Not Programmed	P0602	This DTC will be stored if the ECU is a service part that has not been programmed.	Service (reflash) controller calibration present	= 1		none	Diagnostic runs at powerup and once per second continuously after that	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
ECM Long Term Memory Reset	P0603	0603 This DTC detects an invalid NVM which includes a Static NVM, Perserved NVM, ECC ROM in NVM Flash Region, and Perserved NVM during shut down.	Static NVM region error detected during initialization				Diagnostic runs at controller power up.	Type A, 1 Trips
			Perserved NVM region error detected during initialization				Diagnostic runs at controller power up.	
			ECC ROM fault detected in NVM Flash region ECC ROM Error Count >	5			Diagnostic runs at controller power up.	
			Perserved NVM region error detected during shut down.				Diagnostic runs at controller power down.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
ECM RAM Failure	P0604	Indicates that the ECM has detected a RAM fault. This includes Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, Primary Processor TPU RAM Fault, Primary Processor Update Dual	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	Type A, 1 Trips
		Store RAM Fault, Primary Processor Write Protected RAM Fault, and Secondary Processor RAM Fault. This diagnostic runs continuously.	Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.46666 s			When dual store updates occur.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	0 counts			Diagnostic runs continuously (background loop)	
			Indicates that the secondary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal ECM Processor Integrity Fault	hternal ECM Processor htegrity ault Processor integrity fault. The include diagnostic done on the SPI Communication a as a host of diagr for both the prima and secondary processsors.	Indicates that the ECM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors.	Loss or invalid message of SPI communication from the Secondary Processor at initialization detected by the Primary Processor or loss or invalid message of SPI communication from the Secondary Processor after a valid message was received by the Primary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved	Run/Crank voltage Run/Crank voltage	>=6.41 Volts or >= 11.00 Volts, else the failure will be reported for all conditions	In the primary processor, 159/399 counts intermittent or 39 counts continuous; 39 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	Type A, 1 Trips
			Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was received by the Secondary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved			In the secondary processor, 64/161 counts intermittent or 0.1875 s continuous; 0.4875 s continuous @ initialization. 12.5 ms /count in the ECM secondary processor	
			Checks for stack over or underflow in secondary processor by looking for corruption of known pattern at stack boundaries. Checks number of stack over/ under flow since last powerup reset >=	5		KeMEMD_b_StackLimitTe stEnbl == 1 Value of KeMEMD_b_StackLimitTe stEnbl is: 1 . (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			MAIN processor is verified by responding to a seed sent from the secondary with a key response to secondary. Checks number of incorrect keys	2 incorrect seeds within 8 messages, 0.2000 seconds		ignition in Run orCrank	150 ms for one seed continually failing	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			received > or Secondary processor has not received a new within time limit					
			Time new seed not received exceeded			always running	0.450 seconds	
			MAIN processor receives seed in wrong order			always running	3 / 17 counts intermittent. 50 ms/count in the ECM main processor	
			2 fails in a row in the Secondary processor's ALU check			KePISD_b_ALU_TestEnbl d == 1 Value of KePISD_b_ALU_TestEnbl d is: 1. (If 0, this test is disabled)	25 ms	
			2 fails in a row in the Secondary processor's configuration register masks versus known good data			KePISD_b_ConfigRegTes tEnbld == 1 Value of KePISD_b_ConfigRegTes tEnbld is: 1. (If 0, this test is disabled)	12.5 to 25 ms	
			Secondary processor detects an error in the toggling of a hardware discrete line controlled by the MAIN processor: number of discrete changes > = or < $-$ over time window(50ms)	7 17		KePISD_b_MainCPU_SO H_FItEnbld == 1 Value of KePISD_b_MainCPU_SO H_FItEnbld is: 1 (If 0, this test is disabled) time from initialization >= 0.5000 seconds	50 ms	
			Software background task first pass time to complete			Run/Crank voltage > 6.41	360.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			2 fails in a row in the MAIN processor's ALU check			KePISD_b_ALU_TestEnbl d == 1 Value of KePISD_b_ALU_TestEnbl d is: 1 . (If 0, this test is disabled)	25 ms	
			2 fails in a row in the MAIN processor's configuration register masks versus known good data			KePISD_b_ConfigRegTes tEnbld == 1 Value of KePISD_b_ConfigRegTes tEnbld is: 1. (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow since last powerup reset >=	3		KeMEMD_b_StackLimitTe stEnbl == 1 Value of KeMEMD_b_StackLimitTe stEnbl is: 1. . (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Voltage deviation >	0.4950		KePISD_b_A2D_CnvrtrTe stEnbld == 1 Value of KePISD_b_A2D_CnvrtrTe stEnbld is: 1. (If 0, this test is disabled)	5 / 10 counts or 0.150 seconds continuous; 50 ms/count in the ECM main processor	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_FlashECC_ CktTestEnbl == 1 Value of KeMEMD_b_FlashECC_ CktTestEnbl is: 1 . (If 0, this test is disabled)	variable, depends on length of time to access flash with corrupted memory	
			Checks for ECC (error	3 (results in MIL),		KeMEMD_b_RAM_ECC_	variable,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	5 (results in MIL and remedial action)		CktTestEnbl == 1 Value of KeMEMD_b_RAM_ECC_ CktTestEnbl is: 1. (If 0, this test is disabled)	depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM	
			MAIN processor DMA transfer from Flash to RAM has 1 failure			KePISD_b_DMA_XferTest EnbId == 1 Value of KePISD_b_DMA_XferTest EnbId is: 0. (If 0, this test is disabled)	variable, depends on length of time to write flash to RAM	
			Safety critical software is not executed in proper order.	>= 1 incorrect sequence.		KaPISD_b_ProgSeq Watc hEnbl[x][y] == 1 Value of KaPISD_b_ProgSeq Watc hEnbl[x][y] is: 1 (If 0, this test is disabled)	Fail Table, f(Loop Time). See supporting tables: P0606_PSW Sequence Fail f (Loop Time) /	
							Sample Table, f (Loop Time)See supporting tables: P0606_PSW Sequence Sample f(Loop Time)	
							counts	
							50 ms/count in the ECM main processor	

Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		MAIN processor determines a seed has not changed within a specified time period within the 50ms task.	Previous seed value equals current seed value.		KePISD_b_SeedllpdKey StorFItEnbl == 1 Value of KePISD_b_SeedllpdKey StorFItEnbl is: 1. (If 0, this test is disabled)	Table, f(Loop Time). See supporting tables: <b>P0606_Last</b> Seed Timeout f (Loop Time)	
	Fault Code	Fault Code       Monitor Strategy Description         Image: Code       Image: Code         Image: Code       I	Fault Code         Monitor Strategy Description         Malfunction Criteria           MAIN processor determines a seed has not changed within a specified time period within the 50ms task.         Image: Comparison of the period within the 50ms task.	Fault Code         Monitor Strategy Description         Malfunction Criteria         Threshold Value           MAIN processor determines a seed has not changed within a specified time period within the 50ms task.         Previous seed value equals current seed value.           Image: Comparison of the period within the 50ms task.         Previous seed value           Image: Comparison of the period within the 50ms task.         Previous seed value.	Fault Code         Monitor Strategy Description         Malfunction Criteria         Threshold Value         Secondary Parameters           MAIN processor determines a seed has not changed within a specified time period within the 50ms task.         Previous seed value         equals current seed value.         Image: Comparison of the seed value.         I	Fault Code         Monitor Strategy Description         Malfunction Criteria         Threshold Value         Secondary Parameters         Enable Conditions           Maily processor determines a seed has not changed within a specified time period within the 50ms task.         Previous seed value equals current seed value.         RePISD to SeedlpdKey StorFIE:nbl == 1 Value of KeFISD to SeedlpdKey StorFIE:nbl is: 1, (if 0, this test is disabled)           Image: the set is disabled         Image: the set is disabled         Image: the set is disabled         Image: the set is disabled	Fault Code         Monitor Strategy Description         Malfunction Criteria         Threshold Value         Secondary Parameters         Enable Conditions         Time Required           Monitor Strategy Description         MAIN processor determines a seed has not changed within a specified time period within the 50ms task.         Previous seed value equals current seed value.         KePISD_b_SeedlipdKey StorFiEnbilis: 1. (If 0, this test is disabled)         Table, f(Loop Time). See StorFiEnbilis: See Time). See StorFiEnbilis:           Image: StorFiEnbilis         Image: StorFiEnbilis         Image: StorFiEnbilis         Table, f(Loop Time). See StorFiEnbilis:         Table, f(Loop Time). See StorFiEnbilis:         Table, f(Loop Time). See StorFiEnbilis:           Image: StorFiEnbilis         Image: StorFiEnbilis         Image: StorFiEnbilis         Image: StorFiEnbilis         StorFiEnbilis:           Image: StorFiEnbilis         Image: StorFiEnbilis         Image: StorFiEnbilis         Image: StorFiEnbilis         StorFiEnbilis           Image: StorFiEnbilis         Image: StorFiEnbilis         Image: StorFiEnbilis         Image: StorFiEnbilis         StorFiEnbilis         StorFiEnbilis           Image: StorFiEnbilis         Image: StorFiEnbilis         Image: StorFiEnbilis         Image: StorFiEnbilis         StorFiEnbilis           Image: StorFiEnbilis         Image: StorFiEnbilis         Image: StorFiEnbilis         Image: StorFiEnbilis         Image: StorFiEnbilis

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Redundant Memory Performance (Gasoline applications ONLY)	P060C	D60C       Detect Processor Calculation faults due to RAM corruptions, ALU failures and ROM failures         For all of the following cases: If the individual diagnostic threshold is equal to 2048 ms, this individual case is not applicable. If any of the following cases are X out of Y diagnostics and the fail (x) is greater than the sample (Y), this individual case is also not applicable.	Equivance Ratio torque compensation exceeds threshold	-46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	Type A, 1 Trips
			Absolute difference between Equivance Ratio torque compensation and its dual store out of bounds given by threshold	46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of Accessory torque and its redundant calculation is out of bounds given by threshold range	46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Absolute difference of Filtered Air-per-cylinder and its redundant calculation is out of bounds given by threshold range	26.52 mg	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference between the previous Final Advance and the current Final Advance not Adjusted for Equivalence Ratio is out of bounds given by threshold range	15.00 degrees		Engine speed >0rpm	Up/down timer 425 ms continuous, 0.5 down time multipier	
			Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm Low Threshold 0.00	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				Nm				
			One step ahead calculation of air-per- cylinder and two step ahead is greater than threshold	80.00 mg		Engine speed > 600 rpm	Up/down timer 451 ms continuous, 0.5 down time multipier	
			Difference between Unmanaged Spark and PACS Spark is greater than threshold	15.00 degrees	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 718.10 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Creep Coast Axle Torque is out of bounds given by threshold range	High Threshold 718.10 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of Friction torque and its redundant calculation is out of bounds given by threshold range	46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Arbitrated Air-Per-Cylinder filter coefficient is out of bounds given by threshold range	High Threshold 1.000 Low Threshold 0.074	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Launch spark is active but the launch spark redundant path indicates it should not be active	N/A		Engine speed < 8,191.88 or 8,191.88 rpm (hysteresis pair)	Up/down timer 151 ms continuous, 0.5 down time multipier	
			Rate limited vehicle speed and its dual store do not equal	N/A		Time since first CAN message with vehicle speed >= 0.500 sec	10/40 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Commanded engine torque due to fast actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded engine torque due to slow actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			TOS to wheel speed conversion factor is out of bounds given by threshold range	High Threshold: 1.10 T/C Range Hi 0.10 T/C Range Lo Low Threshold: 1.10 T/C Range Hi 0.10 T/C Range Lo	Ignition State	Accessory, run or crank	5/15 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Cylinders active greater than commanded	2 cylinders		Engine run flag = TRUE > 2.00 s Number of cylinder events since engine run > 24 No fuel injector faults active	Up/down timer 451 ms continuous, 0.5 down time multipier	
			Transfer case neutral request from four wheel drive logic does not match with operating conditions	N/A	Ignition State	Accessory, run or crank Transfer case range valid and not over-ridden FWD Apps only	7.00/ 10.00 counts; 25.0msec/count	
			Driver progression mode and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							multipier	
			Predicted torque for uncorrected zero pedal determination is greater than calculated limit.	Table, f(Engine, Oil Temp). <b>P060C_Speed Control</b> <b>External Load f(Oil</b> <b>Temp, RPM)</b> + 46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold	45.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Immediate Request Without Motor is greater than its redundant calculation olus threshold	45.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5	
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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			Positive Torque Offset is greater than its redundant calculation plus threshold OR Positive Torque Offset is less than its redundant calculation minus threshold	46.75 Nm	Ignition State	Accessory, run or crank	down time multipier Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Request is greater than its redundant calculation plus threshold	46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, -down timo	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							multipier0.5	
			Commanded Hybrid Predicted Crankshaft Request is greater than its redundant calculation plus threshold	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded Hybrid Immediate Crankshaft Request is less than its redundant calculation minus threshold	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Regeneration Brake Assist is not within a specified range	Brake Regen Assist < 0 Nm or Brake Regen Assist > 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Cylinder Spark Delta Correction exceeds the absolute difference as compared to Unadjusted Cylinder Spark Delta	15.00 degrees	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			1. Cylinder Torque Offset exceeds step size threshold OR	1. 46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multioier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			2. Sum of Cylinder Torque Offset exceeds sum threshold	2. 46.75 Nm				
			Engine Capacity Minimum Immediate Without Motor is greater than its dual store plus threshold	46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Capacity Minimum Engine Off is greater than threshold	0 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Engine Capacity Minimum Engine Immediate Without Motor is greater than threshold	ONm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than Orpm	Up/down timer 151 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Engine Speed Lores Intake Firing timing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than Orpm	Up/down timer 151 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: <b>P060C_Speed Control</b> External Load f(Oil Temp, RPM) + 46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: <b>P060C_Speed Control</b> <b>External Load f(Oil</b> <b>Temp, RPM)</b> +	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				46.75 Nm				
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	718.10 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Driver Immediate Request is less than its redundant calculation minus threshold	718.10 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded Immediate Request is greater than its redundant calculation plus threshold	718.10 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time_	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			OR Commanded Immediate Request is less than its redundant calculation minus threshold				multipier	
			Commanded Immediate Response Type is set to Inactive	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	26.93 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Desired engine torque request greater than redundant calculation plus threshold	45.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine min capacity above threshold	46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 97 ms continuous, 0.5 down time multipier	
			No fast unmanaged retarded spark above the applied spark plus the threshold	15.00 Degree		Engine speed greater than Orpm	Up/down timer 425 ms continuous, 0.5 down time multipier	
			Absolute difference of adjustment factor based on temperature and its dual store above threshold	2.76 m/s	Ignition State	Accessory, run or crank	Up/down timer 133 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			1. Absolute difference of redundant calculated engine speed above threshold	500 RPM		Engine speed greater than 0 RPM	Up/down timer 151 ms continuous, 0.5 down time multipier	
			After throttle blade pressure and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Speed Control's Preditcted Torque Request and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Engine oil temperature and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 315 ms continuous, 0.5 down time multipier	
			Desired throttle position greater than redundant calculation plus threshold	8.36 percent	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the rate limited pre-throttle pressure and its redundant calculation greater than threshold	0.06 kpa	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Throttle desired torque above desired torque plus threshold	46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Desired filtered throttle torque exceeds the threshold plus the higher of desired throttle torque or modeled throttle torque	46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time	
			<b>T</b>	Liber Three body			multipier	
			Torque feedback proportional term is out of allowable range or its dual store copy does not match	High Threshold 23.37 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
				-23.37 Nm				
			Torque feedback integral term magnitude or rate of change is out of allowable ranae or its dual store	High Threshold 43.82 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			copy do not match	Low Threshold -46.75 Nm Rate of change threshold 2.92 Nm/loop			down time multipier	
			Difference of Final Torque feedback proportional plus integral term and its redundant calculation is out of bounds given by threshold range	High Threshold 46.75 Nm Low Threshold -46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of torque dooirod throttle area and	High Threshold	Ignition State	Accessory, run or crank	Up/down timer -4	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			its redundant calculation is out of bounds given by threshold range	0.50 % Low Threshold -0.50%			ms continuous, 0.5 down time multipier	
			Difference of torque model coefficients and its redundant calculation is out of bounds given by threshold range	High Threshold 0.0000925 Low Threshold -0.0000925	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 46.75 Nm Low Threshold -46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 46.75 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold 40.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of Oil temperature delta friction torque and its redundant calculation is out of bounds given by threshold ranoe	High Threshold 46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time <u>multioier</u>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				Low Threshold -46.75 Nm				
			Generator friction torque is out of bounds given by threshold range	High Threshold 46.75 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between the Supercharger friction torque and its redundant calculation greater than threshold	46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			magnitude or its increase rate of chance is out of	46.75		MAF, MAP and Baro	475 <u>ms continuous.</u>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			allowable range or its dual store copy do not match	Nm Low Threshold -46.75 Nm Rate of change threshold 2.92 Nm/loop			0.5 down time multipier	
			Torque error compensation is out of bounds given by threshold range	High Threshold 46.75 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Delta Torque Baro compensation is out of <b>-boundo givenby throchold</b>	High Threshold	Ignition State	Accessory, run or crank	Up/down timer 175 <b>- mo continuouo</b>	

Component/ F System C	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			range	Nm Low Threshold -3.62 Nm			0.5 down time multipier	
			<ol> <li>Difference of reserve torque value and its redundant calculation exceed threshold</li> <li>OR</li> <li>Reserve request does not agree with operating conditions or Difference of final predicted torque and its redundant calculation exeed threshold</li> <li>OR</li> <li>Rate of change of reserve torque exceeds threshold, increasing direction only</li> <li>OR</li> <li>Reserve engine torque above allowable capacity threshold</li> </ol>	1.45.75 Nm 2. N/A 3.45.75 Nm 4.45.75 Nm	3. &4.: Ignition State	1. &2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 46.75 Nm 3. &4.: Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Engine Vacuum and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated Intake Manifold Pressure during engine event versus during time event is greater than threshold	Table, f(Desired Engine Torque). See supporting tables: <b>P060C_Delta MAP</b> <b>Threshold f(Desired</b> <b>Engine Torque)</b>		Engine speed >0rpm	Up/down timer 151 ms continuous, 0.5 down time multipier	
			Min. Axle Torque Capacity is greater than threshold	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Driver Predicted Request is greater than its redundant calculation plus threshold OR	718.10 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Driver Predicted Request is less than its redundant calculation minus threshold					
			Cold Delta Friction Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Predicted torque for zero pedal determination is greater than calculated limit.	Table, f(Oil Temp, RPM). See supporting tables: <b>Speed Control</b> <b>External Load f(Oil</b> <b>Temp, RPM) +</b> 46.75 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded Predicted	<u>1 Nm</u>	lanition State	Accessorv. run or crank	Uo/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Axle Torque and its dual store do not match				475 ms continuous, 0.5 down time multipier	
			Steady State Estimated Engine Torque and its dual store are not equal	N/A		AFM not changing from Active to Inactive and preload torque not changing and one loop after React command Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Difference of Weighting factor for number of cylinders fueled and its redundant calculation is above threshold	0.26		Engine run flag = TRUE > 10.00 s	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of minimum spark advance limit and its redundant calculation is out of bounds given by threshold range	15.00 degrees	Ignition State	Accessory, run or crank	Up/down timer 151 ms continuous, 0.5 down time <u>multioier</u>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Difference of commanded spark advance and adjusted delivered is out of bounds given by threshold range	15.00 degrees		Engine speed >0rpm	Up/down timer 425 ms continuous, 0.5 down time multipier	
			Absolute difference between Estimated Engine Torque and its dual store are above a threshold	46.75 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between Estimated Engine Torque without reductions due to torque control and its dual store are above a threshold	46.75 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Difference of desired spark advance for managed torque and its redundant calculation is out of bounds given by threshold range	15.00 degrees		Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 46.75 Nm	Up/down timer 451 ms continuous, 0.5 down time multipier	
			Absolute difference of Engine Capacity Minimum Running Immediate Brake Torque Excluding Cylinder Sensitivity and its redundant calculation is out of bounds given by threshold range	47 Nm		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			One step ahead calculation of air-per- cylinder greater than two step ahead calculation by threshold for time	Threshold: Dynamically calculated based on current engine conditions Fault Pending Threshold: 100		Engine speed > 600 rpm	Up/down timer 451 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Rate limited cruise axle torque request and its	ms 26.93 Nm	Ignition State	Accessory, run or crank	Up/down timer 163	
			dual store do not match within a threshold				ms continuous, 0.5 down time multipier	
			1. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its redundant calculation is out of bounds given by threshold range	1. 3.50 % 2. N/A 3. N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			OR					
			2. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal					
			 -OR					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal					
			Commanded axle torque is greater than its redundant calculation by threshold	718.10 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	1,077.16 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Preload timer and its redundant calculation do not equal	N/A	Ignition State	Accessory, run or crank AFM apps only	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			AC friction torque is greater than commanded by AC control software	40.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (time based) calculation does not equal its redundant calculation	N/A		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated spark offset for equivalence ratio and its redundant cacluation is greater than a threshold	15.00 degrees		Engine speed >0rpm	Up/down timer 151 ms continuous, 0.5 down time multipier	
			Transmission Torque Request cacluations do not equal their dual stores	N/A		Run or Crank = TRUE > 0.50 s	16/32 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Absolute difference of the predicted motor torque ACS and its redundant cacluation is greater than a threshold	0.01 Nm			Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of maximum throttle area and its redundant cacluation is greater than a threshold	15 mm2			Up/down timer 133 ms continuous, 0.5 down time multipier	
			Absolute difference of Desired TIAP and its redundant cacluation is greater than a threshold	5.00 kPa			Up/down timer 475 ms continuous, 0.5 down time multipier	
			Pedal learns and their redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Throttle learns and their redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Desired Throttle Position and its redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Relay Control Circuit Low Voltage	P0628	Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 0.5 Ohms impedance between signal and controller ground	Run/Crank Voltage Engine Speed	Voltage 11.00 volts ORPM	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Fuel Injector Control Performance	P062B	This DTC determines the internal fuel injctor control module circuit is faulted. The faulted status is set on any failure that could potentially damage the drivers or injectors, or could result in uncontrolled fueling. The following general classes of failures shall be covered: Communication error with control circuit Internal corruption of control circuit values, Invalid interface values (from control circuit)	Internal ECU Boost Voltage OR Internal ECU Boost Voltage OR Driver Status OR Driver Status	>= 90 Volts <= 40 Volts = Not Ready	Battery Voltage	>= 8or>= 11 Enabled when a code clear is not active or not exiting device control Engine is not cranking Powertrain Relay Voltage within range	High Voltage - 160 failures out of 200 samples Low Voltage - 160 failures out of 200 samples Driver Status Not Ready- 160 failures out of 200 samples Driver Status Uninitialized - Uninitialized state for >= 100 counts All at 12.5ms per sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Powertrain Internal Control	P062F	This DTC detects a NVM long term performance. There are	HWIO reports that writing to NVM (at shutdown) will not succeed				Diagnostic runs at controller power up.	Type B, 2 Trips
Module EEPROM Error		two types of diagnostics that run during controller power up. One for HWIO reports that writing to NVM (at shutdown) will not succeed, and the other HWIO reports the assembly calibration integrity check has failed.	HWIO reports the assembly calibration integrity check has failed				Diagnostic runs at controller power up.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
VIN Not Programmed or Mismatched - Engine Control Module (ECM)	P0630	This DTC checks that the VIN is correctly written	At least one of the programmed VIN digits	= 00 or FF	OBD Manufacturer Enable Counter	= 0	250 ms / test Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on the 5 volt reference circuit #1 by monitoring the reference percent Vrefl and failing the diagnostic when the percent Vrefl is too low or too high or if the delta between the filtered percent Vrefl and non-filtered percent Vrefl is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vrefl < or ECM percent Vrefl > or the difference between ECM filtered percent Vrefl and percent Vrefl >	4.875% Vrefl 5.125% Vrefl 0.0495% Vrefl	Diagnostic enabled AND [ (Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged) ]	= 1 >6.41 Volts = 0.02 Seconds = FALSE >8.41 Volts = TRUE	19/39 counts; or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) Open	P0650	Detects an inoperative malfunction indicator lamp control low side driver circuit. This diagnostic reports the DTC when an open circuit is detected.	Voltage low during driver off state (indicates open circuit)	Open circuit: > 200 K 0 impedance between signal and controller ground	Run/Crank Voltage Remote Vehicle Start is not active	Voltage >11.00 volts	1 failures out of 1 samples 50 ms / sample	Type B, No MIL NO MIL Note: In certain controlle rs P263A may also set (MIL Control Short to Ground)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short on the 5 volt reference circuit #2 by monitoring the reference percent Vref2 and failing the diagnostic when the percent Vref2 is too low or too high or if the delta between the filtered percent Vref2 and non-filtered percent Vref2 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref2 < or ECM percent Vref2 > or the difference between ECM filtered percent Vref2 and percent Vref2 >	4.875% Vref2 5.125% Vref2 0.0495% Vref2	Diagnostic enabled AND [ (Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged) ]	= 1 >6.41 Volts = 0.02 Seconds = FALSE >8.41 Volts = TRUE	19/39 counts; or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Powertrain Relay Control (ODM) Open	P0685	Detects an open circuit in the Powertrain Relay driver. This diagnostic reports the DTC when an open circuit failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit: > 200 K Q ohms impedance between output and controller ground	Run/Crank Voltage	Voltage >11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controlle rs P0686 may also set (Powertr ain Relay Control Short to Ground).
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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Powertrain Relay Control (ODM) Low	P0686	Detects a short to ground in the Powertrain Relay low side driver. This diagnostic reports the DTC when a short to ground failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	Short to ground: < 0.5 Q impedance between output and controller ground	Run/Crank Voltage	Voltage >11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controlle rs P0685 may also set (Powertr ain Relay Control Open Circuit).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Powertrain Relay Control (ODM) High	P0687	Detects a short to power in the Powertrain Relay low side driver. This diagnostic reports the DTC when a short to power failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	Short to power: < 0.5 Q impedance between output and controller power	Run/Crank Voltage	Voltage >11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Power Relay Feedback Circuit Low Voltage	P0689	Detects low voltage in the control module relay feedback circuit. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value.	Control module relay feedback circuit low voltage	Powertrain relay voltage <=5.00	Powertrain relay short low diagnostic enable Run Crank voltage Powertrain relay state	= 1.00 >9.00 = ON	5 failures out of 6 samples 1000 m s/ sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Powertrain Relay Feedback Circuit High	P0690	Detects higher than expected voltage in the powertrain relay feedback circuit. This diagnostic reports the DTC when higher than expected voltage is present. For example, the powertrain relay could be stuck on. Monitoring occurs when the relay is commanded "off" for a calibrated duration.	Powertrain Relay Voltage	>= 4.00 volts will increment the fail counter	Powertrain relay commanded "OFF" No active DTCs:	>=2.00 seconds PowertrainRelayStateOn_ FA	50 failures out of 63 samples 100ms /Sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
5 Volt Reference #3 Circuit	P0697	Detects a continuous or intermittent short on the 5 volt reference circuit #3 by monitoring the reference percent Vref3 and failing the diagnostic when the percent Vref3 is too low or too high or if the delta between the filtered percent Vref3 and non-filtered percent Vref3 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref3 < or ECM percent Vref3 > or the difference between ECM filtered percent Vref3 and percent Vref3 >	4.875% Vref3 5.125% Vref3 0.0495% Vref3	Diagnostic enabled AND [ (Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged) ]	= 1 >6.41 Volts = 0.02 Seconds = FALSE >8.41 Volts = TRUE	19/39 counts; or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
5 Volt Reference #4 Circuit	P06A3	Detects a continuous or intermittent short on the 5 volt reference circuit #4 by monitoring the reference percent Vref4 and failing the diagnostic when the percent Vref4 is too low or too high or if the delta between the filtered percent Vref4 and non-filtered percent Vref4 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref4 < or ECM percent Vref4 > or the difference between ECM filtered percent Vref4 and percent Vref4 >	4.875% Vref4 5.125% Vref4 0.0495% Vref4	Diagnostic enabled AND [ (Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged) ]	= 1 >6.41 Volts = 0.02 Seconds = FALSE >8.41 Volts = TRUE	19/39 counts; or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Knock Sensor Processor 1 Performance	P06B6	This diagnostic checks fora fault with the internal test circuit (sensor #1) used only for the '20 kHz' method of the Open Circuit Diagnostic. A fault is present when the signal level from the 20 kHz range of the FFT output falls between the Open Test Circuit thresholds.	FFT Diagnostic Output	> P06B6_P06B7_OpenT estCktThrshMin AND < P06B6_P06B7_OpenT estCktThrshMax See Supporting Tables	Diagnostic Enabled? Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow	Yes > 2.0 seconds > 400 RPM and < 8,500 RPM > 200 Revs > 10 mg/cylinder and < 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	Type A, 1 Trips

Component/ Faul System Cod	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Knock Sensor Processor 2 Performance	37 This diagnostic checks for a fault with the internal test circuit (sensor #2) used only for the '20 kHz' method of the Open Circuit Diagnostic. A fault is present when the signal level from the 20 kHz range of the FFT output falls between the Open Test Circuit thresholds.	Individual Sensor Threshold Enabled? FFT Diagnostic Output	0.00, Use Case 1 Case 1: P06B6_P06B7_OpenT estCktThrshMin AND < P06B6_P06B7_OpenT estCktThrshMax See Supporting Tables Case 2: P06B7_OpenTestCkt Min2 AND < P06B7_OpenTestCkt Max2 See Supporting Tables	Diagnostic Enabled? Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow	Yes > 2.0 seconds > 400 RPM and < 8,500 RPM > 200 Revs > 10 mg/cylinder and < 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient = 0.0100 Updated each engine event Case 2 Weight Coefficient = 0.0100 Updated each engine event	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Two Stage Oil Pump Control Circuit Open	P06DA	Controller specific output driver circuit diagnoses the two stage oil pump low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit > 200 k 0 impedance between output and controller ground	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State	Enabled > 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type B, 2 Trips Note: In certain controlle rs P06DB may also set (Two Stage Oil Pump Control Circuit Short To Ground)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Two Stage Oil Pump Control Circuit Short To Ground	P06DB	Controller specific output driver circuit diagnoses the two stage oil pump low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	Short to Ground Circuit < 0.5 0 impedance between output and controller ground	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State	Enabled > 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type A, 1 Trips Note: In certain controlle rs P06DA may also set (Two Stage Oil Pump Control Circuit Open)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Two Stage Oil Pump Control Circuit Short To Power	P06DC	Controller specific output driver circuit diagnoses the two stage oil pump low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	Short to Power < 0.5 Q impedance between output and controller power	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State	Enabled > 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Two Stage Oil Pump Control Circuit Performance - Two Sided	P06DD	Diagnoses the two stage oil pump is stuck in the high pressure state. This diagnostic includes an intrusive test and a passive test. Intrusive test: The oil pump control is cycled off (high pressure) and on (low pressure) Y = 15 times at calibratable intervals. If a change in oil pressure above a calibration is not detected then the oil pressure is checked to determine if it is stuck. It takes X-out-of-Y failures to fail and set the appropriate code. Passive test: After the intrusive test passes, then a passive test will begin to run. The passive test will monitor the oil pressure changes associated with oil pump control state changes. If the passive test is retriggered.	Fail from passing state: Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is above a threshold	Oil Pressure delta = ABS [ Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.3 seconds] Oil Pressure delta <b>P06DD_P06DE_OP_S</b> tateChangeMin AND Filtered Oil Pressure ( <b>P0521_P06DD_P06D</b> <b>E_OP_HiStatePressu</b> re + <b>P0521_P06DD_P06D</b> <b>E_OP_LoStatePressu</b> re ) 2 (see P06DD details on Supporting Tables Tab <b>P06DD_P06DE_OP_S</b> tateChangeMin <b>P0521_P06DD_P06D</b> <b>E_OP_HiStatePressu</b> re <b>P0521_P06DD_P06D</b> <b>E_OP_HiStatePressu</b> re <b>P0521_P06DD_P06D</b> <b>E_OP_LoStatePressu</b> re <b>P0521_P06DD_P06D</b> <b>E_OP_LoStatePressu</b> re <b>P0521_P06DD_P06D</b>	Common Criteria: Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: <u>Active Criteria:</u> One Sided Performance Test = Disabled	TRUE > 30.0 seconds >70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_SensorFA CrankSensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCkt FA AmbientAirDefault Enabled : OilPmpTFTKO Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccura te EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled	>12 errors out of 15 samples. Run once per trip or activiated by the Passive Test	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Oil Pump in Low State	> 1.3 seconds		
					Modelled Oil Temperature within range	40.0 deg C < Oil Temp < 100.0 deg C		
					Filtered Engine Speed within range	1,500 RPM < Filtered Engine Speed < 2,500 RPM		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds ]< 100 RPM		
					Engine Torque within range	P06DD_P06DE_MinEnab leTorque_OP <		
						Indicated Requested Engine Torque <		
						P06DD_P06DE_MaxEna bleTorque_OP		
						(see P06DD details on Supporting Tables Tab P06DD_P06DE_MinEnab leTorque_OP P06DD_P06DE_MaxEna bleTorque_OP )		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > P06DD_P06DE_MinOilPr essThresh		
						(see P06DD details on Supporting Tables Tab <b>P06DD_P06DE_MinOilPr</b> essThresh )		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Expected Oil Pressure Delta within range	150.0 kPa < ABS [ <b>P0521_P06DD_P06DE_</b> <b>OP_HiStatePressure</b> - <b>P0521_P06DD_P06DE_</b> <b>0 P_LoStatePressure</b> ] < 425.0 kPa		
					Passive Criteria:			
					Active Test Passed	TRUE		
					Filtered Engine Speed within range	1,750 RPM < Filtered Engine Speed < 3,500 RPM		
					Modelled Oil Temperature within range	40.0 deg C < Oil Temp < 100.0 deg C		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.00 seconds ]< 1,000 RPM		
					Oil Pressure Delta within a range	Oil Pressure Delta < <b>P06DD_P06DE_OP_Stat</b> <b>eChangeMin</b> (see P06DD details on Supporting Tables Tab <b>P06DD_P06DE_OP_Stat</b> <b>eChangeMin</b> )		
			Fast Pass Condition Oil Pressure delta is less than a minimum delta pressure on a state	Oil Pressure delta = ABS [ Filtered Oil	<u>Common Criteria:</u> Two Stage Oil Pump is Present	TRUE	0 errors out of 5 samples. Run once per trip	
			change and the measured filtered oil pressure is	Pressure at beginning of state change -	Engine Running	> 30.0 seconds	or activiated by the Passive Test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			above a threshold	filtered oil pressure after 1.3 seconds] Oil Pressure delta < P06DD_P06DE_OP_S tateChangeMin	Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than 30.0 seconds)	>70.0 kPa FALSE		
				AND Filtered Oil Pressure ( P0521_P06DD_P06D E_OP_HiStatePressu re - P0521_P06DD_P06D E_OP_LoStatePressu re ) 2	No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled.	Fault bundles: MAF_SensorFA ECT_SensorFA IAT_SensorFA EngOilPressureSensorCkt FA AmbientAirDefault EngOilTempFA OilPmpTFTKO CrankSensor_FA Enabled : OilPmpTFTKO		
				(see P06DD details on Supporting Tables Tab P06DD_P06DE_OP_S tateChangeMin P0521_P06DD_P06D E_OP_HiStatePressu re P0521_P06DD_P06D E_OP_LoStatePressu re )	No active DTC's for control enable: <u>Active Criteria:</u> One Sided Performance Test = Disabled Oil Pump in Low State Modelled Oil Temperature	Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccura te EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled > 1.3 seconds 40.0 deg C < Oil Temp <		
					Filtered Engine Speed	1,500 RPM < Filtered Enaine Soeed < 2.500		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Engine Torque within range	RPM P06DD_P06DE_MinEnab leTorque_OP < Indicated Requested Engine Torque < P06DD_P06DE_MaxEna bleTorque_OP (see P06DD details on Supporting Tables Tab P06DD_P06DE_MinEnab leTorque_OP P06DD_P06DE_MaxEna bleTorque_OP		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds ]< 100 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > <b>P06DD_P06DE_MinOilPr</b> essThresh (see P06DD details on Supporting Tables Tab <b>P06DD_P06DE_MinOilPr</b> essThresh )		
					Expected Oil Pressure Delta within range	150.0 kPa < ABS [ <b>P0521_P06DD_P06DE_</b> <b>OP_HiStatePressure</b> - <b>P0521_P06DD_P06DE_</b> <b>OP_LoStatePressure</b> ] < 425.0 kPa		

Component/ Faul System Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Two Stage Oil Pump Control Circuit StuckOn - Two Sided	<ul> <li>Diagnoses the two stage oil pump is stuck in the low pressure state. This diagnostic includes an intrusive test and a passive test.</li> <li>Intrusive test: The oil pump control is cycled off (high pressure) and on (low pressure) Y times at calibratable intervals. If a change in oil pressure above a calibration is not detected then the oil pressure is checked to determine if it is stuck. It takes X-out-of-Y failures to fail and set the appropriate code. Passive test: After the intrusive test passes, then a passive test will begin to run. The passive test will monitor the oil pressure changes associated with oil pump control state changes. If the passive test determines that the oil pressure change was less then desired then the intrusive test is retriggered.</li> </ul>	Fail from a passing state: Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is below a threshold	Oil Pressure delta = ABS [ Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.3 seconds] Oil Pressure delta <b>P06DD_P06DE_OP_S</b> <b>tateChangeMin</b> (see P06DE details on Supporting Tables Tab) Filtered Oil Pressure <b>P0521_P06DD_P06D</b> E_OP_HiStatePressu (re - P0521_P06DD_P06D E_OP_LoStatePressu re ) ÷ 2 (see P06DE details on Supporting Tables Tab)	Common Criteria: Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: <u>Active Criteria:</u> One Sided Performance	TRUE > 30.0 seconds >70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_SensorFA ECT_SensorFA CrankSensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCkt FA AmbientAirDefault EngOilTempFA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccura te EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA	> 12 errors out of 15 samples. Run once per trip or activiated by the Passive Test	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Test = Disabled			
					Oil Pump in Low State	> 1.3 seconds		
					Modelled Oil Temperature within range	40.0 deg C < Oil Temp < 100.0 deg C		
					Filtered Engine Speed within range	1,500 RPM < Filtered Engine Speed < 2,500 RPM		
					Engine Torque within range	P06DD_P06DE_MinEnab leTorque_OP < Indicated Requested Engine Torque < P06DD_P06DE_MaxEna bleTorque_OP (see P06DE details on Supporting Tables Tab)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds ]< 100 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > <b>P06DD_P06DE_MinOilPr</b> essThresh (see P06DD details on Supporting Tables Tab)		
					Expected Oil Pressure Delta within range	150.0 kPa < ABS [ <b>P0521_P06DD_P06DE_</b> <b>OP_HiStatePressure</b> - <b>P0521_P06DD_P06DE_</b> <b>OP_LoStatePressure</b> ] < 425.0 kPa		

Passive Criteria:       Active Test Passed       TRUE         Active Test Passed       TRUE         Filtered Engine Speed       1,750 RPM < Filtered         Engine Speed < 3,500 RPM       Modelled Oil Temperature         Within range       40.0 deg C < Oil Temp <         100.0 deg C       TRUE         Delta Filtered Engine Speed within a range       ABS [Filtered RPM at beginning of State change - Filtered RPM at beginning of State change - Filtered RPM atter 1.00.9 conds] < 1,000 RPM         Oil Pressure Delta        Oil Pressure Delta        TRUE         Fast Pass Condition       Oil Pressure delta is less than minimum delta appresent       Oil Pressure delta appresent       TRUE	Component/ System	ult Monitor Strategy de Description	onent/ F m (	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Filtered Engine Speed       1,750 RPM < Filtered Engine Speed < 3,500 RPM						Passive Criteria: Active Test Passed	TRUE		
Modelled Oil Temperature within range       40.0 deg C < Oil Temp < 100.0 deg C						Filtered Engine Speed within range	1,750 RPM < Filtered Engine Speed < 3,500 RPM		
Petta Filtered Engine Speed within a range       ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.00 seconds] < 1,000 RPM						Modelled Oil Temperature within range	40.0 deg C < Oil Temp < 		
Image: Second tion on the second tion on the second time a minimum delta       Oil Pressure delta = ABS [Filtered Oil ABS [Filtered OI] ABS [Filtered OI ABS [F						Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.00 seconds] < 1,000 RPM		
Fast Pass Condition       Common Criteria:       0 errors out of 5 store out						Oil Pressure Delta < <b>P06DD_P06DE_OP_Stat</b> <b>eChangeMin</b> (see P06DE details on Supporting Tables Tab)	TRUE		
pressure on a state change and the measured filtered oil pressure is below a threshold       Pressure at beginning of state change - filtered oil pressure after 1.3 seconds]       Engine Running Ambient Air Pressure       > 30.0 seconds       the Pass         Oil Pressure delta       Oil Aeration       FALSE				Fast Pass Condition Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is below a threshold	Oil Pressure delta = ABS [ Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.3 seconds] Oil Pressure delta	Common Criteria: Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration	TRUE > 30.0 seconds >70.0 kPa FALSE	0 errors out of 5 samples. Run once per trip or activiated by the Passive Test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				P06DD_P06DE_OP_S tateChangeMin (P06DD Performance Test Details on Supporting Tables Tab) Filtered Oil Pressure P0521_P06DD_P06D E_OP_HiStatePressu (re - P0521_P06DD_P06D E_OP_LoStatePressu re )/2 (P06DD Performance Test Details on Supporting Tables Tab)	<ul> <li>&gt; 10,000 RPM for longer than 30.0 seconds)</li> <li>No active DTC's for diagnsotic enable:</li> <li>Check oil pump TFTKO as a diagnostic enable when Enabled.</li> <li>No active DTC's for control :</li> <li>Active Criteria: One Sided Performance Test = Disabled</li> <li>Oil Pump in Low State</li> <li>Modelled Oil Temperature within range</li> <li>Filtered Engine Speed within range</li> <li>Engine Torque within range</li> </ul>	Fault bundles: MAF_SensorFA ECT_SensorFA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCkt FA AmbientAirDefault EngOilTempFA Enabled : OilPmpTFTKO EngineTorqueEstInaccura te EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled > 1.3 seconds 40.0 deg C < Oil Temp < 100.0 deg C 1,500 RPM < Filtered Engine Speed < 2,500 RPM P06DD_P06DE_MinEnab IeTorque_OP		

Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Indicated Requested Engine Torque < <b>P06DD_P06DE_MaxEna</b> <b>bleTorque_OP</b> (P06DD Performance Test Details on Supporting Tables Tab)		
				Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] < 100 RPM		
				Filtered Oil Pressure within range	Filtered Engine Oil Pressure > <b>P06DD_P06DE_MinOilPr</b> essThresh (see P06DD details on Supporting Tables Tab)		
				Expected Oil Pressure Delta within range	150.0 kPa < ABS [ <b>P0521_P06DD_P06DE_</b> OP_HiStatePressure -		
					P0521_P06DD_P06DE_ OP_LoStatePressure ] < 425.0 kPa		
	Fault Code	Fault Code       Monitor Strategy Description         Image: Strategy Description       Image: Strategy Description         Image: Strategy Description	Fault Code       Monitor Strategy Description       Malfunction Criteria         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description 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    Image: Amount of the strategy Description       Image: Amount of the strategy Description       Image: Amount of the strategy Descr	Fault Code         Monitor Strategy Description         Malfunction Criteria         Threshold Value         Secondary Parameters           Image: Second Parameters         Image: Second Parameters         Image: Second Parameters         Image: Second Parameters         Image: Second Parameters           Image: Second Parameters         Image: Second Parameters         Image: Second Parameters         Image: Second Parameters         Image: Second Parameters           Image: Second Parameters         Image: Second Parameters         Image: Second Parameters         Image: Second Parameters         Image: Second Parameters           Image: Second Parameters         Image: Second Parameters         Image: Second Parameters         Image: Second Parameters         Image: Second Parameters           Image: Second Parameters         Image: Second 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Test ialues nabuporting Tables Tab)         Indicated Requested Engine Torque of (POBDD Performance Test ialues nabuporting Tables Tab)           Deta Filtered Engine Speed within a range         ABS [Filtered RPM att beginning of State change - Filtered CII Pressure VBOBDD P60ED_MinOIP (SSE POBDD De0DE_MinOIP (SSE POBDD De0DE_MinOIP (SSE POBDD P60ED OP LoStatePressure ] < 425.0 kPa	Face         Monitor Strategy         Malfunction Criteria         Threshold Value         Secondary Parameters         Enable Conditions         Time Required           Image: Strategy         Image: Strategy

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Traction Control Torque Request Circuit	P0856	Determines if torque request from the EBCM is valid	if torque n the EBCM       Serial Communication 2's complement message - (\$1C7/\$1C9 for engine torque, \$1CA/\$1C6for axle torque)       Message <> 2's complement of message       Active Communication       Serial data has been received         Power Mode Engine Running       = Run = True         Status of traction in GMLAN message (\$4E9)       = Traction Present	>= 6 failures out of 10 Performed on every received message	Type C, 1 Trip No MIL Emissio ns Neutral Emissio ns Neutral			
			OR Serial Communication message (\$1C7/\$1C9 for engine torque, \$1CA/ \$1C6for axle torque) rolling count index value	Message rolling count value <> previous message rolling count value plus one	Ignition Voltage Run/Crank Active	<ul><li>&gt; 6.41 volts</li><li>&gt; 0.50 seconds</li></ul>	6 rolling count failures out of 10 samples Performed on every received message	Diagnost ic - Type C
			OR Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi- transitions out of 5 samples. Performed every 200 ms	
			Torque request greater than torque request diagnostic maximum threshold	<ul> <li>&gt; 99 Nm</li> <li>for engine torque</li> <li>based traction torque</li> <li>system,</li> <li>OR</li> <li>&gt; 4,000 Nm</li> <li>for axle torque based</li> <li>traction torque system</li> </ul>			>= 4 out of 10 samples Performed on every received message	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Heater Supply Voltage Sense Circuit Range/ Performance	P103B	The P103B diagnostic determines if the heater supply circuit is rational by comparing the heater supply voltage to the run crank voltage and calculating the difference. The heater supply voltage input is connected to the 02 heater supply circuit inside the vehicle relay center. It is representative of the voltage supplied to the 02 heaters. The 02 heater voltage is used by the HWIO to calculate the 02 heater resistance on switching type 02 sensors (non- WRAF). With a fault set, the resistance calculation is performed with run crank voltage. The diagnostic failure counter is incremented if the voltage difference is greater than the threshold. This DTC is set based on the fail and sample counters.	The absolute value of Heater Supply Voltage delta from Run Crank voltage	> 2.00 volts	Powertrain relay in range (Relay in range is defined as relay voltage Run Crank signal active	= True > 11.00 volts) = True (Please see "Run/Crank Active conditiions" in Supporting Tables)	8 failures out of 10 samples 250 ms / sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Heater Supply Voltage Sense Circuit Low	P103C	The P103C diagnostic determines if the heater supply circuit is low by comparing the heater supply voltage to the threshold. The heater supply voltage input is connected to the 02 heater supply circuit inside the vehicle relay center. It is representative of the voltage supplied to the 02 heaters. The 02 heater voltage is used by the HWIO to calculate the 02 heater resistance on switching type 02 sensors (non- WRAF). With a fault set, the resistance calculation is performed with run crank voltage. The diagnostic failure counter is incremented if the heater supply voltage is less than the threshold. This DTC is set based on the fail and sample counters.	Heater Supply Voltage	< 6.00 volts	Powertrain relay in range (Relay in range is defined as relay voltage Run Crank signal active	= True > 11.00 volts) = True (Please see " <b>Run/Crank</b> <b>Active conditiions</b> " in Supporting Tables)	8 failures out of 10 samples 250 ms / sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Inlet Airflow System Performance (naturally aspirated)	P1101	Detects a performance failure in the Manifold Pressure (MAP) sensor, Throttle Position sensor (TPS) or Mass Air Flow (MAF) sensor that cannot be uniquely identified as a failure in one individual sensor. This diagnostic can set when more than one of these sensors has a performance concern. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from these three sensors. These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the system, but no	Filtered Throttle Model Error AND ABS(Measured Flow - Modeled Air Flow) Filtered OR ABS(Measured MAP - MAP Model 1) Filtered AND ABS(Measured MAP - MAP Model 2) Filtered	<ul> <li>&gt; 300 kPa*(g/s)</li> <li>&gt; 14.0 grams/sec</li> <li>&gt; 20.0 kPa)</li> <li>&gt; 10.0 kPa</li> </ul>	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	<ul> <li>&gt;= 400 RPM</li> <li>= 6,800 RPM</li> <li>&gt;= -9 Deg C</li> <li>= TRUE)</li> <li>&lt;= 150 Deg C</li> <li>= FALSE)</li> <li>&gt;= -20 Deg C</li> <li>&lt;= 125 Deg C</li> <li>&gt;= 0.50</li> <li>Filtered Throttle Model Error multiplied by</li> <li>P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</li> <li>Modeled Air Flow Error multiplied by</li> <li>P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual</li> <li>Weight Factor based on RPM and</li> <li>P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual</li> <li>Weight Factor based on MAF Est</li> </ul>	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		single failed sensor can uniquely be identified. In this case, the Inlet Airflow System Performance diagnostic will fail.				MAP Model 1 Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM		
						MAP Model 2 Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM		
					No Active DTCs:	MAP_SensorCircuitFA EGRValvePerformance_F A MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA		
					No Pending DTCs:	EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT SIDI High Pressure Rail Temperature Sensor Performance	P111F	This DTC Diagnoses Fuel Temperature sensors rationality by comparing Primary sensor (T1) vs. Secondary sensor (T2)	Fuel Temperature Error (Absolute delta between sensori and sensor2)	> 20.00 degC	Fuel Temperature Rationality Diagnostic Enabled No Fault Active on	True Enabled when a code clear is not active or not exiting device control Temperature sensors 1 out of range Low or High Fault Active (P0182, P0182) Temperature sensors 2 out of range Low or High (P0187, P0188) SENT Communication Fault Active (P16E4, P16E5) SENT Intenal Error Fault Active (P126E, P126F)	100.00 failures out of 125.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
					No Fault Pending on	Fuel Temperature Sensor SENT Message Error Fault Active (P128C, P128D) SENT Communication Fault Pending (P16E4,		
						Fiel Temperature Sensor SENT Message Error Fault Pending (P128C, P128D)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 low side circuit shorted to high side circuit	P1248	Controller specific output driver circuit diagnoses injector 1 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 low side circuit shorted to high side circuit	P1249	Controller specific output driver circuit diagnoses injector 2 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector3 low side circuit shorted to high side circuit	P124A	Controller specific output driver circuit diagnoses injector 3 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 low side circuit shorted to high side circuit	P124B	Controller specific output driver circuit diagnoses injector 4 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injectors low side circuit shorted to high side circuit	P124C	Controller specific output driver circuit diagnoses injector 5 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 low side circuit shorted to high side circuit	P124D	Controller specific output driver circuit diagnoses injector 6 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Over Temperature	P1255	To detect if an internal fuel pump driver over- temperature condition exists under normal operating conditions. The FTZM ERFS control may adjust the PWM slew rate or frequency as a self- protection method, but may not reduce pump rotational speed or impact pumping performance in any way due to an over- temperature condition.	Fuel Pump Driver Temperature	T> 160 degC	<ul> <li>a) Diagnostic enabled [KeFABR b OvertempDia gEnbl]</li> <li>b) Sensor Bus Relay On</li> <li>c) CAN Sensor Bus message \$3EC_Available</li> <li>d) Sensor Bus Message \$3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_A RC_ChkErr]</li> </ul>	<ul> <li>a) == TRUE</li> <li>b) == TRUE</li> <li>c) == TRUE</li> <li>d) &lt;&gt; TRUE</li> </ul>	0.00 failures/ 0.00 samples 1 sample / 100 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Temperature Sensor 1 Internal Fault - Error Code	P126E	This DTC Diagnoses the SENT Fuel Temperature Sensor 1 internal failure	Fuel Temperature Sensor 1 SENT digital read value	>= 4,089.00	No Fault Active on	Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (P16E4, P16E5) Fuel Temperature Sensor SENT Message Error Fault Active (P128C)	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
					No Fault Pending on	Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)		
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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SENT Fuel Rail Temperature Sensor 2 Internal Fault - Error Code	P126F	This DTC Diagnoses the SENT Fuel Temperature Sensor 2 internal failure	Fuel Temperature Sensor 2 SENT digital read value	>= 4,089.00	No Fault Active on	Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (P16E4, P16E5) Fuel Temperature Sensor SENT Message Error FaultActive (P128D)	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
					No Fault Pending on	Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail High Pressure Sensor 2 Out of Range	P127C	This DTC diagnose SENT high pressure sensor 2 that is too low out of range. If the sensor digital value (repressing the refernce voltage) is below the lower digital threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold.	High Pressure Rail Sensor 2 SENT digital read value	=< 76			Time Based: 400 Failuer out of 500 Samples 6.25 ms per Sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Pressure Sensor 1 Internal Performance	P128A	This DTC determines if there is internal error within the SENT pressure sensor 1 (i.e. Broken wire bond internal to the SENT Sensor). Once the internal error is detected a fixed faulted digital values is communicated to the ECU.	Digital pressure sesnor 1 value	>= 4,089	SENT Fuel Rail Pressure Sensor Internal Performance Enable No Fault Pending	Enabled when a code clear is not active or not exiting device control True P16E4 P16E5 P128F	400 failures out of 500 samples 6.25 ms per Sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Pressure Sensor 2 Internal Performance	P128B	This DTC determines if there is internal error within the SENT pressure sensor 2 (i.e. Broken wire bond internal to the SENT Sensor). Once the internal error is detected a fixed faulted digital values is communicated to the ECU.	Digital pressure sesnor 2 value	>= 4,089	SENT Fuel Rail Pressure Sensor Internal Performance Enable No Fault Pending	Enabled when a code clear is not active or not exiting device control True P16E4 P16E5 P128F	400 failures out of 500 samples 6.25 ms per Sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Pressure &Temperatur e Sensor Temperature 1 Message Incorrect	P128C	This DTC diagnoses the the communication errors on the temperature 1 serial data channel	Serial Message 1 Age	>= 0.03 ms	SENT signal Serial waveform diagnostics enable SENT power up delay No Fault Active	True >=0.00 seconds P16E4 P16E5	134 failures out of 167 samples 6.25 ms per sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Pressure & Temperature Sensor Temperature 2 Message Incorrect	P128D	This DTC diagnoses the the communication errors on the temperature 2 serial data channel	Serial Message 2 Age	>= 0.03 ms	SENT signal Serial waveform diagnostics enable SENT power up delay No Fault Active	True >=0.00 seconds P16E4 P16E5	134 failures out of 167 samples 6.25 ms per sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Pressure & Temperature Sensor	P128F	This DTC determines if there is any SENT signal waveform for discrepancies (i.e. too many pulse, too few	SENT HWIO Determines message fault (i.e.too many pulse, too few pulse, clock shift)	= true	SENT signal Serial waveform diagnostics enable	True	400 failures out of 500 samples	Type A, 1 Trips
Pressure Message Incorrect		pulse, clock shift). The SENT HWIO Determines message waveform fault (i.e.too many pulse, too few pulse, clock shift) and if the message age is too long.	Message Age	> 1.69ms	SENT power up delay No Fault Active on	<ul> <li>&gt;= 0.00 seconds</li> <li>Enabled when a code clear is not active or not exiting device control</li> <li>P16E4</li> <li>P16E5</li> </ul>	6.25 ms per sample Continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Module- Ignition Switch Run/ Start Position Circuit Low [FPPM applications only]	P129D	To detect if the Run/ Start position circuit voltage is short to low / open	FPPM Run_Crank Active status	<> ECM Run_Crank Active status	<ul> <li>a) Chassis Fuel Pressure System Type configuration</li> <li>b) Diagnostic Enabled calibration</li> <li>c) FPPM Control Status</li> <li>Alive Rolling Count result</li> <li>d) Diagnostic feedback</li> <li>received</li> <li>e) System Voltage</li> </ul>	a) CeFRPR_e_ECM_FPPM _Sys b) == TRUE c) == Valid d) == TRUE e) >= 0.00 V	64 failures/ 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Signal Message Counter Incorrect [FPPM applications only]	uel Pump river ontrol lodule ignal lessage correctP129ETo detect if the command message received as serial data from the engine control module is valid The "rolling count check" value is created by adding an appended hexadecimal calculation to the pump duty cycle command value. In order to achieve a desired fuel pressure, a hexadecimal equivalent value representing the necessary fuel pump current pulse "On" time ( duty cycle as a percent value) is	FPPM Received Duty Cycle Rolling Count	<> Transmitted Duty Cycle Rolling Count (ECM) (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	<ul> <li>a) Chassis Fuel Pres Sys Type configuration selection</li> <li>b) Diagnostic Enabled</li> <li>c) FPPM Control Rolling Count Faulted</li> <li>d) FPPM Diagnostic data received [\$0CE]</li> <li>e) FPPM Diagnostic Data Validity Enabled</li> <li>f) Diagnostic System Disabled</li> <li>g) Communication Faulted</li> <li>h) Run_Crank Ignition Switch Position Circuit Voltage</li> <li>j) Run_Crank Ignition Status</li> <li>k) Sensor Bus Relay On</li> </ul>	<ul> <li>a) == FCBR ECM FPPM Sys</li> <li>b) == TRUE</li> <li>c) &lt;&gt; True</li> <li>d) == TRUE</li> <li>e) == TRUE</li> <li>f) &lt;&gt; True</li> <li>g) &lt;&gt; True</li> <li>h) &gt; 7.00 Volts</li> <li>j) == TRUE</li> <li>k) == TRUE</li> </ul>	64 failures/ 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips	
		rPPM. The corresponding "check" value is transmitted as well. At the FPPM, the received duty cycle command value is used to create an expected "rolling count" value using the same calculation method as the ECM. The expected "rolling count" value calculated at the receiving power module (smart device) is compared to the transmitted "rolling count" value. If these do not match, a fault condition is reported	FPPM Received Duty Cycle Protection Value	<> Transmitted Duty Cycle Protection Value (ECM) (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	<ul> <li>a) Chassis Fuel Pres Sys Type configuration selection</li> <li>b) Diagnostic Enabled</li> <li>c) FPPM Control Rolling Count Faulted</li> <li>d) FPPM Diagnostic data received [\$0CE]</li> <li>e) FPPM Diagnostic Data Validity Enabled</li> <li>f) Diagnostic System Disabled</li> <li>g) Communication Faulted</li> <li>h) Run_Crank Ignition Switch Position Circuit</li> </ul>	<ul> <li>a) == FCBR ECM FPPM Sys</li> <li>b) == TRUE</li> <li>c) &lt;&gt; True</li> <li>d) == TRUE</li> <li>e) == TRUE</li> <li>f) &lt;&gt; True</li> <li>g) &lt;&gt; True</li> <li>h) &gt; 7.00 Volts</li> </ul>	64 failures/ 80 samples 1 sample / 12.5 millisec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		forward to the ECM where X/Y diagnostic counting is performed.			Voltage j) Run_Crank Ignition Status k) Sensor Bus Relay On	j) == TRUE k) == TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Enable Circuit Performance [FPPM applications]	P12A6	The purpose of the Fuel Pump Driver Control Module Enable Circuit Performance Diagnostic is to detect if the state of the fuel control enable circuit is valid. This is accomplished by comparing the Fuel Control Enable circuit voltage state [high or low] measured by the Fuel Pump Driver Control Module to the state of Fuel Control Enable signal in the ECM. When the measured state does not match the expected state, the fail counter increments.	Fuel Control Enable Circuit Voltage State (Fuel Pump Driver Control Module)	<> Fuel Control Enable State (ECM)	<ul> <li>a) Chassis Fuel Pres Sys Type configuration selection</li> <li>b) Diagnostic Enabled</li> <li>c) Diagnostic System Disabled</li> <li>d1) Run_Crank Ignition</li> <li>Sw Position Active</li> <li>OR</li> <li>d2) Run_Crank Ignition</li> <li>Sw Position Active timer [delay]</li> <li>e) FPPM Control Data Rolling Count Faulted</li> <li>f) Diagnostic serial data received</li> <li>g) Run_Crank Ignition</li> <li>Switch Position Circuit</li> <li>Voltage</li> </ul>	<ul> <li>a) == FCBR ECM FPPM Sys</li> <li>b) == TRUE</li> <li>c) &lt;&gt; True</li> <li>d1) &lt;&gt; True</li> <li>OR</li> <li>d2) &gt;= 0.40 seconds</li> <li>e) &lt;&gt; True</li> <li>f) == TRUE</li> <li>g) &gt; 7.00 volts</li> </ul>	40 failures/ 80 samples 1 sample / 12.5 millisec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Control Status Signal Message Counter Incorrect [FPPM applications	pP12A8To detect if the control status message transmitted as serial data from the driver control module is valid. The "rolling count check" value is created by adding an appended hexadecimal calculation to each control command value. The corresponding "check" value is transmitted to the FPPM as well as the actual command. At the FPPM, the received command value is used to create an expected "rolling count" value using the same calculation method as the ECM. The expected "rolling count" value calculated at the receiving power module ( smart device) is compared to the transmitted "rolling count" value. If these do not match, a fault condition is reported forward to the ECM where X/Y diagnostic counting is performed.	FPPM Control Status Alive Rolling Count	<> ECM Control Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	<ul> <li>a) Chassis Fuel Pres Sys Type configuration selection</li> <li>b) Diagnostic Enabled</li> <li>c) FPPM Diagnostic serial data received</li> <li>d) Run_Crank Ignition Switch Position Circuit Voltage</li> </ul>	<ul> <li>a) == FCBR ECM FPPM Sys</li> <li>b) == TRUE</li> <li>c) == TRUE</li> <li>d) &gt; 0.00 Volts</li> </ul>	64 failures/ 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips	
oniyj		FPPM Power Consumption Alive Rolling Count	<> ECM Power Consumption Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	<ul> <li>a) Chassis Fuel Pres Sys Type configuration selection</li> <li>b) Diagnostic Enabled</li> <li>c) FPPM Diagnostic serial data received</li> <li>d) Run_Crank Ignition Switch Position Circuit Voltage</li> </ul>	<ul> <li>a) == FCBR ECM FPPM Sys</li> <li>b) == TRUE</li> <li>c) == TRUE</li> <li>d) &gt; 0.00 Volts</li> </ul>	64 failures/ 80 samples 1 sample / 12.5 millisec		
		FPPM Driver Status Alive Rolling Count	<> ECM Driver Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	<ul> <li>a) Chassis Fuel Pres Sys Type configuration selection</li> <li>b) Diagnostic Enabled</li> <li>c) FPPM Diagnostic serial data received</li> <li>d) Run_Crank Ignition Switch Position Circuit Voltage</li> </ul>	<ul> <li>a) == FCBR ECM FPPM Sys</li> <li>b) == TRUE</li> <li>c) == TRUE</li> <li>d) &gt; 0.00 Volts</li> </ul>	64 failures/ 80 samples 1 sample / 12.5 millisec		
		condition is reported forward to the ECM where X/Y diagnostic counting is performed.	FPPM Hardware Status Alive Rolling Count	<> ECM Hardware Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	<ul> <li>a) Chassis Fuel Pres Sys Type configuration selection</li> <li>b) Diagnostic Enabled</li> <li>c) FPPM Diagnostic serial data received</li> <li>d) Run_Crank Ignition Switch Position Circuit Voltage</li> </ul>	<ul> <li>a) == FCBR ECM FPPM Sys</li> <li>b) == TRUE</li> <li>c) == TRUE</li> <li>d) &gt; 0.00 Volts</li> </ul>	64 failures/ 80 samples 1 sample / 12.5 millisec	

Component/ Fa System C	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Coil Positive Voltage Circuit Group 1 * * \$IDI ONLY	P135A	This diagnostic checks for minimum voltage at the fuse which supplies power to the Ignition Coils (applicable only for SIDI applications). A diagnostic failure indicates a blown fuse.	Ignition Module Supply Voltage.	< 2.5 Volts	Diagnostic Enabled? Three possible Ignition Coil Power Sources (only 1 used): Ignition Coil Power Source = <u>Case 1: Battery</u> Delay starting at Key-On <u>Case 2: Ignition Run/ Crank</u> Ignition Run/Crank Voltage <u>Case 3: PT Relay</u> PT Relay Voltage	Yes PT Relay (Case 3) 5 Engine Revs > 5.0 volts >11.0 volts	<ul><li>24 Failures out of</li><li>30 Samples</li><li>6.25 msec rate</li></ul>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Coil Positive Voltage Circuit Group 2 * * \$IDI ONLY	P135B	This diagnostic checks for minimum voltage at the fuse which supplies power to the Ignition Coils (applicable only for SIDI applications). A diagnostic failure indicates a blown fuse.	Ignition Module Supply Voltage.	< 2.5 Volts	Diagnostic Enabled? Three possible Ignition Coil Power Sources (only 1 used):	Yes	<ul><li>24 Failures out of</li><li>30 Samples</li><li>6.25 msec rate</li></ul>	Type: Type A, 1 Trips
					Ignition Coil Power Source =	PT Relay (Case 3)		
					<u>Case 1: Battery</u> Delay starting at Key-On	5 Engine Revs		
					<u>Case 2: Ignition Run/</u> <u>Crank</u> Ignition Run/Crank Voltage	>5.0 volts		
					<u>Case 3: PT Relay</u> PT Relay Voltage	>11.0 volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 1 Status Signals Message Counter Incorrect	P135C	This DTC monitors for an error in communication with the Cooling Fan 1 Status Signals	Communication of the Alive Rolling Count or Protection Value of the Cooling Fan 1 Status Signals Message over LIN bus is incorrect for out of total samples	>= 8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	<ul> <li>Is available</li> <li>&gt;= 3,000.00 milliseconds</li> <li>= Run</li> <li>&gt;=11.00 Volts</li> <li>&gt;=11.00 Volts</li> </ul>	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Emissions Reduction System Fault	P1400	Model based test computes power from exhaust flow and thermal energy resulting from elevated idle speed and retarded spark advance. Detects if the cold start emission reduction system has failed resulting in the delivered power being out of range.	Average desired accumulated exhaust power - Average actual accumulated exhaust power (too much energy delivered to catalyst) Average desired accumulated exhaust power - Average actual accumulated exhaust power (too little energy delivered to catalyst) (EWMA filtered) Average Power = output of P1400_EngineSpeedRes idual_Table * output of P1400_SparkResidual_T able NOTE: Desired accumulated power would use the desired catalyst light off spark and desired engine speed and the actual accumuated power would use the final commanded spark and actual engine speed. Refer to the Supporting Tables for details	< -32.00 KJ/s (high RPM failure mode) > 5.30 KJ/s (low RPM failure mode)	To enable the diagnostic, the Cold Start Emission Reduction Strategy must be Active per the following: Catalyst Temperature AND Engine Coolant AND Barometric Pressure The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following: Catalyst Temperature AND Engine Run Time OR Engine Run Time OR	< 500.00 degC > -12.00 degC <= 66.00 degC >= 72.00 KPa >= 1,000.00 degC >= 20.00 seconds > P1400_CatalystLightOff ExtendedEngineRunTim eExit This Extended Engine run time exit is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details. < 72.00 KPa	Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 10 seconds of accumulated qualified data.	EWMA Based - Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Other Enable Criteria:			
					OBD Manufacturer Enable Counter	0		
					Vehicle Speed	<1.86MPH		
					Allow diagnostic to calculate residual in an off-idle state. If the value of the OffIdleEnable is equal to 1 then the "DriverOffAccelPedal" will not be checked. However, if the value of OffIdleEnable is 0 then driver must be off the accel pedal	0 (A value of 1 allows diagnostic to run and calculate the residual while off idle. A value of 0 requires calculation of the residual at idle)		
					A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. Therefore when the:			
					Pedal Close Delay Timer	> 2.00 seconds		
					the diagnostic will continue the calculation.			
					A change in gear will initiate a delay in the calculation of the average qualified residual value to			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					allow time for the actual engine speed and actual final commanded spark to achieve their desired values. Therefore, when the: Gear Shift Delay Timer	> 2.00 seconds		
					the diagnostic will continue the calculation For Manual Transmission			
					vehicles:	> 5.00%		
					Clutch Pedal Position	< 5.00 %		
					The diagnostic will delay calculation of the residual value and potentially weight the residual calculation differently based on engine run time. This is to ensure the diagnostic is operating in idle speed control as well as during the peak catalyst light off period. The time weighting factor must be :	>0 These are scalar values that are a function of engine run time. Refer to		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P1400_ColdStartDiagno sticDelayBasedOnEngin eRunTime and the cal axis, P1400_ColdStartDiagno sticDelayBasedOnEngin eRunTimeCalAxis in the "Supporting Tables" for details.		
					General Enable:			
					DTC's Not Set:	AcceleratorPedalFailure ECT_Sensor_FA IAT_SensorCircuitFA MnfdTempSensorCktFP CrankSensor_FA FuellnjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_F A ClutchPstnSnsr FA IAC_SystemRPM_FA IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA 5VoltReferenceMAP_OO R_Flt TransmissionEngagedStat e_FA EngineTorqueEstInaccura te		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio n Engine Speed Request Circuit	P150C	This DTC monitors for an error in communication with the Transmission Engine Speed Request signal in\$19D	Communication of the Alive Rolling Count or Protection Value in the Transmission Engine Speed signal over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	<ul> <li>Is available</li> <li>&gt;= 3,000.00 milliseconds</li> <li>= Run</li> <li>&gt;=11.00 Volts</li> <li>&gt;=11.00 Volts</li> </ul>	Executes in 25ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Throttle Position Steady State Actuation Fault	P1516	Detect an inablity to maintain a steady state throttle position.	The absolute difference between desired and indicated throttle position is >	2.00 percent	Run/Crank voltage TPS minimum learn is not active AND Throttle is being Controlled Throttle is considered in a steady state condition when the desired throttle position over a 12.5 ms period is For a settling time period Ignition voltage failure is false	<ul> <li>&gt; 6.41 Volts</li> <li>&lt; 0.25 percent</li> <li>&gt; 4.00 seconds</li> <li>P1682</li> </ul>	0.49ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Switch State Undertermin ed	P155A	Detects when cruise switch state cannot be determined, such as low voltage conditions "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch "Data Invalid" (latched on/off switch architectures) or "Indeterminate" (mome ntary on/off switch architectures) is detected for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	cruise switch state is received as "undetermined" for greater than a calibratable time	fail continuously for greater than 0.5 seconds			fail continuously for greater than 0.5 seconds	Type C, 1 Trip No MIL Emissio ns Neutral , "Emissio ns Neutral Diagnost ics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Calibration Incorrect	P158A	Type of cruise in Body Control Module does not match that in the Engine Control Module for 2.5 seconds "Emissions Neutral Default Action : This diagnostic compares the BCM and the ECM configuration calibrations of whether No Cruise, Conventional Cruise Control, or ACC is available on the vehicle. If the calibration for the cruise system type in the ECM does not match the value in \$4E9 signal Vehicle Speed Control System Type, a P158A DTC is set and cruise control is disabled."	Type of cruise system in GMLAN \$4E9 does not match with that in the Engine Control Module for a fix time.	2.5 seconds	Diagnostic is Enabled. DID \$40 from BCM says cruise system is present (ECM recieves programmble information from Body Control Module) OR ECM will not receive Programmable information for Cruise from Body Control Module	True	fail continuously for greater than 2.5 seconds.	Type C, 1 Trip No MIL Emissio ns Neutral "Emissio ns Neutral Diagnost ics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Analog Mode Switch Circuit Low	P159F	This DTC will detect an analog driver mode switch input that is too low out of range.	For button type Normal_Button Analog Mode Switch low voltage threshold % of 5V range For button type Enhanced_Button Analog Mode Switch low voltage threshold % of 5V range For button type Mulitple_Button	<29.00%	Vehicle mode analog switch button type	= CeDMDG_e_Enhanced_ Button	200 failures out of 250 samples 25 ms / sample	Type B, 2 Trips
			Analog Mode Switch low voltage threshold % of 5V range	< 21.20 %				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Analog Mode Switch Circuit High	P15A0	This DTC will detect an analog driver mode switch input that is too high out of range.	For button type Normal_Button Analog Mode Switch high voltage threshold % of 5V range For button type Enhanced_Button Analog Mode Switch high voltage threshold % of 5V range For button type Mulitple_Button	>= 88.80% >= 94.10%	Vehicle mode analog switch button type	= CeDMDG_e_Enhanced_ Button	200 failures out of 250 samples 25 ms / sample	Type B, 2 Trips
			Analog Mode Switch high voltage threshold % of 5V range	>=95.30%				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Analog Mode Switch Performance	P15A1	This DTC will detect an analog driver mode switch input that is in an indeterminate range.	For button type Normal_Button Analog Mode Switch indeterminate region % of 5V range For button type Enhanced_Button Analog Mode Switch indeterminate regions % of 5V range	66.80 % < % of 5 volts <72.80% 63.50 % < % of 5 volts <65.50 % 83.50 % < % of 5 volts < 85.50 %	Vehicle mode analog switch button type	= CeDMDG_e_Enhanced_ Button	200 failures out of 250 samples 25 ms / sample	Type B, 2 Trips
			For button type Mulitple_Button Analog Mode Switch indeterminate regions % of 5V range	52.90 % < % of 5 volts <54.10% 74.10% < % of 5 volts <75.30 % 87.50 % < % of 5 volts < 88.60 %				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module SIDI High Pressure Pump current monitor	P163A	This DTC Diagnoses the current from the control area and compares it with calibrated thresholds to set current high and low flags	SIDI fuel pump High Current SIDI fuel pump Low Current Test Current	>= 3.00 Amps <= 0.10 Amps	Battery Voltage Low Side Fuel Pressure Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT.IAT2.ECTNot FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false andEngine movement detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA	>= 11 Volts > 0.275 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking	Current High/ Low 10 seconds failures out of 12.50 seconds sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Ignition voltage out of correlation error(P1682) not active and			
					Barometric Pressure Inlet Air Temp Fuel Temp	>= 70.0 KPA >= -20.0 degC -12 <= Temp degC <= 127		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage and the Powertrain Relay Ignition Voltage. The diagnostic monitors the difference in voltage between Run/Crank Voltage and the Powertrain Relay Ignition Voltage and fails the diagnostic when the voltage difference is too high. This diagnostic only runs when the powertrain is commanded on and the Run/Crank Voltage is greater than a threshold based on IAT or the powertrain ignition voltage is high enough the Run/Crank voltage is high enough.	Run/Crank - PT Relay ignition) >	3.00 Volts		Powertrain Relay commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: P1682_PT Relay Pull-in Run/Crank Voltage f(IAT) OR PT Relay Ignition voltage > 5.50 Volts) AND Run/Crank voltage > 5.50 Volts	240/480 counts; or 0.175 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ Fa System Co	ault ode	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Voltage Correlation #2	16A7	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage and the Powertrain Relay Ignition Voltage #2. The diagnostic monitors the difference in voltage between Run/Crank Voltage and the Powertrain Relay Ignition Voltage and fails the diagnostic when the voltage difference is too high. This diagnostic only runs when the powertrain is commanded on and the Run/Crank Voltage is greater than a threshold based on IAT or the powertrain ignition voltage is high enough the Run/Crank voltage is high enough. Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage #2.	Run/Crank - PT Relay ignition) >	3.00 Volts		Powertrain commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: P1682_PT Relay Pull-in Run/Crank Voltage f(IAT) OR PT Relay Ignition voltage > 5.50 Volts) AND Run/Crank voltage > 5.50 Volts	240/480 counts; or 0.175 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Controls Ignition Relay Feedback Circuit 2 High Voltage -(GEN III Controllers ONLY)	P16B3	Detects high voltage in the engine controls ignition relay feedback circuit 2. This diagnostic reports the DTC when high voltage is present. Monitoring occurs when the relay state is inactive.	Engine controls ignition relay feedback circuit 2 high voltage	Relay voltage >=4.00	Powertrain relay high diag enable Powertrain relay state	= 1.00 = INACTIVE	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Pressure & Temperature Sensor Communicati on Circuit 3 Low Voltage	P16E4	This DTC determines if the SENT signal shorted low, this is determined by monitoring the number pulses on the SENT signal line received at the ECU and the SENT Signal Line State always indicating low.	The number pulses on the SENT signal line SENT Signal Line State	<= 40 = Low	SENT Sensor Communication Circuit Diagnostic Enabled SENT power up delay	True >= 0.00 seconds Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples 6.25 ms per sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Pressure & Temperature Sensor Communicati on Circuit 3 High Voltage	P16E5	This DTC determines if the SENT signal shorted low, this is determined by monitoring the number pulses on the SENT signal line received at the ECU and the SENT Signal Line State always indicating high.	The number pulses on the SENT signal line SENT Signal Line State	<= 40 = High	SENT Sensor Communication Circuit Diagnostic Enabled SENT power up delay	True >= 0.00 seconds Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples 6.25 ms per sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 1	P16F0	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor before receiving a valid message.		Run/Crank voltage	> 6.41 Volts	39/ 399 counts continuous; 12.5 ms /count in the ECM main processor	Type A, 1 Trips
		message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor after receiving a valid message.		Run/Crank voltage	> 6.41 Volts	159 / 399 counts continuous; 12.5 ms /count in the ECM main processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Park Assistance System Performance	PIECB	CB Determines if Park assist active bit from EBCM is valid	Speed Error - APA active (\$1C6/\$1C7) above a vehicle speed threshold OR Initialization Error - APA active (\$1C6/\$1C7) without an active torque request	>10.00 APA active boolean transitions from False to True with Torque Intervention = No request	Power Mode Engine Running Status of traction in GMLAN message (\$4E9) Ignition Voltage Run/Crank Activ	<ul> <li>Run</li> <li>True</li> <li>Traction Present</li> <li>6.41 volts</li> <li>0.50 seconds</li> </ul>	<ul> <li>&gt;= 4 failures out of10</li> <li>Performed every 12.5ms</li> <li>&gt;= 4 failures out of10</li> <li>Performed every 12.5ms</li> </ul>	Type C, 1 Trip No MIL Emissio ns Neutral Diagnon Stic - Type C
			OR Exit Error - APA transitions to inactive during active torque request above a vehicle speed threshold	APA active boolean transitions from True to False with Torque Intervention <> No request when vehicle speed is > 1.00			When transition occurs, no number of samples Performed every 12.5ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 2 Performance (For use on vehicles with two fuel senders and mechanical transfer pump)	P2066	This DTC will detect a secondary fuel tank level sensor stuck in-range.	<ol> <li>If Deadband diagnostic subtest Enabled AND</li> <li>If fuel volume in primary tank is and</li> <li>if fuel volume in secondary tank is and</li> <li>if fuel volume in secondary tank is</li> <li>and figure 2a and 2b indications do not change while fuel volume consumed by engine is</li> <li>If Secondary sensor rationality diagnostic subtest enabled AND</li> <li>Volume in primary tank is</li> <li>and volume in secondary tank is</li> <li>and remains in this condition for</li> </ol>	<ol> <li>1) == Enabled status</li> <li>2a) &gt;33.0 liters</li> <li>2b) &lt;2.8 liters</li> <li>2c) &gt;15.0 liters</li> <li>1) == Disabled status</li> <li>2a) &lt;33 liters</li> <li>2b) &gt;3 liters</li> <li>2c) &gt; 1,800 seconds</li> </ol>	Ia) Diagnostic Enabled Ib) Engine Operational Status Ia) Diagnostic Enabled Ib) Engine Operational StatusEngine Running	la) == True lb) == Running la) == True lb) == Running	250 ms / sample	Type B, 2 Trips
			<ul> <li>a) If indicated fuel volume change is</li> <li>b) while fuel consumed by the engine is</li> </ul>	a) < 3.00 liters b) > 24 liters	<ul> <li>Ia) Diagnostic Enabled</li> <li>Ib) Engine Operational StatusEngine Running</li> <li>2) Secondary tank volume [Not Empty] is</li> </ul>	Ia) == True Ib) == Running 2) >2.8 liters	250 ms / sample	
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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Fuel Level Sensor 2 Circuit Low Voltage (For use on vehicles with two fuel senders connected directly to the ECM)	P2067	This DTC will detect a fuel sender out-of- range low in the secondary fuel tank.	Fuel level Sender % of 5V range	<10%	a) Diagnostic enabled status	a) —– True	100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 2 Circuit High Voltage (For use on vehicles with two fuel senders connected directly to the ECM)	P2068	This DTC will detect a fuel level sensor out-of- range high in the secondary fuel tank.	Fuel level Sender % of 5V range	> 60 %	a) Diagnostic enabled status	a) — True	100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Actuator Solenoid Circuit Low- Bank 1	P2088	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 0.5 Q impedance between signal and controller ground	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Actuator Solenoid Circuit High - Bank 1	P2089	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 0.5 Q impedance between signal and controller power	System supply Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Actuator Solenoid Circuit Low- Bank 1	P2090	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 0.5 Q impedance between signal and controller ground	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Actuator Solenoid Circuit High - Bank 1	P2091	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 0.5 0 impedance between signal and controller power	System supply voltage Output driver Ignition switch	<ul> <li>&gt; 11.00 Volts</li> <li>On</li> <li>Crank or Run</li> </ul>	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Actuator Solenoid Circuit Low- Bank 2	P2092	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 0.5 0 impedance between signal and controller ground	System supply voltage Output driver Ignition switch	<ul> <li>&gt; 11.00 Volts</li> <li>On</li> <li>Crank or Run</li> </ul>	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Actuator Solenoid Circuit High- Bank 2	P2093	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 0.5 0 impedance between signal and controller power	System supply voltage Output driver Ignition switch	<ul> <li>&gt; 11.00 Volts</li> <li>On</li> <li>Crank or Run</li> </ul>	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Actuator Solenoid Circuit Low- Bank 2	P2094	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 0.5 0 impedance between signal and controller ground	System supply voltage Output driver Ignition switch	<ul> <li>&gt; 11.00 Volts</li> <li>On</li> <li>Crank or Run</li> </ul>	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Actuator Solenoid Circuit High - Bank 2	P2095	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 0.5 0 impedance between signal and controller power	System supply voltage Output driver Ignition switch	<ul> <li>&gt; 11.00 Volts</li> <li>On</li> <li>Crank or Run</li> </ul>	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Post Catalyst Fuel Trim System Too Lean Bank 1	P2096	Determines if the post catalyst 02 sensor based fuel control system is indicating a lean exhaust gas condition. If the lean condition is such that the control system utilizes all or most of its available high limit authority (high limit = 100% authority), then P2096 will set. The monitor can be calibrated to fail based on the Average Integral Offset % Authority, the Average Total Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset. Note: When the post catalyst 02 voltage is too lean, the post catalyst 02 integral and proportional offset control is increased (positive % authority). This applies a rich bias to fuel control in an attempt to counteract the lean condition. A perfectly balanced control system (no rich or lean bias required) is represented by integral	The Average Integral Offset % Authority AND The Average Total Offset % Authority (Note: any value greater than or equal to +100% effectively nullifies the Average Total Offset % Authority criteria) High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 30% for>= 2.0 seconds AND the % Authority metric is approaching the failure threshold. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 26% for>= 20.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 85.0 % >= 1.0 % If the P2096 is actively failing then the Average Integral Offset must be < 85.0 % and the Average Total Offset must be < 100.0% for the diagnostic to report a pass.	The post cat fuel trim diagnostic is enabled The diagnostic is enabled during: Deceleration Idle Cruise Light Acceleration Heavy Acceleration Ambient Air Pressure Engine AirFlow Intake Manifold Pressure Induction Air Temperature Start-up Coolant Temp. PTO Intrusive diag. fuel control Ethanol Estimation in Progress 02 Heater Learned Resistance Long Term Secondary Fuel Trim Enabled for (see "Long Term Secondary Fuel Trim Enable Criteria" in Supporting Tables) High Vapor Conditions Green Cat System	No No Yes Yes Yes >= 70 kPa >= 0.0 g/s <= 10,000.0 >= 10 kPa <= 256 >20 deg. C 150 >= -20 deg. C (or OBD Coolant Enable Criteria = TRUE) Not Active Not Present = Not Valid,	Frequency: Continuous Monitoring in 100ms loop. The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 45.0 seconds (450 samples) before comparing to their respective failure thresholds.	Type B, 2 Trips

Component/ Faul System Cod	t Monitor Strategy e Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
	and proportional offset values of "0" (i.e. 0% authority) and a post catalyst 02 sensor that is within its optimal operating range (neither rich nor lean).			Condition	Green Cat System condition is considered valid until the accumulated air flow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is above 22 grams/sec.		
				No Fault Active for:	AmbientAirDefault AIR System FA Ethanol Composition Sensor FA ECT_Sensor_FA EGRValveCircuit_FA EGRValvePerformance_F A IAT_SensorFA CamSensorAnyLocationF A EvapEmissionSystem_FA EvapEmissionSystem_FA EvapFlowDuringNonPurg e_FA FuelTankPressureSnsrCkt _FA EvapPurgeSolenoidCircuit _FA EvapSmallLeak_FA EvapSmallLeak_FA EvapSmallLeak_FA EvapSmallLeak_FA EvapSmallLeak_FA EvapSmallLeak_FA MAF_SensorFA MAF_SensorFA MAF_SensorFA MAP_EngineVacuumStat us EngineMisfireDetected_F		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					For the cells identified as enabled (i.e. those containing a "Yes" at the beginning of the Enable Conditions column), the minimum accumulated samples required before the fuel control metric is considered usable for that cell (1 sample = 100ms): Deceleration Idle Cruise Light Acceleration Heavy Acceleration Heavy Acceleration (Note: A value in any of the above operating "cells" that is an order of magnitude (or more) higher than other cells is an indication that the diagnostic is not capable of diagnosing in that cell).	A/F Imbalance Bankl O2S_Bank_1_Sensor_1_ FA O2S_Bank_1_Sensor_2_ FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Post Catalyst Fuel Trim System Too Rich Bank 1	P2097	Determines if the post catalyst 02 sensor based fuel control system is indicating a rich exhaust gas condition. If the rich condition is such that the control system utilizes all or most of its available low limit authority (low limit = -100% authority), then P2097 will set. The monitor can be calibrated to fail based on the Average Integral Offset % Authority, the Average Total Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset. Note: When the post catalyst 02 voltage is too rich, the post catalyst 02 integral and proportional offset control is decreased (negative % authority). This applies a lean bias to fuel control in an attempt to counteract the rich condition. A perfectly balanced control system (no rich or lean bias required) is represented by integral	The Average Integral Offset % Authority AND The Average Total Offset % Authority (Note: any value less than or equal to -100% effectively nullifies the Average Total Offset % Authority criteria) High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 30% for>= 2.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 26% for>= 20.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	<= -85.0% <= -1.0% If the P2097 is actively failing then the Average Integral Offset must be > -85.0 % and the Average Total Offset must be > -100.0% for the diagnostic to report a pass.	Same as P2096	Same as P2096	Frequency: Continuous Monitoring in 100ms loop. The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 45.0 seconds (450 samples) before comparing to their respective failure thresholds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		and proportional offset values of "0" (i.e. 0% authority) and a post catalyst 02 sensor that is within its optimal operating range (neither rich nor lean).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Post Catalyst Fuel Trim System Too Lean Bank 2	P2098	Determines if the post catalyst 02 sensor based fuel control system is indicating a lean exhaust gas condition. If the lean condition is such that the control system utilizes all or most of its available high limit authority (high limit = 100% authority), then P2098 will set. The monitor can be calibrated to fail based on the Average Integral Offset % Authority, the Average Total Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset+ Proportional Offset. Note: When the post catalyst 02 voltage is too lean, the post catalyst 02 integral and proportional offset control is increased (positive % authority). This applies a rich bias to fuel control in an attempt to counteract the lean condition. A perfectly balanced control system (no rich or lean bias required) is represented by integral	The Average Integral Offset % Authority AND The Average Total Offset % Authority (Note: any value greater than or equal to +100% effectively nullifies the Average Total Offset % Authority criteria) High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 30% for>= 2.0 seconds AND the % Authority metric is approaching the failure threshold. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 26% for>= 20.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 85.0% >= 1.0% If the P2098 is actively failing then the Average Integral Offset must be < 85.0 % and the Average Total Offset must be < 100.0% for the diagnostic to report a pass.	The post cat fuel trim diagnostic is enabled . The diagnostic is enabled during: Deceleration Idle Cruise Light Acceleration Heavy Acceleration Ambient Air Pressure Engine AirFlow Intake Manifold Pressure Induction Air Temperature Start-up Coolant Temp. PTO Intrusive diag. fuel control Ethanol Estimation in Progress 02 Heater Learned Resistance Long Term Secondary Fuel Trim Enabled for (see "Long Term Secondary Fuel Trim Enable Criteria" in Supporting Tables) High Vapor Conditions Green Cat System	No No Yes Yes Yes >= 70 kPa >= 0.0 g/s <= 10,000.0 >= 10 kPa <= 256 >20 deg. C 150 >= -20 deg. C (or OBD Coolant Enable Criteria = TRUE) Not Active Not Present = Not Valid,	Frequency: Continuous Monitoring in 100ms loop. The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 45.0 seconds (450 samples) before comparing to their respective failure thresholds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		and proportional offset values of "0" (i.e. 0% authority) and a post catalyst 02 sensor that is within its optimal operating range (neither rich nor lean).			Condition	Green Cat System condition is considered valid until the accumulated air flow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is above 22 grams/sec.		
					No Fault Active for:	AmbientAirDefault AIR System FA Ethanol Composition Sensor FA ECT_Sensor_FA EGRValveCircuit_FA EGRValvePerformance_F A IAT_SensorFA CamSensorAnyLocationF A EvapEmissionSystem_FA EvapEmissionSystem_FA EvapElowDuringNonPurg e_FA FuelTankPressureSnsrCkt _FA EvapPurgeSolenoidCircuit _FA EvapSmallLeak_FA EvapSmallLeak_FA EvapVentSolenoidCircuit_ FA FuelInjectorCircuit_FA MAF_SensorFA MAF_SensorFA MAF_SensorFA MAP_EngineVacuumStat us EngineMisfireDetected_F A		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					For the cells identified as enabled (i.e. those containing a "Yes" above), the minimum accumulated samples required before the fuel control metric is considered usable for that cell (1 sample = 100ms): Deceleration Idle Cruise Light Acceleration Heavy Acceleration Heavy Acceleration Note: A value in any of the above operating "cells" that is an order of magnitude (or more) higher than other cells is an indication that the diagnostic is not capable of diagnosing in that cell).	O2S_Bank_2_Sensor_1_ FA O2S_Bank_2_Sensor_2_ FA 0 0 0 0 0		

Component/ Fault System Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ SystemFault CodePost Catalyst Fuel Trim System Too Rich Bank 2P2099	Monitor Strategy DescriptionDetermines if the post catalyst 02 sensor based fuel control system is indicating a rich exhaust gas condition. If the rich condition is such that the control system utilizes all or most of its available low limit authority (low limit = -100% authority), then P2099 will set.The monitor can be calibrated to fail based on the Average Integral Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset.Note: When the post catalyst 02 voltage is too rich, the post catalyst 02 integral and proportional offset control is decreased (negative % authority). This applies a lean bias to fuel control in an attempt to counteract the rich condition. A	Malfunction Criteria The Average Integral Offset % Authority AND The Average Total Offset % Authority (Note: any value less than or equal to -100% effectively nullifies the Average Total Offset % Authority criteria) High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 30% for>= 2.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 26% for>= 20.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	Threshold Value >= -85.0% >= -1.0% If the P2099 is actively failing then the Average Integral Offset must be < -85.0 % and the Average Total Offset must be < -100.0% for the diagnostic to report a pass.	Same as P2098	Enable Conditions Same as P2098	Time Required Frequency: Continuous Monitoring in 100ms loop. The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 45.0 seconds (450 samples) before comparing to their respective failure thresholds.	MIL Ilium. 2 Trips
	perfectly balanced control system (no rich or lean bias required) is represented by integral						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		and proportional offset values of "0" (i.e. 0% authority) and a post catalyst 02 sensor that is within its optimal operating range (neither rich nor lean).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Throttle Actuator Position Performance	P2101	1) Detect a throttle positioning error. This is determined if the difference between measured throttle position and modeled throttle position is greater than a threshold or less than a threshold. This diagnostic only runs when the engine is running and the voltage is high enough and there is not a voltage failure and the throttle position minimum learn is not active and the throttle is being controlled 2) Throttle	Difference between measured throttle position and modeled position, (modeled = MAX (Commanded vs. Commanded Filtered)) > OR Difference between modeled position (modeled = MIN (Commanded vs. Commanded vs. Commanded Filtered)) and measured throttle position >	8.36 percent 8.36 percent	TPS minimum learn is not active AND Powertrain Relay Contactl Fault is FALSE (no P1682 fault) AND Throttle Control is not in Service or DVT control AND Throttle is being Controlled AND ( (Engine Running AND Run/Crank Voltage) OR Run Crank Voltage)	> 5.50 Volts > 8.41 Volts	15 counts; 12.5 ms/count in the primary processor	Type A, 1 Trips
		throttle in the incorrect direction. This is determined if the throttle position is greater than a threshold percent and the powertrain relay voltage is high enough and the throttle position minimum learn is active.	Throttle Position >	36.00 percent	TPS minimum learn active AND Powertrain Relay ContactI Fault is FALSE (no P1682 fault) AND Throttle Control is not in Service or DVT control	= TRUE	11 counts; 12.5 ms/count in the primary processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Throttle Return to Default Performance	P2119	Throttle unable to return to default throttle position after de- energizing ETC motor.	(Normalized TPS1 percent Vref > AND Normalized TP82 percent Vref > On the main processor) OR (Normalized TPS1 percent Vref < AND Normalized TP82 percent Vref < On the main processor)	1.7560% Vref 1.7590% Vref 1.4340% Vref 1.4310% Vref	Throttle de-energized due to one of the following conditions: Powerup Default Learn OR Default Throttle Authority OR PT Relay Voltage OR Main System Shutdown OR Battery Saver Active OR (Powertrain Relay On AND Run/Crank Active)	= TRUE = TRUE < 5.500 Volts = TRUE = TRUE = FALSE = FALSE	0.4969 s if ETC motor command is STOP (when Default Throttle Authority or Main System Shutdown is causing Throttle de-energize) 5.0000 s if ETC motor command is not STOP	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detects a continuous or intermittent short low or open in the APP sensor #1 by monitoring the APP1 sensor percent Vref and failing the diagnostic when the APP1 percent Vref is too low. This diagnostic only runs when battery voltage is high enough. Detects a continuous or intermittent short low or open in the APP sensor #1 on the Main processor.	APP1 percent Vref	< 0.4625 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	19/39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 1 Hi	P2123	Detects a continuous or intermittent short high in the APP sensor #1 by monitoring the APP1 sensor percent Vref and failing the diagnostic when the APP1 percent Vref is too high. This diagnostic only runs when battery voltage is high enough. Detect a continuous or intermittent short high in the APP sensor #1 on the Main processor.	APP1 percent Vref >	4.7500 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	>6.41 Volts P06A3	19/39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 2 Lo	P2127	Detects a continuous or intermittent short low or open in the APP sensor #2 by monitoring the APP2 sensor percent Vref and failing the diagnostic when the APP2 percent Vref is too low. This diagnostic only runs when battery voltage is high enough. Detects a continuous or intermittent short low or open in the APP sensor #2 on the Main processor.	APP2 percent Vref <	0.3250 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P0697	19/39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 2 Hi	P2128	Detects a continuous or intermittent short high in the APP sensor #2 by monitoring the APP2 sensor percent Vref and failing the diagnostic when the APP2 percent Vref is too high. This diagnostic only runs when battery voltage is high enough. Detect a continuous or intermittent short high in the APP sensor #2 on the Main processor.	APP2 percent Vref >	2.6000 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P0697	19/39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Throttle Position (TP) Sensor 1-2 Correlation	P2135	Detect a continuous or intermittent correlation fault between TPS sensors #1 and #2 on Main processor. 1.) The diagnostic monitors the difference in position between TPS1 and the TPS2 and fails the diagnostic when the difference is too high. This	Difference between TPS1 displaced and TPS2 displaced >	6.797% offset at min. throttle position with a linear threshold to 9.720% at max. throttle position	Run/Crank voltage No TPS sensor faults No 5V reference error or fault for # 4 5V reference circuit	<ul> <li>&gt; 6.41 Volts</li> <li>(P0122, P0123, P0222, P0223)</li> <li>P06A3</li> </ul>	79/159 counts; or 58 counts continuous; 3.125 ms/count in the main processor	Type A, 1 Trips
		diagnostic only runs when the battery voltage is high enough. 2.) The diagnostic monitors the difference in reference voltage between normalized min TPS1 and the normalized min TPS2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. Detects a continuous or intermittent correlation fault between TPS sensors #1 and #2 on Main processor	Difference between (normalized min TPS1 ) and (normalized min TPS2) >	5.000 % Vref	Run/Crank voltage No TPS sensor faults No 5V reference error or fault for # 4 5V reference circuit	<ul> <li>&gt; 6.41 Volts</li> <li>(P0122, P0123, P0222, P0223)</li> <li>P06A3</li> </ul>	79/159 counts; or 58 counts continuous; 3.125 ms/count in the main processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138 Detect a c intermitter fault betwo sensors # Main proc The diagn monitors t in position APP1 and	Detect a continuous or intermittent correlation fault between APP sensors #1 and #2 on Main processor. 1.) The diagnostic monitors the difference in position between APP1 and the APP2 and fails the diagnostic	Difference between APP1 displaced and APP2 displaced >	5.000% offset at min. pedal position with a linear threshold to 10.001 % at max. pedal position	Run/Crank voltage No APP sensor faults No 5V reference errors or faulstfor#3& #4 5V reference circuits	> 6.41 Volts (P2122, P2123.P2127, P2128) (P06A3, P0697)	19/39 counts intermittent; or 15 counts continuous, 12.5 ms/count in the main processor	Type A, 1 Trips
		and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. 2.) The diagnostic also monitors the difference in reference voltage between normalized min APP1 and the normalized min APP2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. Detects a continuous or intermittent correlation fault between APP sensors #1 and #2 on Main processor	Difference between (normalized min APP1 ) and (normalized min APP2) >	3.500 % Vref	Run/Crank voltage No APP sensor faults No 5V reference errors or fauIstfor#3& #4 5V reference circuits	<ul> <li>&gt; 6.41 Volts</li> <li>(P2122, P2123.P2127, P2128)</li> <li>(P06A3, P0697)</li> </ul>	19/39 counts intermittent; or 15 counts continuous, 12.5 ms/count in the main processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 high side circuit shorted to ground	P2147	Controller specific output driver circuit diagnoses Injector 1 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 high side circuit shorted to power	P2148	Controller specific output driver circuit diagnoses Injector 1 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 high side circuit shorted to ground	P2150	Controller specific output driver circuit diagnoses Injector 2 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 high side circuit shorted to power	P2151	Controller specific output driver circuit diagnoses Injector 2 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector3 high side circuit shorted to ground	P2153	Controller specific output driver circuit diagnoses Injector3 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector3 high side circuit shorted to power	P2154	Controller specific output driver circuit diagnoses Injector3 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 high side circuit shorted to ground	P2156	Controller specific output driver circuit diagnoses Injector 4 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 high side circuit shorted to power	P2157	Controller specific output driver circuit diagnoses Injector 4 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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Injectors high side circuit shorted to ground	P216B	Controller specific output driver circuit diagnoses Injectors high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injectors high side circuit shorted to power	P216C	Controller specific output driver circuit diagnoses Injectors high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 high side circuit shorted to ground	P216E	Controller specific output driver circuit diagnoses Injector 6 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 high side circuit shorted to power	P216F	Controller specific output driver circuit diagnoses Injector 6 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Minimum Throttle Position Not Learned	P2176	Detect when the throttle position minimum learn on the main processor is not learned. This diagnostic detects this by monitoring if the throttle position is greater than a threshold and the number of learn attempts is greater than a threshold. This diagnostic only runs when the battery voltage is high enough and the throttle position minimum learn is active. Throttle position sensors were not in the minmum learn window after multiple attempts to learn the minimum.	During TPS min learn on the Main processor, TPS percent Vref > AND Number of learn attempts >	0.5740 % Vref 10 counts	Run/Crank voltage TPS minimum learn is active No previous TPS min learn values stored in long term memory	> 6.41 Volts = TRUE	2.0 secs	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 1 / 2 Correlation	P2199	Detects when the Intake Air Temperature (IAT) sensor and IAT2 sensor values do not correlate with each other. These two temperature sensors are both in the induction system, although they do have different sensor time constants and different positional relationships with components that produce heat. If these two temperature values differ by a large enough amount, the Intake Air Temperature 1 / 2 Correlation Diagnostic will fail. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	ABS (IAT - IAT2)	> 55.0 deg C	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System Bank 1 Air- Fuel Ratio Imbalance	Fault Code P219A	Monitor Strategy Description This monitor determines if there is an Air Fuel Imbalance in the fueling system for a cylinder on a Bank 1. Detection is based on a the pre catalyst oxygen sensor voltage. The pre catalyst 02 voltage is used to generate a variance metric that represents the statistical variation of the 02 sensor voltage over a given engine cycle. This metric is proportional to the air-fuel ratio imbalance (variance is higher with an imbalance than without).	Malfunction Criteria Filtered Ratio > The EWMA calculation uses the weighting coefficient from the following supporting table: P219A EWMA Coefficient The Ratio metric is calculated by selecting the appropriate threshold calibration from a 17x17 table (see Supporting Table P219A Variance Threshold BankI Table) and subtracting it from the measured Variance. The result is then divided by a normalizer calibration from another 17 x 17 table (see Supporting Table P219A Normalizer	Threshold Value 0.41 If the diagnostic has reported a failure on the prior trip, the Filtered Ratio must fall below 0.39 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing when the Filtered Ratio remains near the initial failure threshold of 0.41.	Secondary Parameters The A/F imbalance diagnostic is enabled System Voltage Fuel Level Engine Coolant Temperature Cumulative engine run time Diagnostic enabled at Idle (regardless of other operating conditions)	Enable Conditions no lower than 11.0 Volts for more than 0.2 seconds > 10.0% The diagnostic will disregard the fuel level criteria if the fuel sender is faulty. > -20 deg. C (or OBD Coolant Enable Criteria = TRUE) > 0.0 seconds No	Time Required Minimum of 1 test per trip, up to 15 tests per trip during RSR or FIR. The front 02 sensor voltage is sampled once per cylinder event. Therefore, the time required to complete a single test (when all enable conditions are met) decreases as engine speed increases. For example, 8.00 seconds of data is required at 1000 rpm while	MIL Ilium. 1 Trips
		is dependent on engine speed and load and is normalized by comparing it to a known "good system" result for that speed and load, and generating a Ratio metric. The Ratio metric is calculated by selecting the appropriate threshold calibration from a 17x17 table (see Supporting Table	Bankl Table ). This quotient is then multiplied by a quality factor calibration from a 17 x 17 table (see Supporting Table P219A Quality Factor Bankl Table ). This result is referred to as the Ratio. Note that the quality factor ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used.		Engine speed range Engine speed delta during a short term sample period Mass Airflow (MAF) range Cumulative delta MAF during a short term sample period Filtered MAF delta between samples Note: first order lag filter coefficient applied to MAF = 0.050	1,000 to 3,000 RPM <200 RPM 0 to 1,000 g/s <5 g/s <0.30 g/s	double this time is required at 500 rpm and half this time is required at 2000 rpm. This data is collected only when enable conditions are met, and as such significantly more operating time is required than is indicated above. Generally, a report will be	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		P219A Variance Threshold Bankl Table ) and subtracting it from the			Air Per Cylinder (APC)	200 to 400 mg/cylinder	made within 5 minutes of operation.	
		measured Variance. The result is then			term sample period	<30mg/cylinder	For RSRor FIR, 30 tests must	
		divided by a normalizer calibration from another 17x17 table (see Supporting Table <b>P219A Normalizer</b> Bankl, Table			Filtered APC delta between samples Note: first order lag filter coefficient applied to APC = 0.250	<5.00 percent	complete before the diagnostic can report.	
		This quotient is then			Spark Advance	5 to 70 degrees		
		factor calibration from a 17x17 table (see Supporting Table			Throttle Area (percent of max)	0 to 200 percent		
		P219A Quality Factor			Intake Cam Phaser Angle	-50 to 50 degrees		
		. This result is referred to as the Ratio. Note that the quality factor			Exhaust Cam Phaser Angle	-50 to 50 degrees		
		ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used. Finally, a EWMA filter is			Quality Factor (QF) QF calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Table <b>P219A Quality Factor</b> <b>Bankl Table</b> ). QF values less than "1" indicate that we don't	>=0.90		
		applied to the Ratio metric to generate the Filtered Ratio malfunction criteria metric. Generally, a normal system will			have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data.			
		Filtered Ratio while a failing system will result in a positive Filtered			Closed Loop and Long Term FT Enabled for:	>= 5.0 seconds (Please see "Closed Looo Enable_		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Ratio. The range of the Filtered Ratio metric is application specific since both the emissions sensitivity and relationship between imbalance and the Variance metric are application specific. Some applications may need to command a unique cam phaser value before performing the above calculations since cam phasing has been shown to have an impact on overall signal quality. This application Does Not Use this feature.			Device Control AIR pump CASE learn EGR EVAP Engine Over Speed Protection Idle speed control PTO Injector base pulse width 02 learned htr resistance Rapid Step Response (RSR): RSR will trigger if the Ratio result from the last test is AND it exceeds the last Filtered ratio by Once triggered, the filtered ratio is reset to: Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to: No Fault Active for:	Clarification" and "Long Term FT Enable Criteria" in Supporting Tables) Not active Not on Not active Not intrusive Not Active Normal Not Active Above min pulse limit = Valid (the 02 heater resistance has learned since NVM reset) >= 0.27 >=0.10 0.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						EngineMisfireDetected_F A MAP_SensorFA ECT_SensorFA ECT_SensorFA TPS_ThrottleAuthorityDef aulted FuelInjectorCircuit_FA AIR System FA EvapExcessPurgePsbI_F A CamSensorAnyLocationF A FuelTrimSystemB1_FA O2S_Bank_1_Sensor_1_ FA O2S_Bank_1_Sensor_2_ FA WRAF_Bank_1_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System Bank 2 Air- Fuel Ratio Imbalance	P219B	Monitor Strategy Description	Malfunction Criteria Filtered Ratio > The EWMA calculation uses the weighting coefficient from the following supporting table: P219B EWMA Coefficient The Ratio metric is calculated by selecting the appropriate threshold calibration from a 17x17 table (see Supporting Table P219B Variance Threshold Bank2 Table) and subtracting it from the measured Variance. The result is then divided by a normalizer calibration from another 17 x 17 table (see Supporting Table P219B Normalizer Bank2 Table )This quotient is then multiplied by a quality factor calibration from a 17 x 17 table (see Supporting Table P219B Quality Factor Bank2 Table ). This result is referred to as the Ratio. Note that the quality factor ranges between 0 and 1 and represents robustness to false diagnosis in the	Threshold Value 0.33 If the diagnostic has reported a failure on the prior trip, the Filtered Ratio must fall below 0.31 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing when the Filtered Ratio remains near the initial failure threshold of 0.33.	Secondary Parameters The A/F imbalance diagnostic is enabled System Voltage Fuel Level Engine Coolant Temperature Cumulative engine run time Diagnostic enabled at Idle (regardless of other operating conditions) Engine speed range Engine speed delta during a short term sample period Mass Airflow (MAF) range Cumulative delta MAF during a short term sample period Filtered MAF delta between samples	Enable Conditions no lower than 11.0 Volts for more than 0.2 seconds > 10.0% The diagnostic will disregard the fuel level criteria if the fuel sender is faulty. > -20 deg. C (or OBD Coolant Enable Criteria = TRUE) > 0.0 seconds No 1,000 to 3,000 RPM < 200 RPM 0 to 1,000g/s <5g/s <0.30 g/s	Time Required Minimum of 1 test per trip, up to 15 tests per trip during RSR or FIR. The front 02 sensor voltage is sampled once per cylinder event. Therefore, the time required to complete a single test (when all enable conditions are met) decreases as engine speed increases. For example, 8.00 seconds of data is required at 1000 rpm while double this time is required at 500 rpm and half this time is required at 2000 rpm. This data is collected only when enable conditions are met, and as such significantly more operating time is required than is indicated above.	MIL Ilium. 1 Trips
		Supporting Table	Regions with low quality factors are not used.		coefficient applied to MAF $= 0.050$		report will be made within 5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		P219B Variance Threshold Bank2 Table ) and			Air Per Cylinder (APC)	200 to 400 mg/cylinder	minutes of operation.	
		subtracting it from the measured Variance.			APC delta during short term sample period	<30mg/cylinder	For RSRor FIR, 30 tests must	
		divided by a normalizer calibration from another 17x17 table (see Supporting Table P219B Normalizer Bank2 Table			Filtered APC delta between samples Note: first order lag filter coefficient applied to APC = 0.250	< 5.00 percent	the diagnostic can report.See P219Ainfo	
		This quotient is then multiplied by a quality			Spark Advance	5 to 70 degrees		
		factor calibration from a 17x17 table (see Supporting Table			Throttle Area (percent of max)	0 to 200 percent		
		P219B Quality Factor Bank2 Table			Intake Cam Phaser Angle	-50 to 50 degrees		
		. This result is referred to as the Ratio. Note that the quality factor			Exhaust Cam Phaser Angle	-50 to 50 degrees		
		ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used. Finally, a EWMA filter is applied to the Ratio metric to generate the Filtered Ratio malfunction criteria metric. Generally, a			Quality Factor (QF) QF calibrations are located in a 17x17 lookup table versus engine speed and load (Supporting Table <b>P219B Quality Factor</b> <b>Bank2 Table</b> ). QF values less than "1" indicate that we don't have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data	>=0.90		
		normal system will result in a negative Filtered Ratio while a failing system will result in a positive Filtered			Fuel Control Status Closed Loop and Long Term FT Enabled for:	>= 5.0 seconds (Please see "Closed Loop Enable Clarification" and "Lona Term FT Enable_		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Ratio. The range of the Filtered Ratio metric is application specific since both the emissions sensitivity and relationship between imbalance and the Variance metric are application specific. Some applications may need to command a unique cam phaser value before performing the above calculations since cam phasing has been shown to have an impact on overall signal quality. This application Does Not Use this feature.			Device Control AIR pump CASE learn EGR EVAP Engine Over Speed Protection Idle speed control PTO Injector base pulse width 02 learned htr resistance Rapid Step Response (RSR): RSR will trigger if the Ratio result from the last test is AND it exceeds the last Filtered ratio by Once triggered, the filtered ratio is reset to: Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to: No Fault Active for:	Criteria" in Supporting Tables) Not active Not on Not active Not intrusive Not Active Normal Not Active Above min pulse limit = Valid (the 02 heater resistance has learned since NVM reset) >= 0.25 >=0.14 0.00 0.00 EngineMisfireDetected_F A MAP_SensorFA		

Component/ Fault System Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					ECT_Sensor_FA TPS_ThrottleAuthorityDef aulted FuellnjectorCircuit_FA AIR System FA EvapExcessPurgePsbl_F A CamSensorAnyLocationF A FuelTrimSystemB2_FA O2S_Bank_2_Sensor_1_ FA O2S_Bank_2_Sensor_2_ FA WRAF_Bank_2_FA		

Component/ Fault System Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Performance (naturally aspirated)	<ul> <li>Detects a performance failure in the Barometric Pressure (BARO) sensor, such as when a BARO value is stuck in range.</li> <li>If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The BARO sensor value is checked to see if it is within the normal expected atmospheric pressure range. If it is not, then the BARO performance diagnostic will fail.</li> <li>When the engine is running, there is an estimate of barometric pressure that is determined with the Manifold Pressure (MAP) sensor, throttle position, engine airflow and engine speed. If the BARO value from the sensor is not similar to this barometric pressure estimate, then the BARO performance diagnostic will fail.</li> </ul>	Engine Running: Difference between Baro Pressure reading and Estimated Baro when distance since last Estimated Baro update OR Difference between Baro Pressure reading and Estimated Baro when distance since last Estimated Baro update Engine Not Rotating: Barometric Pressure OR Barometric Pressure	<ul> <li>&gt; 15.0 kPa</li> <li>&lt;= 1.24 miles</li> <li>&gt; 20.0 kPa</li> <li>&gt; 1.24 miles</li> <li>&lt; 50.0 kPa</li> <li>&gt; 115.0 kPa</li> </ul>	No Active DTCs: Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	AmbPresSnsrCktFA IAT_SensorFA MAF_SensorFA AfterThrottlePressureFA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA > 10.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	320 failures out of 400 samples 1 sample every 12.5 msec 4 failures out of 5 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ Fa System Co	ault ode	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric P2 Pressure (BARO) Sensor Circuit Low (non- boosted applications, Gen III)	2228	Detects a continuous short to ground in the Barometric Pressure (BARO) signal circuit by monitoring the BARO sensor output voltage and failing the diagnostic when the BARO voltage is too low. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO Voltage	< 40.0% of 5 Volt Range (This is equal to 51.0 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ Fau System Co	ult ode	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Circuit High (non- boosted applications, Gen III)	'229	Detects a continuous short to power or open circuit in the Barometric Pressure (BARO) signal circuit by monitoring the BARO sensor output voltage and failing the diagnostic when the BARO voltage is too high. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO Voltage	> 90.0% of 5 Volt Range (This is equal to 115.1 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Circuit Intermittent	P2230	Detects a noisy or erratic signal in the barometric pressure (BARO) circuit by monitoring the BARO sensor and failing the diagnostic when the BARO signal has a noisier output than is expected. When the value of BARO in kilopascals (kPa) is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of BARO readings. The result of this summation is called a "string length". Since the BARO signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic BARO signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO reading - BARO reading from 12.5 milliseconds previous)	>216 kPa 80 consecutive BARO readings			4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Signal Stuck Lean Bank 1 Sensor 2	P2270	The P2270 diagnostic is the first in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor is stuck in a normal lean voltage range and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required rich voltage before the accumulated mass air flow threshold is reached.	Post 02 sensor signal AND The Accumulated mass airflow monitored during the Stuck Lean Voltage Test	< 800mvolts	No Active DTCs B182 DTCs Not active this key cycle System Voltage Learned heater resistance Green 02S Condition	TPS_ThrottleAuthorityDef aulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AIR System FA FuellnjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_F A Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0 P013A, P013B, P013E, P013F, P2270 orP2271 >10.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "H02S Heater Resistance DTCs" ) = Not Valid, Green 02S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green</b> <b>Sensor Delay Criteria -</b> <b>Limit</b> for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_Rap idResponseActiv e = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						is above 22.0 grams/sec.		
					Low Fuel Condition	= False		
					FuelLevelDataFault	= False		
					Pedal position	< 1.5%		
					Engine Airflow	3.2 < gps < 11.5		
					Closed loop integral Closed Loop Active	0.90 < C/L Int < 1.07 = TRUE (Please see "Closed Loop Enable Clarification" in Supporting Tables).		
					Decel Fuel Cut Off	not inhibited		
					Evap	notin control of purge		
					Ethanol Estimation in Progress	= Not Active (Please see <b>"Ethanol</b> Estimation in Progress" in Supporting Tables).		
					Post fuel cell	= Enabled, refer to Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests for additional info.		
					Crankshaft Torque	<100.0Nm		
					EGR Intrusive diagnostic All post sensor heater	= not active		
					delays O2S Heater (post sensor)	= not active		
					on Time	> 60.0 sec		
					Transmission Temp	> -40.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Predicted Catalyst temp Fuel State ===================================	575 < °C < 900 = DFCO possible ====================================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	The P2271 diagnostic is the fourth in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor is stuck in a normal rich voltage range and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required lean voltage before the accumulated mass air flow threshold is reached.	Post 02 sensor signal AND The Accumulated mass airflow monitored during the Stuck Rich Voltage Test	> 9.0 grams	No Active DTCs B182 DTCs Not Active this key cycle System Voltage Learned heater resistance Green 02S Condition	TPS_ThrottleAuthorityDef aulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AIR System FA FuellnjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_F A Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0 P013A, P013B, P013E, P013F or P2270 >10.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" ) = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green</b> <b>Sensor Delay Criteria -</b> <b>Limit</b> for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_Rap idResponseActiv e = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Low Fuel Condition Only when FuelLevelDataFault Fuel State DTC's Passed ===================================	is above 22.0 grams/sec. = False = DFCO possible = P2270 = P013E = P013A ====================================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Signal Stuck Lean Bank 2 Sensor 2	P2272	The P2272 diagnostic is the first in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, &P013D. ThisDTC determines if the secondary 02 sensor is stuck in a normal lean voltage range and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required rich voltage before the accumulated mass air flow threshold is reached.	Post 02 sensor signal AND The Accumulated mass airflow monitored during the Stuck Lean Voltage Test	< 800 mvolts	No Active DTCs B282 DTCs Not Active this key cycle System Voltage Learned heater resistance Green 02S Condition	TPS_ThrottleAuthorityDef aulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AIR System FA FuellnjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_F A Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0 P013C, P013D, P014A, P014B, P2272 or P2273 >10.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" ) = Not Valid, Green 02S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green</b> <b>Sensor Delay Criteria -</b> <b>Limit</b> for the following locations: B1S2, B2S2 in Supporting Tables tab. Airflow accumulation is only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_Rap idResponseActiv e = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						is above 22.0 grams/sec.		
					Low Fuel Condition	= False		
					FuelLevelDataFault	= False		
					Pedal position	< 1.5%		
					Engine Airflow	3.2 < gps < 11.5		
					Closed loop integral Closed Loop Active	0.90 < C/L Int < 1.07 = TRUE (Please see "Closed Loop Enable Clarification" in Supporting Tables).		
					Decel Fuel Cut Off	not inhibited		
					Evap	notin control of purge		
					Ethanol Estimation in Progress	= Not Active (Please see <b>"Ethanol</b> Estimation in Progress" in Supporting Tables).		
					Post fuel cell	= Enabled, refer to Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests for additional info.		
					Crankshaft Torque	< 100.0Nm		
					EGR Intrusive diagnostic	= not active		
					delays 02S Heater (nost sensor)	= not active		
					on Time	>= 60.0 sec		
					Transmission Temp	> -40.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Predicted Catalyst temp Fuel State 	575 < °C < 900 = DFCO possible ====================================		
					All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested. ====================================	0.96 <eqr< 1.08<br="">&lt;20.0Nm</eqr<>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Signal Stuck Rich Bank 2 Sensor 2	P2273	The P2273 diagnostic is the fourth in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, &P013D. ThisDTC determines if the secondary 02 sensor is stuck in a normal rich voltage range and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required lean voltage before the accumulated mass air flow threshold is reached.	Post 02 sensor signal AND The Accumulated mass airflow monitored during the Stuck Rich Voltage Test	> 100 mvolts >9.0 grams.	No Active DTCs B282 DTCs Not Active this key cycle System Voltage Learned heater resistance Green 02S Condition	TPS_ThrottleAuthorityDef aulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AIR System FA FuellnjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_F A Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0 P013C, P013D, P014A, P014B or P2272 >10.0 Volts = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs" ) = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than <b>Multiple DTC Use_Green</b> <b>Sensor Delay Criteria -</b> <b>Limit</b> for the following locations: B1S2, B2S2 in Supporting Tables tab. Airflow accumulation is only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_Rap idResponseActiv e = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Low Fuel Condition Only when FuelLevelDataFault Fuel State DTC's Passed ===================================	is above 22.0 grams/sec. = False = DFCO possible = P2272 = P014A = P013C ====================================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SIDI High Pressure Pump Performance	P228C	This DTC determines if the high pressure pump is not able to maintain target pressure. The fault is set if the measured fuel rail pressure is lower than desired fuel pressure by a value that can impact emission and drivability for a number of pump events.	Fuel Pressure Error (Desired Pressure - Measure Pressure)	>= P228C P2C1F-High Pressure Pump Control (HPC) fail threshold of pressure too low Mpa (see supporting tables)	High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or Crank Sensor Not FA and IAT.IAT2.ECTNot FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false and	True >=11 Volts > 0.275 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking	Positive Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Engine movement detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active Barometric Pressure Inlet Air Temp Fuel Temp	>=70.0KPA >=-20.0 degC -12<=Temp degC <= 127		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SIDI High Pressure Pump Performance	P228D	This DTC determines if the high pressure pump is delivering high pressure that desired pressure. The fault is set if the measured fuel rail pressure by a value that can impact emission and drivability for a number of pump events.	Fuel Pressure Error (Desired Pressure - Measure Pressure)	<= P228D P2C20-High Pressure Pump Control (HPC) fail threshold for pressure too high Mpa (see supporting tables)	High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT.IAT2.ECTNot FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement	True >=11 Volts >0.275 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking	Negative Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active Barometric Pressure Inlet Air Temp Fuel Temp	>= 70.0 KPA >= -20.0 DegC -12 <= Temp degC <=		
						127		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #1 CIRCUIT LOW	P2300	Diagnoses Cylinder #1 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 100 Q impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0	20 Failures out of 25 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #1 CIRCUIT High	P2301	Diagnoses Cylinder #1 Ignition Control (EST) output driver circuit for a Short to Power fault. Controller specific output driver circuit diagnoses the low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #2 CIRCUIT Low	P2303	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 100 Q impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #2 CIRCUIT High	P2304	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for a Short to Power fault	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type B, 2 Trips
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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IGNITION CONTROL #3 CIRCUIT Low	P2306	Diagnoses Cylinder #3 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 100 Q impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #3 CIRCUIT High	P2307	Diagnoses Cylinder #3 Ignition Control (EST) output driver circuit for a Short to Power fault	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #4 CIRCUIT Low	P2309	Diagnoses Cylinder #4 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 100 Q impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #4 CIRCUIT High	P2310	Diagnoses Cylinder #4 Ignition Control (EST) output driver circuit for a Short to Power fault	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #5 CIRCUIT Low	P2312	Diagnoses Cylinder #5 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	<ul><li>20 Failures out of</li><li>25 Samples</li><li>100 msec rate</li></ul>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #5 CIRCUIT High	P2313	Diagnoses Cylinder #5 Ignition Control (EST) output driver circuit for a Short to Power fault	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #6 CIRCUIT Low	P2315	Diagnoses Cylinder #6 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #6 CIRCUIT High	P2316	Diagnoses Cylinder #6 Ignition Control (EST) output driver circuit for a Short to Power fault	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio n Control Torque Request	P2544	Determines if the torque request from the TCM is valid	Protect error - Serial Communication message 2's complement not equal (\$189/\$199)	Message <> two's complement of message	Diagnostic Status	Enabled	>=16 failures out of 20 samples.	Type B, 2 Trips
Circuit			(4.00,4.00)		Power Mode	= Run	Performed on every received message	
			OR Rolling count error - Serial Communication message (\$189/\$199) rolling count index value	Message <> previous message rolling count value + one	Ignition Voltage Engine Running	> 6.41 volts = True	>= 6 Rolling count errors out of 10 samples.	
			OR		Run/Crank Active	> 0.50 Sec	Performed on every received message	
			Range Error - Serial Communication message - (\$189/\$199) TCM Requested Torque Increase	> 410 Nm	No Serial communication loss to TCM (U0101)	No loss of communication	>=6 range errors out of 10 samples. Performed on every received message	
			OR Multi-transition error - Trans torque intervention type request change	Requested torque intervention type toggles from not increasing request to increasing request			>=4 multi- transitions out of 5 samples. Performed every 200 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
VVT Lock Control Open Ckt Bnk1	P25CA	Controller specific output driver circuit diagnoses the VVL park pin system high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K 0 impedance between signal and controller ground.	System supply voltage Output driver Ignition switch	<ul> <li>&gt; 11.00 Volts</li> <li>On</li> <li>Crank or Run</li> </ul>	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
VVT Lock Control Low Ckt Bnk1	P25CB	Controller specific output driver circuit diagnoses the VVL park pin system high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 0.5 0 impedance between signal and controller ground	System supply voltage Output driver Ignition switch	> 11.00 Volts On Crank or Run	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
VVT Lock Control Hi Ckt Bnk1	P25CC	Controller specific output driver circuit diagnoses the VVL park pin system high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 0.5 Q impedance between signal and controller power	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
VVT Lock Control Open Ckt Bnk2	P25CD	Controller specific output driver circuit diagnoses the VVL park pin system high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K Q impedance between signal and controller ground.	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
VVT Lock Control Low Ckt Bnk2	P25CE	Controller specific output driver circuit diagnoses the VVL park pin system high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 0.5 Q impedance between signal and controller ground	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
VVT Lock Control Hi Ckt Bnk2	P25CF	Controller specific output driver circuit diagnoses the VVL park pin system high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 0.5 Q impedance between signal and controller power	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Module Power Off Timer Performance	P262B	This DTC determines if the hardware timer does not initialize or count properly. There are two tests to ensure proper functioning of the timer: Count Up Test (CUT) and Range Test (RaTe). Count Up Test (CUT): Verifies that the HWIO timer is counting up with the proper increment.	Count Up Test: Time difference between the current read and the previous read of the timer	> 1.50 seconds			Count Up Test: 4 failures out of 20 samples 1 sec / sample Continuous while run/crank is not active and until controller shutdown is initiated.	Type B, 2 Trips
		Range Test (RaTe): When the run/crank is not active both the hardware and mirror timers are started. The timers are compared when module shutdown is initiated or run/crank becomes active.	Range Test: The variation of the HWIO timer and mirror timer is	> 0.25%.			Range Test: Once per trip when controller shutdown is initiated or run/ crank becomes active.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump "A" Low Flow/ Performance	P2635	This DTC detects degradation in the performance of the electronically regulated fuel system by calculating the difference between the sensed, filtered system [line] pressure versus the ECM-commanded pressure [error calculation]. The calculated error is then compared to calibrated fault threshold tables for a fault decision.	Sensed Filtered Fuel System [line] pressure error	<= Low Threshold [Supporting Table] P2635 Threshold Low OR >= High Threshold [Supporting Table] P2635 Threshold High	a) Diagnostic enabled [FDBR_b_FSRD] b) Timer Engine Running [FDBR_t_EngModeRunC oarse] c1) Fuel Flow Rate Valid c2) Ambient Air Pressure Value Defaulted c3) FDB_FuelPresSnsrCktFA c4) Reference Voltage Fault Status [DTC P0641] c5) Exhaust AfterTreatment Fuel Injector A Control Circuit Short Low Fault [HCIR_b_GshtFA DTC P20CD] c6) Fuel Pres Sensor Performance Fault Active [DTC P018B] c7) Use Calculated Flow Performance Fault Thresholds [FDBR_b_UseCalcFSRD _FitThrshs] c8) Engine Speed Status Valid c9) FAB_FuelPmpCktFA	a) == TRUE b) >= 30.00 seconds c1)== TRUE c2) <> TRUE c3) <> TRUE c4) <> TRUE c5) <> TRUE c5) <> TRUE c6) <> TRUE c6) <> TRUE c7) <> TRUE c9] <> TRUE c9] <> TRUE c10) <> TRUE	1 sample/ 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Fault Active [DTC P12A6] d 1) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255]	c11)<>TRUE		
					c12) Fuel Pump Speed Fault Active [DTCP129F]	c12) <> TRUE		
					c13) CAN Sensor Bus message \$0C3 Comm Fault [CFMR_b_FTZM_Info1_U codeCmFA DTC P165C]	c13) ⇔ TRUE		
					c14) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_ UcodeCmFA DTC]	c14] <>TRUE		
					c15) Sensor Configuration [FDBR_e_FuelPresSnsrC onfig]	c15) == CeFDBR_e_WiredTo_EC M		
					c16) Sensor Bus Relay On	<sub>c</sub> 16) == TRUE		
					d) Emissions Fuel Level Low [Message \$3FB]	d) <> TRUE		
					e) Fuel Control Enable	e) == TRUE		
					f) Fuel Pump Control State	f) == normal		
					g) Run_Crank input circuit voltage	g) 11.00 volts <= Run_Crank_V <= 32.00 volts		
					h) High Pres Fuel Pump	h) <> TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Mode Management Enabled			
					j) High Pres Fuel Pump Control Mode	j) <> Disabled Mode AND a8b) <> ZeroFlow Mode		
					k) Instantaneous Fuel Flow [FCBR_dm_InstFuelFlow]	k) 0.05 grams/sec <= InstFuelFlow <= Max Allowed Flow [Supporting Table] <b>P2635 Max Fuel Flow</b>		
					ml) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B \$0CE] [CFMR_b_FTZM_Cmd1_ ARC_ChkErr DTC]	m1)<> TRUE		
					m2) CAN Sensor Bus message \$0C3_Available	m2)== TRUE		
					m3) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B \$0C3] [CFMR_b_FTZM_Info1_A RC_ChkErr DTC]	m3) <> TRUE		
					n) Timer – Diagnostic Enable	n)> 2.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio n Range Sensor B Circuit Low	P2802	Controller specific PWM circuit diagnoses the internal range sensor (IRS) B for a short to ground failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates short to ground failure Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to ground	< 0.5 Q impedance between signal and controller ground	diagnostic monitor enable battery voltage update battery voltage timer PWM % duty cycle when voltage directly proportional OR	= 1 Boolean > 0.00 volts < 7.78 %	fail time > 0.50 seconds out of sample time > 1.00 seconds battery voltage timer > 1.00 seconds	Type A, 1 Trips
					PWM % duty cycle when voltage inversly proportional circuit sensor type	> 7.78 % CeTRGD_e_VoltDirctPro		

Component/ F System C	<sup>-</sup> ault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio P n Range Sensor B Circuit High	>2803	Controller specific PWM circuit diagnoses the internal range sensor (IRS) B for a power short or open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit or power short failure Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit or power short	< 0.5 0 impedance between signal and controller voltage source OR > 200 K 0 impedance between signal and controller ground	diagnostic monitor enable battery voltage update battery voltage timer PWM % duty cycle when voltage directly proportional OR PWM % duty cycle when voltage inversly proportional circuit sensor type	<ul> <li>= 1 Boolean</li> <li>&gt; 0.00 volts</li> <li>&gt; 92.22 %</li> <li>&lt; 92.22 %</li> <li>CeTRGD_e_VoltDirctPro</li> </ul>	fail time > 0.50 seconds out of sample time > 1.00 seconds battery voltage timer > 1.00 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module SIDI High Pressure Pump min/ max authority During Catalyst Warm Up	P2C1E	This DTC determines when the high pressure pump control has reached to its max or min authority during Cataylst Warm up	High Pressure Fuel Pump OR High Pressure Fuel Pump Delivery Angle	>= 240° <= 0°	Catalyst Warm Up High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Low Side Fuel Pressure Barometric Pressure Inlet Air Temp Fuel Temp Catalyst Warm up enabled (See Definition in Supporting Material below) Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or	True >=11 Volts > 0.275 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking >= 70.0 KPA >= -20.0 degC -12 <= Temp degC <= 127 = True	Windup High/ Low 10.00 seconds failures out of 12.50 Seconds samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Crank Sensor Not FA and IATJAT2.ECTNot FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SIDI High Pressure Pump Performance During Catalyst Warm Up	P2C1F	This DTC determines if the high pressure pump is not able to maintain target pressure Catalyst Warm Up. The fault is set if the measured fuel rail pressure is lower than desired fuel pressure by a value that can impact emission and drivability for a number of pump events.	Fuel Pressure Error (Desired Pressure - Measure Pressure)	>= P228C P2C1F-High Pressure Pump Control (HPC) fail threshold of pressure too low Mpa (see supporting tables)	Catalyst Warm Up High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Catalyst Warm up enabled (See Definition in Supporting Material below) Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or Crank Sensor Not FA and IAT.IAT2.ECTNot FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and	True >=11 Volts > 0.275 MPa = True Enabled when a code clear is not active or not exiting device control Engine is not cranking	Positive Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active Barometric Pressure Inlet Air Temp Fuel Temp	>=70.0KPA >=-20.0 degC -12<=Temp degC <= 127		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SIDI High Pressure Pump Performance During Catalyst Warm Up	P2C20	This DTC determines if the high pressure pump is delivering high pressure that desired pressure Catalyst Warm Up. The fault is set if the measured fuel rail pressure is higher than desired fuel pressure by a value that can impact emission and drivability for a number of pump events.	Fuel Pressure Error (Desired Pressure - Measure Pressure)	<= P228D P2C20-High Pressure Pump Control (HPC) fail threshold for pressure too high Mpa (see supporting tables)	Catalyst Warm Up High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Catalyst Warm up enabled (See Definition in Supporting Material below) Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT.IAT2.ECTNot FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not	True >=11 Volts >0.275 MPa = True Enabled when a code clear is not active or not exiting device control Engine is not cranking	Negative Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active Barometric Pressure Inlet Air Temp Fuel Temp	>= 70.0 KPA >= -20.0 DegC -12 <= Temp degC <= 127		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 1 Out of Range Low [LIN Bus Electric PWM Fans Only - Internal or External controller]	P30EE	The reported actual fan speed in RPM exceeds an lower limit for the fan speed, indicating that there is a failure of the measurement of the fan speed	Measured LIN Fan1 Speed	< = -110.00 rpm	<ul> <li>a) Diagnostic Enabled</li> <li>b) Configuration calibration for number of fans</li> <li>c) Diagnostic System Disabled</li> <li>d) Battery Voltage In Range</li> <li>e) LIN Bus based Fan Operation Enabled</li> <li>f] LIN Serial data Lost communication Fault Active</li> <li>g] LIN Serial data Continuous Operation Fault Active</li> </ul>	a] ==1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <>True g] <> True	16.00 failures out of 20.00 samples; 1000 millisec/ sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 1 Out of Range High [LIN Bus Electric PWM Fans Only - Internal or External controller]	P30EF	The reported actual fan speed in RPM exceeds an upper limit for the fan speed, indicating that there is a failure of the measurement of the fan speed	Measured LIN Fan1 Speed	> = 4,000.00 rpm	<ul> <li>a) Diagnostic Enabled</li> <li>b) Configuration calibration for number of fans</li> <li>c) Diagnostic System Disabled</li> <li>d) Battery Voltage In Range</li> <li>e) LIN Bus based Fan Operation Enabled</li> <li>f) LIN Bus Lost Communication Fault Active</li> <li>g] LIN Bus serial data Continuous Operation Fault Active</li> </ul>	a] == 1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <>True g] <> True	16.00 failures out of 20.00 samples; 1000 millisec/ sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System Deactivation System Performance	Fault Code	Monitor Strategy Description	Malfunction Criteria Current MAP Model 2 Error AND (All Cylinder MAP Model 2 Error) - (Current MAP Model 2 Error) Where: Current MAP Model 2 Error = (Measured MAP - MAP Model 2) Filtered Where: All Cylinder MAP Model 2 Error = (Measured MAP - MAP Model 2) Filtered stored the last time that all cylinders were active for a time greater than	Threshold Value <-6 kPa > -6 kPa > 2.0 seconds	Secondary Parameters ReducedEngineCapacit yMode_Enable = TRUE fora time Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	Enable Conditions > 2.0 seconds >= 400 RPM <= 6,800 RPM >= -9 Deg C = TRUE) <= 150 Deg C = FALSE) >= -20 Deg C <= 125 Deg C >=0.50 MAP Model 2 Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM	Time Required 100 failures out of 200 samples Performed every 100 msec	MIL Ilium. 2 Trips
		comparison. When cylinders are deactivated, a "cylinder deactivation" MAP2 Model error is similarly established. If the "all cylinder" and "cylinder deactivation" MAP2 Model errors are			No Active DTCs:	MAP_SensorCircuitFA EGRValvePerformance_F A MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA		
		similar, then airflow through the system			No Pending DTCs:	EGRValve_FP ECT_Sensor_Ckt_FP		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		when cylinders are deactivated is the expected value. All cylinders are properly deactivated. If these two MAP2 Model errors are not similar, then airflow through the system when cylinders are deactivated is different than the expected value. This indicates that a cylinder is pumping air when it should not. This cylinder is not properly deactivated. In this case, the Deactivation System Performance diagnostic will fail.				IAT_SensorCircuitFP		

Component/ F System C	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Deactivation Solenoid Control Circuit/Open (Legacy AFM)	P3409	Controller specific output driver circuit diagnoses the Cylinder 2 Deactivation Solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit: > 200 k Q impedance between output and controller ground	Diagnostic Enable Powertrain Relay Voltage Engine RPM	Enabled > 11.00 volts > 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controlle rs P3411 may also set (Cylinder 2 Deactiva tion Solenoid Control Circuit/ Low)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Deactivation Solenoid Control Circuit/Low (Legacy AFM)	P3411	Controller specific output driver circuit diagnoses the Cylinder 2 Deactivation Solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	Short to Ground Circuit < 0.5 Q impedance between output and controller ground	Diagnostic Enable Powertrain Relay Voltage Engine RPM	Enabled > 11.00 volts >400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controlle rs P3409 may also set (Cylinder 2 Deactiva tion Solenoid Control Circuit/ Open)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Deactivation Solenoid Control Circuit/High (Legacy AFM)	P3412	Controller specific output driver circuit diagnoses the Cylinder 2 Deactivation Solenoid low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	Short to Power < 0.5 Q impedance between output and controller power	Diagnostic Enable Powertrain Relay Voltage Engine RPM	Enabled >11.00 volts > 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Deactivation Solenoid Control Circuit/Open (Legacy AFM)	P3433	Controller specific output driver circuit diagnoses the Cylinder 5 Deactivation Solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit: > 200 k Q impedance between output and controller ground	Diagnostic Enable Powertrain Relay Voltage Engine RPM	Enabled > 11.00 volts > 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controlle rs P3435 may also set (Cylinder 5 Deactiva tion Solenoid Control Circuit/ Low)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Deactivation Solenoid Control Circuit/Low (Legacy AFM)	P3435	Controller specific output driver circuit diagnoses the Cylinder 5 Deactivation Solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Controller specific output driver circuit diagnoses the Cylinder 3 Deactivation Solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Short to Ground Circuit < 0.5 Q impedance between output and controller ground	Diagnostic Enable Powertrain Relay Voltage Engine RPM	Enabled >11.00 volts >400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controlle rs P3433 may also set (Cylinder 5 Deactiva tion Solenoid Control Circuit/ Open)
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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Cylinder 5 Deactivation Solenoid Control Circuit/High (Legacy AFM)	P3436	Controller specific output driver circuit diagnoses the Cylinder 5 Deactivation Solenoid low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	Short to Power < 0.5 Q impedance between output and controller power	Diagnostic Enable Powertrain Relay Voltage Engine RPM	Enabled > 11.00 volts > 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communicati on Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures equals or exceeds before the sample time of is reached	5 counts (equivalent to 0.83 seconds) 0.83 seconds	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for Normal CAN transmission on Bus Controller not in programming mode If bus type = Sensor Bus: Sensor bus relay is on Otherwise: If power mode = Run/	<ul> <li>&gt; 15.00 milliseconds</li> <li>&gt; 8.41 Volts</li> <li>&gt;=5.00 seconds</li> <li>Enabled</li> </ul>	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
					Power Mode If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage	= Run >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					IfEOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition	> 15.00 milliseconds > 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Enabled OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communicati on Bus B Off	U0074	This DTC monitors for a BUS B off condition	Bus off failures equals or exceeds before the sample time of is reached	5 counts (equivalent to 0.83 seconds) 0.83 seconds	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for Normal CAN transmission on Bus Controller not in programming mode If bus type = Sensor Bus: Sensor bus relay is on Otherwise: If power mode = Run/	<ul> <li>&gt; 15.00 milliseconds</li> <li>&gt; 8.41 Volts</li> <li>&gt;=5.00 seconds</li> <li>Enabled</li> </ul>	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips
					Power Mode If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage	= Run >=11.00 Volts		

Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				IfEOBD: Run/Crank ignition voltage	>=9.00 Volts		
				If Secure: Starter motor engaged for Or Run/Crank ignition	> 15.00 milliseconds > 8.41 Volts		
				If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
				If power mode = Accessory			
				Off key cycle diagnostics are enabled Or Controller is an OBD controller	Enabled OBD Controller		
				Controller shutdown impending	= False		
				Power Mode	= Not crank		
				Battery voltage	>=11.00 Volts		
	Fault Code	Fault Code       Monitor Strategy Description         Image: Strategy Description       Image: Strategy Description         Image: Strategy Description	Fault Code       Monitor Strategy Description       Malfunction Criteria         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description         Image: Strategy Description       Image: Strategy Description       Image: Strategy Description<	Fault Code       Monitor Strategy Description       Malfunction Criteria       Threshold Value         Image: Imag	Fault Code         Monitor Strategy Description         Malfunction Criteria         Threshold Value         Secondary Parameters           Image: I	Fault Code         Monitor Strategy Description         Malfunction Criteria         Threshold Value         Secondary Parameters         Enable Conditions           If CoBD: Run/Crank ignition Voltage         >=9.00 Volts         >=9.00 Volts         >= 15.00 milliseconds         > > 15.00 milliseconds         > > 8.41 Volts         > > 9.4.1 Volt	Fault Code         Monitor Strategy Description         Malfunction Criteria         Threshold Value         Secondary Parameters         Enable Conditions         Time Required           If COBD: Run/Crank ignition voltage         If COBD: Run/Crank ignition voltage         >=9.00 Volts         >=9.00 Volts         >=9.00 Volts           If Secure: Stater motor engaged for voltage         >15.00 milliseconds         >         >= 15.00 milliseconds         >           If Hybrid Secure: Run/Crank ignition voltage         >=6.41 Volts         >=6.41 Volts         >         >=6.41 Volts         >           If power mode = Accessory         Off key cycle diagnostics are enabled Or Controller s an OBD controller         Enabled OBD Controller         OBD Controller         OBD Controller           Voltage         If power Mode         = Not crank         =         =         =         =           If power Mode         = Not crank         =

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communicati	U0101	This DTC monitors for a loss of	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
on With TCM		communication with the Transmission Control	Message \$0F9	>0.50 seconds	If message is on Bus A: U0073	Not Active		
		Module.	Message \$189	>0.50 seconds	If message is on Bus B: U0074	Not Active		
			Message \$197	>0.50 seconds	lé managana ia an Dua Cu			
			Message \$199	>0.50 seconds	U0076	Not Active		
			Message \$19D	>0.50 seconds	Starter motor engaged for Or	> 15.00 milliseconds		
			Message \$1AF	>0.50 seconds	Run/Crank ignition voltage	> 8.41 Volts		
		Message \$	Message \$1F5	>0.50 seconds	Bus is enabled for	>=0.40 seconds		
			Message \$4C9	>10.00 seconds				
					The following criteria have been enabled for	>=5.00 seconds		
					Normal CAN transmission on Bus	Enabled		
					Transition from accessory mode to off is pending	= False		
					Controller not in programming mode			
					If bus type = Sensor Bus:			
					Battery voltage	>11.00 Volts		
					Sensor Bus Relay	= On		
					Otherwise:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If power mode = Run/ Crank:			
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					IfOBDII:			
					Run/Crank ignition voltage	>=11.00 Volts		
					IfEOBD:			
					Run/Crank ignition voltage	>=9.00 Volts		
					If Secure:			
					Starter motor engaged for	> 15.00 milliseconds		
					Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure:			
					Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled Or	Enabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Controller is an OBD controller	OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communicati on With Anti- Lock Brake System (ABS) Control	U0121	This DTC monitors for a loss of communication with the Anti-Lock Brake System (ABS) Control Module (Non-OBD Module ID 243)	Message is not received from controller for Message \$0C1 Message \$0C5	>0.50 seconds >0.50 seconds	General Enable Criteria: If message is on Bus A: U0073 If message is on Bus B: U0074	Not Active	Diagnostic runs in 12.5 ms loop	Type C, 1 Trip No MIL Emissio ns Neutral "Emissio
Module			Message \$1C7 Message \$1E9	>0.50 seconds >0.50 seconds	If message is on Bus S: U0076	Not Active		ns Neutral Diagnost ics - Type C"
					Or Run/Crank ignition voltage	> 8.41 Volts		Type O
					Bus is enabled for The following criteria have been enabled for	>=0.40 seconds >=5.00 seconds		
					Normal CAN transmission on Bus	Enabled		
					Transition from accessory mode to off is pending	= False		
					Controller not in programming mode			
					If bus type = Sensor Bus:			
					Battery voltage	>11.00 Volts		
					Sensor Bus Relay	= On		
					Otherwise: If power mode = Run/ Crank:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Power Mode	= Run		
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode:OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					IfEOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15.00 milliseconds > 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled	Enabled		
					Controller is an OBD controller	OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost	U012A	This DTC monitors for	Message is not received		General Enable Criteria:		Diagnostic runs	Type B, 2 Trips
on With Chassis Control		communication with the Chassis Control Module A.	Message \$1EB	> 10.00 seconds	If message is on Bus A: U0073	Not Active	in 12.0 ms 100p	2 11103
Module A			Message \$4DB	> 10.00 seconds	If message is on Bus B: U0074	Not Active		
					If message is on Bus S: U0076	Not Active		
					Starter motor engaged for	> 15.00 milliseconds		
					Run/Crank ignition voltage	> 8.41 Volts		
					Bus is enabled for	>=0.40 seconds		
					The following criteria have been enabled for	>=5.00 seconds		
					Normal CAN transmission on Bus	Enabled		
					Transition from accessory mode to off is pending	= False		
					Controller not in programming mode			
					If bus type = Sensor Bus:			
					Battery voltage	>11.00 Volts		
					Sensor Bus Relay	= On		
					Otherwise: If power mode = Run/ Crank:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Power Mode If calibratable low voltage disable mode is not Never Disabled	= Run		
					Low voltage disable mode:OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					IfEOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Bun/Crank ignition	> 15.00 milliseconds		
					voltage	> 0.41 VOIIS		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled Or	Enabled		
					Controller is an OBD controller	OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System Lost Communicati on With Body Control Module	Fault Code	Monitor Strategy Description	Malfunction Criteria Message is not received from controller for Message \$0F1 Message \$1E1 Message \$1F1 Message \$451	Threshold Value >0.50 seconds >0.50 seconds >0.50 seconds >0.50 seconds	Secondary Parameters General Enable Criteria: If message is on Bus A: U0073 If message is on Bus B: U0074 If message is on Bus S: U0076 Starter motor engaged for Or Run/Crank ignition voltage Bus is enabled for The following criteria have been enabled for Normal CAN transmission on Bus	Enable Conditions Not Active Not Active Not Active > 15.00 milliseconds > 8.41 Volts >=0.40 seconds >=5.00 seconds Enabled	Time Required Diagnostic runs in 12.5 ms loop	MIL Ilium. Type C, 1 Trip No MIL Emissio ns Neutral Diagnost ics - Type C"
					Transition from accessory mode to off is pending Controller not in programming mode If bus type = Sensor Bus: Battery voltage Sensor Bus Relay Otherwise: If power mode = Run/ Crank:	= False >11.00 Volts = On		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Power Mode If calibratable low voltage disable mode is not Never Disabled	= Run		
					Low voltage disable mode:OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					IfEOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Bun/Crank ignition	> 15.00 milliseconds		
					voltage	> 0.41 VOIIS		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled Or	Enabled		
					Controller is an OBD controller	OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Battery voltage	>=11.00 Volts		

Component/ Fault System Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communicati on with Throttle Position Sensor 1	Detects a continuous or intermittent short low or short high or open fault in the TPS SENT Communication Circuit 1 by monitoring the voltage and failing the diagnostic when the voltage for the wave pulse is below or above state threshold as defined by SAE J2716 SENT Protocol. Detects a message fault in the TPS SENT Communication Circuit by monitoring the message pulse time and failing the diagnostic when the time for the pulse is below a low time threshold or above a high time threshold or if the message age limit is greater than a time threshold. This diagnostic only runs when battery voltage is high enough.	Voltage for wave pulse is below state threshold as defined by SAE J2716 SENT Protocol OR Voltage for wave pulse is above state threshold as defined by SAE J2716 SENT Protocol OR Message Pulse < Message Pulse > OR Message Age Limit >= OR Signal CRC fails	0.5 V OR 4.1 V OR 0.125977 ms 0.209991 ms OR 3.125 ms	Run/Crank voltage	> 6.41 Volts	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ Fau System Cod	ult Monitor Strategy de Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost U06 Communicati on with Throttle Position Sensor 2	607 Detects a continuous or intermittent short low or short high or open fault in the TPS SENT Communication Circuit 2 by monitoring the voltage and failing the diagnostic when the voltage for the wave pulse is below or above state threshold as defined by SAE J2716 SENT Protocol. Detects a message fault in the TPS SENT Communication Circuit by monitoring the message pulse time and failing the diagnostic when the time for the pulse is below a low time threshold or above a high time threshold or if the message age limit is greater than a time threshold. This diagnostic only runs when battery voltage is high enough.	Voltage for wave pulse is below state threshold as defined by SAE J2716 SENT Protocol OR Voltage for wave pulse is above state threshold as defined by SAE J2716 SENT Protocol OR Message Pulse < Message Pulse > OR Message Age Limit >= OR Signal CRC fails	0.5 V OR 4.1 V OR 0.125977 ms 0.209991 ms OR 3.125 ms	Run/Crank voltage	> 6.41 Volts	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

ault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
J0632	This DTC monitors for a loss of communication on the LIN bus with Cooling Fan 1.	Communication failures equals or exceeds	3.00 counts	General Enable Criteria: U1345 Subnet configuration not used Or Device is calibrated as present The following criteria have	Not active this key cycle Used >=5.00 seconds	LIN bus communication executes in 500ms loop.	Type B, 2 Trips
				been enabled for Normal LIN transmission on Bus Controller not in programming mode	Enabled		
				If UCAP is present on bus, starter motor is not engaged Power mode And Run/Crank ignition voltage Or Pottor weltage	Not Present = Run >=11.00 Volts		
				And the following criteria have been enabled for LIN bus is awake If controller is an OBD controller: Power mode	>= 400.00 milliseconds = Not off		
	ault ode 0632	ault odeMonitor Strategy Description0632This DTC monitors for a loss of communication on the LIN bus with Cooling Fan 1.	ault odeMonitor Strategy DescriptionMalfunction Criteria0632This DTC monitors for a loss of communication on the LIN bus with Cooling Fan 1.Communication failures equals or exceeds	ault ode         Monitor Strategy Description         Malfunction Criteria         Threshold Value           0632         This DTC monitors for a loss of communication on the LIN bus with Cooling Fan 1.         Communication failures equals or exceeds         3.00 counts	aut odeMonitor Strategy DescriptionMalfunction CriteriaThreshold ValueSecondary Parameters0632This DTC monitors for communication on the LIN bus with Cooling Fan 1.Communication failures equals or exceeds3.00 countsGeneral Enable Criteria: U134507 Device is calibrated as presentFan 1.Subnet configuration not used Or Device is calibrated as presentNormal LIN transmission on Bus Controller not in programming mode11 UCAP is present on bus, starter motor is not engagedIf UCAP is present on bus, starter motor is not engaged9000 Or Device is calibrated as presentPower mode And Run/Crank ignition voltage11 Or Device is auxIf UCAP is present on bus, starter motor is not engaged11 Or Device is auxIf UCAP is present on bus, starter motor us, starter motor and Controller not us and Controller is an OBD controller: Power mode11 Device is an OBD controller: Power modePower mode And the protection is an OBD controller.11 Device is an OBD controllerPower mode And the protection is an OBD controller.12 Device is an OBD controllerPower mode And the protection is not enabled for LIN bus is awake If controller is an OBD controller.	utual         Monitor Strategy         Malfunction Criteria         Threshold Value         Secondary Parameters         Enable Conditions           0832         This DTC monitors for LIN bus with Cooling Fan 1.         Communication failures equals or exceeds         3.00 counts         General Enable Criteria: U1345         Not active this key cycle           12         Subnet configuration on the LIN bus with Cooling Fan 1.         Subnet configuration nutuals used Or Device is calibrated as present         >=5.00 seconds           12         Normal LIN transmission on Bus         Enabled         Fabled           13         Controller not in programming mode         Enabled           14         UCAP is present on bus, statter motor is not enabled for         Not Present           14         UCAP is present on bus, statter motor is not enabled for         = Run >=11.00 Volts           15         And the following criteria: have been enabled for         >=400.00 milliseconds           10         Voltage Or Battery voltage         >=400.00 milliseconds           11         LIN bus is awake If controller: is an OBD Controller:         = Not off	autoMonitor StrategyMalfunction CriteriaThreshold ValueSecondary ParametersEnable ConditionsTime Required0932This DT conditors for a loss of construction of allores pan 1.Communication failures equals or exceeds3.00 countsGeneral Enable Criteria: U1345Not active this key cycleUIN bus communication operations0933This DT conditors for tub bus with Cooling Fan 1.Communication failures equals or exceeds3.00 countsGeneral Enable Criteria: U1345Not active this key cycleUIN bus communication operations0934This DT conditor for tub bus with Cooling Fan 1.Fan 1.Not active this key cycleSome long0935This DT conditor for tub bus with Cooling Fan 1.Not active this key cycleSome long0936The following criteria have tub econditorSome configuration not tub econditorNot active this key cycle0937The following criteria have tub econditorSome configuration not tub econditorNot active this key cycle0938The following criteria have tub econditorSome configuration not tub econditorSome configuration tub econditor0939The following criteria have tub econditionNot active this key cycleSome configuration tub econditor0939The following criteria have tub econditionPower mode active this key cycleSome configuration tub econdition tub econdition0939The following criteria have tub econditionPower mode active triangle econdition econdition econt

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If controller is a non-OBD controller:			
					Power mode	= Run or accessory or crank if diagnostics are enabled during crank		
					Enabled during crank:	Disabled		
					Controller type: OBD Controller			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine	U1345	This DTC monitors for	Bus off failures equals or	3.00 counts	General Enable Criteria:		Dependent on bus loading.	Type B,
Module LIN Bus 1		a LIN bus off condition on LIN Bus 1	exceeds		The following criteria have been enabled for	>=5.00 seconds	bus loading.	2 mps
					Normal LIN transmission on Bus	Enabled		
					Controller not in programming mode			
					If UCAP is present on bus, starter motor is not engaged	Not Present		
					Power mode	= Run		
					And Run/Crank ignition voltage	>=11.00 Volts		
					Or Battery voltage	>=11.00 Volts		
					And the following criteria have been enabled for	>= 400.00 milliseconds		
					LIN bus is awake			
					If controller is an OBD controller:			
					Power mode	= Not off		
					Or			
					If controller is a non-OBD controller:			
					Power mode	= Run or accessory or crank if diagnostics are enabled during crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Enabled during crank:	Disabled		
					Controller type: OBD Controller			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.	
Lost Communicati	U18A2	This DTC monitors for a loss of	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type B, 2 Trips	
on With Fuel Pump Driver Control		communication with the Fuel Pump Driver Control Module on Bus	Message \$0C3	>seconds	If message is on Bus A: U0073	Not Active			
Module on Bus B		В.	Message \$0CB	>seconds	If message is on Bus B: U0074	Not Active			
			Message \$0CC	>seconds	If message is on Bus St				
			Message \$2C1	>seconds	U0076	Not Active			
			Message \$2D7	>seconds	Starter motor engaged for Or	> 15.00 milliseconds			
			Message \$2D9	>seconds	Run/Crank ignition	> 8.41 Volts			
				Message \$3C8	>seconds	Bus is enabled for	>=0.40 seconds		
			Message \$3EB	>seconds	The following criteria have	>-5.00 seconds			
		Message \$3EC Message \$3EE	>seconds	been enabled for					
			Message \$3EE	>seconds	Normal CAN transmission on Bus	Enabled			
					Transition from accessory mode to off is pending	= False			
					Controller not in programming mode				
					If bus type = Sensor Bus:				
					Battery voltage	>11.00 Volts			
					Sensor Bus Relay	= On			
					Otherwise: If power mode = Run/ Crank:				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Power Mode If calibratable low voltage disable mode is not Never Disabled	= Run		
					Low voltage disable mode:OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					IfEOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Bun/Crank ignition	> 15.00 milliseconds		
					voltage	> 0.41 VOIIS		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled Or	Enabled		
					Controller is an OBD controller	OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Battery voltage	>=11.00 Volts		

Component/ Fault System Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Lost Communicati on with ECM [FPPM applications only]	6 To detect lost serial data communication from the power driver controller to the ECM	Timer - Fuel System Control message not received (FPPM Received Data Communication Status)	t> 10s (Fuel Pmp Power Module device reports Faulted, Not Faulted or Indeterminate)	<ul> <li>a) Chassis Fuel Pres Sys Type configuration selection</li> <li>b) Diagnostic Enabled</li> <li>c) Diagnostic System Disabled condition</li> <li>d) FPPM Control Alive Rolling Count Faulted</li> <li>e) FPPM serial data received [\$0CE]</li> <li>f) Run_Crank Input Circuit Voltage</li> <li>g) Run_Crank Ignition Switch Position status</li> <li>h) Sensor Bus Relay On</li> </ul>	<ul> <li>a) == FCBR ECM FPPM Sys</li> <li>b) == TRUE</li> <li>c) &lt;&gt; True</li> <li>d) &lt;&gt; True</li> <li>e) == TRUE</li> <li>f) &gt; 7.00 volts</li> <li>g) == TRUE</li> <li>h) == TRUE</li> </ul>	64.00 failures/ 80.00 samples 1 sample / 12.5 millisec	Type B, 2 Trips

## Initial Supporting table - CalculatedPerfMaxEd

Description: Maximum desired camshaft position for Exhaust CAM - Bankl

**Value Units:** Maximum desired camshaft position (degCam) **X Unit:** Engine Oil Temperature (degC) [1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17] [-40 -28 -16 -4 8 20 32 44 56 68 80 92 104 116 128 140 152]

Y Units: Engine Speed (rpm)

[1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17]

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
2	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
3	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
4	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
6	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
7	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
8	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
9	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
10	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
11	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
12	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
13	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
14	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
15	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
16	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
17	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5

## Initial Supporting table - CalculatedPerfMaxEc2

**Description:** Maximum desired camshaft position for Exhaust CAM - Bank2

Value Units: Maximum desired camshaft position (degCam) X Unit: Engine Oil Temperature (degC) [1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17]

[-40 -28 -16 -4 8 20 32 44 56 68 80 92 104 116 128 140 152]

Y Units: Engine Speed (rpm)

[1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17]

_				1	-		-	_	_	1			-	1			
y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
2	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
3	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
4	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
6	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
7	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
8	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
9	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
10	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
11	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
12	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
13	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
14	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
15	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
16	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
17	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5

## Initial Supporting table - CalculatedPerfMaxIcI

Description: Maximum desired camshaft position for Intake CAM - Bankl

Value Units: Maximum desired camshaft position (degCam) X Unit: Engine Oil Temperature (degC) [1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17]

[-40 -28 -16 -4 8 20 32 44 56 68 80 92 104 116 128 140 152]

Y Units: Engine Speed (rpm)

[1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17]

					-												
y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
2	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
3	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
4	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
5	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
6	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
7	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
8	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
10	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
11	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
12	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
13	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
14	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
15	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
16	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
17	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0

#### Initial Supporting table - CalculatedPerfMaxIc2

**Description:** Maximum desired camshaft position for Intake CAM - Bank2

Value Units: Maximum desired camshaft position (degCam) X Unit: Engine Oil Temperature (degC) [1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17]

[-40 -28 -16 -4 8 20 32 44 56 68 80 92 104 116 128 140 152]

Y Units: Engine Speed (rpm)

[1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17]

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
2	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
3	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
4	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
5	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
6	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
7	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
8	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
9	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
10	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
11	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
12	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
13	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
14	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
15	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
16	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
17	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29

# Initial Supporting table - P0521 P06QD\_P06DE\_OP\_HiStatePressure

Description: Two Stage Oil Pump Oil Pressure in High State

Value Units: Nominal high state oil pressure (kPa) X Unit: Engine oil temperature (deg C)

y/x	-7.0	0.0	20.0	40.0	60.0	80.0	100.0	110.0	120.0
1,400.0	999.8	793.6	589.6	603.3	558.1	542.4	425.9	387.3	330.1
1,500.0	1,015.9	818.3	614.3	628.3	585.4	570.4	456.7	414.1	353.4
2,000.0	1,065.9	909.9	701.3	699.2	658.1	647.4	561.7	508.5	438.5
2,500.0	1,072.1	960.9	770.1	753.5	710.3	692.2	623.4	559.6	485.0
3,000.0	1,022.1	955.3	805.0	792.4	754.1	720.5	664.0	592.6	518.1
3,500.0	946.1	919.6	816.1	811.7	782.4	737.9	699.4	621.5	546.9
4,000.0	874.3	883.7	828.6	836.4	810.4	742.6	720.2	636.2	561.9
4,500.0	831.7	867.3	836.1	834.9	803.4	712.4	703.8	612.1	538.9
5,000.0	800.8	848.8	812.6	793.4	766.0	667.1	678.3	581.8	512.6

# Initial Supporting table - P0521 P06DD\_P06DE\_OP\_LoStatePressure

Description: Two Stage Oil Pump Oil Pressure in Low State

Value Units: Nominal low state oil pressure (kPa) X Unit: Engine oil temperature (deg C)

y/x	-7	0	20	40	60	80	100	110	120
1,400	394	374	358	330	324	309	290	278	256
1,500	398	377	360	331	325	311	294	283	262
2,000	418	395	373	340	332	317	310	303	284
2,500	428	402	377	345	338	321	321	316	298
3,000	437	410	384	355	349	328	330	325	305
3,500	436	409	383	360	356	333	337	332	311
4,000	438	410	380	361	358	335	342	337	317
4,500	460	430	391	370	363	337	344	341	321
5,000	479	449	402	379	369	339	346	343	325

# Initial Supporting table - P06DD\_P06DE\_MaxEnableTorque\_OP

Description: Two Stage Oil Pump Rationality Test Torque Max Enable Threshold

Value Units: Maximum engine torque (Nm) X Unit: Engine speed (RPM)

y/x	1,300.0	1,462.5	1,625.0	1,787.5	1,925.0	1,926.0	2,088.5	2,296.0	2,600.0
1.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0

# Initial Supporting table - P06DD\_P06DE\_MinEnableTorque\_OP

Description: Two Stage Oil Pump Rationality Test Torque Min Enable Threshold

Value Units: Min engine torque (Nm) X Unit: Engine speed (RPM)

y/x	1,300.0	1,462.5	1,625.0	1,787.5	1,925.0	1,926.0	2,088.5	2,296.0	2,600.0
1.0	120.0	128.0	140.0	165.0	185.0	185.0	185.0	185.0	185.0

## Initial Supporting table - P06DD\_P06DE\_MinOilPressThresh

**Description:** Intrusive diagnostic minimum pressure limit that is a function of Engine Speed and Oil Temperature

Value Units: Minimum engine oil pressure threshold (kPa) X Unit: Engine oil temperature (deg C)

y/x	-7	0	20	40	60	80	100	110	120
1,400	257	257	257	257	238	228	218	207	195
1,500	260	260	260	260	239	228	220	209	198
2,000	265	265	265	265	245	235	229	223	217
2,500	265	265	265	265	254	238	230	226	222
3,000	263	263	263	263	262	248	234	228	221
3,500	264	264	264	264	265	254	240	234	228
4,000	271	271	271	271	269	259	246	242	238
4,500	279	279	279	279	255	239	230	232	234
5,000	284	284	284	284	235	221	213	220	227
#### Initial Supporting table - P06DD P06DE\_OP\_StateChangeMin

Description: Minimum allowed pressure change on a Two Stage Oil Pump state change

Value Units: Min pressure change (kPa) X Unit: Engine oil temperature (deg C)

y/x	-7.0	0.0	20.0	40.0	60.0	80.0	100.0	110.0	120.0
1,400.0	136.0	136.0	136.0	50.0	50.0	50.0	50.0	50.0	50.0
1,500.0	140.9	140.9	140.9	119.1	108.9	101.9	57.1	39.8	25.2
2,000.0	159.5	159.5	159.5	149.6	139.8	140.1	103.3	79.1	62.4
2,500.0	172.3	172.3	172.3	176.5	159.8	157.5	126.2	100.9	74.5
3,000.0	175.9	175.9	175.9	195.8	167.1	161.8	136.3	112.1	83.4
3,500.0	181.4	181.4	181.4	191.9	180.6	159.7	140.3	117.4	92.1
4,000.0	173.6	173.6	173.6	208.6	186.6	154.9	151.3	117.3	107.5
4,500.0	171.2	171.2	171.2	175.1	168.0	137.9	133.8	105.0	88.8
5,000.0	169.9	169.9	169.9	148.1	161.1	112.9	120.8	101.1	73.7

#### Initial Supporting table - Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests

**Description:** This table describes the adaptive (Block Learn) cells in which to enable the Post (Secondary) Oxygen sensor response tests. Note: When the table column heading matches the calibration value below it, that individual cell is enabled.

The cell r CeF/ CeF/ CeF/ CeF/ CeF/ CeF/ CeF/ CeF/	ADR_e_Cell ADR_e_Cell ADR_e_Cell ADR_e_Cell ADR_e_Cell ADR_e_Cell ADR_e_Cell ADR_e_Cell ADR_e_Cell ADR_e_Cell ADR_e_Cell ADR_e_Cell ADR_e_Cell ADR_e_Cell ADR_e_Cell	he table a OO_PurgC 01_PurgC 02_PurgC 03_PurgC 05_PurgC 06_PurgC 07_PurgC 09_PurgC 10_PurgC 11_PurgC 13_PurgC 14_PurgC 15_PurgC	re defined a DnAirMode3 DnAirMode3 DnAirMode3 DnAirMode2 DnAirMode1 DnAirMode1 DnAirMode2 DnHe = 6, DnDecel = 7 OffAirMode3 OffAirMode3 OffAirMode3 OffAirMode2 OffAirMode2 OffAirMode2	AS: i = 0, i = 1, i = 2, i = 3, i = 4, i = 5, j = 8, i = 9, i = 10, i = 11, i = 12, i = 13, 5												
Value Ur X Unit: B	iits: Block L lock Learn (	earn cell n cell numbe	number er													
y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	7	7	7	7	7	7	7	8	15	15	15	15	15	15	15

#### Initial Supporting table - Multiple DTC Use Green Sensor Delay Criteria - Limit

**Description:** This Calibration is the acculmulated airflow limit above which the Green condition is expired Used for: P0133, P013A, P013B, P013C, P013D, P013E, P013F, P014A, P014B, P0153, P015A, P015B, P015C, P015D, P1133, P1153, P2270, P2271, P2272 and P2273. Note: This feature is only enabled when the vehicle is new and cannot be enabled in service.

#### Value Units: Grams

X Unit: Acculmulated Engine Airflow

y/x	CiOXYR_O2_Bank1_Sensor1	CiOXYR_O2_Bank1_Sensor2	CiOXYR_O2_Bank2_Sensor1	CiOXYR_O2_Bank2_Sensor2
1	120,000	120,000	120,000	120,000

#### Initial Supporting table - POOI1\_CamPosErrorLimIc1

Description: Maximum Intake Cam 1 phase error as a function of engine speed and engine oil temperature.

Value Units: Maximum Intake Cam 1 phase error (degCAM) X Unit: Engine Oil Temperature (degC) Y Units: Engine Speed (rpm)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
800	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
1,200	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
1,600	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
2,000	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
2,400	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
2,800	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
3,200	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
3,600	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
4,000	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
4,400	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
4,800	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
5,200	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
5,600	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
6,000	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
6,400	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
6,800	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

## Initial Supporting table - P0011\_P0021\_P05CC\_P05CD\_EngOilPressEnbllc

Description: Delay time before the oil pressure enable flag is set assuming all the oil pressure enable criteria are met

Value Units: Time (sec) X Unit: Engine Coolant Temperature (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	5	5	5	3	2	1	1	1	1	1	1	1	1	1	3	3	3

## Initial Supporting table - P0011\_P0021\_P05CC\_P05CD\_HiEngSpdHiDsbllc

Description: Minimum engine speed to disable Intake cam

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000

## Initial Supporting table - P0011\_P0021\_P05CC\_P05CD\_HiEngSpdLoEnbllc

Description: Maximum engine speed to enable Intake cam - works as hysteresis.

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800

## Initial Supporting table - P0011\_P0021\_P05CC\_P05CD\_LoPresHiEnbllc

**Description:** Intake cam is enabled when oil pressure exceeds this value

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155

## Initial Supporting table - P0011\_P0021\_P05CC\_P05CD\_LoPresLoDsbllc

**Description:** Intake cam is disabled when oil pressure falls below this value

Value Units: Engine Oil Pressure (kPa) X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145

## Initial Supporting table - P0011\_P0021\_P05CC\_P05CD\_LoRpmHiEnbllc

**Description:** Intake cam is enabled when engine speed exceeds this value.

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000

## Initial Supporting table - P0011\_P0021\_P05CC\_P05CD\_LoRpmLoDsbllc

**Description:** Intake cam is disabled when engine speed is below this value.

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900

#### Initial Supporting table - P0011\_P0021\_P05CC\_P05CD\_P0014\_P0024\_P05CE\_P05CF\_ColdStartEngRunning

Description: Engine running time must be greater than this threshold during a cold start to enable cam phasing

Value Units: Time (sec) X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	31	16	9	9	8	7	7	7	5	5	5	5	5	5	5	5	5

#### Initial Supporting table - P0011\_P( 05CC\_StablePositionTimeIc1

**Description:** Minimum time for Intake Cam 1 phase position to be stable to enable performance diagnostic.

Value Units: Minimum time (sec) X Unit: Engine Oil Temperature (degC) Y Units: Engine Speed (rpm)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2,800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3,600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4,800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
5,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
5,600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6,800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

#### Initial Supporting table - P00114\_CamPosErrorLimEc1

Description: Maximum Exhaust Cam 1 phase error as a function of engine speed and engine oil temperature.

Value Units: Maximum Exhaust Cam 1 phase error (degCAM) X Unit: Engine Oil Temperature (degC) Y Units: Engine Speed (rpm)

y/x -40 -28 -16 -4 8 20 32 44 56 68 80 92 104 116 128 140 152 400 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 800 5.0 1,200 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 1,600 5.0 2,000 5.0 2,400 2,800 5.0 3,200 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 3,600 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 4,000 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 4,400 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 4.800 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5,200 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5,600 5.0 6,000 6,400 5.0 6,800

## Initial Supporting table - P0014\_P0024\_P05CE\_P05CF\_EngOilPressEnblEc

Description: Delay time before the oil pressure enable flag is set assuming all the oil pressure enable criteria are met

Value Units: Time (sec) X Unit: Engine Coolant Temperature (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

## Initial Supporting table - P0014\_P0024\_P05CE\_P05CF\_HiEngSpdHiDsblEc

Description: Exhaust cam is disabled when engine speed exceeds this value

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000

## Initial Supporting table - P0014\_P0024\_P05CE\_P05CF\_HiEngSpdLoEnblEc

Description: Exhaust cam is enabled when engine speed remains below this value

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800

#### Initial Supporting table - P0014\_P0024\_P05CE\_P05CF\_LoPresHiEnblEc

**Description:** Exhaust cam is enabled when oil pressure exceeds this value

Value Units: Engine Oil Pressure (kPa) X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155

#### Initial Supporting table - P0014\_P0024\_P05CE\_P05CF\_LoPresLoDsblEc

Description: Exhaust cam is disabled when oil pressure falls below this value

Value Units: Engine Oil Pressure (kPa) X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145

#### Initial Supporting table - P0014\_P0024\_P05CE\_P05CF\_LoRpmHiEnblEc

**Description:** Exhaust cam is enabled when engine speed exceeds this value.

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000

#### Initial Supporting table - P0014\_P0024\_P05CE\_P05CF\_LoRpmLoDsblEc

**Description:** Exhaust cam is disabled when engine speed is below this value.

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900

#### Initial Supporting table - P0014\_PO)5CE\_StablePositionTimeEc1

Description: Minimum time for Exhaust Cam 1 phase position to be stable to enable performance diagnostic.

Value Units: Minimum time (sec) X Unit: Engine Oil Temperature (degC) Y Units: Engine Speed (rpm)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2,800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3,600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4,800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
5,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
5,600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6,800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

## Initial Supporting table - P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold

Description: P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold

Value Units: Engine Run Time- Seconds X Unit: Oil Temperature- C

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	300.0	7.0	5.0	2.0	1.3	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	1.0	1.0

## Initial Supporting table - P0016-0019 Mid-Park Phaser Delay

**Description:** P0016-0019 Mid-Park Phaser Park Delay. Total delay is twice the calibration value as both 'hi' side and 'lo' side park check sequences are delayed by the stated calibration values

## Value Units: Time - seconds

**X Unit:** Oil Temperature - degC

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	40.0	20.0	8.0	2.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4

#### Initial Supporting table - POO21\_CamPosErrorLimIc2

Description: Maximum Intake Cam 2 phase error as a function of engine speed and engine oil temperature.

Value Units: Maximum Intake Cam 2 phase error (degCAM) X Unit: Engine Oil Temperature (degC) Y Units: Engine Speed (rpm)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
800	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
1,200	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
1,600	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
2,000	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
2,400	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
2,800	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
3,200	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
3,600	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
4,000	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
4,400	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
4,800	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
5,200	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
5,600	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
6,000	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
6,400	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
6,800	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

#### Initial Supporting table - P0021\_P( 05CD\_StablePositionTimelc2

**Description:** Minimum time for Intake Cam 2 phase position to be stable to enable performance diagnostic.

Value Units: Minimum time (sec) X Unit: Engine Oil Temperature (degC) Y Units: Engine Speed (rpm)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2,800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3,600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4,800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
5,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
5,600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6,800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

#### Initial Supporting table - POOS4\_CamPosErrorLimEc2

Description: Maximum Exhaust Cam 2 phase error as a function of engine speed and engine oil temperature.

Value Units: Maximum Exhaust Cam 2 phase error (degCAM) X Unit: Engine Oil Temperature (degC) Y Units: Engine Speed (rpm)

y/x -40 -28 -16 -4 8 20 32 44 56 68 80 92 104 116 128 140 152 400 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 800 5.0 1,200 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 1,600 5.0 2,000 5.0 2,400 2,800 5.0 3,200 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 3,600 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 4,000 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 4,400 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 4.800 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5,200 5,600 5.0 6,000 6,400 5.0 6,800

#### Initial Supporting table - P0024\_PC)5CF\_StablePositionTimeEc2

Description: Minimum time for Exhaust Cam 2 phase position to be stable to enable performance diagnostic.

Value Units: Minimum time (sec) X Unit: Engine Oil Temperature (degC) Y Units: Engine Speed (rpm)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2,800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3,600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4,800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
5,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
5,600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6,800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

## Initial Supporting table - P0071: OAT Performance Drive Equilibrium Engine Off

**Description:** OAT Performance Diagnostic counter increment for determining OAT-IAT equilibrium for engine off (for hybrid applications)

Value Units: Counter Increment Value (Unitless) X Unit: Vehicle Speed (KPH)

y/x	0.0	5.0	10.0	15.0	20.0	25.0	30.0	50.0	80.0
1.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0

#### Initial Supporting table - P0071: OAT Performance Drive Equilibrium Engine Running

Description: OAT Performance Diagnostic counter increment for determining OAT-IAT equilibrium for engine running

Value Units: Counter Increment Value (Unitless) X Unit: Vehicle Speed (KPH) Y Units: Engine Air Flow (Grams/Second)

y/x	0.0	5.0	10.0	15.0	20.0	25.0	30.0	50.0	80.0
1.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
5.0	-5.0	-2.0	-1.0	0.0	1.0	2.0	3.0	4.0	5.0
10.0	-4.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0
20.0	-2.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0
30.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0
40.0	0.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0
50.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0
60.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
70.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0

#### Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM

Description: P0101\_P0106\_P0121\_P012B\_P0236\_P1101 MAPI Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless) X Unit: Engine Speed (RPM)

y/x	500	1,000	1,250	1,500	1,750	2,000	2,250	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

#### Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM

Description: P0101\_P0106\_P0121\_P012B\_P0236\_P1101 MAP2 Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless) X Unit: Engine Speed (RPM)

y/x	500	1,000	1,250	1,500	1,750	2,000	2,250	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
1	1.000	1.000	0.900	0.900	0.900	0.900	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

## Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM

Description: P0101\_P0106\_P0121\_P012B\_P0236\_P1101 TPS Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless) X Unit: Engine Speed (RPM)

y/x	500	1,000	1,250	1,500	1,750	2,000	2,250	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

## Initial Supporting table - P050D\_P1400\_Catalystl\_ightOffExtendedEngineRunTimeExit

**Description:** Exit Catalyst Warm-up mode if Engine Run Time is greater than this value. This table is based on percent ethanol (x-axis) and catmon's NormRatio\_EWMA value (y-axis). The NormRatio\_EWMA value determines the state of the catalyst. Typically, NormRatio\_EWMA values below 0.35 (0 is bad and 1 is good) represent catalysts that have degraded. The emission performance of these degraded catalysts can be improved by extending catalyst light off of GetE85R\_Pct\_FFS\_CompAtEngFloat.

I	8 , I	, , , ,		1 9	
y/x	0	25	50	75	100
0.000	20	20	20	20	20
0.125	20	20	20	20	20
0.250	20	20	20	20	20
0.375	20	20	20	20	20
0.500	20	20	20	20	20
0.625	20	20	20	20	20
0.750	20	20	20	20	20
0.875	20	20	20	20	20
1.000	20	20	20	20	20

#### Initial Supporting table - P1400\_CatalystLightOffExtendedEngineRunTimeExit

**Description:** Exit Catalyst Warm-up mode if Engine Run Time is greater than this value. This table is based on percent ethanol (x-axis) and catmon's NormRatio\_EWMA value (y-axis). The NormRatio\_EWMA value determines the state of the catalyst. Typically, NormRatio\_EWMA values below 0.35 (0 is bad and 1 is good) represent catalysts that have degraded. The emission performance of these degraded catalysts can be improved by extending catalyst light off of GetE85R\_Pct\_FFS\_CompAtEngFloat.

1	8 <u>,</u> 1	, , , ,		1 5	
y/x	0	25	50	75	100
0.000	20	20	20	20	20
0.125	20	20	20	20	20
0.250	20	20	20	20	20
0.375	20	20	20	20	20
0.500	20	20	20	20	20
0.625	20	20	20	20	20
0.750	20	20	20	20	20
0.875	20	20	20	20	20
1.000	20	20	20	20	20

# Initial Supporting table - P1400\_ColdStartDiagnosticDelayBasedOnEngineRunTime

<b>Description:</b> Qua timer or to change average qualified	lity weight-based or the value of the av residual value.	n engine run time. rerage qualified res	This allows adjustn idual energy calcula	nent of the weightin ation to prevent fals	g factors at various e Fails of the diagr	engine run times in nostic under circums	n order to prevent t stances inappropria	he updating of the c ate to update the ca	cumulative quality Iculation of the			
y/x	0	2	2	3	5	10	15	20	30			
1	0	0	1	1	1	1	1	1	1			
	Initial Supporting table - P1400_ColdStartDiagnosticDelayBasedOnEngineRunTimeCalAxis											
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Description: This	is the x-axis for the	e KtCSED_K_Time	Wght calibration tab	ole. Refer to the de	scription for KtCSE	D_K_TimeWght for	details.					
y/x	1	2	3	4	5	6	7	8	9			
1	0 2 2 3 5 10 15 20 30											

	Initial Supporting table - P1400_EngineSpeedResidual_Table																
Descripti engine ex	on: This 1 chaust flow	x17 table o is gathere	of engine e d from the	xhaust flow desired en	v values is gine speed	used to ca d (VeSPDF	lculate botl R_n_EngDs	n the desire ard). The v	ed and the alue used	actual eng for the actu	ine exhaus Jal engine	st flow base exhaust flo	ed on desir w is based	ed and act on the ac	tual engine tual engine	speed. Th RPM valu	e desired e.
y/x	/x 0 500 650 700 750 800 850 875 900 925 950 1,000 1,050 1,100 1,200 1,500 2,000																
1	0	5	6	6	6	6	6	6	6	9	12	12	12	12	12	12	12

# Initial Supporting table - P1400\_SparkResidual\_Table

<b>Description:</b> Predicted engine-out energy potential based on either the desired cold start spark advance value or the actual spark advance value. ExhEngyPerUnitMass used to calculate both desired exhaust energy and actual energy. The desired and actual exhaust energy per unit mass values are used in part to calculate the desired exhaust energy per unit time and actual exhaust energy per unit time. Both desired and actual go into the residual exhaust energy per unit time calculation.									
y/x	-15	-10	-5	-1	1	2	4	10	25
1	1.13	1.13	1.13	1.13	1.00	0.88	0.75	0.63	0.31

#### Initial Supporting table - P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est

Description: P0101\_P0106\_P010B\_P01 21\_P012B\_P0236\_\_P1101 MAF1 Residual Weight Factor based on MAF Est

Value Units: Weight Factor (Unitless)

X Unit: Estimated Engine Air Flow (Grams/Second)

y/x	0	50	70	73	76	79	82	85	89	95	100	110	120	150	200	280	350
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.900	0.900	0.900

#### Initial Supporting table - P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM

Description: P0101\_P0106\_P010B\_P0121\_P012B\_P0236\_P1101 MAF1 Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless) X Unit: Engine Speed (RPM)

y/x	500	1,000	1,250	1,500	1,750	2,000	2,250	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.695	0.600	0.615	0.806	1.000

### Initial Supporting table - P0128\_Maximum Accumulated Energy for Start-up ECT conditions - Alternate

**Description:** KtECTR\_E\_CTR\_WrmUpEnrgyLimTest1

Value Units: Cooling system energy failure threshold (kJ) X Unit: Minimum ECT for the key cycle (°C)

y/x	-20	-5	10	30	45	60	75
1	13,628	11,445	9,263	7,080	6,000	5,400	5,400

#### Initial Supporting table - P0128\_Maximum Accumulated Energy for Start-up ECT conditions - Primary

**Description:** KtECTR\_E\_CTR\_WrmllpEnrgyLimTestO

Value Units: Cooling system energy failure threshold (kJ) X Unit: Minimum ECT for the key cycle (°C)

y/x	-20	-5	10	30	45	60	75
1	23,399	20,418	17,438	14,457	12,474	10,260	10,260

#### Initial Supporting table - P0606\_Lai st Seed Timeout f(Loop Time)

**Description:** The max time for the Last Seed Timeout as a function of operating loop time sequence.

#### P0606\_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSe	CePISR_e_10msSeq	CePISR_e_12p5msSe	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq				
		q		q							
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000				
P0606_Last Seed Tin	neout f(Loop Time) - Pa	art 2									
y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_S	CePISR_e_EventB_S	CePISR_e_EventC_S					
				eq	eq	eq					
1	500.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875					

	In	itial Supporting t	able - P0606_PS'	W Sequence Fail	f(Loop Time)		
Description: Fail three	shold for PSW per opera	iting loop.					
P0606_PSW Sequence	Fail f(Loop Time) - P	art 1					
y/x	CePISR_e_5msSeq	CePISR_e_6p25msSe q	CePISR_e_10msSeq	CePISR_e_12p5msSe q	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	5	3	5	3	5	3	5
P0606_PSW Sequence	Fail f(Loop Time) - P	art 2					
y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_S	CePISR_e_EventB_S	CePISR_e_EventC_S	
				eq	eq	eq	
1	3	5	5	3	5	5	

# Initial Supporting table - P0606\_PSW Sequence Sample f(Loop Time)

**Description:** Sample threshold for PSW per operating loop.

P0606_PSW Sequence Sample f(Loop Time) - Part 1											
y/x	CePISR_e_5msSeq	CePISR_e_6p25msSe a	CePISR_e_10msSeq	CePISR_e_12p5msSe a	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq				
Ī	4	4	4	4	4	4	4				
P0606_PSW Sequend	ce Sample f(Loop Time	e) - Part 2									
y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_S	CePISR_e_EventB_S	CePISR_e_EventC_S					
				eq	eq	eq					
1	4	4	4	4	4	4					

Initial Supporting table - P060C_Delta MAP Threshold f(Desired Engine Torque)											
Description: Engine Sync	based and Time based de	Ita pressure threshold abov	e which Torque Security err	or is reported.							
y/x	0.00	50.00	100.00	150.00	200.00	300.00					
.00 20.55 20.55 20.55 20.55 20.55 20.55											

# Initial Supporting table - P060C\_Speed Control External Load f(Oil Temp, RPM)

Description: Specif	Description: Specifies the external load table for 8PDR torque security as a function of engine oil temperature and engine RPM.											
y/x	-40.00	-20.00	-10.00	0.00	50.00	90.00						
350.00	295.25	295.25	295.25	295.25	295.25	268.67						
450.00	295.25	295.25	295.25	295.25	295.25	198.23						
550.00	295.25	295.25	295.25	295.25	237.73	146.26						
600.00	295.25	295.25	295.25	295.25	215.57	127.55						
700.00	295.25	267.61	265.19	261.50	173.11	98.63						
800.00	295.25	236.41	227.35	223.13	146.34	82.59						
900.00	273.80	206.05	196.24	192.15	123.90	85.16						
1,000.00	250.20	185.31	175.25	169.40	105.66	90.14						
1,100.00	229.77	176.56	174.28	174.97	110.38	95.12						
1,200.00	211.16	183.89	181.61	180.54	115.11	100.10						
1,300.00	218.20	189.20	185.08	183.42	117.13	102.10						
1,400.00	221.84	190.57	178.56	170.29	111.15	100.11						
2,000.00	119.16	91.89	68.60	61.09	77.46	73.19						
2,500.00	-42.39	-42.39	-42.39	-42.39	-42.39	-42.39						
3,000.00	-46.63	-46.63	-46.63	-46.63	-46.63	-46.63						
4,000.00	-50.87	-50.87	-50.87	-50.87	-50.87	-50.87						
6,000.00	-55.11	-55.11	-55.11	-55.11	-55.11	-55.11						

### Initial Supporting table - P00C6 - High Pressure Pump Control Mode timeout

Description: High Pressure Pump Control Mode timeout

Value Units: Time (Seconds) X Unit: Coolant Temperature (Deg C)

y/x	-30	-27	-25	-20	-10	0	8	16	20	24	32	40	48	64	80	90	112
1	10.0	10.0	10.0	9.0	7.0	5.0	4.0	3.4	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

#### 24OBDG03B Part 2 ECM Initial Supporting Tables

#### Initial Supporting table - P00C6 - maximum acceptable counts of fuel rail pressure below KtFHPD\_p\_HPS\_PressFallLoThrsh after High Pressure Start

**Description:** The maximum acceptable counts of fuel rail pressure below KtFHPD\_p\_HPS\_PressFallLoThrsh after High Pressure Start (HPS) is executed but before engine is in run mode.

Value Units: maximum acceptable counts of fuel rail pressure below KtFHPD\_p\_HPS\_PressFallLoThrsh after High Pressure Start (Count) X Unit: Coolant Temperature (Deg C)

Y Units: Ethanol Precent (%)

y/x	-30	-27	-25	-20	-10	0	8	16	20	24	32	40	48	64	80	90	112
0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
13	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
25	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
38	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
50	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
63	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
75	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
88	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
100	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

#### Initial Supporting table - P00C6 - Minimum acceptable value of fuel rail pressure after High Pressure Start

**Description:** The minimum acceptable value of fuel rail pressure after High Pressure Start (HPS) is executed. This ensures the pressure does not fall off drastically after High Pressure Start (HPS) is executed, but before engine is in run mode.

Value Units: Minimum acceptable value of fuel rail pressure after High Pressure Start (Mpa)

X Unit: Coolant Temperature (Deg C)

Y Units: Ethanol Precent (%)

y/x	-30	-27	-25	-20	-10	0	8	16	20	24	32	40	48	64	80	90	112
0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
13	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
25	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
38	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
50	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
63	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
75	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
88	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
100	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

#### Initial Supporting table - P00C6 - Minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery

Description: This calibration is the minimum pressure in MPa that will exit High Pressure Starl mode and allow fuel delivery

Value Units: Minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery

X Unit: Coolant Temperature (Deg C) Y Units: Ethanol Precent (%)

y/x	-30	-27	-25	-20	-10	0	8	16	20	24	32	40	48	64	80	90	112
0	17.0	17.0	17.0	15.0	12.0	5.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	2.0	2.0	3.0
13	17.0	17.0	17.0	15.0	12.0	5.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	2.0	2.0	3.0
25	17.0	17.0	17.0	15.0	12.0	5.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	2.0	2.0	3.0
38	17.0	17.0	17.0	15.0	12.0	5.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	2.0	2.0	3.0
50	17.0	17.0	17.0	15.0	12.0	5.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	2.0	2.0	3.0
63	17.0	17.0	17.0	15.0	12.0	5.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	2.0	2.0	3.0
75	17.0	17.0	17.0	15.0	12.0	5.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	2.0	2.0	3.0
88	17.0	17.0	17.0	15.0	12.0	5.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	2.0	2.0	3.0
100	17.0	17.0	17.0	15.0	12.0	5.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	2.0	2.0	3.0

#### Initial Supporting table - P0420\_BestFailingOSCTableB1

**Description:** This table is a 9x17 table of baseline Best Failing (e.g. threshold converter) OSC times for catalyst Bank 1. The axis' for this table include the average airflow and the catalyst temperature. After OSC is measured for a specific temp and airflow, the BestFailing OSC value is found within this table for the measured temp and airflow and is used along with the OSC\_TimeRaw (and the WorstPassing value) to calculate the Normalized Ratio for that specific test. The values in this table are based on the measured OSC for the identified BPU converter that is used for MIL illumination across the specific temp and airflow range for a given program.

y/x	3.77	4.22	4.67	5.11	5.56	6.01	6.46	6.91	7.36	7.81	8.26	8.71	9.16	9.61	10.06	10.51	10.96
500.00	0.85	0.85	0.80	0.75	0.72	0.70	0.60	0.50	0.45	0.42	0.40	0.36	0.34	0.35	0.30	0.28	0.26
550.00	0.88	0.88	0.83	0.78	0.76	0.73	0.63	0.53	0.48	0.46	0.43	0.39	0.37	0.38	0.33	0.31	0.29
600.00	0.91	0.91	0.86	0.81	0.79	0.76	0.66	0.56	0.51	0.49	0.46	0.42	0.41	0.41	0.37	0.34	0.33
650.00	0.94	0.94	0.89	0.84	0.82	0.79	0.69	0.59	0.54	0.52	0.49	0.46	0.44	0.44	0.40	0.38	0.36
700.00	0.97	0.97	0.92	0.88	0.85	0.83	0.72	0.63	0.58	0.55	0.53	0.49	0.47	0.47	0.43	0.41	0.39
750.00	1.01	1.01	0.96	0.91	0.88	0.86	0.76	0.66	0.61	0.58	0.56	0.52	0.50	0.51	0.46	0.44	0.42
800.00	1.04	1.04	0.99	0.94	0.91	0.89	0.79	0.69	0.64	0.61	0.59	0.55	0.54	0.54	0.49	0.47	0.45
850.00	1.07	1.07	1.02	0.97	0.94	0.92	0.82	0.72	0.67	0.64	0.62	0.58	0.57	0.57	0.52	0.50	0.48
900.00	1.10	1.10	1.05	1.00	0.97	0.95	0.85	0.75	0.70	0.67	0.65	0.61	0.60	0.60	0.55	0.53	0.51

#### Initial Supporting table - P0420\_WorstPassingOSCTableBI

**Description:** This table is a 9x17 table of WorstPassing (e.g. 120k) OSC times for catalyst Bank 1. The axis' for this table include the average airflow and the catalyst temperature. After OSC is measured for a specific temp and airflow, the WorstPassing OSC value is found within this table for the measured temp and airflow and is used along with the OSC\_TimeRaw (and the BestFailing OSC value) to calculate the Normalized Ratio for that specific test. The values in this table are based on the measured OSC for the WPA part across the temp and airflow range.

y/x	3.77	4.22	4.67	5.11	5.56	6.01	6.46	6.91	7.36	7.81	8.26	8.71	9.16	9.61	10.06	10.51	10.96
500.00	1.69	1.69	1.53	1.45	1.30	1.23	1.10	1.00	0.92	0.85	0.81	0.72	0.69	0.66	0.63	0.59	0.52
550.00	1.72	1.72	1.57	1.48	1.33	1.26	1.13	1.03	0.95	0.88	0.84	0.75	0.72	0.69	0.66	0.62	0.55
600.00	1.76	1.76	1.60	1.52	1.37	1.29	1.16	1.06	0.98	0.91	0.87	0.79	0.75	0.72	0.69	0.65	0.58
650.00	1.79	1.79	1.63	1.55	1.40	1.33	1.19	1.09	1.01	0.94	0.90	0.82	0.79	0.75	0.72	0.68	0.62
700.00	1.82	1.82	1.66	1.58	1.43	1.36	1.22	1.13	1.04	0.97	0.93	0.85	0.82	0.78	0.75	0.71	0.65
750.00	1.85	1.85	1.69	1.61	1.46	1.39	1.26	1.16	1.08	1.00	0.96	0.88	0.85	0.81	0.79	0.74	0.68
800.00	1.88	1.88	1.72	1.64	1.49	1.42	1.29	1.19	1.11	1.03	0.99	0.91	0.88	0.84	0.82	0.77	0.71
850.00	1.91	1.91	1.75	1.67	1.52	1.45	1.32	1.22	1.14	1.07	1.03	0.94	0.91	0.87	0.85	0.80	0.74
900.00	1.94	1.94	1.78	1.70	1.55	1.48	1.35	1.25	1.17	1.10	1.06	0.97	0.94	0.91	0.88	0.83	0.77

#### Initial Supporting table - P0430\_BestFailingOSCTableB2

**Description:** This table is a 9x17 table of baseline Best Failing (e.g. threshold converter) OSC times for catalyst Bank 2. The axis' for this table include the average airflow and the catalyst temperature. After OSC is measured for a specific temp and airflow, the BestFailing OSC value is found within this table for the measured temp and airflow and is used along with the OSC\_TimeRaw (and the WorstPassing value) to calculate the Normalized Ratio for that specific test. The values in this table are based on the measured OSC for the identified BPU converter that is used for MIL illumination across the specific temp and airflow range for a given program.

y/x	3.77	4.22	4.67	5.11	5.56	6.01	6.46	6.91	7.36	7.81	8.26	8.71	9.16	9.61	10.06	10.51	10.96
500.00	1.08	1.08	1.08	1.00	0.95	0.90	0.85	0.80	0.75	0.70	0.65	0.65	0.65	0.64	0.61	0.56	0.53
550.00	1.08	1.08	1.08	1.01	0.96	0.91	0.86	0.81	0.76	0.71	0.66	0.66	0.66	0.65	0.62	0.57	0.54
600.00	1.09	1.09	1.09	1.01	0.96	0.91	0.86	0.81	0.76	0.71	0.66	0.66	0.66	0.65	0.62	0.57	0.54
650.00	1.09	1.09	1.09	1.02	0.97	0.92	0.87	0.82	0.77	0.72	0.67	0.67	0.67	0.66	0.63	0.58	0.55
700.00	1.10	1.10	1.10	1.03	0.97	0.92	0.88	0.83	0.78	0.72	0.67	0.67	0.67	0.67	0.63	0.58	0.55
750.00	1.11	1.11	1.11	1.03	0.98	0.93	0.88	0.83	0.78	0.73	0.68	0.68	0.68	0.67	0.64	0.59	0.56
800.00	1.11	1.11	1.11	1.04	0.99	0.94	0.89	0.84	0.79	0.74	0.69	0.69	0.69	0.68	0.65	0.60	0.57
850.00	1.12	1.12	1.12	1.04	0.99	0.94	0.89	0.84	0.79	0.74	0.69	0.69	0.69	0.68	0.65	0.60	0.57
900.00	1.13	1.13	1.13	1.05	1.00	0.95	0.90	0.85	0.80	0.75	0.70	0.70	0.70	0.69	0.66	0.61	0.58

#### Initial Supporting table - P0430\_WorstPassingOSCTableB2

**Description:** This table is a 9x17 table of WorstPassing (e.g. 120k) OSC times for catalyst Bank 2. The axis' for this table include the average airflow and the catalyst temperature. After OSC is measured for a specific temp and airflow, the WorstPassing OSC value is found within this table for the measured temp and airflow and is used along with the OSC\_TimeRaw (and the BestFailing OSC value) to calculate the Normalized Ratio for that specific test. The values in this table are based on the measured OSC for the WPA part across the temp and airflow range.

y/x	3.77	4.22	4.67	5.11	5.56	6.01	6.46	6.91	7.36	7.81	8.26	8.71	9.16	9.61	10.06	10.51	10.96
500.00	1.75	1.75	1.70	1.59	1.45	1.37	1.27	1.21	1.14	1.09	1.01	0.98	0.94	0.92	0.88	0.84	0.81
550.00	1.75	1.75	1.71	1.60	1.46	1.38	1.28	1.21	1.15	1.10	1.02	0.98	0.95	0.93	0.88	0.85	0.82
600.00	1.76	1.76	1.71	1.61	1.46	1.38	1.28	1.22	1.15	1.10	1.02	0.99	0.96	0.93	0.89	0.85	0.82
650.00	1.77	1.77	1.72	1.61	1.47	1.39	1.29	1.22	1.16	1.11	1.03	1.00	0.96	0.94	0.90	0.86	0.83
700.00	1.77	1.77	1.72	1.62	1.47	1.39	1.30	1.23	1.17	1.12	1.03	1.00	0.97	0.95	0.90	0.87	0.83
750.00	1.78	1.78	1.73	1.63	1.48	1.40	1.30	1.24	1.17	1.12	1.04	1.01	0.97	0.95	0.91	0.87	0.83
800.00	1.78	1.78	1.74	1.63	1.49	1.41	1.31	1.24	1.18	1.13	1.05	1.02	0.98	0.96	0.92	0.88	0.84
850.00	1.79	1.79	1.74	1.64	1.49	1.41	1.32	1.25	1.18	1.13	1.05	1.02	0.99	0.96	0.92	0.88	0.84
900.00	1.80	1.80	1.75	1.64	1.50	1.42	1.32	1.26	1.19	1.14	1.06	1.03	0.99	0.97	0.93	0.89	0.85

### Initial Supporting table - F 2635 Max Fuel Flow

**Description:** P2635 Maximum Fuel Flow Disable Criteria Maximum allowed fuel flow values above which the diagnostic is disabled

Value Units: grams / second X Unit: kilopascals [commanded fuel pressure] Y Units: volts [device supply]

y/x	200	250	300	350	400	450	500	550	600
5	512	512	512	512	512	512	512	512	512
6	512	512	512	512	512	512	512	512	512
8	512	512	512	512	512	512	512	512	512
9	512	512	512	512	512	512	512	512	512
11	512	512	512	512	512	512	512	512	512
12	512	512	512	512	512	512	512	512	512
14	512	512	512	512	512	512	512	512	512
15	512	512	512	512	512	512	512	512	512
17	512	512	512	512	512	512	512	512	512
18	512	512	512	512	512	512	512	512	512
20	512	512	512	512	512	512	512	512	512
21	512	512	512	512	512	512	512	512	512
23	512	512	512	512	512	512	512	512	512
24	512	512	512	512	512	512	512	512	512
26	512	512	512	512	512	512	512	512	512
27	512	512	512	512	512	512	512	512	512
29	512	512	512	512	512	512	512	512	512

# Initial Supporting table - P2635 Threshold High

**Description:** P2635 Filtered Fuel Pressure Error High Threshold [under-performing pump] Instantaneously calculated filtered fuel pressure error

Value Units: kilopascals X Unit: kilopascals [commanded fuel pressure] Y Units: grams / sec [fuel flow]

y/x	200	250	300	350	400	450	500	550	600
0	30	38	45	53	60	68	75	83	90
2	30	38	45	53	60	68	75	83	90
3	30	38	45	53	60	68	75	83	90
5	30	38	45	53	60	68	75	83	90
6	30	38	45	53	60	68	75	83	90
8	30	38	45	53	60	68	75	83	90
9	30	38	45	53	60	68	75	83	90
11	30	38	45	53	60	68	75	83	90
12	30	38	45	53	60	68	75	83	90
14	30	38	45	53	60	68	75	83	90
15	30	38	45	53	60	68	75	83	90
17	30	38	45	53	60	68	75	83	90
18	30	38	45	53	60	68	75	83	90
20	30	38	45	53	60	68	75	83	90
21	30	38	45	53	60	68	75	83	90
23	30	38	45	53	60	68	75	83	90
24	30	38	45	53	60	68	75	83	90
26	30	38	45	53	60	68	75	83	90
27	30	38	45	53	60	68	75	83	90
29	30	38	45	53	60	68	75	83	90
30	30	38	45	53	60	68	75	83	90
32	30	38	45	53	60	68	75	83	90
33	30	38	45	53	60	68	75	83	90
35	30	38	45	53	60	68	75	83	90
36	30	38	45	53	60	68	75	83	90
38	30	38	45	53	60	68	75	83	90
39	30	38	45	53	60	68	75	83	90
41	30	38	45	53	60	68	75	83	90
42	30	38	45	53	60	68	75	83	90
44	30	38	45	53	60	68	75	83	90
45	30	38	45	53	60	68	75	83	90

			Initial Suppo	rting table - P	2635 Thresho	old High			
47	30	38	45	53	60	68	75	83	90
48	30	38	45	53	60	68	75	83	90

#### Initial Supporting table - P2635 Threshold Low

#### Description: P2635 Filtered Pressure Error Low Threshold [over-performing pump] Instantaneously calculated filtered fuel pressure error

Value Units: kilopascals X Unit: kilopascals [commanded fuel pressure] Y Units: grams / second [fuel flow]

y/x	200	250	300	350	400	450	500	550	600
0	-490	-440	-390	-340	-290	-240	-190	-140	-90
2	-490	-440	-390	-340	-290	-240	-190	-140	-90
3	-490	-440	-390	-340	-290	-240	-190	-140	-90
5	-490	-440	-390	-340	-290	-240	-190	-140	-90
6	-490	-440	-390	-340	-290	-240	-190	-140	-90
8	-490	-440	-390	-340	-290	-240	-190	-140	-90
9	-490	-440	-390	-340	-290	-240	-190	-140	-90
11	-490	-440	-390	-340	-290	-240	-190	-140	-90
12	-490	-440	-390	-340	-290	-240	-190	-140	-90
14	-490	-440	-390	-340	-290	-240	-190	-140	-90
15	-490	-440	-390	-340	-290	-240	-190	-140	-90
17	-490	-440	-390	-340	-290	-240	-190	-140	-90
18	-490	-440	-390	-340	-290	-240	-190	-140	-90
20	-490	-440	-390	-340	-290	-240	-190	-140	-90
21	-490	-440	-390	-340	-290	-240	-190	-140	-90
23	-490	-440	-390	-340	-290	-240	-190	-140	-90
24	-490	-440	-390	-340	-290	-240	-190	-140	-90
26	-490	-440	-390	-340	-290	-240	-190	-140	-90
27	-490	-440	-390	-340	-290	-240	-190	-140	-90
29	-490	-440	-390	-340	-290	-240	-190	-140	-90
30	-490	-440	-390	-340	-290	-240	-190	-140	-90
32	-490	-440	-390	-340	-290	-240	-190	-140	-90
33	-490	-440	-390	-340	-290	-240	-190	-140	-90
35	-490	-440	-390	-340	-290	-240	-190	-140	-90
36	-490	-440	-390	-340	-290	-240	-190	-140	-90
38	-490	-440	-390	-340	-290	-240	-190	-140	-90
39	-490	-440	-390	-340	-290	-240	-190	-140	-90
41	-490	-440	-390	-340	-290	-240	-190	-140	-90
42	-490	-440	-390	-340	-290	-240	-190	-140	-90
44	-490	-440	-390	-340	-290	-240	-190	-140	-90
45	-490	-440	-390	-340	-290	-240	-190	-140	-90
									,

#### 24OBDG03B Part 2 ECM Initial Supporting Tables

			Initial Support	ting table - F	≥2635 Thresho	old Low			
47	-490	-440	-390	-340	-290	-240	-190	-140	-90
48	-490	-440	-390	-340	-290	-240	-190	-140	-90

### Initial Supporting table - Closed Loop Enable Clarification - KaFCLP U SlphrIntglOfst Thrsh

Description: Integral Offset voltage thresholds (bank and cell specific cals) used with KeFCLP\_Pct\_CatAccuSlphrPostDsbl to check for sulphur poisoning.

Value Units: millivolts

X Unit: Post Catalyst Number

y/x	CiOXYR_O2_PostCat1	CiOXYR_O2_PostCat2
CiFCLP_Decel	2,048	2,048
CiFCLPJdle	2,048	2,048
CiFCLP_Cruise	2,048	2,048
CiFCLP_LightAccel	2,048	2,048
CiFCLP_HeavyAccel	2,048	2,048

Initial Supporting table - Closed Loop Enable Clarification - KcFCLP_Cnt_O2RdyCyclesThrsh			
Description: Number of times a post oxygen sensor value must be in range before declaring it ready			
Value Units: Time (events * 12.5 milliseconds)			
y/x 1			
1	10		

Initial Supporting table - Closed Loop Enable Clarification - KcFULC_O2_SensorReadyEvents			
Description: Number of times a pre oxygen sensor value must be in range before declaring it ready			
Value Units: Time (events * 12.5 milliseconds)			
y/x 1			
1	10		

# Initial Supporting table - Closed Loop Enable Clarification - KeEOSDURichThrsh Description: The oxygen sensor voltage above which a sensor will be considered failing during a Rich Test. Value Units: Volts y/x 1 1 1,050

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_dm_IntegrationAirflowMax			
Description: Maximum allowed estimated airflow for post 02 integral terms to be updated.			
Value Units: Grams per Second			
y/x 1			
1	512		

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP Pct CatAccuSlphrPostDsbl			
Description: Sulphur percent threshold above which post integral learning is disabled if the threshold criteria KaFCLP_U_SlphrIntglOfst_Thrsh is also met.			
Value Units: Percent			
y/x 1			
1	255		

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_T_IntegrationCatalystMax			
Description: Maximum allowed estimated catalytic converter temperature for post 02 integral terms to be updated.			
Value Units: Celcius			
y/x 1			
1	900		

#### Initial Supporting table - Closed Loop Enable Clarification - KeFCLP\_T\_IntegrationCatalystMin

**Description:** Minimum allowed estimated catalytic converter temperature to begin using post 02 integration correction terms. Converter temperature must remain above this threshold to ramp-in the post 02 integration adjustments. Once the ramp-in has started, a converter temperature below this threshold will freeze the ramp-in multiplier. Post 02 integration will not be allowed below this converter temperature

#### Value Units: Celcius

y/x	1
1	550

Initial Supporting table - Closed Loop Enable Clarification - KeFULC T WRAF SensorReadyThrsh			
Description: Pumping cell temperature threshold above which the wideband oxygen sensor will be considered ready for use			
Value Units: Degrees Celcius			
y/x 1			
1	700		

Initial Supporting table - Closed Loop Enable Clarification - KeWRSC T HtrCntrICL			
Description: WRAF heater temperature enabling threshold for transition from Open Loop to Closed Loop			
Value Units: Degrees Celcius			
y/x 1			
1	628		

Initial Supporting table - Closed Loop Enable Clarification - KeWRSI T PumpCurrentEnable			
Description: WRAF heater temperature threshold for enabling the sensor pump current			
Value Units: Degrees Celcius			
y/x 1			
1	640		
Initial Supporting table - Closed Loop Enable Cl	arification - KfFCLL T AdaptiveLoCoolant		
--	--		
Description: LTM learning is inhibited if the engine coolant temperature is below this calibration	on.		
Value Units: Degrees Celcius			
y/x	1		
1	40		

# Initial Supporting table - Closed Loop Enable Clarification - KfFCLP\_U\_O2ReadyThrshLo Description: Voltage limit checked against when determining if a post converter oxygen sensor is in range Value Units: millivolts y/x 1 1 1,100

Initial Supporting table - Closed Loop Enable Cl	arification - KfFULC_U_O2_SensorReadyThrshLo
<b>Description:</b> Voltage limit checked against when determining if a pre converter oxygen senso	r is in range
Value Units: millivolts	
y/x	1
1	1,150

# Initial Supporting table - Closed Loop Enable Clarification - KtFCLL p AdaptiveLowMAP Limit

Description: Long term fuel learning is disabled below this MAP limit as a function of barometric pressure.

# Value Units: KPa X Unit: KPa

y/x	65	70	75	80	85	90	95	100	105
1	20.0	20.0	20.0	21.0	22.5	23.5	24.5	24.5	24.5

## Initial Supporting table - Closed Loop Enable Clarification - KtFCLP t PostIntglDisableTime

**Description:** Disable integral offset after engine start for this amount of time as a function of start up coolant temperature.

Value Units: Time in seconds X Unit: Degrees Celcius

-40 -29 -18 -6 5 16 28 39 50 61 73 84 95 106 118 129 140 y/x 409.0 240.0 240.0 60.0 60.0 60.0 60.0 60.0 409.0 409.0 409.0 400.0 240.0 60.0 60.0 60.0 60.0 1

# Initial Supporting table - Closed Loop Enable Clarification - KtFCLPtPostIntgIRampInTime

**Description:** Time required to ramp integral offset to desired value as a function of start up coolant temperature.

Value Units: Time in seconds X Unit: Degrees Celcius

-40 -29 -18 -6 5 16 28 39 50 61 73 84 95 106 118 129 140 y/x 45.0 40.0 30.0 10.0 10.0 10.0 50.0 50.0 50.0 40.0 40.0 40.0 25.0 10.0 10.0 10.0 10.0

# Initial Supporting table - Closed Loop Enable Clarification - KtFSTA t ClosedLoopAutostart

**Description:** Engine run time following an autostart, as a function of begin run coolant, which must be exceeded to enable CLOSED LOOP.

Value Units: Time in seconds X Unit: Degrees Celcius

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	100.0	100.0	100.0	55.0	19.0	18.0	18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

## Initial Supporting table - Closed Loop Enable Clarification - KtFSTA t ClosedLoopTime

**Description:** Engine run time, as a function of startup coolant temperature, which must be exceeded to enable CLOSED LOOP.

Value Units: Time in seconds X Unit: Degrees Celcius

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	510.0	420.0	380.0	360.0	280.0	70.0	70.0	70.0	70.0	40.0	40.0	25.0	25.0	25.0	25.0	25.0	25.0

### Initial Supporting table - P0442 Volatility Time as a Function of Estimate of Ambient Temperature

Description: EONV volatility time as a function of estimated ambient temperature

Value Units: Volatility time (seconds)

X Unit: Estimated Ambient Temperature (Deg C)

y/x	-10	-4	1	7	13	18	24	29	35	41	46	52	58	63	69	74	80
1	30	30	45	60	80	120	220	300	400	400	400	400	400	400	400	400	400

### 24OBDG03B Part 2 ECM Initial Supporting Tables

### Initial Supporting table - P0442 Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature Description: Maximum engine off time before vehicle off time as a function of estimated ambient temperature (EAT) Value Units: Maximum Engine Off Time Before Vehicle Off Time (seconds) X Unit: Estimated Ambient Temperature (Deg C) -10 -4 y/x

### Initial Supporting table - P0442 EON) V Pressure Threshold (Pascals)

Description: EONV pressure threshold as a function of fuel level and estimated ambient temperature (EAT)

Value Units: EONV Pressure Threshold (Pascals)
X Unit: Fuel Level (percent) from 0 to 100 with step size 6.25
Y Units: Estimated Ambient Temperature (deg C) from -10 to 80 with step size 5.625

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1
2	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1
3	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1
4	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1
5	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1
6	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1
7	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1
8	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1
9	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1
10	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1
11	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1
12	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1
13	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1
14	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1
15	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1
16	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1
17	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1	-274.1

Init	tial Sup	porting	table - I	P0496 P	urge Va	lve Lea	k Test E	ngine \	/acuum	Test Ti	me (Col	d Start)	as a Fi	unction	of Fuel	Level	
Descript	vescription: Purge valve leak test engine vacuum test time as a function of fuel level																
Value Ur X Unit: F	/alue Units: Purge Valve Leak Test Engine Vacuum Test Time (seconds) ( Unit: Fuel Level (percent)																
y/x	/x 0 6 12 19 25 31 37 44 50 56 62 69 75 81 87 94 100																
1	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68

### Initial Supporting table - P0068\_Delta MAF Threshold f(TPS)

Description: Table of delta MAF values as a function of desired throttle position. The output of this table provides a delta MAF that if the measured minus the estimated MAF exceeds, is considered a fail.

### Value Units: Delta MAF Values (dm) X Unit: Desired Throttle Position (Pct)

y/x	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	100.00
1.00	17.39	17.59	7.45	20.97	29.16	39.48	255.00	255.00	255.00

### Initial Supporting table - P0068\_Delta MAP Threshold f(TPS)

**Description:** Table of delta MAP values as a function of desired throttle position. The output of this table provides a delta MAP that if the measured minus the estimated MAP exceeds, is considered a fail.

Value Units: Delta MAP Values (kPa) X Unit: Desired Throttle Position (Pct)

y/x	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	100.00
1.00	36.30	35.81	21.48	20.55	22.08	22.45	255.00	255.00	255.00

### Initial Supporting table - P0068\_Maximum MAF f(RPM)

Description: Table of maximum MAF values vs. engine speed. This is the maximum MAF the engine can see under all ambient conditions.

Value Units: Delta MAF Values (dm) X Unit: Engine Speed (RPM)

y/x	600.00	1,400.00	2,200.00	3,000.00	3,800.00	4,600.00	5,400.00	6,200.00	7,000.00
1.00	20.00	50.00	80.00	115.00	150.00	176.00	194.00	203.00	210.00

### Initial Supporting table - P0068\_Maximum MAF f(Volts)

Description: Table of maximum MAF values vs. system voltage. The output of the air meter is clamped to lower values as system voltage drops off.

### Value Units: Delta MAF Values (dm) X Unit: System Voltage (V)

y/x	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00
1.00	0.00	20.00	60.00	150.00	250.00	300.00	300.00	300.00	300.00

	Initial Supporting table - P0326_P0331_AbnormalNoise_Thresh_AFM																
Descript	Description: Fail threshold for the Knock Performance Abnormal Noise Diagnostic when engine IS in AFM mode																
y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.683	0.683	0.683	0.630	0.450	0.300	0.250	0.200	0.200	0.200	0.200	0.200	0.200	0.203	0.200	0.200	0.200

### Initial Supporting table - P0606\_Last Seed Timeout f(Loop Time)

**Description:** The max time for the Last Seed Timeout as a function of operating loop time sequence.

500.000

Value Units: Max Time for Last Seed Timeout (ms) X Unit: Operating Loop Sequence (enum)

### P0606\_Last Seed Timeout f(Loop Time) - Part 1

500.000

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSe	CePISR_e_10msSeq	CePISR_e_12p5msSe	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq					
		q		q								
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000					
P0606_Last Seed Timeout f(Loop Time) - Part 2												
y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_S	CePISR_e_EventB_S	CePISR_e_EventC_S						
				ea	ea	ea						

8,191.875

8,191.875

8,191.875

1,000.000

## Initial Supporting table - P0606\_PSW Sequence Fail f(Loop Time)

**Description:** Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count) X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1													
y/x	CePISR_e_5msSeq	CePISR_e_6p25msSe	CePISR_e_10msSeq	CePISR_e_12p5msSe	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq						
		q		q									
1	5	3	5	3	5	3	5						
P0606_PSW Sequence	P0606_PSW Sequence Fail f(Loop Time) - Part 2												
y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_S	CePISR_e_EventB_S	CePISR_e_EventC_S							
				eq	eq	eq							
1	3	5	5	3	5	5							

## Initial Supporting table - P0606 PSW Sequence Sample f(Loop Time)

**Description:** Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count) X Unit: Operating Loop (enum)

4

### P0606\_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSe q	CePISR_e_10msSeq	CePISR_e_12p5msSe q	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq					
1	4	4	4	4	4	4	4					
P0606_PSW Sequence Sample f(Loop Time) - Part 2												
y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_S	CePISR_e_EventB_S	CePISR_e_EventC_S						
				eq	eq	eq						

4

4

4

4

# Initial Supporting table - P1682 PT Relay Pull-in Run/Crank Voltage f(IAT)

**Description:** The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.

Value Units: Run/Crank Voltages required to pull in PT Relay (V) X Unit: Induction Air Temperature (deg C)

y/x	23.0	85.0	95.0	105.0	125.0
1	7.000	8.699	9.000	9.199	10.000

### Initial Supporting table - P060C\_Delta MAP Threshold f(Desired Engine Torque)

Description: Engine Sync based and Time based delta pressure threshold above which Torque Security error is reported.

Value Units: Torque Security Threshold for Engine Sync and Time Based Delta Pressure (kPa) X Unit: Desired Engine Torque (Nm)

y/x	0.00	50.00	100.00	150.00	200.00	300.00
1.00	20.55	20.55	20.55	20.55	20.55	20.55

### Initial Supporting table - P060C\_Speed Control External Load f(Oil Temp, RPM)

**Description:** Specifies the external load table for SPDR torque security as a function of engine oil temperature and engine RPM.

Value Units: External Load Table for SPDR (Nm) X Unit: Engine Oil Temperature (deg C) Y Units: Engine Speed (RPM)

y/x	-40.00	-20.00	-10.00	0.00	50.00	90.00
350.00	295.25	295.25	295.25	295.25	295.25	268.67
450.00	295.25	295.25	295.25	295.25	295.25	198.23
550.00	295.25	295.25	295.25	295.25	237.73	146.26
600.00	295.25	295.25	295.25	295.25	215.57	127.55
700.00	295.25	267.61	265.19	261.50	173.11	98.63
800.00	295.25	236.41	227.35	223.13	146.34	82.59
900.00	273.80	206.05	196.24	192.15	123.90	85.16
1,000.00	250.20	185.31	175.25	169.40	105.66	90.14
1,100.00	229.77	176.56	174.28	174.97	110.38	95.12
1,200.00	211.16	183.89	181.61	180.54	115.11	100.10
1,300.00	218.20	189.20	185.08	183.42	117.13	102.10
1,400.00	221.84	190.57	178.56	170.29	111.15	100.11
2,000.00	119.16	91.89	68.60	61.09	77.46	73.19
2,500.00	-42.39	-42.39	-42.39	-42.39	-42.39	-42.39
3,000.00	-46.63	-46.63	-46.63	-46.63	-46.63	-46.63
4,000.00	-50.87	-50.87	-50.87	-50.87	-50.87	-50.87
6,000.00	-55.11	-55.11	-55.11	-55.11	-55.11	-55.11

	nitial Supporting table - Mi	nimum Non-Purge Sample	s for Purge Vapor Fuel									
Description: Number of Fuel Trim M	onitor sample counts required to allow	the Purge Vapor Fuel value to inhibit	the Intrusive Rich test									
<b>/alue Units:</b> Sample Counts per loop rate of 100ms (divide by 10 to get seconds) <b>X Unit:</b> Long Term Fuel Trim Cell I.D. (no units) (Only PurgeOff cells are used)												
Minimum Non-Purge Samples for Purge Vapor Fuel - Part 1												
y/x	CeFADR_e_CellOO_PurgOnAirMode 5	CeFADR_e_Cell01_PurgOnAirMode 4	CeFADR_e_Cell02_PurgOnAirMode 3	CeFADR_e_Cell03_PurgOnAirMode 2								
1	65,535	65,535	65,535	65,535								
Minimum Non-Purge Samples for F	Purge Vapor Fuel - Part 2											
y/x	CeFADR_e_Cell04_PurgOnAirMode 1	CeFADR_e_Cell05_PurgOnAirMode 0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel								
1	65,535	65,535	65,535	65,535								
Minimum Non-Purge Samples for F	Purge Vapor Fuel - Part 3											
y/x	CeFADR_e_Cell08_PurgOffAirMode 5	CeFADR_e_Cell09_PurgOffAirMode 4	CeFADR_e_Cell 10_PurgOffAirMode 3	CeFADR_e_Cell11_PurgOffAirMode 2								
1	150	65,535	65,535	65,535								
Minimum Non-Purge Samples for F	Purge Vapor Fuel - Part 4											
y/x	CeFADR_e_Cell 12_PurgOffAirMode 1	CeFADR_e_Cell13_PurgOffAirMode 0	CeFADR_e_Cell14_PurgOffldle	CeFADR_e_Cell1 5_PurgOffDecel								
1	65,535	65,535	150	150								

# Initial Supporting table - P0171\_P0172\_P0174\_P0175 Long-Term Fuel Trim Cell Usage

Description: Identifies which Long T	erm Fuel Trim Cell I.D.s are used for d	iagnosis. Only cells identified as "CeF	ADD_e_NonSelectedCeH" are not use	d for diagnosis.								
 P0171_P0172_P0174_P0175 Long-	Term Fuel Trim Cell Usage - Part 1											
y/x	CeFADR_e_CellOO_PurgOnAirMode 5	CeFADR_e_Cell01_PurgOnAirMode 4	CeFADR e Cell02 PurgOnAirMode 3	CeFADR_e_Cell03_PurgOnAirMode 2								
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_8electedPurgeCell	CeFADD_e_SelectedPurgeCell								
P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 2												
y/x	CeFADR_e_Cell04_PurgOnAirMode 1	CeFADR e Cell05 PurgOnAirMode 0	CeFADR_e_Cell06_PurgOnldle	CeFADR_e_Cell07_PurgOnDecel								
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_NonSelectedCell								
P0171_P0172_P0174_P0175 Long-	Term Fuel Trim Cell Usage - Part 3											
y/x	CeFADR_e_Cell08_PurgOffAirMode 5	CeFADR_e_Cell09_PurgOffAirMode 4	CeFADR e Cell10 PurgOffAirMode 3	CeFADR_e_Cell11_PurgOffAirMode 2								
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell								
P0171_P0172_P0174_P0175 Long-	Term Fuel Trim Cell Usage - Part 4											
y/x	CeFADR_e_Cell12_PurgOffAirMode 1	CeFADR e Cell13 PurgOffAirMode 0	CeFADR_e_Cell14_PurgOffldle	CeFADR_e_Cell15_PurgOffDecel								
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_NonSelectedCell								

### Initial Supporting table - P219A EWMA Coefficient

**Description:** The bank 1 EWMA coefficient used to filter the AFIM Variance Ratio.

Value Units: Unitless Scalar

X Unit: Unitless Scalar

y/x	-1.00	-0.50	0.00	0.50	1.00
1	0.01	0.03	0.07	0.10	0.15

## Initial Supporting table - P219A Normalizer Bankl Table

**Description:** Bank 1 Normalizer table used in the calculation of the Ratio for the current sample period.

Value Units: Unitless Scalar

y/x	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000
40	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
80	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
120	9,999.00	9,999.00	9,999.00	34.00	34.00	34.00	9,999.00	9,999.00	9,999.00	21.25	21.25	25.00	40.50	40.50	9,999.00	9,999.00	9,999.00
160	77.50	77.50	73.00	64.50	34.00	45.25	45.00	52.75	47.50	31.75	21.25	25.00	40.50	40.50	9,999.00	9,999.00	9,999.00
200	77.50	77.50	73.00	95.00	71.25	56.50	45.00	52.75	47.50	42.25	49.50	61.50	48.00	48.00	9,999.00	9,999.00	9,999.00
240	71.00	71.00	91.50	111.00	107.50	113.25	89.00	70.25	70.25	86.75	85.25	112.00	84.50	84.50	9,999.00	9,999.00	9,999.00
280	102.50	102.50	109.00	100.00	144.50	164.00	140.25	106.50	155.00	133.00	120.25	93.25	123.00	123.00	9,999.00	9,999.00	9,999.00
320	142.50	142.50	131.75	159.25	175.50	206.25	159.00	109.00	176.75	108.00	169.00	105.00	115.00	115.00	9,999.00	9,999.00	9,999.00
360	223.00	223.00	176.50	196.00	213.75	200.50	141.50	151.00	182.00	194.00	162.00	113.75	101.50	95.50	9,999.00	9,999.00	9,999.00
400	215.00	215.00	197.25	234.50	179.00	208.00	201.00	189.25	208.75	148.00	143.25	111.00	76.00	76.00	9,999.00	9,999.00	9,999.00
440	219.00	219.00	221.00	230.50	226.25	205.50	215.75	201.25	209.25	151.25	89.25	88.75	78.75	78.75	9,999.00	9,999.00	9,999.00
480	219.00	219.00	221.00	229.75	229.25	230.75	240.75	237.75	149.00	86.00	67.50	98.50	82.00	82.00	9,999.00	9,999.00	9,999.00
520	9,999.00	9,999.00	9,999.00	229.25	229.25	230.75	240.75	237.75	149.00	86.00	67.50	98.50	82.00	82.00	9,999.00	9,999.00	9,999.00
560	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
600	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
640	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
680	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00

### Initial Supporting table - P219A Quality Factor Bankl Table

Description: Bank 1 lookup table of Quality Factors used in the calculation of the Ratio for the current sample period

Value Units: Unitless Scalar

y/x	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
200	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
240	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
280	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
320	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
360	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
400	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
440	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
480	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
560	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
600	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
640	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
680	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

### Initial Supporting table - P219A Variance Threshold Bankl Table

Description: Bank 1 lookup table of Variance metric used to calculate the Ratio for the current sample period

Value Units: Unitless ratio

y/x	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000
40	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
80	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
120	9,999.00	9,999.00	9,999.00	24.75	24.75	24.75	9,999.00	9,999.00	9,999.00	21.00	21.00	24.00	27.25	27.25	9,999.00	9,999.00	9,999.00
160	40.00	40.00	56.00	37.75	24.75	37.25	53.50	43.50	47.00	35.75	21.00	24.00	27.25	27.25	9,999.00	9,999.00	9,999.00
200	40.00	40.00	56.00	50.75	46.25	49.50	53.50	43.50	47.00	50.50	49.00	43.25	47.25	47.25	9,999.00	9,999.00	9,999.00
240	94.00	94.00	94.50	77.00	77.50	66.00	70.50	80.25	80.25	69.75	75.50	58.00	58.00	58.00	9,999.00	9,999.00	9,999.00
280	127.00	127.00	146.00	130.00	92.00	79.50	88.50	95.75	79.00	83.25	88.50	109.75	73.00	73.00	9,999.00	9,999.00	9,999.00
320	138.50	138.50	155.25	112.50	102.00	77.25	86.25	118.50	74.50	140.00	85.00	112.50	63.50	63.50	9,999.00	9,999.00	9,999.00
360	110.25	110.25	128.75	100.75	82.75	75.50	114.00	101.75	79.00	73.25	56.00	77.00	73.00	71.00	9,999.00	9,999.00	9,999.00
400	133.00	133.00	107.50	79.25	116.00	65.00	60.75	72.50	59.50	80.50	50.00	68.50	78.50	78.50	9,999.00	9,999.00	9,999.00
440	114.00	114.00	78.00	76.00	77.50	70.50	63.50	76.50	69.25	57.25	64.00	63.50	71.50	71.50	9,999.00	9,999.00	9,999.00
480	114.00	114.00	78.00	76.75	77.75	65.00	54.75	47.75	45.00	60.50	79.75	55.00	67.75	67.75	9,999.00	9,999.00	9,999.00
520	9,999.00	9,999.00	9,999.00	77.75	77.75	65.00	54.75	47.75	45.00	60.50	79.75	55.00	67.75	67.75	9,999.00	9,999.00	9,999.00
560	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
600	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
640	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
680	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00

# Initial Supporting table - P219B EWMA Coefficient

**Description:** The bank 2 EWMA coefficient used to filter the AFIM Variance Ratio.

Value Units: Unitless Scalar

X Unit: Unitless Scalar

v/x	-1.00	-0.50	0.00	0.50	1.00
1.0	0.01	0.03	0.07	0.10	0.15

### Initial Supporting table - P219B Normalizer Bank2 Table

Description: Bank 2 Normalizer table used in the calculation of the Ratio for the current sample period.

Value Units: Unitless Scalar

y/x	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000
40	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
80	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
120	9,999.00	9,999.00	74.25	74.25	66.00	66.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
160	71.00	71.00	74.25	74.25	66.00	79.25	82.00	74.00	92.00	76.75	61.25	81.25	81.25	9,999.00	9,999.00	9,999.00	9,999.00
200	71.00	71.00	122.75	114.25	109.00	92.25	82.00	74.00	92.00	99.00	61.25	81.25	120.50	160.00	9,999.00	9,999.00	9,999.00
240	210.50	210.50	174.50	154.00	168.75	112.75	59.25	128.00	122.00	143.25	94.75	122.00	160.00	160.00	9,999.00	9,999.00	9,999.00
280	210.50	179.75	149.00	136.00	118.50	151.50	107.25	121.00	122.75	135.25	82.75	111.50	119.75	119.75	9,999.00	9,999.00	9,999.00
320	9,999.00	149.00	149.00	112.25	92.50	156.00	147.75	158.50	113.00	143.00	106.00	115.00	71.25	71.25	9,999.00	9,999.00	9,999.00
360	110.50	110.50	109.25	107.75	117.75	152.50	145.00	134.50	99.00	101.00	83.50	102.00	75.25	75.25	9,999.00	9,999.00	9,999.00
400	110.50	110.50	110.50	108.75	122.75	122.75	102.75	82.50	90.00	86.00	80.00	70.50	73.00	75.25	9,999.00	9,999.00	9,999.00
440	112.25	112.25	110.25	108.00	117.25	126.50	126.50	85.50	64.75	75.25	78.25	70.50	70.50	9,999.00	9,999.00	9,999.00	9,999.00
480	112.25	112.25	110.25	108.00	104.25	104.25	106.75	109.00	86.75	64.75	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
520	9,999.00	9,999.00	9,999.00	9,999.00	104.25	104.25	106.75	109.00	109.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
560	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
600	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
640	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
680	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00

### Initial Supporting table - P219B Quality Factor Bank2 Table

Description: Bank 2 lookup table of Quality Factors used in the calculation of the Ratio for the current sample period

Value Units: Unitless Scalar

y/x	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
200	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
240	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
280	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
320	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
360	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
400	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
440	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
480	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
560	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
600	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
640	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
680	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

### Initial Supporting table - P219B Variance Threshold Bank2 Table

Description: Bank 2 lookup table of Variance metric used to calculate the Ratio for the current sample period

Value Units: Unitless ratio

y/x	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000
40	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
80	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
120	9,999.00	9,999.00	30.00	30.00	45.25	45.25	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
160	78.50	78.50	30.00	30.00	45.25	68.50	81.75	99.50	63.50	65.00	66.50	50.25	50.25	9,999.00	9,999.00	9,999.00	9,999.00
200	78.50	78.50	99.50	80.00	74.50	92.00	81.75	99.50	63.50	69.75	66.50	50.25	64.25	78.00	9,999.00	9,999.00	9,999.00
240	76.25	76.25	120.50	129.75	86.50	119.00	83.00	76.50	83.00	79.25	77.25	66.75	78.00	78.00	9,999.00	9,999.00	9,999.00
280	76.25	97.75	119.25	119.00	117.50	93.50	66.25	100.00	101.75	88.00	109.25	67.50	78.50	78.50	9,999.00	9,999.00	9,999.00
320	9,999.00	119.25	119.25	149.00	148.25	113.25	102.00	97.00	135.75	103.00	93.50	67.25	101.50	101.50	9,999.00	9,999.00	9,999.00
360	169.00	169.00	186.25	179.50	144.25	105.25	109.25	120.75	109.00	124.25	94.00	78.50	99.50	99.50	9,999.00	9,999.00	9,999.00
400	169.00	169.00	193.00	186.50	154.50	154.50	156.25	158.25	141.00	118.75	108.50	113.00	106.25	99.50	9,999.00	9,999.00	9,999.00
440	202.75	202.75	194.25	187.00	175.25	163.50	163.50	129.50	123.75	121.25	115.75	113.00	113.00	9,999.00	9,999.00	9,999.00	9,999.00
480	202.75	202.75	195.00	187.00	183.00	183.00	144.75	106.50	115.00	123.75	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
520	9,999.00	9,999.00	9,999.00	9,999.00	183.00	183.00	144.75	106.50	106.50	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
560	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
600	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
640	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
680	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00

### Initial Supporting table - Cool Down Diagnostic Min Heat to Coolant

Description: KtECTR\_P\_CDD\_HeatToCoolantMin

Value Units: Power (kW) X Unit: Firing fraction (ratio) Y Units: Ambient Air Temperature (Deg C)

y/x	0.00	0.25	0.50	0.67	1.00
-9.0	15.0	15.0	15.0	15.0	15.0
0.0	15.0	15.0	15.0	15.0	15.0
10.0	30.0	30.0	30.0	30.0	30.0
20.0	30.0	30.0	30.0	30.0	30.0
50.0	30.0	30.0	30.0	30.0	30.0

### Initial Supporting table - P0330\_OpenCktThrshMax2 (20kHz)

**Description:** Max threshold table for the 20 KHz portion of the open circuit diagnostic for sensor 2. The lookup into this table will be filtered to define the max threshold for the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the min cal filters.

						,	,	.,	0,000	0,000	0,000	0,000	.,000	.,000	0,000	0,000
1 8.949	9.000	9.029	9.020	8.988	8.920	8.828	8.699	8.549	8.359	8.148	7.898	7.629	7.318	6.988	6.619	6.229

### Initial Supporting table - P0330\_OpenCktThrshMax2 (NN)

Description: Max threshold table for the Normal Noise for sensor 2. The lookup into this table will be filtered to define the max threshold for the filtered intensity. To fail, the filtered intensity intensity needs to fall between this cal and the min cal filters.

y/x	2,700	2,900	3,000	3,250	3,500	3,750	4,000	4,250	4,500	4,750	5,000	5,500	6,000	6,500	7,000	7,500	8,500
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
# Initial Supporting table - P0330\_OpenCktThrshMin2 (20 kHz)

Descript fail, the fi	ion: Min th Itered inter	reshold ta	ble for the to fall bet	Normal No	bise portior	n of the ope max cal fi	en circuit di Iters.	iagnostic.	The looku	p into this t	able will be	e filtered to	define the	max thresh	old for the	filtered inte	ensity. To
v/v	500	1 000	1 500	2 000	2 500	2 000	2 500	4 000	4 500	5 000	5 500	6 000	6 500	7 000	7 500	0 000	0 500

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	2.689	2.760	2.809	2.840	2.850	2.840	2.809	2.760	2.689	2.600	2.488	2.359	2.209	2.039	1.850	1.639	1.408

## Initial Supporting table - P0330\_OpenCktThrshMin2 (NN)

Descript intensity.	i <b>on:</b> Min th To fail, the	reshold tal	ole for the l tensity nee	Normal No ds to fall b	ise portion etween this	of the ope s cal and th	n circuit dia ne max cal	agnostic fo filters.	r sensor 2.	The looku	ıp into this	table will b	e filtered to	o define the	e max three	shold or the	e filtered
y/x	2,700	2,900	3,000	3,250	3,500	3,750	4,000	4,250	4,500	4,750	5,000	5,500	6,000	6,500	7,000	7,500	8,500
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

#### Initial Supporting table - P0331\_AbnormalLo2

**Description:** The low limit (no Hi limit, left for excessive knock) for sensor 2 for the performance diagnostic, abnormal noise; used for per sensor and per cyl performance diagnostics. The lookup in this table as a function of RPM and APC is then filtered using KeKNKD\_k\_PerfAbnFilter (KeKNKD\_k\_PerfCylAbnFilter for per cyl), and then this filtered quantity VaKNKD\_k\_PerfAbnFiltILimitLo (VaKNKD\_k\_PerfCylAbnFiltILimitLo for per cyl) becomes the actual limit. The code will immediately set if the filtered intensity goes below the filtered threshold

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.060	0.060	0.060	0.060	0.060	0.069	0.149	0.239	0.340	0.449	0.569	0.699	0.840	0.840	0.840	0.840	0.840

#### Initial Supporting table - P0331\_AbnormalLoAFM\_2

**Description:** The low limit for AFM mode (no Hi limit, left for excessive knock) for sensor 2 for the performance diagnostic, abnormal noise; used for per sensor and per cyl performance diagnostics. The lookup in this table as a function of RPM and APC is then filtered using KeKNKD\_k\_PerfAbnFilter (KeKNKD\_k\_PerfCylAbnFilter for per cyl), and then this filtered quantity VaKNKD\_k\_PerfAbnFiltILimitLo (VaKNKD\_k\_PerfCylAbnFiltILimitLo for per cyl) becomes the actual limit. The code will immediately set if the filtered intensity goes below the filtered threshold

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.060	0.060	0.060	0.060	0.060	0.069	0.149	0.239	0.340	0.449	0.569	0.699	0.840	0.840	0.840	0.840	0.840

## Initial Supporting table - P06B7\_OpenTestCktMax2

Descript fail, the fi	ion: Max th Itered inter	nreshold ta sity needs	ble for the to fall bety	20 KHz fo ween this c	r the test ci al and the	ircuit diagn min cal filte	ostic for se ers.	ensor 2. Th	ne lookup i	nto this tab	le will be fi	Itered to de	efine the m	ax thresho	ld for the fi	Itered inter	isity. To
y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.049	0.100	0.119	0.180	0.299	0.398	0.510	0.520	0.529	0.750	1.100	1.398	1.600	1.799	2.000	2.199	2.398

# Initial Supporting table - P06B7\_OpenTestCktMin2

Descript fail, the fi	ion: Min th Itered inter	reshold tab sity needs	ble for the to fall betw	20 KHz for ween this c	the test ciral and the	rcuit diagno max cal filt	ostic for sei ers.	nsor 2. Th	e lookup ir	nto this tabl	e will be fil	tered to de	fine the ma	ax threshol	d for the fil	tered inten	sity. To
y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.000	0.000	0.000	0.020	0.020	0.049	0.078	0.119	0.129	0.158	0.180	0.199	0.219	0.260	0.299	0.318	0.340

## Initial Supporting table - F 2635 Max Fuel Flow

**Description:** P2635 Maximum Fuel Flow Disable Criteria Maximum allowed fuel flow values above which the diagnostic is disabled

Value Units: grams / second X Unit: kilopascals [commanded fuel pressure] Y Units: volts [device supply]

y/x	200	250	300	350	400	450	500	550	600	
5	512	512	512	512	512	512	512	512	512	
6	512	512	512	512	512	512	512	512	512	
8	512	512	512	512	512	512	512	512	512	
9	512	512	512	512	512	512	512	512	512	
11	512	512	512	512	512	512	512	512	512	
12	512	512	512	512	512	512	512	512	512	
14	512	512	512	512	512	512	512	512	512	
15	512	512	512	512	512	512	512	512	512	
17	512	512	512	512	512	512	512	512	512	
18	512	512	512	512	512	512	512	512	512	
20	512	512	512	512	512	512	512	512	512	
21	512	512	512	512	512	512	512	512	512	
23	512	512	512	512	512	512	512	512	512	
24	512	512	512	512	512	512	512	512	512	
26	512	512	512	512	512	512	512	512	512	
27	512	512	512	512	512	512	512	512	512	
29	512	512	512	512	512	512	512	512	512	

# Initial Supporting table - P2635 Threshold High

Description: P2635 Filtered Fuel Pressure Error High Threshold [under-performing pump] Instantaneously calculated filtered fuel pressure error

Value Units: kilopascals X Unit: kilopascals [commanded fuel pressure] Y Units: grams / sec [fuel flow]

y/x	200	250	300	350	400	450	500	550	600
0	30	38	45	53	60	68	75	83	90
2	30	38	45	53	60	68	75	83	90
3	30	38	45	53	60	68	75	83	90
5	30	38	45	53	60	68	75	83	90
6	30	38	45	53	60	68	75	83	90
8	30	38	45	53	60	68	75	83	90
9	30	38	45	53	60	68	75	83	90
11	30	38	45	53	60	68	75	83	90
12	30	38	45	53	60	68	75	83	90
14	30	38	45	53	60	68	75	83	90
15	30	38	45	53	60	68	75	83	90
17	30	38	45	53	60	68	75	83	90
18	30	38	45	53	60	68	75	83	90
20	30	38	45	53	60	68	75	83	90
21	30	38	45	53	60	68	75	83	90
23	30	38	45	53	60	68	75	83	90
24	30	38	45	53	60	68	75	83	90
26	30	38	45	53	60	68	75	83	90
27	30	38	45	53	60	68	75	83	90
29	30	38	45	53	60	68	75	83	90
30	30	38	45	53	60	68	75	83	90
32	30	38	45	53	60	68	75	83	90
33	30	38	45	53	60	68	75	83	90
35	30	38	45	53	60	68	75	83	90
36	30	38	45	53	60	68	75	83	90
38	30	38	45	53	60	68	75	83	90
39	30	38	45	53	60	68	75	83	90
41	30	38	45	53	60	68	75	83	90
42	30	38	45	53	60	68	75	83	90
44	30	38	45	53	60	68	75	83	90
45	30	38	45	53	60	68	75	83	90

			Initial Suppo	rting table - P	2635 Thresho	old High			
47	30	38	45	53	60	68	75	83	90
48	30	38	45	53	60	68	75	83	90

#### Initial Supporting table - P2635 Threshold Low

#### Description: P2635 Filtered Pressure Error Low Threshold [over-performing pump] Instantaneously calculated filtered fuel pressure error

Value Units: kilopascals X Unit: kilopascals [commanded fuel pressure] Y Units: grams / second [fuel flow]

y/x	200	250	300	350	400	450	500	550	600
0	-490	-440	-390	-340	-290	-240	-190	-140	-90
2	-490	-440	-390	-340	-290	-240	-190	-140	-90
3	-490	-440	-390	-340	-290	-240	-190	-140	-90
5	-490	-440	-390	-340	-290	-240	-190	-140	-90
6	-490	-440	-390	-340	-290	-240	-190	-140	-90
8	-490	-440	-390	-340	-290	-240	-190	-140	-90
9	-490	-440	-390	-340	-290	-240	-190	-140	-90
11	-490	-440	-390	-340	-290	-240	-190	-140	-90
12	-490	-440	-390	-340	-290	-240	-190	-140	-90
14	-490	-440	-390	-340	-290	-240	-190	-140	-90
15	-490	-440	-390	-340	-290	-240	-190	-140	-90
17	-490	-440	-390	-340	-290	-240	-190	-140	-90
18	-490	-440	-390	-340	-290	-240	-190	-140	-90
20	-490	-440	-390	-340	-290	-240	-190	-140	-90
21	-490	-440	-390	-340	-290	-240	-190	-140	-90
23	-490	-440	-390	-340	-290	-240	-190	-140	-90
24	-490	-440	-390	-340	-290	-240	-190	-140	-90
26	-490	-440	-390	-340	-290	-240	-190	-140	-90
27	-490	-440	-390	-340	-290	-240	-190	-140	-90
29	-490	-440	-390	-340	-290	-240	-190	-140	-90
30	-490	-440	-390	-340	-290	-240	-190	-140	-90
32	-490	-440	-390	-340	-290	-240	-190	-140	-90
33	-490	-440	-390	-340	-290	-240	-190	-140	-90
35	-490	-440	-390	-340	-290	-240	-190	-140	-90
36	-490	-440	-390	-340	-290	-240	-190	-140	-90
38	-490	-440	-390	-340	-290	-240	-190	-140	-90
39	-490	-440	-390	-340	-290	-240	-190	-140	-90
41	-490	-440	-390	-340	-290	-240	-190	-140	-90
42	-490	-440	-390	-340	-290	-240	-190	-140	-90
44	-490	-440	-390	-340	-290	-240	-190	-140	-90
45	-490	-440	-390	-340	-290	-240	-190	-140	-90
									,

#### 24OBDG03B Part 2 ECM Initial Supporting Tables

			Initial Support	ting table - P	≥2635 Thresho	old Low			
47	-490	-440	-390	-340	-290	-240	-190	-140	-90
48	-490	-440	-390	-340	-290	-240	-190	-140	-90

## Initial Supporting table - P0191 - High fail limit of fuel control due to high pressure sensor skewed High

Description: High fail limit of fuel control due to high pressure sensor skewed High error as Function of desired pressure

#### Value Units: Ratio

X Unit: Desired Pressure (Mpa)

y/x	0.00	3.00	4.00	15.00	20.00	25.00	27.50	32.00	36.00
1.00	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.09	1.05

## Initial Supporting table - P0191 - Low fail limit of fuel control due to pressure sensor skewed low

Description: Low fail limit of fuel control due to pressure sensor skewed low error as Function of desired pressure

#### Value Units: Ratio

X Unit: Desired Pressure (Mpa)

y/x	0.00	3.00	4.00	15.00	20.00	25.00	27.50	32.00	36.00
1.00	0.75	0.75	0.75	0.75	0.79	0.82	0.86	0.92	0.95

#### Initial Supporting table - P228C P2C1F - High Pressure Pump Control (HPC) fail threshold of pressure too low **Description:** The High Pressure Pump Control (HPC) fail threshold of pressure too low test as a function of desired fuel pressure. Value Units: Pressure Error - Desired pressure - Actual Pressure (Mpa) X Unit: Desired Pressure (Mpa) y/x

### Initial Supporting table - P228D P2C20 - High Pressure Pump Control (HPC) fail threshold for pressure too high

Description: The High Pressure Pump Control (HPC) fail threshold for pressure too high test as a function of desired fuel pressure.

Value Units: Pressure Error - Desired pressure - Actual Pressure (Mpa) X Unit: Desired Pressure (Mpa)

y/x	0.00	3.00	4.00	15.00	20.00	25.00	27.50	32.00	36.00
1	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00

#### P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F - kaFULO\_n\_RP

Description: Max Engine Speed to allow Multipulse function of injector energy profile

Value Units: Max Engine Speed to allow Multipulse X Unit: Injector Energy Profile Y Units: Multipulse Mode (0 = Double Pulse, 1 = Triple Pulse)

y/x	0	1	2	3
0	3,600	3,600	3,600	3,600
1	3,000	3,000	3,000	3,000

	Initial Supporting table - P057B KtBRKI K CmpltTestPointWeight												
Description:	Description:												
y/x	y/x 0.000 0.010 0.015 0.030 0.040 0.050 0.075 0.100 1.000												
1	0 0 0 1 1 1 1 1 1												

# Initial Supporting table - P057B KtBRKI K FastTestPointWeight

Description:											
y/x	0.000	0.015	0.030	0.040	0.050	0.075	0.200	0.500	1.000		
1	0	0	0	1	1	1	1	1	1		

Initial Supporting table - DFCO CoolEnblHi Temp										
Description:										
y/x	-40	0	20							
1	25.0	30.0	60.0							

# Initial Supporting table - DFCODelayAfterStartTime

Description:									
y/x	-30	-10	20	60	90				
1	20.0	15.0	10.0	8.0	5.0				

# Initial Supporting table - DFCO\_DsblLo\_Vehicle\_Speed

Description:		
y/x	CeTCOR_e_NonEcoMode	CeTCOR_e_EcoMode
CeTGRR_e_TransGr1	512	512
CeTGRR_e_TransGr2	26	26
CeTGRR_e_TransGr3	33	33
CeTGRR_e_TransGr4	36	36
CeTGRR_e_TransGr5	38	38
CeTGRR_e_TransGr6	0	0
CeTGRR_e_TransGr9	0	0
CeTGRR_e_TransGr10	0	0
CeTGRR_e_TransGrNeut	0	0
CeTGRR_e_TransGrRvrs	512	512
CeTGRR_e_TransGrPark	0	0
CeTGRR_e_TransGr7	0	0
CeTGRR_e_TransGr8	0	0

# Initial Supporting table - DFCO EnblHi Vehicle Speed

Description:		
y/x	CeTCOR_e_NonEcoMode	CeTCOR_e_EcoMode
CeTGRR_e_TransGr1	512.0	512.0
CeTGRR_e_TransGr2	30.0	30.0
CeTGRR_e_TransGr3	37.0	37.0
CeTGRR_e_TransGr4	40.0	40.0
CeTGRR_e_TransGr5	40.0	40.0
CeTGRR_e_TransGr6	44.0	44.0
CeTGRR_e_TransGr9	0.0	0.0
CeTGRR_e_TransGr10	0.0	0.0
CeTGRR_e_TransGrNeut	0.0	0.0
CeTGRR_e_TransGrRvrs	512.0	512.0
CeTGRR_e_TransGrPark	0.0	0.0
CeTGRR_e_TransGr7	0.0	0.0
CeTGRR_e_TransGr8	0.0	0.0

	Initial Supporting table - DFCO EngSpdEnblOfst											
Description:												
y/x	-1,750	-1,500	-1,250	-1,000	-750	-500	-300	-100	0			
1	500	500	500	50	0	0	0	0	0			

	Initial Supporting table - P0324_PerCyI_ExcessiveKnock_Threshold																
Description: Fail threshold for the Knock Performance per-cylinder Excessive Knock Diagnostic																	
y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	3.00 3.00 3.00 3.00 3.00 3.00 3.00 3.00													3.50			

				Initial	Suppor	ting tab	le - P03	25_P03	30_Ope	nCktTh	rshMax	(20 kHz	<u>z)</u>				
Descripti	Description: Knock Open Circuit Diagnostic Maximum Threshold when using the 20 kHz method (see "OpenMethod" description)																
y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	2.8008	2.8281	2.8242	2.8203	2.8242	2.8281	2.8242	2.8242	2.8262	2.5605	2.5605	2.5605	2.5605	2.5605	2.5605	2.5605	2.5605

#### Initial Supporting table - P0325\_P0330\_OpenCktThrshMax (Normal Noise)

Description: Knock Open Circuit Diagnostic Minimum Threshold when using the Normal Noise method (see "OpenMethod" description): When using the Normal Noise method (see "OpenMethod" description).

y/x	2,700	2,900	3,000	3,250	3,500	3,750	4,000	4,250	4,500	4,750	5,000	5,500	6,000	6,500	7,000	7,500	8,500
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

				Initial	Suppor	ting tab	ole - P03	25_P03	30_Ope	enCktTh	rshMin	(20 kHz	z)				
Descript	escription: Knock Open Circuit Diagnostic Minimum Threshold when using the 20 kHz method (see "OpenMethod" description)																
y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.8691	0.8691	0.9375	0.8691	0.8809	0.8594	0.8711	0.8535	0.8496	0.9258	0.9258	0.9258	0.9258	0.9258	0.9258	0.9258	0.9258

#### Initial Supporting table - P0325\_P0330\_OpenCktThrshMin (Normal Noise)

Description: Knock Open Circuit Diagnostic Minimum Threshold when using the Normal Noise method (see "OpenMethod" description): When using the Normal Noise method (see "OpenMethod" description).

y/x	2,700	2,900	3,000	3,250	3,500	3,750	4,000	4,250	4,500	4,750	5,000	5,500	6,000	6,500	7,000	7,500	8,500
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

#### Initial Supporting table - P032!5\_P0330\_OpenMethod\_2

				_	
Description: Defines which K	nock Open Circuit Diagnostic m	ethod to use.			
P0325_P0330_OpenMethod_	2 - Part 1				
y/x	0	1	2	3	4
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz
P0325_P0330_OpenMethod_	2 - Part 2				
y/x	5	6	7	8	9
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz
P0325_P0330_OpenMethod_	2 - Part 3				
y/x	10	11	12	13	14
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz
P0325_P0330_OpenMethod_	2 - Part 4				
y/x	15	16			
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz			

	Initial Supporting table - P0326_P0331_AbnormalNoise_CyIsEnabled													
Description: Specif	ies which cylinders wi	II be used for the Abr	normal Noise portion	of the performance di	agnostics (1 = cylinde	er used, 0 = cylinder r	not used)							
y/x	0	1	2	3	4	5	6	7						
1	1	1	1	1	1	1	0	0						

## Initial Supporting table - P0326\_P0331\_AbnormalNoise\_Threshold

Description: Fail threshold for the Knock Performance Abnormal Noise Diagnostic when engine is NOT in AFM mode

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.683	0.683	0.683	0.630	0.450	0.300	0.250	0.200	0.200	0.200	0.200	0.200	0.200	0.203	0.200	0.200	0.200

# Initial Supporting table - P06B6\_P06B7\_OpenTestCktThrshMax

Descript Circuit er	ion: Knock	c Open Circ the interna	cuit Minimi al circuit us	um Thresho sed to gene	old for Inte erate the 20	rnal Circuit ) kHz signa	Diagnostic al for the O	c. Used on pen Circuit	lly when th diags (P0	e 20 kHz r 325, P033	nethod is t 0) is within	being used range.	(see "Oper	nMethod" c	lescription)	. The Ope	en Test
y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.045	0.043	0.045	0.047	0.049	0.055	0.063	0.066	0.072	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090

# Initial Supporting table - P06B6\_P06B7\_OpenTestCktThrshMin

Descript Circuit en	ion: Knock sures that	COpen Circ the interna	cuit Minimu al circuit us	um Thresho ed to gene	old for Inter erate the 20	rnal Circuit ) kHz signa	Diagnostic Il for the O	. Used on pen Circuit	ly when th diags (P0	e 20 kHz n 325, P033(	nethod is b 0) is within	eing used range.	(see "Oper	nMethod" d	lescription)	. The Ope	en Test
y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.020	0.020	0.020	0.020	0.021	0.023	0.027	0.031	0.031	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041

#### 24OBDG03B Part 2 EPS Summary Tables

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
STEERING WHEEL ANGLE SENSOR	C0051	Monitors steering angle sensor communication protocols. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	CRC and other communication protocal errors.	Fault Detected	\$1F1 (SYSTEMPOWER MODE) \$0C9 (ENGINE RUN ACTIVE) Voltage DIAGNOSTIC ENABLED	= RUIVACC = TRUE = 6V < voltage < 16V = TRUE	Ims	Safety Emissions Neutral Diagnostic - Type C
STEERING WHEEL ANGLE SENSOR	C0051	Monitors steering rack slip. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Slip detected	Steering Angle offset >= 14° Steering Angle Gradient < 2000%	\$1F1 (SYSTEMPOWER MODE) \$0C9 (ENGINE RUN ACTIVE) Voltage DIAGNOSTIC ENABLED	= RUWACC = TRUE = 6V < voltage < 16V = TRUE	1000ms	Safety Emissions Neutral Diagnostic - Type C
STEERING WHEEL ANGLE SENSOR	C0051	Monitors steering angle for value invalidity.Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Invalid steering angle	Steering Angle is invalid for longer than 200ms	\$1F1 (SYSTEMPOWER MODE) \$0C9 (ENGINE RUN ACTIVE) Voltage DIAGNOSTIC ENABLED	= RUN/ACC = TRUE = 6V < voltage < 16V = TRUE	200ms	Safety Emissions Neutral Diagnostic - Type C
STEERING WHEEL ANGLE SENSOR	C0051	Monitors steering angle to check if it's within range.Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Steering angle OOR	-467* > x > 467*	\$1F1 (SYSTEMPOWER MODE) \$0C9 (ENGINE RUN ACTIVE) Voltage DIAGNOSTIC ENABLED	= RUN/ACC = TRUE = 6V < voltage < 16V = TRUE	INSTANT	Safety Emissions Neutral Diagnostic - Type C
STEERING WHEEL ANGLE SENSOR	C0051	Monitors steering angle for value invalidity. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Rolling count, period or gradient cyclic check invalid	Fail 5 times [5mspercheck]	\$1F1 (SYSTEM POWER MODE) \$0C9 (ENGINE RUN ACTIVE) Voltage DIAGNOSTIC ENABLED	= RUN/ACC = TRUE = 6V < voltage < 16V = TRUE	25ms	Safety Emissions Neutral Diagnostic - Type C
STEERING WHEEL ANGLE SENSOR	C0051	Monitors steering angle value for plausibility. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Steering angle range plausibility check	0°>x>2016*	51F1 (SYSTEM POWER MODE) 50C9 (ENGINE RUN ACTIVE) Voltage DIAGNOSTIC ENABLED	= RUN/ACC = TRUE = 6V < voltage < 16V = TRUE	50ms	Safety Emissions Neutral Diagnostic - Type C
STEERING WHEEL ANGLE SENSOR	C0051	Monitors steering angle sensor calibration status. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Invalid Calibration Status	Estimated or Unknown Calibration status	\$1F1 (SYSTEMPOWER MODE) \$0C9 (ENGINE RUN ACTIVE) Voltage MANUFACTURER ENBLCNTR DIAGNOSTIC ENABLED	= RUN/ACC = TRUE = 6V < voltage < 16V = 0 = TRUE	INSTANT	Safety Emissions Neutral Diagnostic - Type C

#### 24OBDG03B Part 2 EPS Summary Tables

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Torque Sensor	C1119	Monitors torque sensor communication. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Interference/corruption of transmmitted data	Fault Detected	DIAGNOSTIC ENABLED Voltage PRODUCTION MODE \$1F1 (SYSTEMPOWER MODE)	= TRUE = 6V < voltage < 18 V = FALSE = 1/2/4	8ms	Safety Emissions Neutral Diagnostic - Type C
Torque Sensor	C1119	Monitors torque sensor for ASIC over/under voltage. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	ASIC over/under voltage.	<6 V >6.32 V	DIAGNOSTIC ENABLED Voltage PRODUCTION MODE	= TRUE = 6V < voltage < 18 V = TRUE	3ms	Safety Emissions Neutral Diagnostic - Type C
Torque Sensor	C1119	Monitors torque sensor for ASIC short circuit. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	ASIC short circuit	Current > 90 mA	DIAGNOSTIC ENABLED Voltage PRODUCTION MODE	= TRUE = 6V < voltage < 18 V = TRUE	8ms	Safety Emissions Neutral Diagnostic - Type C
Torque Sensor	C1119	Monitors torque sensor for ASICover temperature. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	ASIC over temperature	> 175  °C	DIAGNOSTIC ENABLED Voltage PRODUCTION MODE	= TRUE = 6V < voltage < 18 V = TRUE	8ms	Safety Emissions Neutral Diagnostic - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lateral Acceleration Sensor Circuit Low	C124F	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to ground or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	< -3.8500 g > -3.8500 g (< 0.5 Q impedance between signal and controller ground)	battery voltage run crank voltage diagnostic monitor enable sensor type is either directly proportional or inversely proportional U0073 fault active U0073 test fail this key on	<ul> <li>&gt; 11.00 volts</li> <li>&gt; 11.00 volts</li> <li>= 1 Boolean</li> <li>= CeLATR_e_VoltageDirec tProp</li> <li>= FALSE</li> <li>= FALSE</li> </ul>	raw lateral acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissio ns Neutral Diagnost ic-Type C
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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Lateral Acceleration Sensor Circuit High	C1250	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to power or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	<ul> <li>&gt; 3.8500 g</li> <li>&lt; 3.8500 g</li> <li>(&lt; 0.5 Q impedance between signal and controller power)</li> </ul>	battery voltage run crank voltage diagnostic monitor enable sensor type is either directly proportional or inversely proportional U0073 fault active U0073 test fail this key on	<ul> <li>&gt; 11.00 volts</li> <li>&gt; 11.00 volts</li> <li>= 1 Boolean</li> <li>= CeLATR_e_VoltageDirec tProp</li> <li>= FALSE</li> <li>= FALSE</li> </ul>	raw lateral acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissio ns Neutral Diagnost ic-Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lateral Acceleration Sensor Performance	C1251	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a signal value that is stuck in a valid range by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	ABS(raw lateral acceleration signal) AND ABS(raw lateral acceleration signal) update raw lateral acceleration signal fail, 50 millisecond update rate	> 0.5300 g	battery voltage run crank voltage diagnostic monitor enable update raw lateral acceleration signal stablity time: TOSS vehicle speed automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07C0 fault active P07C0 fault active P07C0 test fail this key on attained gear ABS(raw lateral acceleration signal) update sample time U0073 fault active	<ul> <li>&gt; 11.00 volts</li> <li>&gt; 11.00 volts</li> <li>= 1 Boolean</li> <li>&gt; 15.0 KPH</li> <li>= TRUE</li> <li>= TRUE</li> <li>= TRUE</li> <li>= FALSE</li> <li>= Ist thru 10th</li> <li>&lt; 0.5300 g</li> <li>= FALSE</li> <li>= FA</li></ul>	raw lateral acceleration signal stability time > 10.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissio ns Neutral Diagnost ic-Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Longitudinal Acceleration Sensor Circuit Low	C1252	Controller specific analog circuit diagnoses the raw longitudinal acceleration signal for a short to ground or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	raw longitudinal acceleration signal when sensor type is directly proportional OR raw longitudinal acceleration signal when sensor type is inversely proportional update raw longitudinal acceleration signal stability time, fail and sample time, 50 millisecond update rate	< -3.8500 g > -3.8500 g (< 0.5 Q impedance between signal and controller ground)	battery voltage run crank voltage diagnostic monitor enable sensor type is either directly proportional or inversely proportional U0073 fault active U0073 test fail this key on	<ul> <li>&gt; 11.00 volts</li> <li>&gt; 11.00 volts</li> <li>= 1 Boolean</li> <li>= CeLATR_e_VoltageDirec tProp</li> <li>= FALSE</li> <li>= FALSE</li> </ul>	raw longitudinal acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissio ns Neutral Diagnost ic-Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Longitudinal Acceleration Sensor Circuit High	C1253	Controller specific analog circuit diagnoses the raw longitudinal acceleration signal for a short to power or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	raw longitudinal acceleration signal when sensor type is directly proportional OR raw longitudinal acceleration signal when sensor type is inversely proportional update raw longitudinal acceleration signal stability time, fail and sample time, 50 millisecond update rate	<ul> <li>&gt; 3.8500 g</li> <li>&lt; 3.8500 g</li> <li>(&lt; 0.5 Q impedance between signal and controller power)</li> </ul>	battery voltage run crank voltage diagnostic monitor enable sensor type is either directly proportional or inversely proportional U0073 fault active U0073 test fail this key on	<ul> <li>&gt; 11.00 volts</li> <li>&gt; 11.00 volts</li> <li>= 1 Boolean</li> <li>= CeLATR_e_VoltageDirec tProp</li> <li>= FALSE</li> <li>= FALSE</li> </ul>	raw longitudinal acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissio ns Neutral Diagnost ic-Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Longitudinal Acceleration Sensor Performance	C1254	Controller specific analog circuit diagnoses the raw longitudinal acceleration signal rationalized against the TOSS vehicle speed acceleration. The diagnostic monitor can be designed to detect an invalid longitudinal acceleration signal based on the TOSS vehicle speed windows and TOSS vehicle speed acceleration, 4 windows can be enabled. The delta between the TOSS vehicle speed acceleration and longitudinal acceleration signal is taken within each window to verify the delta is small, no failure indicated, or the delta is large indicating the longitudinal acceleration signal is in error. Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal fail time, 50 millisecond update rate update raw longitudinal acceleration signal region 1 fail time, 50 millisecond update rate	> 0.0800 g	battery voltage run crank voltage diagnostic monitor enable region 1 specific enable update raw lateral longitudinal acceleration signal stability time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0717 fault active P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07BF fault active P07C0 test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal) update region 1 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed	<ul> <li>&gt; 11.00 volts</li> <li>&gt; 11.00 volts</li> <li>= 1 Boolean</li> <li>= 1 Boolean</li> <li>&gt; 15.0 KPH</li> <li>&lt; 0.5300 g</li> <li>= TRUE</li> <li>= TRUE</li> <li>= TRUE</li> <li>= FALSE</li> <li>= Satistic for the second seco</li></ul>	raw longitudinal acceleration signal stability time > 10.0 seconds raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate region 1 fail time > 4.0 seconds out of region 1 sample time > 5.0 seconds, 50 millisecond update rate	Emissio ns Neutral Diagnost ic-Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	< 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal fail time, 50 millisecond update rate update raw longitudinal acceleration signal region 2 fail time, 50 millisecond update rate	> 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 2 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0 fault active P07C0 test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal)	<ul> <li>&gt; 11.00 volts</li> <li>&gt; 11.00 volts</li> <li>= 1 Boolean</li> <li>= 0 Boolean</li> <li>&gt; 15.0 KPH</li> <li>&lt; 0.5300 g</li> <li>= TRUE</li> <li>= TRUE</li> <li>= TRUE</li> <li>= FALSE</li> <li>= Satisfies</li> <li>= Satisf</li></ul>	raw lateral longitudinal acceleration signal stability time > 10.0 seconds raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate region 2 fail time > 75.0 seconds out of region 2 sample time > 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					update region 2 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	< 0.70 % > 80.0 Nm > 0.1500 g > 0.0 KPH < 0.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal fail time, 50 millisecond update rate update raw longitudinal acceleration signal region 3 fail time, 50 millisecond update rate	> 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0717 fault active P0717 test fail this key on P07BF fault active P07BF fault active	<ul> <li>&gt; 11.00 volts</li> <li>&gt; 11.00 volts</li> <li>= 1 Boolean</li> <li>= 0 Boolean</li> <li>&gt; 15.0 KPH</li> <li>&lt; 0.5300 g</li> <li>= TRUE</li> <li>= TRUE</li> <li>= FALSE</li> </ul>	raw lateral longitudinal acceleration signal stability time > 10.0 seconds raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate region 3 fail time > 75.0 seconds out of region 3 sample time > 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal)	= FALSE = FALSE = 1st thru 10th > 0.5300 g < 3.8500 g		
					update region 3 sample time: brake pedal position engine torque ABS(TOSS vehicle speed acceleration) TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	< 0.70 % > 80.0 Nm < 0.1000 g > 0.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal fail time, 50 millisecond update rate update raw longitudinal acceleration signal region 4 fail time, 50 millisecond update rate	> 0.1700 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable	<ul> <li>&gt; 11.00 volts</li> <li>&gt; 11.00 volts</li> <li>= 1 Boolean</li> <li>= 1 Boolean</li> <li>&gt; 15.0 KPH</li> <li>&lt; 0.5300 g</li> <li>= TRUE</li> <li>= TRUE</li> </ul>	raw lateral longitudinal acceleration signal stability time > 10.0 seconds raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal) update region 4 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	= FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = Tat thru 10th > 0.5300 g < 3.8500 g < 0.70 % < 50.0 Nm < -0.1700 g > 2.0 KPH < 120.0 KPH < 0.5300 g = FALSE = FALSE = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 4 fail time > 2.0 seconds out of region 4 sample time > 2.5 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System Voltage Performance	P0561	Detects a low performing 12V battery system. This	Run Crank voltage low and high	ABS(Battery voltage - Run Crank voltage) > 3.00	Battery voltage B+ line present = TRUE	1.00	40 failures out of 50 samples	Type A, 1 Trips
		diagnostic reports the DTC when the absolute value of the difference			Battery voltage low and high diag enable = TRUE	1.00	100 ms / sample	
		between the battery voltage and the run/ crank voltage exceeds a calibrated value.			Run Crank voltage	Voltage >5.00 volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Read Only Memory (ROM)	P0601 y	01 This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code.	The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5.00 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	Type A, 1 Trips
			The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	254 failures detected via Error Correcting Code			Diagnostic runs continuously via the flash hardware.	
			The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations.	2 consecutive failures detected or 5 total failures detected.			Diagnostic runs continuously. Will report a detected fault within 200 ms.	
				In all cases, the failure count is cleared when controller shuts down				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
TCM Long Term Memory	P0603	This DTC detects an invalid NVM which includes a Static NVM,	Static NVM region error detected during initialization				Diagnostic runs at controller power up.	Type A, 1 Trips
Reset		ROM in NVM Flash Region, and Perserved NVM during shut down.	Perserved NVM region error detected during initialization				Diagnostic runs at controller power up.	
			Perserved NVM region error detected during shut down.				Diagnostic runs at controller power down.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
TCM RAM Failure P0604	04 Indicates that the TCM has detected a RAM fault. This includes Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, Primary Processor TPU RAM Fault, Primary Processor Update Dual	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	Type A, 1 Trips	
		Store RAM Fault, Primary Processor Write Protected RAM Fault, and Secondary Processor RAM Fault. This diagnostic runs continuously.	Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	3 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.40000 s			When dual store updates occur.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	65,534 counts			Diagnostic runs continuously (background loop)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal TCM Processor	P0606	Indicates that the TCM has detected an	Time new seed not received exceeded			always running	409.594 seconds	Type A, 1 Trips
Fault		integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors.	MAIN processor receives seed in wrong order			always running	18 / 17 counts intermittent. 50 ms/count in the TCM main processor	
			2 fails in a row in the MAIN processor's ALU check		CPU1 calibration enable = CPU2 calibration enable = CPU3 calibration enable = CPU4 calibration enable =	0 BOOLEAN 1 BOOLEAN 0 BOOLEAN 0 BOOLEAN (If 0, this test is disabled)	25 ms	
			2 fails in a row in the MAIN processor's configuration register masks versus known good data		test enabld calibration =	1 BOOLEAN (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow since last powerup reset >=	5.00	test enabld calibration =	1 BOOLEAN (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Voltage deviation >	0.4950	test enabld calibration =	1 BOOLEAN (If 0, this test is disabled)	5 / 10 counts or 0.450 seconds continuous; 50 ms/count in the TCM main processor	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error	3 (results in MIL), 5 (results in MIL and remedial action)	test enabld calibration =	1 BOOLEAN (If 0, this test is disabled)	variable, depends on length of time to access flash with corrupted memory	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			occured since last controller initialization. Counter >=					
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)	test enabld calibration =	1 BOOLEAN (If 0, this test is disabled)	variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM	
			MAIN processor DMA transfer from Flash to RAM has 1 failure		test enabld calibration =	1 BOOLEAN (If 0, this test is disabled)	variable, depends on length of time to write flash to RAM	
			Safety critical software is not executed in proper order.	>= 1 incorrect sequence.		Table, f(Core, Loop Time). See supporting tables: <b>P0606_Program</b> <b>Sequence Watch Enable</b> <b>f(Core, Loop Time)</b> (If 0, this Loop Time test is disabled)	Fail Table, f(Loop Time). See supporting tables: P0606_PSW Sequence Fail f (Loop Time) /	
							Sample Table, f (Loop Time)See supporting tables: P0606_PSW Sequence Sample f(Loop Time)	
							counts	
							50 ms/count in	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							the TOM main processor	
			MAIN processor determines a seed has not changed within a specified time period within the 50ms task.	Previous seed value equals current seed value.	test enabld calibration =	1 BOOLEAN (If 0, this test is disabled)	Table, f(Loop Time). See supporting tables: <b>P0606_Last</b> Seed Timeout f (Loop Time)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal TCM Processor Integrity Performance	P0607	507 Indicates that the TCM has detected an internal processor integrity performance.	Performs the failure diagnostic for the offline and online BIST results.			Test is enabled: 1. (If 0, this test is disabled)	5 counts background task/ count in the TCM main processor	Type A, 1 Trips
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		Test is enabled: 1. (If 0, this test is disabled)	variable, depends on length of time to access flash with corrupted memory	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		Test is enabled: 1. (If 0, this test is disabled)	variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Redundant Memory Performance , P060C = previous model years P16F3	P060C	The diagnostic monitor is a rationalization of command values: command clutch pressures, command gear, and commanded direction. The monitor is broken up into three fault detection routines, command pressure (tie up) fault detection, command gear/shift fault detection, and commanded direction.	For each combination of clutches which can lead to an output lock: Commanded Clutch PCS Pressure OR	> Cmnd Tie Up Monitor Output Lock Thresh * Clutch PCS Pressure Gain + Clutch PCS Pressure Offset				Type A, 1 Trips
		The command pressure (tie up) fault detection is designed to verify the number of clutches applied in a given gear state is limited, in order to prevent a transmission internal mechanical tie- up condition. A condition which could lead to a vehicle deceleration above the design safety metric. If commanded clutch	For each combination of clutches which can lead to a mult-clutch tie-up: Commanded Clutch PCS Pressure	transfer case range is 4WD Low: > Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo * Clutch PCS Pressure Gain +				
		pressures are above a threshold which would allow multiple clutches to carry torque, the clutch is considered applied, otherwise the clutch is considered released. If there are more clutches applied, via the commanded clutch pressures, in a given gear state than is		Clutch PCS Pressure Offset Else Cmnd Tie Up Monitor Multi-Clutch Thresh Clutch PCS Pressure Gain +				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System	Code	rational, one or more of the clutch pressure command values are in error. Given rate of change of transmission output shaft speed, command gear state clutches and clutch hydraulic fill volumes, those clutches in transition from the hydraulic released state to the hydraulic applied state and from the hydraulic applied state to the hydraulic released state, the rationality detects any number of command clutch pressures above a threshold, that are simultaneously active to cause a vehicle deceleration above the design safety metric. The command gear/ shift fault detection is designed to verify the commanded gear will not induce a downshift resulting in a gear state that is erroneous given vehicle operating conditions. The detection rationalizes the command gear against a minimum gear, highest gear ratio, for given vehicle speed and transfer case	if above criteria met, increment fail timer by 3.125 6.25 ms update rate	Clutch PCS Pressure Offset	commanded tie up monitor enable calibration vehicle speed OR commanded tie up fault pending OR (vehicle speed AND monitor enabled in previous loop) High Side Driver 1 On High Side Driver 2 On Service Fast Learn OR (Service Fast Learn AND Vehicle Speed) Number of fill factor conditions below which need to be met Clutch 1 volume fill factor Clutch 2 volume fill factor Clutch 3 volume fill factor Clutch 4 volume fill factor Clutch 5 volume fill factor Clutch 6 volume fill factor SOWC volume fill factor (GF9 only)	<ul> <li>= 1 (1 to enable, 0 to disable)</li> <li>&gt; 5.0 KPH</li> <li>= TRUE</li> <li>&gt; 5.0 KPH</li> <li>= TRUE</li> <li>= TRUE</li> <li>= TRUE</li> <li>= FALSE</li> <li>= TRUE</li> <li>&gt; 8.0 KPH</li> <li>= 4 Filled Clutches</li> <li>&gt; 1.00</li> </ul>	when fail timer reaches 100, set DTC	
		ranqe			output shaft deceleration	< -408.1 RPM/sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		The command direction fault detection is designed to verify the clutches commanded on will result in the commanded direction (e.g. reverse clutches			DTCs Not Fault Active DTCs Not Test Failed This Key On	Else < -151.1 RPM/sec P077C, P077D P0723, P0722		
		are being commaned on when the commanded range is reverse). This is used to prevent an incorrect direction safety hazard.	Commanded Gear AND at least one of the following:	< Shift Monitor Lowest Allowed Gear			when incorrect downshift fail timer reaches 4.63 sec, set DTC	
			Previous Loop Commanded Gear and current loop commanded OR	> Current Loop Commanded Gear (i.e a downshift) = a forward, locked gear				
			current commanded gear and previous loop commanded gear	= a forward, locked gear # a forward, locked gear				
			OR incorrect downshift fail timer	>0.0				
			if above conditions are met, increment incorrect downshift fail timer 6.25 ms update rate					
			Alternatively, if commanded gear increment invalid commanded gear fail timer	= NULL	command shift monitor	= 1 (1 to enable, 0 to	when invalid fail timer reaches 4.63 sec, set DTC	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			6.25 ms update rate		enable calibration Service Fast Learn OR (Service Fast Learn AND Vehicle Speed) High Side Driver 1 On High Side Driver 2 On DTCs Not Fault Active DTCs Not Test Failed This Key On	disable) = FALSE = TRUE > 8.0 KPH = TRUE = TRUE P077C, P077D, P0721 P0723, P0722, P172A, P172B	>2.50 sec	
			Criteria based on driver requested range: Drive: An invalid combination of drive clutches commanded on* driver requested range Incorrect drive enable calibration Incrorrect drive disable calibration Reverse: An invalid combination of reverse clutches commanded on* driver requested range	Illegal Drive Clutch = Combinations = Drive = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) = Illegal Reverse Clutch Combinations = Reverse			Fault pending fail timer Clutch Connectivity Wrong > Direction FP Fail time based on driver requested range: Incorrect Drive Fail Time Incorrect Reverse Fail Time Incorrect Neutral Fail Time Incorrect Park Fail Time 6.25 ms update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Incorrect reverse enable calibration Incrorrect reverse disable calibration	<ul> <li>= 1 (1 to enable, 0 to disable)</li> <li>= 0 (0 to enable, 1 to enable)</li> </ul>	Current driver requested range	= previous driver requested range	> Incorrect Direction Range Change Delay Time	
			Neutral: An invalid combinatio of		(vehicle speed AND vehicle speed	> -6.00 KPH > 6.00 KPH		
			neutral clutches commanded on*	= Illegal Park-Neutral Clutch Combinations	OR Fail Timer)	>0.0		
			driver requested range	= Neutral	clutch connectivity detection enable calibration	= 1 (1 to enable, 0 to disable)		
			Incorrect neural enable calibration	= 1 (1 to enable, 0 to disable)	clutch connectivity monitor enable	= 1 (1 to enable, 0 to disable		
			Incrorrect neutral disable calibration	= 0 (0 to enable, 1 to disable)	OR clutch connectivity monitor disable	= 0 (0 to enable, 1 to disable)		
			Park: An invalid combination of		Service Fast Learn OR	= FALSE		
			reverse clutches commanded on*	= Illegal Park-Neutral Clutch Combinations	(Service Fast Learn AND Vehicle Speed)	= TRUE > 8.0 KPH	>2.50 sec	
			driver requested range	= Park	High Side Driver 1 On High Side Driver 2 On	= TRUE = TRUE		
			Incorrect park enable calibration	= 1 (1 to enable, 0 to disable)	DTCs Not Fault Active	P077C, P077D, P0721		
			Incrorrect park disable calibration	= 0 (0 to enable, 1 to disable)	DTCs Not Test Failed This Key On	P0723, P0722, P172A, P172B		
					* Note, clutch is considered "on" when the following conditions are met:			
					Clutch commanded	>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND	Clutch Connectivity C1 On Threshold OLD OR Clutch Connectivity C2 On Threshold OLD OR Clutch Connectivity C3 On Threshold OLD OR Clutch Connectivity C4 On Threshold OLD OR Clutch Connectivity C5 On Threshold OLD OR Clutch Connectivity C6 On Threshold OLD OR Clutch Connectivity C6 On Threshold OLD OR Clutch Connectivity C7 On Threshold OLD		
					Current clutch pressure command * 0.25 + 1st derivative of pressure command * 0.25 + 2nd derivative of pressure command * -0.25 + 3rd derivative of pressure command * -0.25	= 0.0 OR > -1.00 kPa		
			ratio monitor fault pending	= TRUE			increment fail timer by	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Output speed direction OR Output speed direction Plus following criteria based on driver requested range	= FORWARD = REVERSE			Ratio Monitor Fail Increment Rate (Percent per Loop) when timer reaches 100, set fault pending	
			Drive: driver requested range Incorrect drive enable calibration	= Drive = 1 (1 to enable, 0 to disable)			Fail time based on driver requested range (once fault pending has matured):	
			Incrorrect drive disable calibration	= 0 (0 to enable, 1 to disable)			Incorrect Drive Fail Time	
			Reverse: driver requested range	= Reverse			Incorrect Reverse Fail Time	
			Incorrect reverse enable calibration	= 1 (1 to enable, 0 to disable)			Incorrect Neutral Fail Time	
			Incrorrect reverse disable calibration Neutral:	= 0 (0 to enable, 1 to enable)	If all conditions below are met, increment ratio monitor fault pending	*****	Incorrect Park Fail Time 6.25 ms update	
			driver requested range	= Neutral	timer:		late	
			Incorrect neural enable calibration Incrorrect neutral disable calibration Park:	<ul> <li>= 1 (1 to enable, 0 to disable)</li> <li>= 0 (0 to enable, 1 to disable)</li> </ul>	vehicle speed OR vehicle speed (note: fault pending will remain latched if vehicle speed max thresholds are exceeded)	> 0.50 AND < 6.00 KPH <-0.50 AND >-6.00 KPH		
			driver requested range	= Park	Monitor Armed	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable)	Secondary Parameters Measured output speed direction Input speed default direction Current driver requested range based on PRNDL position: driver requested range AND transmission measured speed ratio AND Loop-to-loop change in measured ratio AND (Direction By Ratio OR Direction By Clutch Slip) driver requested range AND transmission measured speed ratio AND (Direction By Ratio OR Direction By Clutch Slip) driver requested range AND transmission measured speed ratio AND (Direction By Ratio OR Direction By Ratio AND Loop-to-loop change in measured speed ratio AND Loop-to-loop change in measured speed ratio AND (Direction By Ratio OR Direction By Clutch Slip)	Enable Conditions  = REVERSE or FORWARD  = REVERSE or FORWARD  = previous driver requested range  = Reverse  > 0.40  > -8.00  = FORWARD  = a FORWARD  = a FORWARD Gear  = Drive  < -0.40  < 8.00  = REVERSE  = REVERSE  = REVERSE	Time Required Incorrect Direction Range Change Delay Time	MIL Ilium.
					if Range Shift enable cal: THEN	= 0 (1 to enable, 0 to disable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Range Shift State OR if Attained Gear enable cal: THEN Attained Gear	<ul> <li>Range Shift Complete</li> <li>0 (1 to enable, 0 to disable)</li> <li># Neutral AND # Park</li> </ul>		
					ALSO Engine Speed Ratio Monitor enable cal OR Ratio Monitor disable cal  Direction By Ratio:	<ul> <li>&gt; 400 RPM</li> <li>= 1 (1 to enable, 0 to disable)</li> <li>= 0 (0 to enable, 1 to disable)</li> </ul>		
					Direction By Ratio Enable cal	= 1 (1 to enable, 0 to disable)		
					(vehicle speed OR vehicle speed)	> 0.50 KPH < -0.50 KPH		
					WHEN: Measured output speed direction AND Absolute measured gear ratio	= reverse > 4.82 AND < 4.94		
					THEN Direction by Ratio	= REVERSE		
					ELSE WHEN Measured output speed direction AND Absolute measured gear ratio	= forward > 4.67 AND < 0.66		
					THEN Direction bv Ratio	= FORWARD		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System	Code	Description			Direction by Clutch Slip: C1 clutch slip valid C2 clutch slip valid C5 clutch slip valid C3C4 dual clutch slip valid C3C6 dual clutch slip valid C4C6 dual clutch slip valid Direction by Clutch Slip Enable cal (vehicle speed OR vehicle speed) for each clutch: current clutch slip	<ul> <li>TRUE</li> <li>TRUE</li> <li>TRUE</li> <li>TRUE</li> <li>TRUE</li> <li>TRUE</li> <li>TRUE</li> <li>1 (1 to enable, 0 to disable)</li> <li>0.50 KPH</li> <li>&lt; -0.50 KPH</li> <li>Ratio Monitor Slip</li> <li>Threshold (if slip condition met, clutch held = 1, else held</li> </ul>		
					clutch held combination matches a valid gear in: General enables: Genral Ratio Monitor Detection enable cal Transmission Type Service Fast Learn OR (Service Fast Learn AND Vehicle Speed) High Side Driver 1 On	<ul> <li>a)</li> <li>Ratio Monitor Clutch States</li> <li>a)</li> <li>a)</li> <li>b)</li> <li>b)</li> <li>b)</li> <li>c)</li> <lic)< li=""> <li>c)</li> <lic)< li=""> <li>c)</li> <lic)< li=""> <li< td=""><td>&gt;2.50 sec</td><td></td></li<></lic)<></lic)<></lic)<></ul>	>2.50 sec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					High Side Driver 2 On	= TRUE		
					DTCs Not Fault Pending	P0716, P0717, P07BF, P07C0, P0721, P0722, P0723, P077C, P077D, P172A, P172B, P1783, P17CE		
					DTCs Not Fault Active	P0716, P0717, P07BF, P07C0, P077C, P077D, P0721, P17CE, P1783		
					DTCs Not Test Failed This Key On	P0721, P0722, P0723, P172A, P172B		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Powertrain Internal Control	P062F	This DTC detects a NVM long term performance. There are	HWIO reports that writing to NVM (at shutdown) will not succeed				Diagnostic runs at controller power up.	Type A, 1 Trips
Module EEPROM Error		two types of diagnostics that run during controller power up. One for HWIO reports that writing to NVM (at shutdown) will not succeed, and the other HWIO reports the assembly calibration integrity check has failed.	HWIO reports the assembly calibration integrity check has failed				Diagnostic runs at controller power up.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Actuator Supply Voltage Circuit Low	P0658	Controller specific output driver circuit diagnoses the high sided driver circuit for a short to ground failure, or where controller H/W cannot differentiate, diagnoses the high sided driver circuit for a short to ground failure or open circuit failure, when the output is powered on, by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground or an open circuit.	< 0.5 Q impedance between signal and controller ground OR > 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail count and increment sample count, otherwise increment only sample count	(ground short diagnostic monitor enable calibration OR open circuit diagnostic monitor enable calibration) high side drive ON service mode \$04 active	= 1 Boolean = 1 Boolean = TRUE = FALSE	ground short fail count > 6 counts within sample count of 2,400 counts OR open circuit fail count > 30 counts within sample count of 50 counts 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio n Range (TR) Switch Circuit Low Voltage	P0707	Diagnoses the internal range sensor circuit A and wiring for a ground short circuit fault using controller specific PWM duty cycle measurement thresholds.	when PWM sensor type and PWM voltage direct conditional internal range sensor A PWM duty cycle when PWM sensor type and PWM voltage inverse conditional internal range sensor A PWM duty cycle Increment fail and sample time, update rate 25 milliseconds	< 7.779 % duty cycle	diagnostic monitor enable battery voltage when sensor type is PWM duty cycle direct or inverse conditional for fail threshold is used conditional type check calibration	= 1 Boolean >0.00 volts = CeTRGD_e_VoltDirctPro P	fail time > 0.500 seconds out of sample time > 1.500 seconds battery voltage time > 1.000 seconds	Type A, 1 Trips
			Controller specific PWM duty cycle thresholds are set to meet the following controller specification for a short to ground.	< 0.5 Q impedance between signal and controller ground				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio n Range (TR) Switch Circuit High Voltage	P0708	Diagnoses the internal range sensor circuit A and wiring for a short to voltage circuit fault using controller specific PWM duty cycle measurement thresholds.	when PWM sensor type and PWM voltage direct conditional internal range sensor A PWM duty cycle when PWM sensor type and PWM voltage inverse conditional internal range sensor A PWM duty cycle Increment fail and sample time, update rate 25 milliseconds	> 92.221 % duty cycle < 92.221 % duty cycle	diagnostic monitor enable battery voltage when sensor type is PWM duty cycle direct or inverse conditional for fail threshold is used conditional type check calibration	= 1 Boolean >0.00 volts = CeTRGD_e_VoltDirctPro P	fail time > 0.900 seconds out of sample time > 1.100 seconds battery voltage time > 1.000 seconds	Type A, 1 Trips
			Controller specific PWM duty cycle thresholds are set to meet the following controller specification for a short to power.	< 0.5 Q impedance between signal and controller power	ECM Message Available Communication Check Enable for ECM message Vehicle is in a mode that enables accessory power	= TRUE = 1.00 Boolean = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio n Fluid Temperature (TFT) Sensor Performance	P0711	The diagnostic monitor will verify the time to transmission fluid temperature warm up based on the raw transmission fluid temperature sesnor, any intermittent signal that causes multiple	raw transmission fluid temperature and the transmission fluid temperature warm up time has elapsed	< -6.7 °C			transmission fluid temperature warm up time > transmission fluid temperature warm up time seconds	Type B, 2 Trips
		unrealistic delta changes (intermittent			diagnsotic monitor enable P0712 NOT fault active	= 1 Boolean		
		raw transmission fluid temperature sesnor, and, raw transmission fluid temperature			battery voltage	>9.00 volts	battery voltage time > 0.100 seconds	
		sesnor signal stuck in valid range.			run crank voltage	>9.00 volts	run crank voltage time > 0.100 seconds	
					warm up test enable	= 1 Boolean		
					TET rationality diagnostic monitor enabled	= VeTFSR_b_TFT_RatlEnbl		
					driver accelerator pdeal	> 5.0 %		
					engine torque	> 50.0 Nm		
					engine speed	> 500.0 RPM		
					engine coolant	> -40.0 °C		
					temperature	450.0.00		
					temperature	< 150.0 °C		
					raw transmission fluid	> -273.0 °C		
					temperature	< 150.0 °C		
					temperature			
					P2818 fault active P2818 test fail this key on	= FALSE = FALSE		
					DTCs not fault active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						EngineTorqueEstInaccura te AcceleratorPedalFailure CrankSensor_FA ECT_Sensor_FA VehicleSpeedSensor_FA		
			current transmission fluid temperature string length = previous transmission fluid temperature transmission temperature string length + (raw transmission fluid temperature - previous raw transmission fluid temperature, update rate 100 milliseconds, increment sample count	> 80.0 °C			sample count > 10 counts evaluate fail temperature threshold, 100 millisecond update rate, if transmission fluid temperature string length above fail threshold increment fail time fail time > 8.0 seconds out of sample time > 12.0 seconds	
					diagnsotic monitor enable P0712 NOT fault active P0713 NOT fault active battery voltage	= 1 Boolean >9.00 volts	battery voltage time > 0.100 seconds	
					run crank voltage	>9.00 volts	run crank voltage time > 0.100 seconds	
					intermittent test enable propulsion system active	= 1 Boolean = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			raw transmission fluid temperature - previous raw transmission fluid	< 0.0000 °C			fail time > 600.0 seconds	
			temperature, update rate 100 milliseconds,		diagnsotic monitor enable P0712 NOT fault active P0713 NOT fault active	= 1 Boolean		
			update fail time		battery voltage	>9.00 volts	battery voltage time > 0.100 seconds	
					run crank voltage	>9.00 volts	run crank voltage time > 0.100 seconds	
					stuck in range test enable propulsion system active raw transmission fluid temperature raw transmission fluid	= 1 Boolean = TRUE > -273.0 °C < 150.0 °C		
					temperature			
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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Transmissio n Fluid Temperature Sensor Circuit Low Voltage	P0712	Controller specific analog circuit diagnoses the transmission fluid temperature sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds, converted to a resistance value.	circuit resistance update fail time 1 seconds update rate	< 13.000 Q	diagnostic monitor enable battery voltage run crank voltage run crank voltage in range time	= 1 Boolean >9.00 volts >9.00 volts	fail time > 5.00 seconds out of sample time > 6.00 seconds 1 seconds update rate battery voltage in range time > 0.100 seconds run crank voltage in range time > 0.100 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio n Fluid Temperature Sensor Circuit Low Voltage	P0713	Controller specific analog circuit diagnoses the transmission fluid temperature sensor and wiring for an open circuit or short to voltage failure by comparing a voltage measurement to controller specific voltage thresholds, converted to a resistance value.	circuit resistance update fail time 1 seconds update rate	>284,177.0 Q	diagnostic monitor enable battery voltage run crank voltage run crank voltage in range time	= 1 Boolean >9.00 volts >9.00 volts	fail time > 5.00 seconds out of fail time > 6.00 seconds 1 seconds update rate battery voltage in range time > 0.100 seconds run crank voltage in range time > 0.100 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input Speed Sensor Performance	P0716	Detects unrealistic drop in raw transmission input speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a lower value. The raw transmission input	delta raw transmission input speed delta raw transmission input speed = raw transmission input speed - last valid raw transmission input speed, 25 millisecond update rate	> 2,000.0 RPM	service mode \$04 active diagnostic monitor enable P0717 test fail this key on P07BF test fail this key on P07C0 test fail this key on last valid raw transmission input speed	= FALSE = 1 Boolean = FALSE = FALSE = FALSE > 240.0 RPM	fail time > 1.500 seconds updated fail event count, fail event count > 5 counts, 25 millisecond update rate raw transmission input speed time	Type A, 1 Trips
		speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumualted indicating the raw transmission input speed has not			OR valid raw transmission input speed (before drop event) last valid raw transmission input speed updates very 25 milliseconds when stablity time complete as long as	> 240.0 RPM	> 2.000 seconds	
		recovered above a threshold, allowing the fail event count to increment. Multiple fail event counts must occur, but if the signal remains low, no further deltas occur, the "Input Speed Sensor Circuit Low Voltage" DTC will			(delta delta raw transmission input speed AND raw transmission input speed) raw transmission output speed accelerator pedal position engine torque	< 320.0 RPM > 200.0 RPM > 377.0 RPM > 5.0 % < 8,191.9 Nm	stability time > 0.100 seconds	
		set before P0716, as P0716 is designed to set based on an intermittent raw transmission input speed signal RPM.			engine torque transmission hydraulic pressure available: engine speed	> 30.0 Nm > 500.0 RPM	engine speed time >	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccura te	engine speed time for transmission hydraulic pressure available	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input Speed Sensor Circuit Low Voltage	P0717	Detects no activity in raw transmission input speed signal RPM due to open ciruit electrical failure mode or sensor internal faults, or, controller internal failure modes. The raw transmission input speed signal RPM is rationalized against vehicle conditions in which the the powertrain is producing torque available at the drive wheels, but raw transmission input speed signal RPM remains low. After a sudden drop in raw transmission input speed signal RPM, a race condition can occur between P0717 and "Input Speed Sensor Performance" depending on the true nature of the failure.	raw transmission input speed OR TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE, update fail time 25 millisecond update rate	< 168.0 RPM	service mode \$04 active diagnostic monitor enable run crank voltage service fast learn active run crank voltage P0722 fault active P0723 fault active P077C fault active P077C fault active P077D fault active brake pedal position sesnor must be OBDII to use brake pedal conditional brake pedal position sesnor type brake pedal position P0716 test fail this key on P07BF test fail this key on P07C0 test fail this key on accelerator pedal position engine torque engine torque (transmission current attained gear raw transmission output speed OR transmission current attained gear raw transmission output speed) P0717 fault active P0717 test fail this key on	<pre>= FALSE = 1 Boolean &gt; 5.00 volts = FALSE &gt;9.00 volts = FALSE &gt; 5.0 % &gt; 30.0 Nm &lt; 8,191.9 Nm &lt; CeCGSR_e_CR_Fourth &gt; CeCGSR_e_CR_First &gt; 250.0 RPM &lt; CeCGSR_e_CR_Tenth &gt; CeCGSR_e_CR_Fourth &gt; 377.0 RPM</pre>	fail time > 4.00 seconds run crank voltage time > 25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE occurs when: (P0722 fail time high gear exceeds fail threshold OR P0722 fail time low gear exceeds fail threshold) TISS/TOSS has single power supply calibration TISS/TOSS single power supply test enabled transmission hydraulic pressure available: engine speed DTCs not fault active	= FALSE = FALSE = 0 Boolean = 1 Boolean > 500.0 RPM EngineTorqueEstInaccura te	engine speed time > engine speed time for transmission hydraulic pressure available	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System Output Speed Sensor Performance	P0721	Monitor Strategy Description The diagnostic monitor determines if the direction TOSS value is coherent based on the on period time of the directional sensor and TOSS raw. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow TOSS raw RPM. When the on period time indicates a non- transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	Malfunction Criteria TOSS raw direction when TOSS transitional period = FALSE AND TOSS raw direction when TOSS transitional period = FALSE OR TOSS raw when TOSS transitional period = TRUE update fail and sample time 6.26 millisecond update rate	Threshold Value # FORWARD # REVERSE > 225.0 RPM	Secondary Parameters service mode \$04 active diagnostic monitor enable TOSS count sample period P0721 fault active P0721 test fail this key on TOSS transitional period detected = FALSE when: on period on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward TOSS transitional period	<ul> <li>Enable Conditions</li> <li>= FALSE</li> <li>= 1 Boolean</li> <li># 0 counts</li> <li>= FALSE</li> <li>= FALSE</li> <li>&gt; 0.4434 seconds</li> <li>&lt; 0.2773 seconds</li> <li>&lt; 0.2363 seconds</li> <li>&gt; 0.1240 seconds</li> <li>&lt; 0.0811 seconds</li> <li>&gt; 0.0088 seconds</li> </ul>	Time Required fail time > 7.000 seconds out of sample time > 10.000 seconds	MIL Ilium. Type A, 1 Trips
					TOSS transitional period detected = TRUE when: on period when direction unknown senor type is directional senor type calibration	< 0.4434 seconds > 0.2773 seconds = CeTOSR_e_Directional		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Circuit Low Voltage	P0722	Detects no activity in raw transmission output speed signal RPM due to open ciruit electrical failure mode or sensor internal faults, or, controller internal failure modes. The raw transmission output speed signal RPM is rationalized against vehicle conditions in which the the powertrain is producing torque, but raw transmission output speed signal RPM remains low. After a sudden drop in raw transmission output speed signal RPM, a race condition can occur between P0722 and "Output Speed Sensor Circuit Intermittent" depending on the true nature of the failure.	raw transmission output speed, update fail time 6.25 millisecond update rate when: attained gear attained gear AND attained gear use high gear fail time threshold ELSE use low gear fail time threshold	< 30.0 RPM CeCGSR_e_CR_First CeCGSR_e_CR_Tenth CeCGSR_e_CR_Four th	service mode \$04 active diagnostic monitor enable when neutral range occurs: (garage shift OR PRNDL OR PRNDL OR range inhibit state) AND (engine torque accelerator pedal position) when not neutral range occurs: attained gear attained gear (attained gear engine torque hysteresis high engine torque hysteresis low accelerator pedal position hysteresis high accelerator pedal position hysteresis low) when not neutral range occurs: (attained gear	= FALSE = 1 Boolean # COMPLETE = PARK = NEUTRAL # no inhibit active > 8,192.0 Nm > 100.0 % > CeCGSR_e_CR_First < CeCGSR_e_CR_Tenth CeCGSR_e_CR_Fourth > 30.0 Nm > 3.0 % > 1.5 % 	fail time >4.00 seconds high gear OR fail time > 3.00 seconds low gear	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					accelerator pedal position hysteresis high accelerator pedal position hysteresis low)	> 3.5 % > 2.0 %		
					TISS/TOSS has single power supply calibration AND	= 0 Boolean		
					TISS AND	< 8,191.9 RPM		
					TISS) OR	> 175.0 RPM		
					TISS/TOSS has single power supply calibration AND	= 0 Boolean		
					TISS	< 8,191.9 RPM		
					TISS)	> 3,500.0 RPM		
					P0716 test fail this key on P0717 test fail this key on P07BF test fail this key on P07C0 test fail this key on	= FALSE = FALSE = FALSE = FALSE		
					PTO check: PTO enable calibration is FALSE OR	# 1 Boolean		
					(PTO enable calibration is TRUE	= 1 Boolean		
					PTO active)	= TRUE		
					run crank voltage	> 5.00 volts		
					service fast learn active run crank voltage transmission fluid temperature P0723 test fail this kev on	= FALSE >9.00 volts > -40.00 °C = FALSE	run crank voltage time > 25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P077C test fail this key on P077D test fail this key on P0722 fault active P0722 test fail this key on transmission hydraulic pressure available: engine speed	= FALSE = FALSE = FALSE = FALSE > 500.0 RPM	engine speed time > engine speed time for transmission hydraulic pressure available	
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccura te		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Circuit Intermittent	P0723	Detects unrealistic drop in raw transmission output speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a	4WD low fail threshold: delta raw transmission output speed OR NOT 4WD low fail threshold, update fail time, delta raw transmission output speed = raw	> 1,755.0 RPM > 650.0 RPM	service mode \$04 active diagnostic monitor enable	= FALSE = 1 Boolean	fail time > 1.500 seconds updated fail event count, fail event count > 5 counts, 25 millisecond update rate	Type A, 1 Trips
		lower value. The raw transmission output speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumualted indiacting the row	transmission output speed previous loop - raw transmission output speed, 25 millisecond update rate		transmission engaged state	# not engaged	transmission engaged state time > P0723 transmission engaged state time threshold	
		transmission output speed has not recovered above a threshold allowing the			4WD low state	= 4WD low state previous loop, 25 millisecond update rate	4WD low change time > 3.0 seconds	
		fail event count to increment. Multiple fail event counts must occur, but if the signal remains low no further			PTO check: PTO enable calibration is FALSE OR (PTO enable calibration is	# 1 Boolean		
		deltas occur, the "Output Speed Sensor Circuit Low Voltage" DTC will set before			TRUE AND PTO active)	= TRUE		
		P0723, as P0723 is designed to set based on an intermittent raw			run crank voltage	> 5.00 volts	run crank voltage time > 25 milliseconds	
		speed signal RPM.			service fast learn active run crank voltage P077C test fail this key on P077D test fail this key on	= FALSE >9.00 volts = FALSE = FALSE		
					when PRNDL is moved to			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					NEUTRAL allow transmission engaged state time before enabling fail evaluation, or, if raw raw transmission output speed is active in NEUTRAL enable fail evaluation: PRNDL OR PRNDL OR PRNDL OR PRNDL OR raw transmission output speed OR last valid raw transmission output speed	= CeTRGR_e_PRNDL_Neu tral = CeTRGR_e_PRNDL_Tra nsitionall N-D transitional = CeTRGR_e_PRNDL_Tra nsitional4 R-N transitional > 250.0 RPM > 250.0 RPM		
					determine if raw transmission input speed is stable: (raw transmission input speed - raw transmission input speed previous, 25 millisecond update AND raw transmission input speed) OR (TISS/TOSS has single power supply calibration AND raw transmission input speed)	< 4,095.9 RPM > 200.0 RPM = 0 Boolean = 0.0 RPM	raw transmission input speed stability time > 2.00 seconds no time required	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					select delta RPM fail theshold: (4WD low state AND\$WD low valid) select P0723 4WD TOSS delta fail threshold otherwise use P0723 TOSS delta fail threshold	= TRUE = TRUE		
					last valid raw transmission output speed OR valid raw transmission output speed (before drop event) last valid raw transmission output speed updates very 25 milliseconds when stablity time complete as	> 36.0 RPM > 36.0 RPM	raw transmission output speed time > 2.00 seconds	
					(delta delta raw transmission output speed AND raw transmission output speed)	< 140.0 RPM > 36.0 RPM	stability time > 0.100 seconds	
					transmission hydraulic pressure available: engine speed	> 500.0 RPM	engine speed time > engine speed time for transmission hydraulic pressure available	
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccura te		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Torque Converter Clutch (TCC) System Performance - GR10 specific	P0741	The GR10 diagnostic monitor detects the transmission torque converter control valve failed hydraulically on. If the control valve is stuck, the torque converter will drain down, resulting in an excessive K factor above expected value	calculated transmission torque converter K factor = engine speed / SQR (engine torque) increment fail count 25 millisecond update rate	> P0741 GR10 torque converter K factor fail limit see supporting table	diagnostic monitor enable (TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available:	= 1 Boolean = 1 Boolean = 1 Boolean	fail count > 4 counts in 75 count sample 25 millisecond update rate	Type A, 1 Trips
					engine speed	> 500.0 RPM	engine speed time > engine speed time for transmission hydraulic pressure available see supporting table	
					battery voltage	>9.00 volts	battery voltage time > 0.100 seconds	
					run crank voltage P281B fault active P281D fault active P281E fault active P0722 fault pending P0723 fault pending PRNDL PRNDL transmission fluid temperature transmission fluid temperature	>9.00 volts = FALSE = FALSE = FALSE = FALSE # PARK # NEUTRAL > -6.66 °C < 130.0 °C	run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					engine speed intrusive shift active (intrusive shift due to fault maturing for clutch pressure control solenoid stuck off/on P0746, P0747, P0776, P0777, P0796, P0797, P2714, P2715, P2723, P2724, P2732, P2733, P2820, P2821) P0741 test fail this key on range shift state attained gear slip engine torque accelerator pedal position accelerator pedal position transmission torque converter speed ratio (transmission turbine shaft speed / engine speed) DTCs not fault active	<ul> <li>&gt; 1,500.0 RPM</li> <li>= FALSE</li> <li>= range shift complete (steady state gear)</li> <li>&lt; 75.0 RPM</li> <li>&gt; 5.00 Nm</li> <li>&gt; 0.00 %</li> <li>&lt; 100.0 %</li> <li>&lt; 0.900</li> <li>AcceleratorPedalFailure EngineTorqueEstInaccura te CrankSensor_FA</li> <li>P0716, P0717, P07BF, P07C0</li> <li>P0722, P0723, P077C, P077D</li> </ul>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System Pressure Control (PC) Solenoid A Stuck Off (GRWand 8SPD)	<b>Code</b> P0746	<b>Description</b> Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is	C1 clutch slip speed, update fail time 6.25 milliscond update	> 200.0 RPM	system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	<ul> <li>+</li></ul>	fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	Ilium. Type A, 1 Trips
		considered, the clutch pressure control solenoid is mapped to			service fast learn active	= FALSE Boolean		
		transmission line			service sciencia cleaning	l		

pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control       procedure active hydraulic pressure available       = TRUE         Image: speed fail compare when:         Image: speed fail compare when:       ((startle mitigation active OR (startle mitigation active AND startle mitigation gear))       = TRUE         Image: speed is uncontrol speed is uncontrollable. The clutch pressure control       image: speed is uncontrol startle mitigation active AND startle mitigation active or active NOTE below)       = TRUE	
normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control= TRUEat the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control= FALSE enable C1 clutch slip speed fail compare when:at the given engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control= TRUE maintain and the pressure controlat the pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control= TRUE maintain tording startle mitigation active active NOTE below)# initial startle mitigation gear= TRUE	
clutch to maintain full       hydraulic pressure       = TRUE         torque holding capacity       available       = TRUE         at the given engine       crankshaft torque, to	
at the given engine       at the given engine       = 1RUE         crankshaft torque, to	
at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding crankshaft torque, and crankshaft torque, and crankshaft torque, and clutch slip speed is uncontrollable. The clutch pressure control*********************************	
Clariks fail torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control	
ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control	
pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control	
solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control	
hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control	
clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control	
maintain holding       (startle mitigation active       = TRUE         capacity at any engine       AND       # initial startle mitigation         crankshaft torque, and       startle mitigation gear))       # initial startle mitigation         the clutch slip speed is       (see startle mitigation       gear         uncontrollable. The       active NOTE below)       Hours	
capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure controlAND startle mitigation gear) active NOTE below)	
crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure controlstartle mitigation gear)# initial startle mitigation gearclutch pressure controlactive NOTE below)	
the clutch slip speed is uncontrollable. The       (see startle mitigation active NOTE below)       gear         clutch pressure control       (see startle mitigation active NOTE below)       (see startle mitigation active NOTE below)	
uncontrollable. The active NOTE below)	
clutch pressure control	
solenoid test is unintended deceleration	
suspended if the higher tault pending = FALSE	
UR United developed and the second developed a	
$\frac{1}{1000}$	
startle mitigation	
function is triggered	
when a sudden vehicle	
deceleration occurs	
due to a clutch	
pressure control adaptive active = FALSE	
solenoid that has failed	
in the opposite sense, (transmission output shaft > 36.0 RPM	
clutch pressure control speed	
solenoid failed OR	
hydraulically on, while (accelerator pedal > 0.50 %	
the solenoid is position	
electrically functional, UR	
which must take phority engine speed) > 1,000.0 RPM > 0.500 seconds	
over any clutch	
c i ciuici sip speed valid = i RUE (all speed	
diagoetic monitor. All	
clutch pressure control	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control			C1 clutch pressured map	= mapped to line pressure, C1 clutch pressure has reached fully applied state		
		solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or			(enable forward gear cal AND driver direction request AND	= 1 (1 to enable, 0 to disable) = FORWARD		
		performance faults can be present, and no speed sensor electrical or performance faults			Attained Gear) OR (enable reverse gear cal AND	= a FORWARD gear = 0(1 to enable, 0 to disable)		
		can be present, or the clutch pressure control solenoid stuck off test is disabled. This			driver direction request AND Attained Gear)	= REVERSE = REVERSE		
		diagnostic monitor is relative to C1 (GR10 CB123456R or 8 SPD			range shift state	= range shift complete		
		CB1278R) clutch pressure control solenoid.			DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964		
						P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not test fail this key on	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission					Clutch Stuck On Fail Offset Time CD Shifts negative torque upshift: Clutch Clip Press NU Shifts clutch staging shift: Clutch Stuck On Fail Offset	
		shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control					Time STGR Shifts update fail count, fail count > 3 counts 6.25 milliscond	
		solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck			system-level enables: use battery voltage calibration is FALSE	= 1 Boolean	update	
		on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits			OR (use battery voltage calibration is TRUE AND battery voltage)	= 1 Boolean >9.00 volts	battery voltage time > 0.100	
		clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults			use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND	= 1 Boolean = 1 Boolean	seconas	
		can be present, or the clutch pressure control solenoid stuck on test			run crank voltage)	>9.00 volts	run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to the GF9 C1 CB123456, GR10 C1			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
		CB123456R, or 8 Speed C1 CB1278R clutch pressure control solenoid.			TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					******	******		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 36.0 RPM		
					((C1 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time	= TRUE		
					out enable) OR	= 1 ( 1 to enable, 0 to disable)		
					C1 off going clutch command pressure )	< 350.0 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							closed throttle upshift: C1 exhaust delay closed throttle lift foot up shift	
							open throttle upshift: C1 exhaust delay open throttle power on up shift	
							garage shifts: C1 exhaust delay garage shift	
							closed throttle downshift: C1 exhaust delay closed throttle down shift	
							negative torque upshift: C1 exhaust delay negative torque up shift	
							open throttle downshift: C1 exhaust delay open throttle power down shift	
					(engine torque AND Primary oncoming stuck on toraue enable cal)	> 8,191.8 Nm = 0 (0 is enable, 1 is _enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR ( primary oncoming clutch active	= TRUE		
					primary on coming control state	# clutch fill phase		
					primary on coming commanded pressure)	> pressure clip threshold according to shift type:		
						closed and open throttle upshifts:	Post-torque phase delay for powered upshifts	
						pressure clip threshold is dependent on the oncoming clutch:	is dependent on the oncoming clutch:	
						C2 Torque-Based Pressure Clip	C2_Oncoming Post-Torque Phase Delay	
						OR C3 Torque-Based Pressure Clip	OR C3_Oncoming Post-Torque	
						OR C4 Torque-Based Pressure Clip	Phase Delay OR C4_Oncoming Post-Torque	
						OR C5 Torque-Based Pressure Clip	Phase Delay OR C5_Oncoming Post-Torque	
						OR C6 Torque-Based Pressure Clip	Phase Delay OR C6_Oncoming Post-Torque Phase Delay	
						clip thresholds for all other shift types:		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						garage shifts: Clutch Clip Press GS Shifts		
						closed throttle downshift: Clutch Clip Press CD Shifts		
						negative torque upshift: Clutch Clip Press NU Shifts		
						open throttle downshift: Clutch Clip Press PD Shifts		
					C1 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed			
					calculation	= TRUE		
					*****	*****		
					conditions needed to trigger test:			
					(current shift type AND	# Garage shift		
					shift type enable cal for current shift type)	Clutch Stuck On Shift = Type Enable		
					OR	1 will enable)		
					(Intrusive shift active	= FALSE		
					shift type enable cal for	= 1 (0 will enable, 1 will		
					garage shift	enable)		
					Attained Gear	= NEUTRAL OR		
					AND	commanded gear		
					(stuck on enable cal for forward garge shifts	= 1 (0 to disable, 1 to		
					AND	_enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear))	= FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE		
					clutch stuck off intrusive shift active	= FALSE		
					startle mitigation active (see note on startle mitigation below)	= FALSE		
					(new clutch controller has been initalized OR transitioning to a different	= TRUE		
					current clutch solenoid test state	= TRUE transitions to TestState or TUT_HOLD (see note below about state transitions)		
					*****	*****		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P1724 P172B		
					*****	1.1 <i>1.4</i> 01.1 <i>1.4</i> 2		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.			

	-	llium.
NOTE: Startle miligation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that cours during steady state gear, not during an automatic transmission shift. The startle miligation active then forces the transmission shift. The startle miligation active then forces the transmission active then forces the safe gear or neutral state, based of the active and inactive clutches, when the unintended vehicle deceleration ooccurred. Once a safe vehicle gear state is attimed, the gear and clutch pressure control system allows transitions of the clutche son and off, to sequence automatic transmission shifts, single stap shifts. As each single step subtract transmission shift occurs the normal pressure control solenoid stuck on dignostic monitors execute to verify which clutch pressure control solenoid is the stuck on dignostic monitors		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System Pressure Control (PC) Solenoid B Stuck Off (GRWand 8SPD)	Fault Code P0776	Monitor Strategy Description Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission	Malfunction Criteria C2 clutch slip speed, update fail time 6.25 milliscond update	Threshold Value > 200.0 RPM	Secondary Parameters	<ul> <li>Enable Conditions</li> <li>= 1 Boolean</li> <li>= 1 Boolean</li> <li>&gt;9.00 volts</li> <li>= 1 Boolean</li> </ul>	Time Required fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update battery voltage time > 0.100 seconds	MIL Ilium. Type A, 1 Trips
		output snaft speed, and, one transmission intermediate shaft speed. The clutch pressure control			Calibration is FALSE OR (use run crank voltage calibration is TRUE AND	= 1 Boolean		
		solenoid is tested after an automatic transmission shift occurs and has been considered shift			run crank voltage) TCM output driver high side driver 1, clutch	>9.00 volts	run crank voltage time > 0.100 seconds	
		state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is			TCM output driver high side driver 2, clutch pressure control solenoid	= TRUE Boolean		
		considered, the clutch pressure control solenoid is mapped to transmission line			service fast learn active service solenoid cleaning	= FALSE Boolean		

pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch parses crankshaft torque, and the clutch slip speed is uncontrollable. The clutch bigs speed is uncontrollable. The solenoid is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid failed hydraulically off, the clutch operative capacity at any engine crankshaft torque, and the clutch pressure control solenoid that has failed hydraulically off, the clutch pressure control solenoid stuck off diagnostic montor. All       pressure clutch pressure control solenoid stuck off diagnostic montor. All       prestice montor solenoid stuck off diagnostic montor. All	Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Inormally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain tue gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slips peed fail compare when: (startle mitigation active AND startle mitigation active or capacity at any engine crankshaft torque, and the clutch slips peed is uncontrollable. The clutch does not clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch filts particle mitigation gear)) (see startle mitigation gear)) (see startle mitigation fault perssure control solenoid lets is suspended if the higher level sately startle mitigation function is tactive. The sately startle mitigation active. The sately due to a clutch pressure control due to a clutch pressure control solenoid failed hydraulically on, while the solenoid is failed hydraulically on, while the solenoid such off solenoid stuk off disposite montor. All> 0.500 secondsC2 clutch slip speed valid engine speed) solenoid stuk off diagnostic montor. All> 0.500 seconds			pressure control, which			procedure active	= FALSE Boolean		
clubb to maintain tuil       hydraulic pressure       = TRUE         available       = TRUE         available       = TRUE         available       = TRUE         available       = mable C2 clutch slip speed fail compare when:       = FALSE         clubb does not clubb speed all clubb does not clubb speed all clubb does not clubb speed all clubb does not clubb speed clubb does not clubb speed clubb does not clubb speed clubb does not clubb speed clubb does not clubb speed suspended if the higher level safety satile mitigation function is suspended if the higher level safety satile decleration clubb arbits suspended if the higher level safety satile clubb arbits solenoid test is solenoid test is solenoid tailed in the coposite sense, clubb ressure control solenoid failed hydraulcally on, while the solenoid subt off clubb ressure control solenoid failed hydraulcally on, while the solenoid stuk forf diadpreve control solenoid stuk for for dispapreve c			normally allows the						
at the during capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch sip speed is uncontrollable. The clutch speed set startle mitigation active NDT elevisy clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is function is friggered when a sudden vehicle deceleration active. The safety startle mitigation function is friggered when a sudden vehicle deceleration clutch pressure control solenoid that ha failed hydraulically on, while the solenoid failed solenoid failed hydraulically on, while the solenoid failed hydraulically on, while the solenoid failed solenoid suck off diagnopset control solenoid suck off diagnopset co			clutch to maintain full			hydraulic pressure			
at the given regine			torque noiding capacity			avallable	= IRUE		
Claritshift und upe, id			at the given engine						
Initial matrix to gear       enable C2 clutch slip         ratio.       when the rlutch         pressure control       speed fail compare when:         (clattle mitigation active       (startle mitigation active         oranisatin holding       (startle mitigation active         capacity at any engine       (startle mitigation active         crankshaft torque, and       (startle mitigation gear))         (startle mitigation function is       active NOTE below)         uncontrollable. The       unintended deceleration         subpended if the higher       oranisten mitigation         level safety startle       autive pending         vibration is       active. The safety         startle mitigation       function is triggered         due to a clutch       due to a clutch         when a sudden vehicle       gead         deceleration occurs       grad         olutch pressure control       solenoid that has failed         in the opposite sense,       clutch steady state         adaptive active       adaptive active         solenoid thalbes tap			crankshall lorque, lo			******	*****		
Index initial balance pressure control solenoid is failed hydraulcally off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch silp speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation active NOTE below)= FALSE = TRUE = TRUE # initial startle mitigation active NOTE below)unintended deceleration fault pending oclutch pressure control solenoid is the expension deceleration fault pending oclutch pressure control solenoid is the solenoid is elevelia active oclutch pressure control solenoid tast is active NTE below)= FALSE = TRUE # initial startle mitigation active NOTE below)Unintended deceleration fault pending oclutch pressure control solenoid tast is active a clutch the evolution is active a clutch pressure control solenoid that as failed in the opposite sense, clutch pressure control solenoid is eleveliable= FALSE = TALSEunitended deceleration fault pending enable cal is solenoid that as failed in the opposite sense, clutch pressure control solenoid is elevelically functional, which must take priority over any clutch pressure control solenoid is elevelically functional, which must take priority> 0.500 seconds engine speed of all clut spiped of all clut spiped of all clut spiped or any clutch splene solenoid			ratio When the clutch			enable C2 clutch slin			
solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch speed speed is uncontrollable. The clutch speed speed is uncontrol solenoid that has failed in the opposite sense, clutch pressure control solenoid tat take priority over any clutch pressure control solenoid tak take priority over any clutch pressure control solenoid stake off diagnostic monitor. All distance clutch slip solenoid stake off diagnostic monitor. All distance clutch slip solenoid stake off diagnostic monitor. All distance clutch slip solenoid stake off diagnostic monitor. All distance clutch slip			pressure control			speed fail compare when:			
hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is active NOTE below)((startle mitigation active AND startle mitigation active AND startle mitigation active (startle mitigation active AND scartle mitigation active (startle mitigation active AND scartle mitigation active AND supended if the higher level safety startle mitigation function is startle mitigation startle mitigation fault pending OR unintended deceleration fault pending oR unintended deceleration fault pending enable cal is fALSE (startle mitigation)= FALSE = 0 (0 to enable, 1 to disable)deceleration is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid failed hydraulically on, while the solenoid is eleverial solenoid failed hydraulically on, while the solenoid is eleverial solenoid is eleverial sol			solenoid is failed			opood fail compare when.			
clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation is triggered when a sudden vehicle deceleration fault pending our additive NOTE below)= TRUE # initial startle mitigation gear0 (Dt Chronis Siggered solenoid test is startle mitigation active NOTE below)= FALSE= 0 (0 to enable, 1 to disable)1 (Dt Chronis Siggered when a sudden vehicle deceleration fault pending the clutch slip speed to a clutch pressure control solenoid tast has failed in the opposite sense, clutch pressure control solenoid failed hydraulcally on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid tust state priority over any clutch pressure control solenoid tast has failed hydraulcally on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid tast take priority over any clutch pressure control solenoid tast take priority over any clutch size priority over any c			hydraulically off, the			((startle mitigation active	= FALSE		
Image: capacity at any engine capacity at any engine crankshaft torque, and the clutch sip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startleImage: capacity at any engine startle mitigation active NDTe below)#initial startle mitigation gearImage: capacity at any engine crankshaft torque, and the clutch pressure control solenoid test is uncontrollable. The clutch pressure control active. The safety startle mitigation function is tactive active. The safety startle mitigation function is triggered due to a clutch pressure control solenoid tath has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control, solenoid stuck off diagnostic monitor. AllImage: capacity at any engine capacity at a diagnose control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid suck off diagnostic monitor. AllImage: capacity at a startle mitigation active capacity at a startle mitigation active capacity at a startle mitigation capacity at a startle mitigation ca			clutch does not			OR			
capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is active NoTE below)# initial startle mitigation gearuncontrollable. The clutch pressure control solenoid tath as failed in the opposite sense, clutch pressure control solenoid tath tas failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid tatk priority> 0.500 seconds engine speed and solenoid faile pressure control solenoid tatk off diagnostic monitor. All> 0.500 seconds engine speed valid engine speed valid <b< td=""><td></td><td></td><td>maintain holding</td><td></td><td></td><td>(startle mitigation active</td><td>= TRUE</td><td></td><td></td></b<>			maintain holding			(startle mitigation active	= TRUE		
crankshaft torque, and the clutch sip speed is uncontrollable. The clutch pressure control suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration cocurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid task priority over any clutch pressure control solenoid task priority over any clutch startle mitigation, the safety solenoid that has failed in the opposite sense, clutch pressure control solenoid task priority over any clutch startle pressure control solenoid task priority over any clutch pressure control solenoid task off diagnostic monitor. Allstartle mitigation gear initial startle mitigation gear# initial startle mitigation function is active. The safety solenoid that has failed in the opposite sense, clutch pressure control solenoid task priority over any clutch pressure control solenoid stuck off diagnostic monitor. Allstartle mitigation gear initial startle mitigation gear# initial startle mitigation function is active. The safety solenoid suck off diagnostic monitor. All# initial startle mitigation gear# initial startle mitigation gear# initial startle function is active. The safety solenoid stuck off diagnostic monitor. All# initial startle mitigation gear# initial startle mitigation gear# initial startle function is active. The safety solenoid stuck off diagnostic monitor. All# initial startle mitigation active NOTE below)# initial startle mitigation gear# initial startle functional, which must take priority <b< td=""><td></td><td></td><td>capacity at any engine</td><td></td><td></td><td>AND</td><td></td><td></td><td></td></b<>			capacity at any engine			AND			
the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is riggered when a studen vehicle deceleration cours due to a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All(see startle mitigation active NOTE below) unintended deceleration fault pending enable cal is FALSE (startle mitigation)= FALSE = 0 (0 to enable, 1 to disable)clutch startle mitigation function is riggered when a studen vehicle deceleration occurs due to a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch= FALSE e = FALSE= FALSE e = FALSEclutch signed approxument of the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All> 0.500 ker engine speed> 1,000.0 RPM e TRUE (all speed sensors are functional for lever node clutch slip			crankshaft torque, and			startle mitigation gear))	# initial startle mitigation		
uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid suck off diagnostic monitor. Allactive NOTE below) unintended deceleration fault pending (startle mitigation)= FALSE = 0 (0 to enable, 1 to disable)clutch steady state adaptive active solenoid that has failed in the opposite sense, clutch pressure control solenoid suck off diagnostic monitor. All= Clutch steady state adaptive active oR (accelerator pedal position OR engine speed)> 36.0 RPM >> 0.500 seconds0 CR engine speed) over any clutch pressure control solenoid stuck off diagnostic monitor. All> 0.500 seconds			the clutch slip speed is			(see startle mitigation	gear		
clutch pressure control suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch= FALSE active (transmission output shaft speed OR clutch slip speed)= FALSE a 0 (0 to enable, 1 to disable)clutch steady state adaptive active solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All> 0.500 secondsC2 clutch slip speed valid agnostic monitor. All= TRUE (all speed sensors are functional for lever node clutch slip> 0.500 seconds			uncontrollable. The			active NOTE below)			
solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid tuck off diagnostic monitor. All			clutch pressure control						
Suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid tox take for inty electrically functional, which must take priority over any clutch pressure control solenoid tox take for inty electrically functional, which must take priority over any clutch pressure control solenoid tox tox off diagnostic monitor. AllFAUSE or a late for interval or any clutch pressure control solenoid tox find electrically functional, which must take priority over any clutch pressure control solenoid tox tox off diagnostic monitor. AllFAUSE or any clutch endet or any clutch pressure control solenoid tox find clutch state pressure control solenoid tox find or any clutch pressure control solenoid tox tox off diagnostic monitor. AllFAUSE or any clutch endet or any clutch pressure control solenoid tox find clutch state pressure control solenoid tox tox off diagnostic monitor. AllFAUSE or any clutch endet or any clutch pressure control 			solenoid test is			unintended deceleration	541.05		
level safety startie mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid suck off diagnostic monitor. AllOR unintended deceleration fault pending enable cal is FALSE (startle mitigation)= 0 (0 to enable, 1 to disable)out table due to a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutchclutch steady state adaptive active (accelerator pedal position= FALSE > 36.0 RPMout table pressure control solenoid stuck off diagnostic monitor. AllOR engine speed)> 0.50 %c2 clutch slip speed valid engine speed valid= TRUE (all speed sensors are functional for lever node clutch slip			suspended if the higher			fault pending	= FALSE		
Initiation function is       Initiation deceleration         active. The safety       faulti pending enable cal is         startle mitigation       FALSE         function is triggered       (startle mitigation)         when a sudden vehicle       (startle mitigation)         deceleration occurs       clutch steady state         adptive. To only       clutch steady state         solenoid that has failed       clutch pressure control         in the opposite sense,       (transmission output shaft         clutch pressure control       solenoid failed         hydraulically on, while       (accelerator pedal         the solenoid is       electrically functional,         which must take priority       over any clutch         pressure control       solenoid is suck off         olenoid stuck off       clutch slip speed valid			level safety startle			OR			
additive. The safety       startle mitigation         function is triggered       function is triggered         when a sudden vehicle       (startle mitigation)         due to a clutch       clutch steady state         pressure control       solenoid that has failed         in the opposite sense,       clutch steady state         clutch pressure control       speed         oR       oR         electrically functional,       or solenoid is         electrically functional,       or solenoid stuck off         diagnostic monitor. All       clutch slip speed valid			niligation function is			foult ponding opoble col in	-0.00 to onable 1 to		
Status initigation       function is triggered       disable/       istable/         when a sudden vehicle       deceleration occurs       (startle mitigation)       istartle mitigation)         due to a clutch       pressure control       clutch steady state       adaptive active       = FALSE         solenoid that has failed       in the opposite sense,       (transmission output shaft       > 36.0 RPM         outch pressure control       solenoid failed       OR       > 0.50 %         hydraulically on, while       (accelerator pedal position       > 0.50 %         electrically functional,       engine speed)       > 1,000.0 RPM       > 0.500 seconds         over any clutch       pressure control       clutch slip speed valid       = TRUE (all speed sensors are functional for lever node clutch slip			startle mitigation			EAL SE	= 0 (0 to enable, 1 to		
When a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All(adarbe finitigation)= FALSE(adarbe finitigation)= FALSE= FALSE(transmission output shaft speed OR (accelerator pedal position OR engine speed)> 36.0 RPM0.500 seconds over any clutch pressure control solenoid stuck off diagnostic monitor. All> 0.500 seconds			function is triggered			(startle mitigation)	disable)		
deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. Allclutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed)> 36.0 RPM> 0.50 %> 0.50 %> 0.500 seconds over any clutch pressure control solenoid stuck off diagnostic monitor. All> 0.50 %			when a sudden vehicle			(Startie mitgation)			
due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. Allclutch steady state adaptive active= FALSEClutch steady state adaptive active> 36.0 RPM> 36.0 RPMSolenoid failed oR (accelerator pedal position OR engine speed)> 0.50 %> 0.50 %Ver any clutch pressure control solenoid stuck off diagnostic monitor. All> 0.500 seconds> 0.500 seconds			deceleration occurs						
pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. Alladaptive active= FALSE (transmission output shaft speed OR (accelerator pedal position OR engine speed)> 36.0 RPM2 C2 clutch slip speed valid> 0.50 % engine speed)> 0.50 % engine speed)> 0.500 seconds			due to a clutch			clutch steady state			
solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All			pressure control			adaptive active	= FALSE		
in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All(transmission output shaft speed OR (accelerator pedal position OR engine speed)> 0.50 %C2 clutch slip speed valid= TRUE (all speed sensors are functional for lever node clutch slip> 0.500 seconds			solenoid that has failed						
clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. Allspeed OR (accelerator pedal position OR engine speed)> 0.50 %C2 clutch slip speed valid lagnostic monitor. All> 0.500 seconds			in the opposite sense,			(transmission output shaft	> 36.0 RPM		
solenoid failed       OR       0R       > 0.50 %         hydraulically on, while       (accelerator pedal       > 0.50 %         the solenoid is       position       OR         electrically functional,       OR       > 1,000.0 RPM         which must take priority       over any clutch       > 1,000.0 RPM         pressure control       solenoid stuck off       = TRUE (all speed         solenoid stuck off       diagnostic monitor. All       = true clutch slip			clutch pressure control			speed			
hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All			solenoid failed			OR			
the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All			hydraulically on, while			(accelerator pedal	> 0.50 %		
electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All       OR engine speed)       > 1,000.0 RPM       > 0.500 seconds			the solenoid is			position			
wnich must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All       engine speed)       > 1,000.0 RPM       > 0.500 seconds         C2 clutch slip speed valid diagnostic monitor. All       = TRUE (all speed sensors are functional for lever node clutch slip       = TRUE (all speed sensors are functional for lever node clutch slip			electrically functional,			OR .		0.500	
pressure control solenoid stuck off diagnostic monitor. All			which must take priority			engine speed)	> 1,000.0 RPM	> 0.500 seconds	
solenoid stuck off diagnostic monitor. All			over any clutch						
diagnostic monitor. All			pressure control			C2 clutch slip speed valid	= IKUE (all speed		
unagnostic monitor. An			diagnostic monitor				sensors are junctional for		
Longed coloulation			clutch pressure control				spood colculation)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control			C2 clutch pressured map	= mapped to line pressure, C2 clutch pressure has reached fully applied state		
		solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or			(enable forward gear cal AND driver direction request AND	= 1 (1 to enable, 0 to disable) = FORWARD		
		performance faults can be present, and no speed sensor electrical			Attained Gear) OR (enable reverse gear cal	= a FORWARD gear = 0(1 to enable, 0 to		
		or performance faults can be present, or the clutch pressure control			AND driver direction request AND	disable) = REVERSE		
		solenoid stuck off test is disabled. This			Attained Gear)	= REVERSE		
		diagnostic monitor is relative to C2 (GR10			range shift state	= range shift complete		
		CB128910R or 8SPD CB12345R) clutch pressure control solenoid.			DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not test fail this key on	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission					Clutch Stuck On Fail Offset Time CD Shifts negative torque upshift: Clutch Clip Press NU Shifts clutch staging shift: Clutch Stuck On Fail Offset	
		shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control					Time STGR Shifts update fail count, fail count > 3 counts 6.25 milliscond	
		solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all			system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND	= 1 Boolean = 1 Boolean	update	
		clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control			battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)	>9.00 volts = 1 Boolean = 1 Boolean >9.00 volts	battery voltage time > 0.100 seconds run crank voltage time > 0.100	
		solenoid stuck on test					seconds	
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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		is disabled. This diagnostic monitor is relative to the GF9 C2 CB29, GR10C2 CR128010P. or 8			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
		Speed C2 CB12345R clutch pressure control solenoid.			TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					*****	*****		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 36.0 RPM		
					((C2 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time	= TRUE		
					out enable)	= 1 ( 1 to enable, 0 to disable)		
					C2 off going clutch command pressure )	< 350 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required closed throttle upshift: C2 exhaust delay open throttle power on up shift open throttle upshift: C2 exhaust delay open throttle power on up shift garage shifts: C2 exhaust delay garage shift closed throttle downshift: C2 exhaust delay closed throttle down	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal)	> 8,192 Nm = 0 (0 is enable, 1 is enable)	negative torque upshift: C2 exhaust delay negative torque up shift open throttle downshift: C2 exhaust delay open throttle power down shift	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR ( primary oncoming clutch active	= TRUE		
					primary on coming control state	# clutch fill phase		
					primary on coming commanded pressure)	> pressure clip threshold according to shift type:		
						closed and open throttle upshifts:	Post-torque phase delay for	
						pressure clip threshold is dependent on the oncoming clutch:	is dependent on the oncoming clutch:	
						C1 Torque-Based Pressure Clip	C1_Oncoming Post-Torque Phase Delav	
						OR C3 Torque-Based Pressure Clip	OR C3_Oncoming Post-Torque Phase Delay	
						OR	OR CA Oncoming	
						C4 Torque-Based Pressure Clip	C4_Oncoming Post-Torque Phase Delay	
						OR C5 Torque-Based	OR C5 Oncoming	
						Pressure Clip	Post-Torque	
						OR	OR	
						C6 Torque-Based Pressure Clip	C6_Oncoming Post-Torque Phase Delay	
						clip thresholds for all other shift types:	i nase Delay	
						garage shifts:		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Clutch Clip Press GS Shifts		
						closed throttle downshift: Clutch Clip Press CD Shifts		
						negative torque upshift: Clutch Clip Press NU Shifts		
						open throttle downshift: Clutch Clip Press PD Shifts		
					C2 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed	= TRUE		
					calculation			
					conditions needed to trigger test:	*****		
					(current shift type AND shift type enable cal for	# Garage shift		
					current shift type)	Clutch Stuck On Shift		
					OR	(0 table value will disable, 1 will enable)		
					(Intrusive shift active AND	= FALSE		
					shift type enable cal for			
					garage shift	= 1 (0 will enable, 1 will		
					Attained Gear	enable)		
					AND	= NEUTRAL OR		
					(stuck on enable cal for	commanded gear		
					forward garge shifts			
					AND driver requested direction	= 1 (0  to disable, 1  to onable)		
					current shift type) OR (Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction_	Clutch Stuck On Shift = Type Enable (0 table value will disable, 1 will enable) = FALSE = 1 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 1 (0 to disable, 1 to enable)		

AND AND AND AND AND AND AND AND	Component/ System	ult Monitor Strategy Malfunder Description	rategy Malfunction Criteria Threshold Valu n	e Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
mitigation below)       mitigation below)       (new clutch controller has been initialized OR transitioning to a different clutch controller)       = TRUE         current clutch solenoid test state       = TRUE       = TRUE         DTCs not fault pending				AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle	= FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE		
Image: state of the state				mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state	= TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions)		
DTCs not fault active				DTCs not fault pending	<ul> <li>P17CE P1783 P178F</li> <li>P17C6 P17C4 P17C7</li> <li>P17D3 P17C5 P0721</li> <li>P172AP172B P0716</li> <li>P0717 P07C0 P07BF</li> <li>P0723 P0722 P077D</li> <li>P077C P176C P176D</li> <li>P176B P17D6</li> <li>P2534 P0707 P0708</li> </ul>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure		
					DTCs not test fail this key on	CrankSensor_FA P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have	P172AP172B		
					multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE when one off			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System	Code				NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747,			
					P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Circuit Low	P077C	Controller specific analog circuit diagnoses the transmission output speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission output speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	< 0.2500 volts (< 0.5 Q impedance between signal and controller ground)	service mode \$04 active diagnostic monitor enable P077D fault active service fast learn run crank voltage battery voltage P077C fault active P077C test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.050 seconds, update fail count, fail count > 16 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Circuit High	P077D	Controller specific analog circuit diagnoses the transmission output speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission output speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	> 4.7500 volts (< 0.5 Q impedance between signal and controller power)	service mode \$04 active diagnostic monitor enable P077C fault active service fast learn run crank voltage battery voltage P077D fault active	= FALSE = 1 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE	fail time > 0.050 seconds, update fail count, fail count > 16 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips
		comparing a voltage measurement to controller specific voltage thresholds.			run crank voltage battery voltage P077D fault active P077D test fail this key on	> 10.00 volts > 10.00 volts = FALSE = FALSE	run crank and battery voltage time > 5.000 seconds	

Component/ Fault System Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System Code Pressure Control (PC) Solenoid C Stuck Off (GRWand 8SPD) P0796	Description Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete.	C3 clutch slip speed, update fail time 6.25 milliscond update	> 200.0 RPM	system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid	<ul> <li>= 1 Boolean</li> <li>= 1 Boolean</li> <li>&gt; 9.00 volts</li> <li>= 1 Boolean</li> <li>= 1 Boolean</li> <li>&gt; 9.00 volts</li> </ul>	fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	Ilium. Type A, 1 Trips
	steady state gear is considered, the clutch			driver circuit enabled	= TRUE Boolean		
	solenoid is mapped to transmission line			service fast learn active service solenoid cleaning	= FALSE Boolean		

pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to       procedure active procedure active hydraulic pressure available       = FALSE Boolean		
normally allows the       hydraulic pressure         clutch to maintain full       hydraulic pressure         torque holding capacity       available       = TRUE         at the given engine       crankshaft torque, to		
Clutch to maintain full       hydraulic pressure         torque holding capacity       available         at the given engine		
at the given engine crankshaft torque, to		
crankshaft torque, to		
maintain true dear		
ratio. When the clutch		
pressure control		
solenoid is failed		
hydraulically off, the ((startle mitigation active = FALSE		
clutch does not		
maintain holding (startle mitigation active = TRUE		
capacity at any engine AND		
crankshaft torque, and startle mitigation gear)) # initial startle mitigation		
the clutch slip speed is (see startle mitigation gear		
uncontrollable. The active NOTE below)		
clutch pressure control		
solenoid test is		
suspended if the higher fault pending = FALSE		
ievel salety statue mitigation function is		
$\begin{array}{c} \text{Initigation function is} \\ \text{active. The safety} \\ \text{fault pending enable calls} = 0 (0 to enable 1 to b) \\ \text{fault pending enable calls} \\ \text{faul pending enable calls} \\ fault pe$		
startle mitigation		
function is triagered (startle mitigation)		
when a sudden vehicle		
deceleration occurs		
due to a clutch		
pressure control adaptive active = FALSE		
solenoid that has failed		
in the opposite sense, (transmission output shaft > 36.0 RPM		
clutch pressure control speed		
solenoid failed OR		
hydraulically on, while (accelerator pedal > 0.50 %		
the solenoid is position		
electrically functional, UR units must take priority	0.500	
engine speed) > 1,000.0 RPM > 0	> 0.500 seconds	
Dver any ciulon		
solenoid stuck off		
diagnostic monitor. All		
clutch pressure control		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control			C3 clutch pressured map	= mapped to line pressure, C3 clutch pressure has reached fully applied state		
		solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or			(enable forward gear cal AND driver direction request AND	= 1 (1 to enable, 0 to disable) = FORWARD		
		performance faults can be present, and no			Attained Gear) OR	= a FORWARD gear		
		or performance faults can be present, or the			AND driver direction request	= o() to enable, o to disable) = REVERSE		
		solenoid stuck off test is disabled. This			Attained Gear)	= REVERSE		
		diagnostic monitor is relative to C3 (GR10			range shift state	= range shift complete		
		C23457910 or 8SPD C13567) clutch pressure control solenoid.			DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not test fail this key on	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System Pressure Control (PC) Solenoid C Stuck On	Fault         Code         P0797	Monitor Strategy Description	Malfunction Criteria shift type is power down shift: C3 clutch slip speed OR shift type is garage shift: C3 clutch slip speed ELSE shift is another type: C3 clutch slip speed update fail time 6.25 milliscond update	Threshold Value         < 50.00 RPM	Secondary Parameters	Enable Conditions	Time Required Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.35 shift type is another type: fail time > 0.35 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: Clutch Stuck On Fail Offset Time PU Shifts open throttle downshift: Clutch Stuck On Fail Offset Time PD Shifts garage shift: Clutch Stuck On Fail Offset	MIL Ilium. Type A, 1 Trips
		clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring					Time GS Shifts closed throttle downshift:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no					Clutch Stuck On Fail Offset Time CD Shifts negative torque upshift: Clutch Clip Press NU Shifts clutch staging shift: Clutch Stuck	
		automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle					On Fail Offset Time STGR Shifts update fail count,	
		deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while			****	*****	fail count > 3 counts 6.25 milliscond update	
		the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors			system-level enables: use battery voltage calibration is FALSE OR	= 1 Boolean		
		DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional no			(use battery voltage calibration is TRUE AND battery voltage)	= 1 Boolean >9.00 volts	battery voltage time > 0.100	
		clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical			use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE	= 1 Boolean = 1 Boolean	5000103	
		or performance faults can be present, or the clutch pressure control solenoid stuck on test			AND run crank voltage)	>9.00 volts	run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to the GF9 C3 CB38, GR10C3			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
		Speed C3C13567 clutch pressure control solenoid.			TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					******	*******		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 36.0 RPM		
					((C3 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time	= TRUE		
					out enable)	= 1 ( 1 to enable, 0 to disable)		
					C3 off going clutch command pressure )	< 350 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							closed throttle upshift: C3 exhaust delay closed throttle lift foot up shift	
							open throttle upshift: C3 exhaust delay open throttle power on up shift	
							garage shifts: C3 exhaust delay garage shift	
							closed throttle downshift: C3 exhaust delay closed throttle down shift	
							negative torque upshift: C3 exhaust delay negative torque up shift	
							open throttle downshift: C3 exhaust delay open throttle power down shift	
					(engine torque AND Primary oncoming stuck on toraue enable cal)	> 8,192 Nm = 0 (0 is enable, 1 is _enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters OR ( primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	Enable Conditions = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch:	Time Required Post-torque phase delay for powered upshifts is dependent on the oncoming clutch:	MIL Ilium.
						C1 Torque-Based Pressure Clip OR C2 Torque-Based Pressure Clip OR C4 Torque-Based Pressure Clip OR C5 Torque-Based Pressure Clip OR C6 Torque-Based Pressure Clip clip thresholds for all other shift types: garage shifts:	C1_Oncoming Post-Torque Phase Delay OR C2_Oncoming Post-Torque Phase Delay OR C4_Oncoming Post-Torque Phase Delay OR C5_Oncoming Post-Torque Phase Delay OR C6_Oncoming Post-Torque Phase Delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Clutch Clip Press GS Shifts		
						closed throttle downshift: Clutch Clip Press CD Shifts		
						negative torque upshift: Clutch Clip Press NU Shifts		
						open throttle downshift: Clutch Clip Press PD Shifts		
					C3 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed			
					calculation	= TRUE		
					*****	*****		
					conditions needed to trigger test:			
					(current shift type	# Garage shift		
					shift type enable cal for current shift type)	Clutch Stuck On Shift = Type Enable		
					OR	1 will enable)		
					(Intrusive shift active AND	= FALSE		
					shift type enable cal for	= 1 (0 will enable, 1 will		
					garage shift AND	enable)		
					Attained Gear	= NEUTRAL OR		
					AND	commanded gear		
					(stuck on enable cal for forward garge shifts	= 1 (0 to disable, 1 to		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear))	= FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE		
					clutch stuck off intrusive shift active startle mitigation active (see note on startle	= FALSE = FALSE		
					mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller)	= TRUE = TRUE		
					test state	TUT_HOLD (see note below about state transitions)		
					**************************************	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P1724 P172B		
					*****	1.1 <i>1.4</i> 01.1 <i>1.4</i> 2		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.			

Component/ Fault System Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTC stoset P0747, P0777 P0707 P0715			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input/Turbine Speed Sensor A Circuit Low	P07BF	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intput/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	< 0.2500 volts (< 0.5 Q impedance between signal and controller ground)	service mode \$04 active diagnostic monitor enable P07C0 fault active service fast learn run crank voltage battery voltage P07BF fault active P07BF test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.050 seconds, update fail count, fail count > 16 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input/Turbine Speed Sensor A Circuit High	P07C0	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission input/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	> 4.7500 volts (< 0.5 Q impedance between signal and controller power)	service mode \$04 active diagnostic monitor enable P07BF fault active service fast learn run crank voltage battery voltage P07C0 fault active P07C0 test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.050 seconds, update fail count, fail count > 16 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Upshift Switch Circuit	P0815	Diagnoses the state of the upshift switch circuit, stuck in the state "tap up" (upshift) active. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 1 100 millisecond update rate	= tap up (upshift) state active	service mode \$04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage p1761 fault active P0826 fault active P0826 fault active P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2OR D3OR D4OR D5OR D6OR D7OR D8OR D9OR D10OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	<ul> <li>= FALSE</li> <li>= 1 Boolean</li> <li>&gt; 5.00 volts</li> <li>&gt; 25 milliseconds</li> <li>&gt; 9.00 volts</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>&gt; 1.00 seconds</li> </ul> 1 Boolean <ul> <li>= 1 Boolean</li> <li>= 0 Boolean</li> </ul>	fail time 1 > 1.00 seconds	Emissio ns Neutral Diagnost ics - Type C
			update fail time 2 100 millisecond update rate	active	diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active	<ul> <li>= 1 Boolean</li> <li>&gt;5.00 volts</li> <li>&gt; 25 milliseconds</li> <li>&gt;9.00 volts</li> <li>= FALSE</li> </ul>	120.00 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P0826 fault active P0826 test fail this key on P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2OR D3OR D4OR D5OR D4OR D5OR D6OR D7OR D8OR D9OR D10OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	<ul> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>&gt; 1.00 seconds</li> </ul> 1 Boolean <ul> <li>1 Boolean</li> <li>3 Boolean</li> <li>1 Boolean</li> <li>9 Boolean</li> <li>0 Boolean</li> <li>0 Boolean</li> <li>0 Boolean</li> <li>1 Boolean</li> <li>1 Boolean</li> </ul>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Downshift Switch Circuit	P0816	Diagnoses the state of the downshift switch circuit, stuck in the state "tap down" (downshift) active. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 1 100 millisecond update rate	= tap down (downshift) state active	service mode \$04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active P0826 fault active P0826 fault active P0826 fault pending (P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2OR D3OR D4OR D5OR D4OR D5OR D4OR D5OR D4OR D5OR D4OR D5OR D10OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	<ul> <li>= FALSE</li> <li>= 1 Boolean</li> <li>&gt; 5.00 volts</li> <li>&gt; 25 milliseconds</li> <li>&gt; 9.00 volts</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>&gt; 1.00 seconds</li> </ul> 1 Boolean <ul> <li>= 1 Boolean</li> <li>= 0 Boolean</li> <li>Transmission Shift Lever Position Validity</li> </ul>	fail time 1 > 1.00 seconds	Emissio ns Neutral Diagnost ics - Type C
			switch state update fail time 2 100 millisecond update rate	= tap down (downshift) state active	service mode \$04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active	= FALSE = 1 Boolean >5.00 volts > 25 milliseconds >9.00 volts = FALSE	fail time 2 > 120.00 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P0826 fault active P0826 test fail this key on P0826 fault pending (P0816 fault active OR P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2OR D3OR D4OR D4OR D5OR D4OR D5OR D6OR D7OR D8OR D9OR D10OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	<ul> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>&gt; 1.00 seconds</li> </ul> 1 Boolean <ul> <li>1 Boolean</li> <li>0 Boolean</li> <li>0 Boolean</li> <li>0 Boolean</li> <li>0 Boolean</li> <li>1 Boolean</li> </ul>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Up and Down Shift Switch Circuit	P0826	Diagnoses the state of the upshift/downshift switch circuit at an illegal voltage, voltage out of range. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 100 millisecond update rate	= illegal (voltage out of range)	service mode \$04 active diagnostic monitor enable run crank voltage P1761 fault active (P0826 fault active OR P0826 fault active test fail this key on)	= FALSE = 1 Boolean >5.00 volts >9.00 volts = FALSE = FALSE = FALSE	fail time > 60.00 seconds run crank voltage time > 25 milliseconds	Emissio ns Neutral Diagnost ics - Type C

Component/ F System C	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid A Control Circuit Open	>0960	Controller specific circuit diagnoses 9 speed CB123456R, 8 speed CB123456R, 8 speed CB1278R clutch, or CVT secondary pulley solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit Increment fail time	> 200 K Q impedance between signal and controller ground	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_NoHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid A Control Circuit Low	P0962	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 8 speed CB1278R clutch, or CVT secondary pulley solenoid fora ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode)) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_NoHSD will disable) = ON</pre>	fail time > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid A Control Circuit High	P0963	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 8 speed CB1278R clutch, or CVT secondary pulley solenoid fora short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2) OR (solenoid is mapped to high side driver 3) (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_NOHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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Pressure Control (PC) Solenoid B Control Circuit Open	P0964	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid B Control Circuit Low	P0966	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON</pre>	fail time > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid B Control Circuit High	P0967	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid C Control Circuit Open	P0968	Controller specific circuit diagnoses 9 speed CB38, 10 speed C23457910, 8 speed C13567 clutch, orCVT line pressure solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_NOHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid C Control Circuit Low	P0970	Controller specific circuit diagnoses 9 speed CB38.10 speed C23457910, 8 speed C13567 clutch, or CVT line pressure solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_NoHSD will disable) = ON</pre>	fail time > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid C Control Circuit High	P0971	Controller specific circuit diagnoses 9 speed CB38, 10 speed C23457910, 8 speed C13567 clutch, or CVT line pressure solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_NoHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Wheel Speed Sensor Sequence Number Incorrect (Emissions Neutral Diagnostic)	P15FD	This DTC monitors wheel speed signals for an incorrect sequence Emission neutral default state sets wheel speed signals = 0.0.	Communication of the wheel speed sequence numbers from the ABS / Brake Control Module is incorrect. A complete set of sequence numbers has not been received for and this state is continuous for out of a total sample time of	> 10.00 seconds >2.00 seconds > 12.00 seconds	Sequence Number Error DTC is enabled Power Mode Run/Crank Ignition Voltage Driven and non-driven wheel rotational status is currently being received and not failsoft.	Enabled = Run or Crank >=11.00 Volts	Diagnostic executes in 25ms loop.	Emissio ns Neutral Diagnost ics - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Circuit Forward Direction Error	P172A	The TOS sensor is a directional sensor, and raw TOS direction is rationalized based on attained gear and multiple speed sensors. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. If the raw TOS direction is not a forward gear but attained gear is a forward gear, and, TISS and intermediate speed sensors confirm consistent direction, the raw TOS direction is in error.	(raw TOS direction OR raw TIS direction OR intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	<pre># forward # forward intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2 # predicted direction &gt; 1st gear &lt; 10th gear</pre>	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	<pre>speed sensor directional rationality =enable calibration = CeTOSR_e_Directional &gt; 500.0 RPM &gt; engine speed time for transmission hydraulic pressure available &gt; 9.00 volts &gt; 0.100 seconds = FALSE &gt; 9.00 volt &gt; 0.100 seconds &gt; 1st gear &lt; 10th gear = FALSE = range shift complete &gt; 1.00 seconds</pre>	2.50 seconds	Type A, 1 Trips
			(raw TOS direction OR intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	<pre># forward intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2 # predicted direction &gt; 1st gear &lt; 10th gear</pre>	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM > engine speed time for transmission hydraulic pressure available	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	<ul> <li>&gt;9.00 volts</li> <li>&gt; 0.100 seconds</li> <li>= FALSE</li> <li>&gt;9.00 volt</li> <li>&gt; 0.100 seconds</li> <li>&gt; 1st gear</li> <li>&lt; 10th gear</li> <li>= FALSE</li> <li>= range shift complete</li> <li>&gt; 1.00 seconds</li> </ul>		
			(raw TOS direction OR raw TIS direction OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	<ul> <li># forward</li> <li># forward</li> <li>intermediate speed</li> <li>sensor 1 or 2</li> <li># predicted direction</li> <li>&gt; 1st gear</li> <li>&lt; 10th gear</li> </ul>	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM > engine speed time for transmission hydraulic pressure available	2.50 seconds	
					battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete)	>9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete		

Component/ System	ult Monitor Strategy de Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				enable time	> 1.00 seconds		
		(raw TOS direction OR raw TIS direction OR intermediate speed sensor 1 direction raw) AND attained gear AND attained gear	<pre># forward # forward intermediate speed sensor 1 or 2 # predicted direction &gt; 1st gear &lt; 10th gear</pre>	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete)	<pre>speed sensor directional rationality = enable calibration = CeTOSR_e_Directional &gt; 500.0 RPM &gt; engine speed time for transmission hydraulic pressure available &gt; 9.00 volts &gt; 0.100 seconds = FALSE &gt; 9.00 volt &gt; 0.100 seconds &gt; 1st gear &lt; 10th gear = FALSE = range shift complete</pre>	2.50 seconds	
		(raw TOS direction OR intermediate speed sensor 2 direction raw) AND attained gear AND	# forward intermediate speed sensor 1 or 2 # predicted direction	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional	2.50 seconds	
		attained gear	< 10th gear	engine speed engine speed time	> 500.0 RPM >		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			(raw TOS direction OR	# forward	battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time when the following conditions are met undate	engine speed time for transmission hydraulic pressure available > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			intermediate speed sensor 1 direction raw) AND attained gear AND attained gear	<ul> <li>&gt; 1st gear</li> <li>&lt; 10th gear</li> </ul>	the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	<pre>speed sensor directional rationality = enable calibration = CeTOSR_e_Directional &gt; 500.0 RPM &gt; engine speed time for transmission hydraulic pressure available</pre>		
					battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active	>9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds > 1st gear = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					range shift state (auto trans shift complete)	= range shift complete		
					enable time	> 1.00 seconds		
			(raw TOS direction OR raw TIS direction) AND attained gear AND attained gear	# forward # forward > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable	speed sensor directional rationality = enable calibration	2.50 seconds	
					TOSS sensor type must be directional	= CeTOSR_e_Directional		
					engine speed engine speed time	<ul> <li>&gt; 500.0 RPM</li> <li>&gt;</li> <li>engine speed time for transmission hydraulic pressure available</li> </ul>		
					battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	<ul> <li>&gt;9.00 volts</li> <li>&gt; 0.100 seconds</li> <li>= FALSE</li> <li>&gt;9.00 volt</li> <li>&gt; 0.100 seconds</li> <li>&gt; 1st gear</li> <li>&lt; 10th gear</li> <li>= FALSE</li> <li>= range shift complete</li> <li>&gt; 1.00 seconds</li> </ul>		
			raw TOS direction attained gear	# forward > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					engine speed engine speed time	> 500.0 RPM > engine speed time for transmission hydraulic pressure available		
					battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active	>9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE		
					range shift state (auto trans shift complete) enable time	<ul><li>range shift complete</li><li>1.00 seconds</li></ul>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio n Control System - Shift Limiting Active	P175E	The latent fault diagnostic monitors detects when the vehicle has been driven excessively with an emission MIL request. The DTCs requesting the emission MIL are all due to a safety critical system or component fault present in which a DTC is set fault active, test fail this key on or fault pending (fault pending is fail time # 0). The safety critical systems or safety critical components include: transmission input, output and intermediate speed sensors, transmission range sensors, clutch pressure control solenoids including unintended deceleration detected due to clutch pressure control solenoids, driver accelerator pedal position, engine	unintended decel test system fault unintended decel test system fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND unintended deceleration latent fault fail count)) UPDATE unintended decel test system fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE continue execute only IF: calibrated for a back up signal to longitudinal acceleration and total brake axle torque using and wheel speed or TOSS OR U0121 (loss comm ABS/EBCM) occurs OR brake pedal position fault THEN SET unintended decel test system fault occur = TRUE	<ul> <li>= 1 Boolean</li> <li>&gt; 5.00 volts</li> <li>&gt; 12.5 milliseconds</li> <li>= FALSE</li> <li>= TRUE</li> <li>&gt; 18.0 KPH</li> <li>&gt; 120.0 seconds</li> </ul>	unintended decel test system fault time > 10.0 seconds UPDATE unintended deceleration latent fault fail count SET unintended decel test system fault = TRUE unintended deceleration latent fault fail count > 100 counts 25 millisecond update rate	Type A, 1 Trips
		crankshaft position and engine torque. The DTCs for these safety critical systems or safety critical components include both electrical fault	ECM range sensor fault ECM range sensor fault occur RunCrankVoltageMet (*default gear option active	= FALSE = TRUE = TRUE = FALSE	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time	<ul> <li>= 1 Boolean</li> <li>&gt; 5.00 volts</li> <li>&gt; 12.5 milliseconds</li> </ul>	ECM range sensor fault time > 10.0 seconds UPDATE ECM range sensor latent fault fail count	
		fault DTCs. The latent fault diagnostic monitor	OR (*default gear option active	= TRUE	vehicle speed trip criteria met when: vehicle speed trip criteria	= FALSE	SET ECM range sensor fault = TRUE	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		counts the run/crank ignition cycles before the latent fault DTC is set fault active.	AND ECM range sensor latent fault fail count)) UPDATE ECM range sensor fault time *default gear option active occurs when emission MIL active due to transmission default gear	= 100 counts	met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF ECM P2802 fault active OR ECM P2803 fault active SET ECM range sensor fault occur = TRUE	= TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	ECM range sensor latent fault fail count > 100 counts 25 millisecond update rate	
			TCM range sensor fault TCM range sensor fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND TCM range sensor latent fault fail count)) UPDATE TCM range sensor fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF TCM P0707 fault active OR TCM P0708 fault active SET TCM range sensor fault occur = TRUE	<ul> <li>= 1 Boolean</li> <li>&gt; 5.00 volts</li> <li>&gt; 12.5 milliseconds</li> <li>= FALSE</li> <li>= TRUE</li> <li>&gt; 18.0 KPH</li> <li>&gt; 120.0 seconds</li> <li>= TRUE</li> <li>= TRUE</li> <li>= TRUE</li> </ul>	TCM range sensor fault time > 10.0 seconds UPDATE TCM range sensor latent fault fail count SET TCM range sensor fault = TRUE TCM range sensor latent fault fail count > 100 counts 25 millisecond update rate	
			TOSS fault TOSS fault occur RunCrankVoltageMet <del>(*default gear option</del>	= FALSE = TRUE = TRUE -~ <b>FALSE</b>	test enable calibration RunCrankVoltageMet = TRUE when: <b>-run crank voltage</b>	= 1 Boolean <del>≻ 6.00 volto</del>	TOSS fault time > 10.0 seconds UPDATE TOSS latent fault fail	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			active OR (*default gear option active AND TOSS sensor latent fault fail count)) UPDATE TOSS fault time *default gear option active occurs when emission MIL active due to transmission default gear	= TRUE = 100 counts	for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF P077C or P077D fault active OR P0722 or P0723 test fail this key on SET TOSS fault occur = TRUE	<ul> <li>&gt; 12.5 milliseconds</li> <li>= FALSE</li> <li>= TRUE</li> <li>&gt; 120.0 seconds</li> <li>= TRUE</li> <li>= TRUE</li> </ul>	SET TOSS fault = TRUE TOSS latent fault fail count > 100 counts 25 millisecond update rate	
			tie-up fault tie-up fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND tie-up latent fault fail count)) UPDATE tie-up fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF P077C or P077D fault active OR P0722 or P0723 test fail this key on	<ul> <li>= 1 Boolean</li> <li>&gt; 5.00 volts</li> <li>&gt; 12.5 milliseconds</li> <li>= FALSE</li> <li>= TRUE</li> <li>&gt; 18.0 KPH</li> <li>&gt; 120.0 seconds</li> <li>= TRUE</li> <li>= TRUE</li> <li>= TRUE</li> </ul>	tie-up fault time > 10.0 seconds UPDATE tie-up latent fault fail count SET tie-up fault = TRUE tie-up latent fault fail count > 100 counts 25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					SET tie-up fault occur = TRUE			
			trans range fault trans range fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND tie-up latent fault fail count)) UPDATE trans range fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = TRUE = 200 counts	SET tie-up fault occur = TRUE test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF [(P0717 or P07C0 or P07BF fault active or P077D or P077C fault active or P723 test fail this key on or P077C or P0722 fault pending or P0716or P07C0 or P07BF for P0717 fault pending or P172B or P172A or P0721 fault pending	<ul> <li>= 1 Boolean</li> <li>&gt; 5.00 volts</li> <li>&gt; 12.5 milliseconds</li> <li>= FALSE</li> <li>= TRUE</li> <li>&gt; 18.0 KPH</li> <li>&gt; 120.0 seconds</li> <li>= TRUE</li> </ul>	trans range fault time > 10.0 seconds UPDATE trans range latent fault fail count SET trans range fault = TRUE trans range latent fault fail count > 200 counts 25 millisecond update rate	
					or P1783 or P17CE fault active or	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P1783 or P17CE fault pending or P172A or P172B test fail this key on or	= TRUE = TRUE		
					P0721 fault active) AND	= TRUE		
					(safety diasble cal not FALSE OR	= 0 Boolean		
					safety enable cal TRUE)] OR	= 1 Boolean		
					[(P176C orP160Eor P0963 or P078F or P0707 fault pending	= TRUE		
					or P18AA fault active) AND	= TRUE		
					(safety diasble cal not FALSE OR	= 0 Boolean		
					safety enable cal TRUE)]	= 1 Boolean		
					SET trans range fault occur = TRUE			
			tie-up test disable fault tie-up test disable fault occur	= FALSE = TRUE	test enable calibration RunCrankVoltageMet = TRUF when:	= 1 Boolean	tie-up test latent fault time > 10.0 seconds UPDATE tie-up	
			RunCrankVoltageMet (*default gear option active OR	= TRUE = FALSE	run crank voltage for run crank voltage time vehicle speed trip criteria	> 5.00 volts > 12.5 milliseconds	test latent fault fail count SET tie-up test disable fault =	
			(*default gear option active	= TRUE	met when: vehicle speed trip criteria	= FALSE	TRUE	
			AND tie-up test latent fault fail count))	= 100 counts	met RunCrankVoltageMet vehicle speed	= TRUE > 18.0 KPH	tie-up test latent fault fail count > 100 counts	
			UPDATE tie-up test latent fault time		for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE	> 120.0 seconds	25 millisecond update rate	
			*default gear option active					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			occurs when emission MIL active due to transmission default gear		IF EngineTorqueEstInaccura te	= TRUE		
			, and the second se		AcceleratorPedalFailure	= TRUE		
					CrankSensor_FA	= TRUE		
					P2534 fault active	= TRUE		
					(P0707 test fail this key	= TRUE		
					P0707 fault active OR P0708 test fail this key on	= TRUE = TRUE		
					OR P0708 fault active OR D2805 fault active OR	= TRUE		
					P27EE fault active OR	= TRUE		
					P27EB fault active OR P27ED fault active OR P17E7 fault active OR	= TRUE = TRUE - TPUE		
					P17F5 fault active OR P17F5 fault active OR	= TRUE = TRUE		
					P17FC fault active OR P17FC fault active OR	= TRUE - TRUE		
					P17FB fault active)	= TRUE		
					(P0716 fault pending, fault active, test fail this key on	= TRUE		
					P0717 fault pending, fault	= TRUE = TRUE		
					OR P0721 fault pending, fault	= TRUE		
					active, test fail this key on OR	= TRUE		
					P0722 fault pending, fault active, test fail this key on	= TRUE		
					OR P0723 fault pending, fault	= TRUE = TRUE		
					active, test fail this key on OR _P077B fault oending, fault_	= TRUE = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					active, test fail this key on OR	= TRUE		
					P077C fault pending, fault active, test fail this key on	= TRUE		
					P077D fault pending, fault	= TRUE - TRUE		
					OR P07BE fault pending, fault			
					active, test fail this key on	- 1102		
					P07C0 fault pending, fault active, test fail this key on	= TRUE		
					OR P172A fault pending, fault active, test fail this key on	= TRUE		
					OR P172B fault pending, fault	= TRUE		
					OR P176B fault pending, fault	= TRUE		
					active, test fail this key on OR			
					P176C fault pending, fault active, test fail this key on OR	= TRUE		
					P176D fault pending, fault active, test fail this key on	= TRUE		
					P1783 fault pending, fault active, test fail this key on	= TRUE		
					OR P178F fault pending, fault active, test fail this key on	= TRUE		
					OR P17C4 fault pending, fault	= TRUE		
					active, test fail this key on OR P17C5 fault pending fault	= TRUF		
					active, test fail this key on OR			
					P17C6 fault oending, fault_	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					active, test fail this key on OR P17C7 fault pending, fault active, test fail this key on OR P17CC fault pending, fault active, test fail this key on OR P17CD fault pending, fault active, test fail this key on OR P17CE fault pending, fault active, test fail this key on OR P17D3 fault pending, fault active, test fail this key on OR P17D6 fault pending, fault active, test fail this key on OR P17D6 fault pending, fault active, test fail this key on) SET tie-up test disable fault occur = TRUE	= TRUE = TRUE = TRUE = TRUE = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Acceleration Sensor Signal Message Counter Incorrect	P175F	The diagnostic monitor detects an alive rolling count error or checksum error in the CAN frame containing the lateral acceleration signal value and longitudinal acceleration sensor signal value. Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: Acceleration Sensor Value ARC Acceleration Sensor CSUM	>= 15 counts out of >= 18 counts >= 15 counts out of >=18 counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	>= 3,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Acceleration Sensor Value ARC samples every 50 milliseconds. Acceleration Sensor Value CSUM samples every 50 milliseconds.	Emissio ns Neutral Diagnost ic-Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Up and Down Shift Switch Signal Circuit	P1761	The alive rolling count normally cycles 0, 1, 2, and 3 as a serial data periodic frame is processed normally. The diagnostic monitor counts the number of times an alive rolling count error occurs over a period of time. The TCM receives a serial data frame at a periodic rate, during which, the receive data is processed the comparing the current value of the alive rolling count in the frame date to the incremented value of the diagnostic alive rolling count. When the two values of the alive rolling count do not agree, an alive rolling count error has occurred. The error indicator is saved in an array buffer, and when the number of error indicators in the buffer exceed the fail threshold the fail time is allowed to time up. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	alive rolling count error counter update fail time 100 millisecond update rate	> 3 counts	service mode \$04 active diagnostic monitor enable run crank voltage run crank voltage time up and down shift serial data frame receive occurred when up and down shift serial data frame receive occurred: increment the diagnsotic alive rolling count data value, if the diagnsotic alive rolling count data value, set alive rolling count error to TRUE, when alive rolling count error AND previous alive rolling count error in 10 element arrary buffer, increment alive rolling count error counter	<ul> <li>= FALSE</li> <li>= 1 Boolean</li> <li>&gt; 9.00 volts</li> <li>&gt; 0.100 seconds</li> <li>= TRUE</li> <li># frame alive rolling count data value</li> <li>= TRUE</li> <li>= TRUE</li> <li>= FALSE</li> </ul>	fail time > 10.00 seconds	Emissio ns Neutral Diagnost ics - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Upshift Switch Circuit 2	P1765	Diagnoses the state of the upshift switch circuit, stuck in the state "tap up" (upshift) active. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 1 100 millisecond update rate	= tap up (upshift) state active	service mode \$04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active P1767 fault active P1767 fault active P1765 fault active OR P1765 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2OR D3OR D4OR D5OR D6OR D7OR D8OR D9OR D10OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	<ul> <li>= FALSE</li> <li>= 1 Boolean</li> <li>&gt; 5.00 volts</li> <li>&gt; 25 milliseconds</li> <li>&gt; 9.00 volts</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>&gt; 1.00 seconds</li> </ul> 1 Boolean <ul> <li>= 1 Boolean</li> <li>= 0 Boolean</li> </ul>	fail time 1 > 1.00 seconds	Emissio ns Neutral Diagnost ics - Type C
			update fail time 2 100 millisecond update rate	active	diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active	= 1 Boolean >5.00 volts > 25 milliseconds >9.00 volts = FALSE	120.00 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P1767 fault active P1767 test fail this key on P1767 fault pending (P1765 fault active OR P1765 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2OR D3OR D4OR D5OR D4OR D5OR D6OR D7OR D8OR D9OR D10OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	<ul> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>&gt; 1.00 seconds</li> </ul> 1 Boolean <ul> <li>1 Boolean</li> <li>0 Boolean</li> <li>0 Boolean</li> <li>0 Boolean</li> <li>0 Boolean</li> <li>1 Boolean</li> </ul>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Downshift Switch Circuit 2	P1766	Diagnoses the state of the downshift switch circuit, stuck in the state "tap down" (downshift) active. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 1 100 millisecond update rate	= tap down (downshift) state active	service mode \$04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage time P1761 fault active P1767 fault active P1767 fault pending (P1766 fault active OR P1766 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2OR D3OR D4OR D5OR D4OR D5OR D4OR D7OR D8OR D9OR D10OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	<ul> <li>= FALSE</li> <li>= 1 Boolean</li> <li>&gt; 5.00 volts</li> <li>&gt; 25 milliseconds</li> <li>&gt; 9.00 volts</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>&gt; 1.00 seconds</li> </ul> 1 Boolean <ul> <li>= 1 Boolean</li> <li>= 0 Boolean</li> </ul>	fail time 1 > 1.00 seconds	Emissio ns Neutral Diagnost ics - Type C
			switch state update fail time 2 100 millisecond update rate	= tap down (downshift) state active	service mode \$04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active	= FALSE = 1 Boolean >5.00 volts > 25 milliseconds >9.00 volts = FALSE	fail time 2 > 120.00 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P1767 fault active P1767 test fail this key on P1767 fault pending (P1766 fault active OR P1766 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2OR D3OR D4OR D5OR D4OR D5OR D6OR D7OR D8OR D9OR D10OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	<ul> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>&gt; 1.00 seconds</li> </ul> 1 Boolean <ul> <li>1 Boolean</li> <li>0 Boolean</li> <li>0 Boolean</li> <li>0 Boolean</li> <li>0 Boolean</li> <li>1 Transmission Shift Lever</li> <li>Position Validity</li> </ul>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Up and Down Shift Switch Circuit 2	P1767	Diagnoses the state of the upshift/downshift switch circuit at an illegal voltage, voltage out of range. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 100 millisecond update rate	= illegal (voltage out of range)	service mode \$04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active P1767 fault active	= FALSE = 1 Boolean >5.00 volts > 25 milliseconds >9.00 volts = FALSE = FALSE	fail time > 60.00 seconds	Emissio ns Neutral Diagnost ics - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio n Planetary Gearset Ring Gear Speed Sensor Circuit Range/ Performance	P176B	The diagnostic monitor rationalizes the transmission intermediate shaft speed sensor by using the transmission output shaft output speed sensor and the known ratio between the transmission intermediate shaft speed and the transmission output shaft output speed based on the commanded gear and the transmission lever node design. The estimated transmission intermediate shaft speed is equal to the gear ratio times the transmission output shaft output speed. The absolute value of the delta between the measured transmission intermediate shaft speed and the estimated transmission intermediate shaft speed and the estimated transmission intermediate shaft speed is used to determine if the measured transmission intermediate shaft speed is rational.	deltal =ABS (transmission input speed - (transmission output speed * gear ratio commanded)) update faiil time 25 millisecond update rate	> 10.0 RPM	diagnostic monitor enable speed sesnor configuration calibration is single OR dual ratio calibration is function of command gear and intermediate speed sesnor when not REVERSE ratio calibration is function of command gear and intermediate speed sesnor when REVERSE 	<ul> <li>= 1 Boolean</li> <li>= CeTNSR_e_NSPD_Dual SpdSnsr</li> <li>P176B ratio calibration</li> <li>= when not REVERSE see supporting tables</li> <li>P176B ratio calibration</li> <li>= when REVERSE see supporting tables</li> <li>&gt; P176B minimum estimated transmission intermediate speed to enable fail evaluation see supporting tables</li> </ul>	fail time > P176B intermediate speed sensor fail time threshold see supporting tables fail time threshold met increments fail count, fail count > P176B intermediate speed sensor fail count threshold see supporting tables	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					with transmission input speed input speed sensor ready based on commaned gear	P176B minimum transmission input speed to enable fail > evaluation see supporting tables P176B holding clutch = states see supporting tables	P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation see supporting tables	
					and transmission intermediate speed sensor (state output must be FALSE to enable fail			
					evaluation) with with attained gear	= REVERSE OR = 1st thru 10th		
						**************************************		
					**************************************	> 240.0 RPM > 36.0 RPM = nuetral idle mode ON		
					transmission output speed neutral idle mode	= range shift complete = FALSE		
					range shift state P0716 fault active P0717 fault active P07BF fault active P07C0 fault active P0722 fault active	= FALSE = FALSE = FALSE = FALSE = FALSE = FALSE		
					P0723 fault active P077C fault active P077D fault active P176C fault active P176D fault active battery voltage	= FALSE = FALSE = FALSE >9.00 volts		
						= FALSE >9.00 volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					service fast learn active run crank voltage	> 500.0 RPM	battery voltage time > 0.100 seconds	
					transmission hydraulic pressure available: engine speed		run crank voltage time > 0.100 seconds	
							engine speed time > engine speed time for transmission hydraulic pressure available see supporting tables	

Component/ Fa System Co	ault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio P <sup>2</sup> n Planetary Gearset Ring Gear Speed Sensor Circuit Low	9176C	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	< 0.25 volts (< 0.5 Q impedance between signal and controller ground)	service mode \$04 active diagnostic monitor enable P176D fault active service fast learn run crank voltage battery voltage P176C fault active P176C test fail this key on	= FALSE = 1.00 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.05 seconds, update fail count, fail count > 40.00 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ Fa System Co	ault ode	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio P1 n Planetary Gearset Ring Gear Speed Sensor Circuit High	176D	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	> 4.75 volts (< 0.5 Q impedance between signal and controller power)	service mode \$04 active diagnostic monitor enable P176C fault active service fast learn run crank voltage battery voltage P176D fault active P176D test fail this key on	= FALSE = 1.00 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.05 seconds, update fail count, fail count > 40.00 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input Speed Sensor Direction Not Plausible - Forward	P1783	The TIS sensor is a directional sensor, and raw TIS direction is rationalized based on attained gear and multiple speed sensors. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. If the raw TIS direction is not reverse but attained gear is reverse, or, if the raw TIS direction is not forward but attained gear is a forward gear, the raw TIS direction is in error.	raw TIS direction AND attained gear	# FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	<pre>speed sensor directional rationality = enable calibration = CeTOSR_e_Directional &gt; 500.0 RPM &gt; engine speed time for transmission hydraulic pressure available seconds &gt; 9.00 volts &gt; 0.100 seconds = FALSE &gt; 9.00 volt &gt; 0.100 seconds = REVERSE = FALSE = range shift complete &gt; 1.00 seconds</pre>	2.50 seconds	Type A, 1 Trips
			raw TIS direction AND attained gear AND attained gear	# FORWARD > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM > engine speed time for transmission hydraulic pressure available seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete)	<ul> <li>&gt;9.00 volts</li> <li>&gt; 0.100 seconds</li> <li>= FALSE</li> <li>&gt;9.00 volt</li> <li>&gt; 0.100 seconds</li> <li>= REVERSE</li> <li>= FALSE</li> <li>= range shift complete</li> <li>&gt; 1.00 seconds</li> </ul>		
					enable time			
			intermediate speed sensor 1 direction raw AND TIS direction AND attained gear	intermediate speed sensor 1 or 2 # predicted direction # FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM > engine speed time for transmission hydraulic pressure available seconds	2.50 seconds	
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete)	<ul> <li>&gt;9.00 volts</li> <li>&gt; 0.100 seconds</li> <li>= FALSE</li> <li>&gt;9.00 volt</li> <li>&gt; 0.100 seconds</li> <li>= REVERSE</li> <li>= FALSE</li> <li>= range shift complete</li> <li>&gt; 1.00 seconds</li> </ul>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enable time			
			intermediate speed sensor 1 direction raw AND	intermediate speed sensor 1 or 2 # predicted direction	when the following conditions are met update the enable time: diagnsotic monitor enable	speed sensor directional rationality = enable calibration	2.50 seconds	
			raw TIS direction AND attained gear AND attained gear	# FORWARD > 1st gear < 10th gear	TOSS sensor type must be directional	= CeTOSR_e_Directional > 500.0 RPM >		
					engine speed engine speed time	engine speed time for transmission hydraulic pressure available seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	<ul> <li>&gt;9.00 volts</li> <li>&gt; 0.100 seconds</li> <li>= FALSE</li> <li>&gt;9.00 volt</li> <li>&gt; 0.100 seconds</li> <li>= REVERSE</li> <li>= FALSE</li> <li>= range shift complete</li> </ul>		
					range shift state (auto trans shift complete) enable time	> 1.00 seconds		
			intermediate speed sensor 2 direction raw AND	intermediate speed sensor 1 or 2 # predicted direction	when the following conditions are met update the enable time: diagnsotic monitor enable	speed sensor directional rationality = enable calibration	2.50 seconds	
			TIS direction AND attained gear	# FORWARD = REVERSE	TOSS sensor type must be directional	<pre>= CeTOSR_e_Directional &gt; 500.0 RPM &gt;</pre>		
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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						engine speed time for transmission hydraulic pressure available seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	>9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds = REVERSE = FALSE		
					range shift state (auto trans shift complete)	= range shift complete		
					enable time	> 1.00 seconds		
			intermediate speed sensor 2 direction raw	intermediate speed sensor 1 or 2 # predicted direction	when the following conditions are met update the enable time: diagnsotic monitor enable	speed sensor directional rationality = enable calibration	2.50 seconds	
			raw TIS direction AND attained gear AND attained gear	# FORWARD > 1st gear < 10th gear	TOSS sensor type must be directional	= CeTOSR_e_Directional > 500.0 RPM >		
					engine speed engine speed time	engine speed time for transmission hydraulic pressure available seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	<ul> <li>&gt;9.00 volts</li> <li>&gt; 0.100 seconds</li> <li>= FALSE</li> <li>&gt;9.00 volt</li> <li>&gt; 0.100 seconds</li> <li>= REVERSE</li> <li>= FALSE</li> <li>= range shift complete</li> </ul>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System	Code	Description	(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND TIS direction AND attained gear	intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2 # predicted direction # FORWARD = REVERSE	range shift state (auto trans shift complete) enable time when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time	> 1.00 seconds speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM engine speed time for transmission hydraulic pressure available seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt	2.50 seconds	llium.
				intermediate speed	service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time when the following	<ul> <li>&gt; 0.100 seconds</li> <li>= REVERSE</li> <li>= FALSE</li> <li>= range shift complete</li> <li>&gt; 1.00 seconds</li> </ul>	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) ■AN©	sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2 # predicted direction	conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			raw TIS direction AND attained gear AND attained gear	# FORWARD > 1st gear < 10th gear	engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto	engine speed time for transmission hydraulic pressure available seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = FALSE = range shift complete		
					trans shift complete) enable time	> 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intermediate Speed Sensor 1 Direction Not Plausible - Forward	P178F	The intermediate speed sensor 1 is a directional sensor, and raw intermediate speed sensor 1 direction is rationalized based on attained gear. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. Intermediate speed sensor 1 direction can be predicted, based on a function of the attained gear. When the raw intermediate speed sensor 1 direction does not correlate to the predicted direction and does not correlate to the attained gear, the intermediate speed sensor 1 directional is in error.	intermediate speed sensor 1 direction raw AND attained gear	intermediate speed sensor 1 or 2 # predicted direction = REVERSE	<ul> <li>when the following conditions are met update the enable time: diagnsotic monitor enable</li> <li>TOSS sensor type must be directional</li> <li>engine speed engine speed time</li> <li>battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active</li> <li>range shift state (auto trans shift complete)</li> </ul>	<pre>speed sensor directional rationality = enable calibration = CeTOSR_e_Directional &gt; 500.0 RPM &gt; engine speed time for transmission hydraulic pressure available seconds &gt; 9.00 volts &gt; 0.100 seconds = FALSE &gt; 9.00 volt &gt; 0.100 seconds = REVERSE = FALSE = range shift complete &gt; 1.00 seconds</pre>	2.50 seconds	Type A, 1 Trips
			intermediate speed sensor 1 direction raw AND attained gear AND	intermediate speed sensor 1 or 2 # predicted direction > 1st gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional	2.50 seconds	
			attained gear	l < 10th gear	must be directional engine speed engine speed time	<ul> <li>&gt; 500.0 RPM</li> <li>&gt;</li> <li>engine speed time for transmission hydraulic pressure available seconds</li> </ul>		

>9.00 volts       >0.100 seconds         >0.100 seconds       = FALSE         >9.00 volt       >0.100 seconds         = FALSE       >9.00 volt         > 0.100 seconds       = FALSE         > 0.100 seconds       = FALSE         > 0.100 seconds       = FALSE         > 0.100 seconds       = REVERSE         = REVERSE       = FALSE         = attained gear       = FALSE	Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
P0721 Fault Active = range shift complete range shift state (auto trans shift complete) > 1.00 seconds						battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete)	<ul> <li>&gt;9.00 volts</li> <li>&gt; 0.100 seconds</li> <li>= FALSE</li> <li>&gt;9.00 volt</li> <li>&gt; 0.100 seconds</li> <li>= REVERSE</li> <li>= FALSE</li> <li>= range shift complete</li> <li>&gt; 1.00 seconds</li> </ul>		
intermediate speed sensor 1 direction raw AND TIS direction AND attained gear       intermediate speed sensor 1 or 2 #predicted direction       when the following conditions are met update the enable time: diagnotic monitor enable must be directional       speed sensor directional rationality = enable calibration       2.50 seconds         # FORWARD attained gear       # FORWARD = REVERSE       TOSS sensor type must be directional       = CeTOSR_e_Directional       > 500.0 RPM >         engine speed engine speed time for time service fast learn active run/crank voltage for time attained gear       > 90.0 volts > 0.100 seconds = FALSE = FALSE = FALSE = range shift state (auto       > 9.00 volts > 0.100 seconds = REVERSE       = FALSE = range shift state (auto				intermediate speed sensor 1 direction raw AND TIS direction AND attained gear	intermediate speed sensor 1 or 2 # predicted direction # FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto	<pre>speed sensor directional rationality = enable calibration = CeTOSR_e_Directional &gt; 500.0 RPM &gt; engine speed time for transmission hydraulic pressure available seconds &gt; 9.00 volts &gt; 0.100 seconds = FALSE &gt; 9.00 volt &gt; 0.100 seconds = REVERSE = FALSE = FALSE = range shift complete</pre>	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enable time			
			intermediate speed sensor 1 direction raw AND	intermediate speed sensor 1 or 2 # predicted direction	when the following conditions are met update the enable time: diagnsotic monitor enable	speed sensor directional rationality = enable calibration	2.50 seconds	
			raw TIS direction AND attained gear AND attained gear	# FORWARD > 1st gear < 10th gear	TOSS sensor type must be directional	= CeTOSR_e_Directional > 500.0 RPM >		
					engine speed engine speed time	engine speed time for transmission hydraulic pressure available seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	<ul> <li>&gt;9.00 volts</li> <li>&gt; 0.100 seconds</li> <li>= FALSE</li> <li>&gt;9.00 volt</li> <li>&gt; 0.100 seconds</li> <li>= REVERSE</li> <li>= FALSE</li> <li>= range shift complete</li> </ul>		
					range shift state (auto trans shift complete) enable time	> 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw)	intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2 # predicted direction	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM	2.50 seconds	
			AND attained gear	= REVERSE	engine speed	>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						engine speed time for transmission hydraulic pressure available seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	>9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds = REVERSE = FALSE		
					range shift state (auto trans shift complete)	= range shift complete		
					enable time	> 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR	intermediate speed sensor 1 or 2 # predicted direction	when the following conditions are met update the enable time: diagnsotic monitor enable	speed sensor directional rationality = enable calibration	2.50 seconds	
			intermediate speed sensor 2 direction raw) AND	intermediate speed sensor 1 or 2 # predicted direction	TOSS sensor type must be directional	= CeTOSR_e_Directional > 500.0 RPM		
			attained gear AND attained gear	> 1st gear < 10th gear	engine speed engine speed time	engine speed time for transmission hydraulic pressure available seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	<ul> <li>&gt;9.00 volts</li> <li>&gt; 0.100 seconds</li> <li>= FALSE</li> <li>&gt;9.00 volt</li> <li>&gt; 0.100 seconds</li> <li>= REVERSE</li> <li>= FALSE</li> <li>= range shift complete</li> </ul>		

Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Description	(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear	intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2 # predicted direction # FORWARD = REVERSE	range shift state (auto trans shift complete) enable time when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete)	<pre>&gt; 1.00 seconds  speed sensor directional rationality = enable calibration = CeTOSR_e_Directional &gt; 500.0 RPM engine speed time for transmission hydraulic pressure available seconds &gt; 9.00 volts &gt; 0.100 seconds = FALSE &gt; 9.00 volt &gt; 0.100 seconds = REVERSE = FALSE = range shift complete &gt; 1.00 seconds</pre>	2.50 seconds	
			enable time			
	(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR	intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2 # predicted direction	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM	2.50 seconds	
	Monitor Strategy Description	Monitor Strategy Description       Malfunction Criteria         Image: Malfunction Criteria       Image: Criteria         Image: Image: Image: Criteria       Image: Criteria         Image: Image: Image: Image: Image: Criteria       Image: Image: Criteria         Image: Im	Monitor Strategy Description         Malfunction Criteria         Threshold Value           Intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear         intermediate speed sensor 1 or 2 # predicted direction           Intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear         # FORWARD = REVERSE           Intermediate speed sensor 1 or 2         # FORWARD = REVERSE           Intermediate speed sensor 1 or 2         # predicted direction           Intermediate speed sensor 1 direction raw OR intermediate speed sensor 1 direction raw OR         Intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2           Intermediate speed sensor 2 direction raw OR         Intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2	Monitor Strategy Description         Malfunction Criteria         Threshold Value         Secondary Parameters           Description         Intermediate speed sensor 1 direction raw OR intermediate speed sensor 1 direction raw OR TIS direction AND attained gear         Intermediate speed sensor 1 or 2         range shift state (auto trans shift complete) enable time           Very State         (intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear         intermediate speed sensor 1 or 2         when the following conditions are met update the enable time: diagnotic monitor enable           Battery voltage for time         FORWARD = REVERSE         engine speed engine speed time           Battery voltage for time service fast learn active run/crank voltage for time attained gear         battery voltage for time attained gear           Intermediate speed sensor 1 direction raw OR intermediate speed sensor 1 or 2         intermediate speed sensor 1 or 2           Intermediate speed sensor 1 direction raw OR intermediate speed sensor 1 or 2         intermediate speed sensor 1 or 2           Intermediate speed sensor 1 or 2         when the following conditions are met update the enable time: diagnotic monitor enable time: diagnotic monitor enable time: diagnot	Monitor Strategy Description         Malfunction Criteria         Threshold Value         Secondary Parameters         Enable Conditions           Description         Intermediate speed sensor 1 direction raw OR sensor 1 direction raw OR TIS direction AND attained gear         intermediate speed sensor 1 direction raw OR TIS direction AND attained gear         intermediate speed sensor 1 direction raw OR TIS direction AND attained gear         intermediate speed sensor 1 or 2         speed sensor predicted direction # FORWARD = REVERSE         offentions         conditions are met update the enable time.         speed sensor directional rationality enable conditions are met update the enable directional         speed sensor directional rationality = cortoSR_e_Directional           # ORWARD = REVERSE         # ORWARD = REVERSE         engine speed time run/crank voitage for time service fast learn active run/crank voitage for time service fast learn active run/crank voitage for time attained gear         > 0.100 seconds = FALSE         > 0.100 seconds = REVERSE           (intermediate speed sensor 1 direction raw OR (intermediate speed sensor 1 direction raw OR intermediate speed sensor 1 or 2 Heredicted direction Heredicted speed sensor 1 or 2 Heredicted direction Heredicted betraction the enable time         > 0.100 seconds = RALSE         = range shift complete = range conds = ran	Monitor Strategy Description         Malfunction Criteria         Threshold Value         Secondary Parameters         Enable Conditions         Time Required           Description         Image: speed split state (auto trans shift complete)         > 1.00 seconds         2.50 seconds           Image: speed sensor 1 or 2 sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear         intermediate speed sensor 1 or 2 predicted direction sensor 2 direction raw OR TIS direction) AND attained gear         Secondary Parameters requires speed sensor 1 or 2 predicted direction sensor 2 direction raw OR # FORWARD = REVERSE         when the following conditions are met update range shift state (auto rans shift complete) seconds         Seconds         2.50 seconds           0.100 seconds = FALSE for time service fast learn active range shift state (auto range shift state

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			attained gear AND attained gear	> 1st gear < 10th gear	engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time	engine speed time for transmission hydraulic pressure available seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE		
					attained gear P0721 Fault Active range shift state (auto trans shift complete)	<ul><li>range shift complete</li><li>1.00 seconds</li></ul>		
					enable time			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intermediate Speed Sensor 2 Performance	P17C5	The diagnostic monitor determines if the direction transmission intermediate speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non- transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	when: (intermediate speed sensor raw direction when transitional period = FALSE AND intermediate speed sensor raw direction when transitional period = FALSE) OR intermediate speed sesnor raw when transitional period = TRUE update fail and sample time	# FORWARD # REVERSE P17C5 P17D3 intermediate speed > sensor RPM	service mode \$04 active diagnostic monitor enable intermediate speed sesnor count sample period P17C5 fault active OR P17C5 test fail this key on senor type calibration (senor type is directional) transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period when direction unknown	<ul> <li>= FALSE</li> <li>= 1 Boolean</li> <li># 0 counts</li> <li>= FALSE</li> <li>= FALSE</li> <li>= CeTNSR_e_NSPD_Dual SpdSnsr</li> <li>&gt; 0.4434 seconds</li> <li>&lt; 0.2773 seconds</li> <li>&lt; 0.2363 seconds</li> <li>&gt; 0.1240 seconds</li> <li>&gt; 0.00811 seconds</li> <li>&gt; 0.0088 seconds</li> <li>&lt; 0.0088 seconds</li> <li>&lt; 0.4434 seconds</li> <li>&gt; 0.0088 seconds</li> <li>&lt; 0.4434 seconds</li> <li>&gt; 0.0088 seconds</li> </ul>	fail time > 3.500 seconds out of sample time > 5.000 seconds 6.26 millisecond update	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intermediate Speed Sensor 2 Direction Not Plausible -	P17C6	The intermediate speed sensor 2 is a directional sensor, and raw intermediate speed sensor 2 direction is	intermediate speed sensor 2 direction raw AND	intermediate speed sensor 1 or 2 # predicted direction	when the following conditions are met update the enable time: diagnsotic monitor enable	speed sensor directional rationality = enable calibration	2.50 seconds	Type A, 1 Trips
Forward		rationalized based on attained gear. Attained gear is a true indication	attained gear	= REVERSE	TOSS sensor type must be directional	<ul> <li>CeTOSR_e_Directional</li> <li>500.0 RPM</li> </ul>		
		measured gear ratio, TISS/TOSS. Intermediate speed sensor 2 direction can be predicted, based on a function of the attained gear. When the raw intermediate speed sensor 2 direction does not correlate to the predicted direction and does not correlate to the attained gear, the intermediate speed sensor 2 directional is in error.			engine speed engine speed time	engine speed time for transmission hydraulic pressure available seconds		
			<ul> <li>predicted, based on function of the tained gear. When</li> <li>e raw intermediate</li> <li>peed sensor 2</li> <li>rection does not</li> <li>prrelate to the</li> <li>edicted direction and</li> <li>pes not correlate to</li> <li>e attained gear, the</li> <li>termediate speed</li> <li>peror.</li> </ul>		battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	<ul> <li>&gt;9.00 volts</li> <li>&gt; 0.100 seconds</li> <li>= FALSE</li> <li>&gt;9.00 volt</li> <li>&gt; 0.100 seconds</li> <li>= REVERSE</li> <li>= FALSE</li> <li>= range shift complete</li> <li>&gt; 1.00 seconds</li> </ul>		
			intermediate speed sensor 2 direction raw	intermediate speed sensor 1 or 2 # predicted direction	when the following conditions are met update the enable time: diagnsotic monitor enable	speed sensor directional rationality = enable calibration	2.50 seconds	
			attained gear AND attained gear	> 1st gear < 10th gear	TOSS sensor type must be directional	= CeTOSR_e_Directional > 500.0 RPM		
					engine speed engine speed time	> engine speed time for transmission hydraulic pressure available seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	<ul> <li>&gt;9.00 volts</li> <li>&gt; 0.100 seconds</li> <li>= FALSE</li> <li>&gt;9.00 volt</li> <li>&gt; 0.100 seconds</li> <li>= REVERSE</li> <li>= FALSE</li> <li>= range shift complete</li> <li>&gt; 1.00 seconds</li> </ul>		
			intermediate speed sensor 2 direction raw AND TIS direction AND attained gear	intermediate speed sensor 1 or 2 # predicted direction # FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	<pre>speed sensor directional rationality = enable calibration = CeTOSR_e_Directional &gt; 500.0 RPM &gt; engine speed time for transmission hydraulic pressure available seconds &gt; 9.00 volts &gt; 0.100 seconds = FALSE &gt; 9.00 volt &gt; 0.100 seconds = REVERSE = FALSE = FALSE = range shift complete</pre>	2.50 seconds	
					range shift state (auto trans shift complete)	> 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enable time			
			intermediate speed sensor 2 direction raw AND	intermediate speed sensor 1 or 2 # predicted direction	when the following conditions are met update the enable time: diagnsotic monitor enable	speed sensor directional rationality = enable calibration	2.50 seconds	
			raw TIS direction AND attained gear AND attained gear	# FORWARD > 1st gear < 10th gear	TOSS sensor type must be directional	= CeTOSR_e_Directional > 500.0 RPM >		
					engine speed engine speed time	engine speed time for transmission hydraulic pressure available seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	<ul> <li>&gt;9.00 volts</li> <li>&gt; 0.100 seconds</li> <li>= FALSE</li> <li>&gt;9.00 volt</li> <li>&gt; 0.100 seconds</li> <li>= REVERSE</li> <li>= FALSE</li> <li>= range shift complete</li> </ul>		
					range shift state (auto trans shift complete) enable time	> 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw)	intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2 # predicted direction	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM	2.50 seconds	
			AND attained gear	= REVERSE	engine speed	>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						engine speed time for transmission hydraulic pressure available seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	>9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds = REVERSE = FALSE		
					range shift state (auto trans shift complete)	= range shift complete		
					enable time	> 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR	intermediate speed sensor 1 or 2 # predicted direction	when the following conditions are met update the enable time: diagnsotic monitor enable	speed sensor directional rationality = enable calibration	2.50 seconds	
			intermediate speed sensor 2 direction raw) AND	sensor 1 or 2 # predicted direction	TOSS sensor type must be directional	= CeTOSR_e_Directional > 500.0 RPM >		
			attained gear AND attained gear	> 1st gear < 10th gear	engine speed engine speed time	engine speed time for transmission hydraulic pressure available seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	<ul> <li>&gt;9.00 volts</li> <li>&gt; 0.100 seconds</li> <li>= FALSE</li> <li>&gt;9.00 volt</li> <li>&gt; 0.100 seconds</li> <li>= REVERSE</li> <li>= FALSE</li> <li>= range shift complete</li> </ul>		

Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Description	(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear	intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2 # predicted direction # FORWARD = REVERSE	range shift state (auto trans shift complete) enable time when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete)	<pre>&gt; 1.00 seconds  speed sensor directional rationality = enable calibration = CeTOSR_e_Directional &gt; 500.0 RPM engine speed time for transmission hydraulic pressure available seconds &gt; 9.00 volts &gt; 0.100 seconds = FALSE &gt; 9.00 volt &gt; 0.100 seconds = REVERSE = FALSE = range shift complete &gt; 1.00 seconds</pre>	2.50 seconds	
			enable time			
	(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR	intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2 # predicted direction	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM	2.50 seconds	
	Monitor Strategy Description	Monitor Strategy Description       Malfunction Criteria         Image: Malfunction Criteria       Image: Criteria         Image: Image: Image: Criteria       Image: Criteria         Image: Image: Image: Image: Image: Criteria       Image: Image: Criteria         Image: Im	Monitor Strategy Description         Malfunction Criteria         Threshold Value           Intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear         intermediate speed sensor 1 or 2 # predicted direction           Intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear         # FORWARD = REVERSE           Intermediate speed sensor 1 or 2         # FORWARD = REVERSE           Intermediate speed sensor 1 or 2         # predicted direction           Intermediate speed sensor 1 direction raw OR intermediate speed sensor 1 direction raw OR         Intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2           Intermediate speed sensor 2 direction raw OR         Intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2	Monitor Strategy Description         Malfunction Criteria         Threshold Value         Secondary Parameters           Description         Intermediate speed sensor 1 direction raw OR intermediate speed sensor 1 direction raw OR TIS direction AND attained gear         Intermediate speed sensor 1 or 2         range shift state (auto trans shift complete) enable time           Very State         (intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear         intermediate speed sensor 1 or 2         when the following conditions are met update the enable time: diagnotic monitor enable           Battery voltage for time         FORWARD = REVERSE         engine speed engine speed time           Battery voltage for time service fast learn active run/crank voltage for time attained gear         battery voltage for time attained gear           Intermediate speed sensor 1 direction raw OR intermediate speed sensor 1 or 2         intermediate speed sensor 1 or 2           Intermediate speed sensor 1 direction raw OR intermediate speed sensor 1 or 2         intermediate speed sensor 1 or 2           Intermediate speed sensor 1 or 2         when the following conditions are met update the enable time: diagnotic monitor enable time: diagnotic monitor enable time: diagnot	Monitor Strategy Description         Malfunction Criteria         Threshold Value         Secondary Parameters         Enable Conditions           Description         Intermediate speed sensor 1 direction raw OR sensor 1 direction raw OR TIS direction AND attained gear         intermediate speed sensor 1 direction raw OR TIS direction AND attained gear         intermediate speed sensor 1 direction raw OR TIS direction AND attained gear         intermediate speed sensor 1 or 2         speed sensor predicted direction # FORWARD = REVERSE         offentions         conditions are met update the enable time.         speed sensor directional rationality enable conditions are met update the enable directional         speed sensor directional rationality = cortoSR_e_Directional           # ORWARD = REVERSE         # ORWARD = REVERSE         engine speed time run/crank voitage for time service fast learn active run/crank voitage for time service fast learn active run/crank voitage for time attained gear         > 0.100 seconds = FALSE         > 0.100 seconds = REVERSE           (intermediate speed sensor 1 direction raw OR (intermediate speed sensor 1 direction raw OR intermediate speed sensor 1 or 2 Heredicted direction Heredicted speed sensor 1 or 2 Heredicted direction Heredicted betraction the enable time         > 0.100 seconds = RALSE         = range shift complete = range conds = ran	Monitor Strategy Description         Malfunction Criteria         Threshold Value         Secondary Parameters         Enable Conditions         Time Required           Description         Image: speed split state (auto trans shift complete)         > 1.00 seconds         2.50 seconds           Image: speed sensor 1 or 2 sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear         intermediate speed sensor 1 or 2 predicted direction sensor 2 direction raw OR TIS direction) AND attained gear         Secondary Parameters requires speed sensor 1 or 2 predicted direction sensor 2 direction raw OR # FORWARD = REVERSE         when the following conditions are met update range shift state (auto rans shift complete) seconds         Seconds         2.50 seconds           0.100 seconds = FALSE for time service fast learn active range shift state (auto range shift state

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			attained gear AND attained gear	> 1st gear < 10th gear	engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time	engine speed time for transmission hydraulic pressure available seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE		
					attained gear P0721 Fault Active range shift state (auto trans shift complete)	<ul><li>range shift complete</li><li>1.00 seconds</li></ul>		
					enable time			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio n Intermediate Speed Sensor B Circuit Low	P17CC	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	< 0.250 volts (< 0.5 Q impedance between signal and controller ground)	service mode \$04 active diagnostic monitor enable P17CD fault active service fast learn	= FALSE = 1 Boolean = FALSE = FALSE	fail time > 0.050 seconds, update fail count 12.5 millisecond update rate fail count > 40 counts 12.5 millisecond update rate	Type A, 1 Trips
					run crank voltage battery voltage	> 10.00 volts > 10.00 volts	run crank and battery voltage time > 5.000 seconds	
					sensor configuration is single OR dual	= CeTNSR_e_NSPD_Dual SpdSnsr		
					P17CC fault active OR P17CC test fail this key on	= FALSE = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio n Intermediate Speed Sensor B Circuit High	P17CD	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	> 4.750 volts (< 0.5 Q impedance between signal and controller power)	service mode \$04 active diagnostic monitor enable P17CC fault active service fast learn	= FALSE = 1 Boolean = FALSE = FALSE	fail time > 0.050 seconds, update fail count 12.5 millisecond update rate fail count > 40 counts 12.5 millisecond update rate	Type A, 1 Trips
					run crank voltage battery voltage	> 10.00 volts > 10.00 volts	run crank and battery voltage time > 5.000 seconds	
					sensor configuration is single OR dual	= CeTNSR_e_NSPD_Dual SpdSnsr		
					P17CD fault active OR P17CD test fail this key on	= FALSE = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input Speed Sensor Direction Error	P17CE	The diagnostic monitor determines if the direction transmission input shaft speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non- transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	input shaft speed sesnor raw direction when transitional period = FALSE AND input shaft speed sesnor raw direction when transitional period = FALSE OR input shaft speed sesnor raw when transitional period = TRUE update fail and sample time, update rate defined in Secondary Parameters	# FORWARD # REVERSE > 225.0 RPM	determine update rate: 6.26 millisecond update rate calibration, TRUE, update rate = 6.25 millisecond FALSE, update rate = 25 millisecond service mode \$04 active diagnostic monitor enable input shaft speed sesnor count sample period senor type calibration (senor type calibration (senor type is directional) P17CE fault active OR P17CE fault active OR P17CE test fail this key on transitional period detected = FALSE when: on period OR on period when direction unknown OR on period when direction is reverse OR on period when direction is forward transitional period detected = TRUE when: on period when direction unknown	<ul> <li>= 1 Boolean</li> <li>= FALSE</li> <li>= 1 Boolean</li> <li># 0 counts</li> <li>= CeTISR_e_Directional</li> <li>= FALSE</li> <li>= FALSE</li> <li>&gt; 0.4434 seconds</li> <li>&lt; 0.2773 seconds</li> <li>&lt; 0.2363 seconds</li> <li>&gt; 0.1240 seconds</li> <li>&gt; 0.0811 seconds</li> <li>&gt; 0.0088 seconds</li> <li>&lt; 0.0434 seconds</li> <li>&gt; 0.0088 seconds</li> <li>&lt; 0.4434 seconds</li> <li>&gt; 0.0088 seconds</li> </ul>	fail time > 3.500 seconds out of sample time > 5.000 seconds update rate defined in Secondary Parameters	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intermediate Speed Sensor 1 Direction Error	P17D3	The diagnostic monitor determines if the direction transmission intermediate speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non- transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	intermediate speed sesnor raw direction when transitional period = FALSE AND intermediate speed sesnor raw direction when transitional period = FALSE OR intermediate speed sesnor raw when transitional period = TRUE update fail and sample time 6.26 millisecond update rate	# FORWARD # REVERSE P17C5 P17D3 intermediate speed > sensor RPM	service mode \$04 active diagnostic monitor enable intermediate speed sesnor count sample period P17D3 fault active OR P17D3 test fail this key on senor type calibration (senor type is directional) transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period when direction unknown	<ul> <li>= FALSE</li> <li>= 1 Boolean</li> <li># 0 counts</li> <li>= FALSE</li> <li>= FALSE</li> <li>= CeTNSR_e_NSPD_Dual SpdSnsr</li> <li>&gt; 0.4434 seconds</li> <li>&lt; 0.2773 seconds</li> <li>&lt; 0.2363 seconds</li> <li>&gt; 0.1240 seconds</li> <li>&gt; 0.0811 seconds</li> <li>&gt; 0.0088 seconds</li> <li>&gt; 0.0088 seconds</li> <li>&lt; 0.4434 seconds</li> <li>&gt; 0.2773 seconds</li> </ul>	fail time > 3.500 seconds out of sample time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio n Intermediate Speed Sensor B Circuit Range/ Performance	P17D6	The diagnostic monitor rationalizes the transmission intermediate shaft speed sensor by using the transmission output shaft output speed sensor and the known ratio between the transmission intermediate shaft speed and the transmission output shaft output speed based on the commanded gear and the transmission lever node design. The estimated transmission intermediate shaft speed is equal to the gear ratio times the transmission output shaft output speed. The absolute value of the delta between the measured transmission intermediate shaft speed and the estimated transmission intermediate shaft speed and the estimated transmission intermediate shaft speed is used to determine if the measured transmission intermediate shaft speed is rational.	deltal =ABS (transmission input speed - (transmission output speed * gear ratio commanded)) AND delta2 = ABS (transmission input speed - (transmission intermediate speed * ratio calibration)) update faiil time 25 millisecond update rate	> 10.0 RPM P17D6 intermediate speed sensor fail RPM threshold see supporting tables	diagnostic monitor enable speed sesnor configuration calibration is dual ratio calibration is function of command gear and intermediate speed sesnor when not REVERSE ratio calibration is function of command gear and intermediate speed sesnor when REVERSE 	<pre>= 1 Boolean = CeTNSR_e_NSPD_Dual SpdSnsr = P17D6 ratio calibration when not REVERSE see supporting tables = P17D6 ratio calibration when REVERSE see supporting tables</pre>	fail time > P17D6 intermediate speed sensor fail time threshold see supporting tables fail time threshold met increments fail count, fail count > P17D6 intermediate speed sensor fail count threshold see supporting tables	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					speed / ratio calibration) with transmission input speed	P17D6 minimum estimated transmission intermediate speed to enable fail evaluation see supporting tables > P17D6 minimum transmission input	P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation see supporting tables	
					input speed sensor ready based on commaned gear and transmission intermediate speed sensor (state output must be FALSE to enable fail evaluation) with with attained gear	<pre>speed to enable fail evaluation see supporting tables = P17D6 holding clutch states see supporting tables</pre>		
					transmission input speed transmission output speed neutral idle mode range shift state P0716 fault active P0717 fault active P07BF fault active P07C0 fault active P0722 fault active P0772 fault active P077C fault active P077C fault active P17CC fault active P17CC fault active battery voltage	<ul> <li>REVERSE OR</li> <li>1st thru 10th</li> <li>240.0 RPM</li> <li>36.0 RPM</li> <li>nuetral idle mode ON</li> <li>range shift complete</li> <li>FALSE</li> </ul>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					service fast learn active run crank voltage transmission hydraulic pressure available: engine speed	>9.00 volts = FALSE >9.00 volts > 500.0 RPM	battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds engine speed time > engine speed time for transmission hydraulic pressure available see supporting tables	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Up and Down Shift Switch Performance	P1876	This diagnostic monitor rationalizes the PRNDL, transmission shift lever position, against the state for the tap-up-tap-down (TUTD) enable switch or the manual-up- manual-down (MUMD) enable switch. The switch circuit is considered failing when the PRNDL is in park, reverse or neutral, and the switch circuit is indicating the switch in in the enable, or TUTD/ MUMD function request state. The switch can only be in the enable state when the PRNDL is in the appropriate drive range, for example D9, D8 or D7, but not in park, reverse or neutral. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	(PRNDL OR PRNDL) OR PRNDL) AND (shift lever range calibration is tap-up-tap- down (TUTD) OR shift lever range calibration is manual-up- manual-down (MUMD)) AND TUTD/MUMD enable request (switch state) update fail time 100 millisecond update rate	= NEUTRAL = REVERSE = PARK = CeTUDR_e_TUTD_M odeOnly = TRUE	service mode \$04 active diagnostic monitor enable (P1876 test fail this key on OR P1876 fault active) PRNDL OR PRNDL OR PRNDL DTCs not test fail this key on DTCs not fault active	<ul> <li>= FALSE</li> <li>= 1 Boolean</li> <li>= FALSE</li> <li>= FALSE</li> <li>= NEUTRAL</li> <li>= REVERSE</li> <li>= PARK</li> <li>P0815, P0816, P0826</li> <li>Transmission Shift Lever Position Validity U0100, P0815, P0816, P0826, P1761, P0707, P0708</li> </ul>	fail time > 3.00 seconds, update fail count fail count > 5 counts 100 millisecond update rate	Emissio ns Neutral Diagnost ics - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Switch Run/ Start Position Circuit Low	P2534	Detects a low ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is low. Monitoring occurs when the TCM run/ crank is active.	Ignition switch Run/Start position circuit low	Run / Crank = FALSE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = TRUE	106 failures out of 106 samples 25 ms /sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Switch Run/ Start Position Circuit High	P2535	Detects a high ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is high. Monitoring occurs when the TCM run/ crank is NOT active.	Ignition switch Run/Start position circuit high	Run/ Crank = TRUE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = FALSE	280 failures out of280 samples 25 ms /sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Actuator Supply Voltage B Circuit Low	P2670	Controller specific output driver circuit diagnoses the high sided driver circuit for a short to ground failure, or where controller H/W cannot differentiate, diagnoses the high sided driver circuit for a short to ground failure or open circuit failure, when the output is powered on, by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground or an open circuit.	< 0.5 Q impedance between signal and controller ground OR > 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail count and increment sample count, otherwise increment only sample count	(ground short diagnostic monitor enable calibration OR open circuit diagnostic monitor enable calibration) high side drive 2 ON service mode \$04 active	= 1 Boolean = 1 Boolean = TRUE = FALSE	ground short fail count > 6 counts within sample count of 2,400 counts OR open circuit fail count > 30 counts within sample count of 50 counts 6.25 millisecond update rate	Type A, 1 Trips

Component/ Fa System Co	ault ode	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid D Stuck Off (GRWand 8SPD)	2714	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete, when the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C4 clutch slip speed, update fail time 6.25 milliscond update	> 200.0 RPM	system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning	<ul> <li>+</li></ul>	fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		pressure control, which			procedure active	= FALSE Boolean		
		normally allows the						
		clutch to maintain full			hydraulic pressure			
		of the given engine			available	= IRUE		
		crankshaft torque, to						
		maintain true dear			******	******		
		ratio When the clutch			enable C4 clutch slip			
		pressure control			speed fail compare when:			
		solenoid is failed						
		hydraulically off, the			((startle mitigation active	= FALSE		
		clutch does not			ÖR			
		maintain holding			(startle mitigation active	= TRUE		
		capacity at any engine			AND			
		crankshaft torque, and			startle mitigation gear))	# initial startle mitigation		
		the clutch slip speed is			(see startle mitigation	gear		
		uncontrollable. The			active NOTE below)			
		clutch pressure control						
		solenoid test is			unintended deceleration			
		suspended if the higher				= FALSE		
		mitigation function is			Unintended deceleration			
		active The safety			fault pending enable cal is	= 0 (0 to enable 1 to		
		startle mitigation			FALSE	disable)		
		function is triggered			(startle mitigation)			
		when a sudden vehicle			(			
		deceleration occurs						
		due to a clutch			clutch steady state			
		pressure control			adaptive active	= FALSE		
		solenoid that has failed						
		in the opposite sense,			(transmission output shaft	> 36.0 RPM		
		ciutch pressure control			speed			
		solenoid falled			UK (appelorator padal	> 0.50 %		
		the solenoid is				> 0.50 %		
		electrically functional			OR			
		which must take priority			engine speed)	> 1 000 0 RPM	> 0.500 seconds	
		over any clutch				- 1,000.0 11 10	- 0.000 0000103	
		pressure control			C4 clutch slip speed valid	= TRUE (all speed		
		solenoid stuck off			· · · · · · · · · · · · · · · · · · ·	sensors are functional for		
		diagnostic monitor. All				lever node clutch slip		
		clutch pressure control				speed calculation)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control			C4 clutch pressured map	= mapped to line pressure, C4 clutch pressure has reached fully applied state		
		solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or			(enable forward gear cal AND driver direction request AND	= 1 (1 to enable, 0 to disable) = FORWARD		
		performance faults can be present, and no speed sensor electrical			Attained Gear) OR (enable reverse gear cal	= a FORWARD gear = 0(1 to enable, 0 to		
		can be present, or the clutch pressure control solenoid stuck off test			AND driver direction request AND Attained Gear)	= REVERSE = REVERSE		
		is disabled. This diagnostic monitor is relative to C4 (GR10 C23467810Ror 8SPD			range shift state	= range shift complete		
		C23468) clutch pressure control solenoid.			DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727		
						P2736 P17CE P1783 P17D3 P17C5 P0721		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not test fail this key on	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid D Stuck On	P2715	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C4 clutch slip speed OR shift type is garage shift: C4 clutch slip speed ELSE shift is another type: C4 clutch slip speed update fail time 6.25 milliscond update	< 50.00 RPM < 50.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: Clutch Stuck On Fail Offset Time PU Shifts open throttle downshift: Clutch Stuck On Fail Offset Time PD Shifts garage shift: Clutch Stuck On Fail Offset Time PD Shifts garage shift: Clutch Stuck On Fail Offset Time GS Shifts closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no					Clutch Stuck On Fail Offset Time CD Shifts negative torque upshift: Clutch Clip Press NU Shifts clutch staging shift: Clutch Stuck	
		automatic transmission shift in progress. The safety startle mitigation function is triggered					On Fail Offset Time STGR Shifts	
		deceleration occurs due to a clutch pressure control solenoid that has failed					fail counts 6.25 milliscond update	
		hydraulically on, while the solenoid is electrically functional. All clutch pressure			system-level enables: use battery voltage			
		control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage			calibration is FALSE OR (use battery voltage calibration is TRUE	= 1 Boolean = 1 Boolean		
		must be normal, all clutch pressure control solenoid driver circuits must be functional, no			AND battery voltage)	>9.00 volts	battery voltage time > 0.100 seconds	
		clutch pressure control solenoid electrical or performance faults can be present and po			use run crank voltage calibration is FALSE OR (use run crank voltage	= 1 Boolean		
		speed sensor electrical or performance faults can be present, or the			calibration is TRUE AND run crank voltage)	>9.00 volts	run crank voltage	
		clutch pressure control solenoid stuck on test					time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to the GF9 C4 C4, GR10C4 C22467810P, or 8			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
		Speed C4 C23468 clutch pressure control solenoid.			TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					******	*********		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 36.0 RPM		
					((C4 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time	= TRUE		
					out enable)	= 1 ( 1 to enable, 0 to disable)		
					C4 off going clutch command pressure )	< 350 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							closed throttle upshift: C4 exhaust delay closed throttle lift foot up shift	
							open throttle upshift: C4 exhaust delay open throttle power on up shift	
							garage shifts: C4 exhaust delay garage shift	
							closed throttle downshift: C4 exhaust delay closed throttle down shift	
							negative torque upshift: C4 exhaust delay negative torque up shift	
							open throttle downshift: C4 exhaust delay open throttle power down shift	
					(engine torque AND _Primary oncomina stuck	> 8,192 Nm _= 0 (0 is enable. 1 is		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					on torque enable cal)	enable)		
					OR			
					( primary oncoming clutch active	= TRUE		
					primary on coming control state	# clutch fill phase		
					primary on coming commanded pressure)	> pressure clip threshold according to shift type:		
						closed and open throttle upshifts:	Post-torque phase delay for powered upshifts	
						pressure clip threshold is dependent on the oncoming clutch:	is dependent on the oncoming clutch:	
						C1 Torque-Based Pressure Clip	Post-Torque Phase Delay OR	
						OR	C2_Oncoming	
						C2 Torque-Based Pressure Clip	Post-Torque Phase Delay	
						OR	C3 Oncoming	
						C3 Torque-Based	Post-Torque	
						Pressure Clip	Phase Delay OR	
						OR	C5_Oncoming	
						C5 Torque-Based	Post-Torque	
						Pressure Clip	Phase Delay	
						OR	C6 Oncomina	
						C6 Torque-Based Pressure Clip	Post-Torque Phase Delay	
						clip thresholds for all other shift types:		
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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						garage shifts: Clutch Clip Press GS Shifts		
						closed throttle downshift: Clutch Clip Press CD Shifts		
						negative torque upshift: Clutch Clip Press NU Shifts		
						open throttle downshift: Clutch Clip Press PD Shifts		
					C4 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					conditions needed to trigger test:	*****		
					(current shift type AND shift type enable cal for current shift type) OR	# Garage shift <b>Clutch Stuck On Shift</b> <b>= Type Enable</b> (0 table value will disable, 1 will enable)		
					(Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for	= FALSE = 1 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different	<ul> <li>= 1 (0 to disable, 1 to enable)</li> <li>= FORWARD</li> <li>= a FORWARD gear</li> <li>= 1 (0 to disable, 1 to enable)</li> <li>= REVERSE</li> <li>= REVERSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= TRUE</li> </ul>		
					clutch controller) current clutch solenoid test state	= TRUE transitions to TestState or TUT_HOLD (see note below about state transitions)		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift			
					state = range shift			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					complete.			
					NOTE: Startle mitigation			
					is used to detect			
					unintended vehicle			
					deceleration due to a			
					clutch pressure control			
					solenoid stuck on failure			
					mode that occurs during			
					steady state gear, not			
					during an automatic			
					transmission shift. The			
					startie mitigation active			
					then forces the			
					transmission clutch			
					to a sofe goor or poutrol			
					to a sale gear of neutral			
					state, based on the active			
					when the unintended			
					when the unintended			
					vehicle geer state is			
					attained the gear and			
					clutch pressure control			
					eveter allows transitions			
					of the clutches on and off			
					to sequence automatic			
					transmission shifts single			
					sten shifts As each			
					single step automatic			
					transmission shift occurs			
					the normal pressure			
					control solenoid stuck on			
					diagnostic monitors			
					execute to verify which			
					clutch pressure control			
					solenoid is in the stuck on			
					failure mode, allowing one			
					of the clutch pressure			
					control solenoid stuck on			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid D Control Circuit Open	P2718	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_NoHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid D Control Circuit Low	P2720	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_NoHSD will disable) = ON</pre>	fail time > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid D Control Circuit High	P2721	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_NoHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ Fa System C	ault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System C Pressure Control (PC) Solenoid E Stuck Off (GR10)	Code 2723	Description Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed	C5 clutch slip speed, update fail time 6.25 milliscond update	> 200.0 RPM	system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	<ul> <li>+</li></ul>	fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	Ilium. Type A, 1 Trips
		active, range shift complete. When the automatic transmission chift is complete.			TCM output driver high side driver 2, clutch			
		steady state gear is considered, the clutch			driver circuit enabled	= TRUE Boolean		
		pressure control solenoid is mapped to transmission line			service fast learn active service solenoid cleaning	= FALSE Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		pressure control, which			procedure active	= FALSE Boolean		
		normally allows the			here have the second second			
		clutch to maintain full			nydraulic pressure			
		of the given engine			available	= IRUE		
		crankshaft torque to						
		maintain true gear						
		ratio When the clutch			********	*******		
		pressure control			enable C5 clutch slip			
		solenoid is failed			speed fail compare when:			
		hydraulically off, the						
		clutch does not			((startle mitigation active	= FALSE		
		maintain holding			OR			
		capacity at any engine			(startle mitigation active	= TRUE		
		crankshaft torque, and			AND			
		the clutch slip speed is			startle mitigation gear))	# initial startle mitigation		
		uncontrollable. The			(see startle mitigation	gear		
		clutch pressure control			active NOTE below)			
		solenoid test is			unintended decoloration			
		suspended if the higher			fault ponding			
		mitigation function is				= FALSE		
		active The safety			unintended deceleration			
		startle mitigation			fault pending enable cal is	= 0 (0 to enable, 1 to		
		function is triggered			FALSE	disable)		
		when a sudden vehicle			(startle mitigation)	,		
		deceleration occurs			· · · ·			
		due to a clutch						
		pressure control			clutch steady state			
		solenoid that has failed			adaptive active	= FALSE		
		in the opposite sense,			<i>,</i>			
		clutch pressure control			(transmission output shaft	> 36.0 RPM		
		solenoid failed			speed			
		hydraulically on, while			UK (appalarator padal			
		che solenoid is				> 0.50 %		
		which must take priority						
		over any clutch			engine speed)	> 1 000 0 RPM	> 0.500 seconds	
		pressure control				2 1,000.0 IXI W		
		solenoid stuck off			C5 clutch slip speed valid	= TRUE (all speed		
		diagnostic monitor. All				sensors are functional for		
		clutch pressure control				lever node clutch slip		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control			C5 clutch pressured map	speed calculation) = mapped to line pressure, C5 clutch pressure has reached fully applied state		
		solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no			(enable forward gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear		
		speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This			OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 0(1 to enable, 0 to disable) = REVERSE = REVERSE		
		diagnostic monitor is relative to C5 (GR10 C1356789) clutch pressure control			range shift state	= range shift complete		
		solenoid.			DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CF P1783		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not test fail this key on	P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System Pressure Control (PC) Solenoid E Stuck On	Fault         Code         P2724	Monitor Strategy Description	Malfunction Criteria shift type is power down shift: C5 clutch slip speed OR shift type is garage shift: C5 clutch slip speed ELSE shift is another type: C5 clutch slip speed update fail time 6.25 milliscond update	<ul> <li>Threshold Value</li> <li>&lt; 50.00 RPM</li> <li>&lt; 50.00 RPM</li> <li>&lt; 50.00 RPM</li> </ul>	Secondary Parameters	Enable Conditions	Time Required Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.25 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: Clutch Stuck On Fail Offset Time PU Shifts open throttle downshift: Clutch Stuck On Fail Offset Time PD Shifts garage shift: Clutch Stuck On Fail Offset Time PD Shifts	MIL Ilium. Type A, 1 Trips
		transmission lever node design, requiring					downshift:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
oystem	Code	transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle					Clutch Stuck On Fail Offset Time CD Shifts negative torque upshift: Clutch Clip Press NU Shifts clutch staging shift: Clutch Stuck On Fail Offset Time STGR Shifts update fail count,	
		deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional.			**************************************	****	fail count > 3 counts 6.25 milliscond update	
		All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or			use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE	= 1 Boolean = 1 Boolean >9.00 volts = 1 Boolean	battery voltage time > 0.100 seconds	
		performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			OR (use run crank voltage calibration is TRUE AND run crank voltage)	= 1 Boolean >9.00 volts	run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to the GF9 C5 C57R, GR10C5			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
		C1356789, or 8 Speed C5 C45678R clutch pressure control solenoid.			TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					******	*******		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 36.0 RPM		
					((C5 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time	= TRUE		
					out enable) OR	= 1 ( 1 to enable, 0 to disable)		
					C5 off going clutch command pressure )	< 350 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							closed throttle upshift: C5 exhaust delay closed throttle lift foot up shift	
							open throttle upshift: C5 exhaust delay open throttle power on up shift	
							garage shifts: C5 exhaust delay garage shift	
							closed throttle downshift: C5 exhaust delay closed throttle down shift	
							negative torque upshift: C5 exhaust delay negative torque up shift	
							open throttle downshift: C5 exhaust delay open throttle power down shift	
					(engine torque AND Primary oncoming stuck on toraue enable cal)	> 8,192 Nm = 0 (0 is enable, 1 is enable)_		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR			
					( primary oncoming clutch active	= TRUE		
					primary on coming control state	# clutch fill phase		
					primary on coming commanded pressure)	> pressure clip threshold according to shift type:		
						closed and open throttle upshifts:	Post-torque phase delay for	
						pressure clip threshold is dependent on the oncoming clutch:	is dependent on the oncoming clutch:	
						C1 Torque-Based Pressure Clip	C1_Oncoming Post-Torque Phase Delay	
						OR C2 Torque-Based Pressure Clip	OR C2_Oncoming Post-Torque Phase Delay	
						OR C3 Torque-Based	OR C3_Oncoming	
						Pressure Clip	Post-Torque Phase Delay OR	
						C4 Torque-Based Pressure Clip	C4_Oncoming Post-Torque	
						OR C6 Torque-Based	OR C6_Oncoming	
						Pressure Clip	Post-Torque Phase Delay	
						shift types:		
						garage shifts:		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Clutch Clip Press GS Shifts		
						closed throttle downshift: Clutch Clip Press CD Shifts		
						negative torque upshift: Clutch Clip Press NU Shifts		
						open throttle downshift: Clutch Clip Press PD Shifts		
					C5 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					conditions needed to trigger test:	******		
					(current shift type AND shift type enable cal for current shift type)	# Garage shift Clutch Stuck On Shift = Type Enable		
					OR	(0 table value will disable, 1 will enable)		
					(Intrusive shift active AND	= FALSE		
					shift type enable cal for garage shift AND	<ul> <li>1 (0 will enable, 1 will enable)</li> </ul>		
					Attained Gear AND	= NEUTRAL OR commanded gear		
					forward garge shifts	= 1(0 to disable, 1 to _enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear))	= FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE		
					clutch stuck off intrusive shift active	= FALSE		
					startle mitigation active (see note on startle mitigation below)	= FALSE		
					(new clutch controller has been initalized OR transitioning to a different clutch controller)	= TRUE = TRUE		
					current clutch solenoid test state	transitions to TestState or TUT_HOLD (see note below about state transitions)		
					****	*****		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P1724 P1728		
					******	1 <i>1/.<del></del>6</i> 1 <i>1/.<del>.18</del></i>		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.			

Component/ Fault System Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTC stoset P0747, P0777 P0707 P0715			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid E Control Circuit Open	P2727	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R clutch solenoid, or CVTTCC Control solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_NOHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid E Control Circuit Low	P2729	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R clutch, or CVT TCC Control solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_NoHSD will disable) = ON</pre>	fail time > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid E Control Circuit High	P2730	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R, or CVT TCC Control solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2) OR (solenoid is mapped to high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_NOHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System Pressure Control (PC) Solenoid F Stuck Off (GR10)	<b>Code</b> P2732	Description Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active range shift	C6 clutch slip speed, update fail time 6.25 milliscond update	> 200.0 RPM	<ul> <li>system-level enables:</li> <li>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</li> <li>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</li> <li>TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</li> </ul>	<ul> <li>+</li></ul>	fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	Ilium. Type A, 1 Trips
		complete. When the automatic transmission shift is complete,			TCM output driver high side driver 2, clutch pressure control solenoid			
		steady state gear is considered, the clutch pressure control			driver circuit enabled service fast learn active	= TRUE Boolean = FALSE Boolean		
		solenoid is mapped to transmission line			service solenoid cleaning			

pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch pisspeed is uncontrollable. The clutch offset y startle mitigation function is active. The safety solenoid struk entry then a sudden vehicle decleration occurs due to a clutch pressure control solenoid failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch pressure control solenoid failed hydraulically off, the clutch offset capacity. The safety startle mitigation solenoid struk off decleration occurs due to a clutch pressure control solenoid failed hydraulically on, while the solenoid stuk off diagnostic montor. All     pressure control solenoid stuk off (caltch slip speed y tattel active pressure control solenoid failed hydraulically on, while the solenoid failed hydraulically on, while the solenoid stuk off diagnostic montor. All     pressure control solenoid stuk off     pressure control solenoid stuk off     pressure control solenoid stuk off     pressure control solenoid stuk off     pressure contro	Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Inormally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain tue gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed fail compare when: (startle mitigation active AND startle mitigation active or capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch does not nitigation function is selenoid lest is suspended if the higher level safety startle mitigation function is triggered when a sudden vehicle deceleration function is triggered when a sudden vehicle deceleration cours due to a clutch pressure control solenoid failed hydraulically on, while the solenoid is failed hydraulically on, while the solenoid failed hydraulically on, while the solenoid is failed hydraulically on, while the solenoid is to failed solenoid is failed hydraulically on, while the solenoid is to			pressure control, which			procedure active	= FALSE Boolean		
clutch to maintain tull       hydraulic pressure       = TRUE         available       = mable C8 clutch slip speed fail compare when:         clutch does not clutch sip apa dis clutch sip apa dis clutch first apa and dis clutch apa and dis clutch apa and dis clutch disable       = FALSE         = 0 (0 to enable, 1 to disable)       = 0 (0 to enable, 1 to disable)         function is triggered when a sudden vehicle disable       = FALSE         vial apprive active disable       = Clutch staady state apprive active clutch staady state clutch pressure control solenoid failed hydraulically on, while the solenoid failed hydraulically on, while the solenoid failed hydraulically on, while the solenoid failed h			normally allows the						
at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch sip speed failed uncontrollable. The clutch sip speed failed uncontrollable. The clutch sip speed is uncontrollable. The clutch speed is uncontrollable. The clutch speed is uncontrollable. The clutch speed is uncontrollable. The clutch speed is solenoid test is solenoid test is due to a clutch pressure control solenoid tailed in the oposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid failed hydraulically on thore here node clutch sip speed hydraulically on the faile here node clutch sip speed hydraulically on the high here node clutch sip speed hydraulically on the high here node clutch sip speed hydraulically on the high here node clutch high here node clutch high here node clutch high here node clutch high here nod			clutch to maintain full			hydraulic pressure			
at the given raging			torque noiding capacity			avallable	= IRUE		
Claritshilt of Ude, id			at the given engine						
Initial function of gear ratio.       enable C6 clutch slip speed fail compare when: ((startle mitigation active or ankshaft torque, and crankshaft torque, and cranks			crankshall lorque, lo			******	*****		
Induct interaction pressure control solenoid is failed hydraulcaily off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch silp speed is uncontollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation induction is active NOTE below)= FALSE = TRUE # initial startle mitigation active NOTE below)Unintended deceleration fault pending oclutch pressure control solenoid is the speed function is active. The safety startle mitigation active NTE below)= FALSE = TRUE # initial startle mitigation active NOTE below)Unintended deceleration fault pending oclutch pressure control solenoid is the able of the opticie sense, clutch pressure control solenoid is a below= FALSE = TRUE # initial startle mitigation active NOTE below)Unintended deceleration fault pending active NTE balay= FALSE = 0 (0 to enable, 1 to disable)Unintended deceleration fault pending enable cal is pressure control solenoid failed in the opposite sense, clutch pressure control solenoid is electically functional, which must take priority over any clutch pressure control solenoid solenoid sol			ratio When the clutch			enable C6 clutch slip			
solenoid is failed hydraulcally off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch spiespeed is uncontrollable. The clutch spiespeed is uncontrollable. The suspended if the higher level safety startle mitigation function is tactive mitigation active MOTE below)= FALSE = TRUE = TRUE = TRUE # initial startle mitigation gearImage: the mitigation subsect of the higher level safety startle mitigation function is tactive. The safety startle mitigation active adden vehicle due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid is alled hydraulcally on, while the solenoid is electrical functional, which must take priority over any clutch pressure control solenoid tat ke priority over any clutch pressure control solenoid statek priority over any clutch pressure control solenoid tat ke priority over any clutch pressure control solenoid tat ke priority over any clutch pressure control solenoid statek off diagnostic monitor. All= C6 clutch slip speed valid engine speed oR engine speed valid engine speed valid e			pressure control			speed fail compare when:			
hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is startle mitigation clutch pressure control startle mitigation startle mitigation suspended if the higher intigation function is startle mitigation startle mitigation clutch pressure control startle mitigation startle mitigation (see startle mitigation fault pending OR unintended deceleration fault pending OR unintended deceleration fault pending oR unintended deceleration fault pending enable cal is fault pending enable cal is fau			solenoid is failed			opood fail compare when.			
ofuch does not maintain holding capacity at any engine crankshaft torque, and the clutch silp speed is uncontrollable. The clutch pressure control solenoid test is startle mitigation active NOTE below)= TRUE # Initial startle mitigation gearunintended deceleration fault pending unciton is triggered when a sudden vehicle deceleration of the topist sense, clutch pressure control solenoid tialed hydranically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid is take priority over any clutch prise priority over any clutch pressure control solenoid is take priority over any clutch pressure control solenoid take of the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid take of the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid take off diagnositic monitor. AllOR Clutch signed value engine speed value engine speed value engine speed value engine speed value engine speed value <br< td=""><td></td><td></td><td>hydraulically off, the</td><td></td><td></td><td>((startle mitigation active</td><td>= FALSE</td><td></td><td></td></br<>			hydraulically off, the			((startle mitigation active	= FALSE		
maintain holding capacity at any engine crankshaft torque, and the clutch sip speed is uncontrollable. The clutch pressure control suspended if the higher level safety startlestartle mitigation active AND startle mitigation active NDTe below)#initial startle mitigation gearImage: startle mitigation clutch pressure control suspended if the higher level safety startle startle mitigation active. The safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration cocurs due to a clutch pressure control solenoid fath tas failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control, solenoid failed hydraulically on, while the solenoid suck off diagnostic monitor. All(startle mitigation active clutch steady state adaptive active adaptive active engine speed) oR clutch speed sense, clutch steady state position> 0.500 secondsoR clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stack off diagnostic monitor. All> 0.500 secondsC6 clutch slip speed valid dlagnostic monitor. All> 0.500 seconds			clutch does not			ÖR			
capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is active NOTE below)* initial startle mitigation gearuncontrollable. The clutch pressure control solenoid tath as failed in the opposite sense, clutch pressure control solenoid tath tas failed in the opposite sense, clutch pressure control solenoid tath tas failed in the opposite sense, clutch pressure control solenoid tath tas failed in the opposite sense, clutch pressure control solenoid suck off diagnostic monitor. AllAND startle mitigation active NOTE below)# initial startle mitigation gear# initial startle mitigation fault pending on fault pending on fault pending enable cal is startle mitigation when a sudden vehicle deceleration cocurs due to a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. AllAND startle mitigation gear# initial startle mitigation geardue to a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. AllAND startle mitigation gear) startle mitigation startle mitigation startle mitigation startle mitigation> 0.500 seconds startle startle mitigation startle mitigation startle mitigation startle mitigationAND startle mitigation startle mitigationAND startle mitigation startle mitigation> 0.500 % startle startle mitigation <br< td=""><td></td><td></td><td>maintain holding</td><td></td><td></td><td>(startle mitigation active</td><td>= TRUE</td><td></td><td></td></br<>			maintain holding			(startle mitigation active	= TRUE		
crankshaft torque, and the clutch sip speed is uncontrollable. The clutch pressure control suspended if the higher level safety startle       # initial startle mitigation active NOTE below)       # initial startle mitigation gear         unintended deceleration suspended if the higher level safety startle mitigation function is startle mitigation active. The safety startle mitigation function is triggered when a sudden vehicle deceleration cocurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid tat kas failed in the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All       \$ startle mitigation function is startle mitigation solenoid suck off diagnostic monitor. All       > 0.500 seconds			capacity at any engine			AND			
the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is figured when a sudden vehicle deceleration cours due to a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All(see startle mitigation active NOTE below) unintended deceleration fault pending enable cal is FALSE (startle mitigation)= FALSE = 0 (0 to enable, 1 to disable)clutch startle mitigation function is riggered when a studen vehicle deceleration occurs due to a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch= FALSE e = FALSE= FALSEout to fig algostic out the pressure control solenoid stuck off diagnostic monitor. All= 0.50 % o .50 %> 0.50 % engine speedclutch slip speed valid glagnostic monitor. All= TRUE (all speed sensors are functional for lever node clutch slip> 0.500 seconds			crankshaft torque, and			startle mitigation gear))	# initial startle mitigation		
uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. Allactive NOTE below) unintended deceleration fault pending (startle mitigation)= FALSEclutch steady state adaptive active= 0 (0 to enable, 1 to disable)= FALSEclutch steady state adaptive active= FALSEsolenoid tailed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All> 0.500 secondsclutch slip speed valid diagnostic monitor. All= TRUE (all speed sensors are functional for lever node clutch slip			the clutch slip speed is			(see startle mitigation	gear		
clutch pressure control suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch= FALSE = 0 (0 to enable, 1 to disable)clutch steady state adaptive active= FALSEclutch steady state adaptive active= FALSEclutch steady state adaptive active= FALSEsolenoid that has failed in the opposite sense, clutch pressure control solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All> 0.500 %C6 clutch slip speed valid diagnostic monitor. All= TRUE (all speed sensors are functional for lever node clutch slip			uncontrollable. The			active NOTE below)			
Solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid tailed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuk off diagnostic monitor. Allunintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation)= FALSE = 0 (0 to enable, 1 to disable)clutch stady state adaptive activeclutch steady state adaptive active= FALSEversesure control solenoid tailed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch> 0.50 %clutch steady state adaptive active= TRLSE> 0.500 secondsclutch pressure control solenoid taike over any clutch> 0.500 secondsclutch pressure control solenoid tack off diagnostic monitor. AllC6 clutch slip speed valid erv node clutch slip> 0.500 seconds			clutch pressure control						
suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid tox take for inty electrically functional, which must take priority over any clutch pressure control solenoid tox take for inty electrically functional, which must take priority over any clutch pressure control solenoid tox take for inty electrically functional, which must take priority over any clutch pressure control solenoid tox tox off diagnostic monitor. AllFALSE or any clutch pressure control solenoid tox for electrically functional, which must take priority over any clutch pressure control solenoid tox tox off diagnostic monitor. AllFALSE or any clutch pressure control solenoid tox tox off diagnostic monitor. All= IFALSE or any clutch pressure control solenoid tox tox off diagnostic monitor. All= 0.0 (0 to enable, 1 to disable)the solenoid is electrically functional, solenoid studek off diagnostic monitor. All= 0.0 (0 to enable, 1 to disable)= 0.0 (0 to enable, 1 to disable)the solenoid is electrically functional, solenoid studek off diagnostic monitor. All= 0.0 (0 to enable, 1 to disable)= 0.0 (0 to enable, 1 to disable)the solenoid is electrically functional, solenoid studek off diagnostic monitor. All= 0.0 (0 to enable, 1 to disable)= 0.0 (0 to enable, 1 to d			solenoid test is			unintended deceleration	541.05		
level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. AllOR unintended deceleration fault pending enable cal is FALSE (startle mitigation)= 0 (0 to enable, 1 to disable)out table clutch steady state adaptive active= FALSE solenoid state position= FALSE solenoid stuck off diagnostic monitor. All> 0.50 % over onde clutch slip			suspended if the higher			fault pending	= FALSE		
Initiation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid tauted hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid is tuck off diagnostic monitor. AllInitiation deceleration fault pending enable cal is FALSE clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed)> 0.50 %0.500 seconds engine speed> 1,000.0 RPM sensor are functional for lever node clutch slip> 0.500 seconds			level safety startle			OR			
additive. The safety       startle mitigation         function is triggered       function is triggered         when a sudden vehicle       (startle mitigation)         due to a clutch       clutch steady state         pressure control       solenoid that has failed         in the opposite sense,       clutch steady state         clutch pressure control       speed         oR       oR         electrically functional,       or solenoid is         electrically functional,       or solenoid stuck off         diagnostic monitor. All       clutch slip speed valid			niligation function is			foult ponding opoble col in	-0.00 to onable 1 to		
Status initigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All       In ACUL (startle mitigation) (startle mitigation)       = FALSE         Image: Clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch       > 36.0 RPM       > 0.50 %         Image: Clutch pressure control solenoid stuck off diagnostic monitor. All       > 0.50 %       > 1,000.0 RPM       > 0.500 seconds			startle mitigation			EAL SE	= 0 (0 to enable, 1 to		
When a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All(adarte finitigation)= FALSE(adarte finitigation)= FALSE= FALSE(ducto pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All> 0.500C6 clutch slip speed valid elever node clutch slip= TRUE (all speed sensors are functional for lever node clutch slip			function is triggered			(startle mitigation)	disable)		
deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. Allclutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed)> 36.0 RPM> 0.50 % > 0.50 %> 0.50 %> 0.500 seconds solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All> 0.500 seconds			when a sudden vehicle			(Startie mitgation)			
due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. Allclutch steady state adaptive active= FALSEClutch steady state adaptive active> 36.0 RPM> 36.0 RPMSolenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All> 0.50 %C6 clutch slip speed valid= TRUE (all speed sensors are functional for lever node clutch slip> 0.500 seconds			deceleration occurs						
pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. Alladaptive active= FALSE (transmission output shaft speed OR (accelerator pedal position OR engine speed)> 36.0 RPM> 0.50 % row over any clutch pressure control solenoid stuck off diagnostic monitor. All> 0.50 % the solenoid for lever node clutch slip> 0.500 seconds			due to a clutch			clutch steady state			
solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All			pressure control			adaptive active	= FALSE		
in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All(transmission output shaft speed OR (accelerator pedal position OR engine speed)> 0.50 %C6 clutch slip speed valid= TRUE (all speed sensors are functional for lever node clutch slip> 0.500 seconds			solenoid that has failed						
clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. Allspeed OR (accelerator pedal position OR engine speed)> 0.50 %C6 clutch slip speed valid elever node clutch slip> 0.500 seconds			in the opposite sense,			(transmission output shaft	> 36.0 RPM		
solenoid failed       OR       0R       > 0.50 %         hydraulically on, while       (accelerator pedal       > 0.50 %         the solenoid is       position       OR         electrically functional,       OR       > 1,000.0 RPM         which must take priority       over any clutch       > 1,000.0 RPM         pressure control       solenoid stuck off       = TRUE (all speed         solenoid stuck off       diagnostic monitor. All       ever node clutch slip			clutch pressure control			speed			
hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All       (accelerator pedal position OR engine speed)       > 0.50 %         C6 clutch slip speed valid diagnostic monitor. All       = TRUE (all speed sensors are functional for lever node clutch slip       > 0.500 seconds			solenoid failed			OR			
the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All			hydraulically on, while			(accelerator pedal	> 0.50 %		
electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All       OR engine speed)       > 1,000.0 RPM       > 0.500 seconds			the solenoid is			position			
wnich must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All       engine speed)       > 1,000.0 RPM       > 0.500 seconds         C6 clutch slip speed valid diagnostic monitor. All       = TRUE (all speed sensors are functional for lever node clutch slip       = TRUE (all speed sensors are functional for lever node clutch slip			electrically functional,			OR .			
pressure control solenoid stuck off diagnostic monitor. All			which must take priority			engine speed)	> 1,000.0 RPM	> 0.500 seconds	
solenoid stuck off diagnostic monitor. All			over any clutch						
diagnostic monitor. All			pressure control			Co clutch slip speed valid	= IKUE (all speed		
uragnostic monitor. An			diagnostic monitor				sensors are junctional for		
Louteb pressure control			clutch pressure control				spood colculation)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control			C6 clutch pressured map	= mapped to line pressure, C6 clutch pressure has reached fully applied state		
		solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or			(enable forward gear cal AND driver direction request AND	= 1 (1 to enable, 0 to disable) = FORWARD		
		performance faults can be present, and no speed sensor electrical			Attained Gear) OR (enable reverse gear cal	= a FORWARD gear = 0(1 to enable, 0 to		
		can be present, or the clutch pressure control solenoid stuck off test			driver direction request AND Attained Gear)	= REVERSE = REVERSE		
		is disabled. This diagnostic monitor is relative to C6 GR10 C45678910R clutch			range shift state	= range shift complete		
		pressure control solenoid.			DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727		
						P2736 P17CE P1783 P17D3 P17C5 P0721		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not test fail this key on	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid F Stuck On (GF9 and GR10)	P2733	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	common logic between P2731 and P2733 shift type is power down shift: C6 clutch slip speed OR shift type is garage shift: C6 clutch slip speed ELSE shift is another type: C6 clutch slip speed P2733 specific attained gear update fail time 6.25 milliscond update	< 50.00 RPM < 50.00 RPM < 50.00 RPM # 1st lock AND# 1st free wheel			Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: Clutch Stuck On Fail Offset Time PU Shifts open throttle downshift: Clutch Stuck On Fail Offset Time PD Shifts garage shift: Clutch Stuck On Fail Offset Time PD Shifts garage shift: Clutch Stuck On Fail Offset Time GS Shifts closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and one transmission					Clutch Stuck On Fail Offset Time CD Shifts	
		intermediate shaft speed. As part of the pressure control solenoid stuck on					negative torque upshift: Clutch Clip Press NU Shifts	
		diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The					clutch staging shift: Clutch Stuck On Fail Offset Time STGR	
		safety startle mitigation function is triggered when a sudden vehicle					Shifts	
		due to a clutch pressure control solenoid that has failed			*****	*****	counts 6.25 milliscond update	
		hydraulically on, while the solenoid is electrically functional. All clutch pressure			system-level enables: use battery voltage			
		control solenoid stuck on diagnostic monitors are emission MIL			calibration is FALSE OR (use battery voltage	= 1 Boolean		
		DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits			calibration is TRUE AND battery voltage)	= 1 Boolean >9.00 volts	battery voltage time > 0.100 seconds	
		clutch pressure control solenoid electrical or performance faults can			use run crank voltage calibration is FALSE OR	= 1 Boolean		
		be present, and no speed sensor electrical or performance faults can be present, or the			(use run crank voltage calibration is TRUE AND run crank voltage)	= 1 Boolean	run crank voltage time > 0.100	
		clutch pressure control solenoid stuck on test					seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to the GF9 C6 C6789 or GR 10C6 C45678910R clutch			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
		pressure control solenoid.			TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					*****	*******		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 36.0 RPM		
					((C6 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time	= TRUE		
					out enable) OR	= 1 (1 to enable, 0 to disable)		
					C6 off going clutch command pressure )	< 350 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							closed throttle upshift: C6 exhaust delay closed throttle lift foot up shift	
							open throttle upshift: C6 exhaust delay open throttle power on up shift	
							garage shifts: C6 exhaust delay garage shift	
							closed throttle downshift: C6 exhaust delay garage shift	
							negative torque upshift: C6 exhaust delay negative torque up shift	
							open throttle downshift: C6 exhaust delay open throttle power down shift	
					(engine torque AND Primary oncoming stuck on toraue enable cal)	> 8,192 Nm = 0 (0 is enable, 1 is enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR (primary oncoming clutch	= TRUE		
					active			
					primary on coming control state	# clutch fill phase		
					primary on coming commanded pressure)	> pressure clip threshold according to shift type:		
						closed and open throttle upshifts:	Post-torque phase delay for powered upshifts	
						pressure clip threshold is dependent on the oncoming clutch:	is dependent on the oncoming clutch:	
						C1 Torque-Based Pressure Clip	C1_Oncoming Post-Torque Phase Delay	
						OR C2 Torque-Based Pressure Clip	OR C2_Oncoming Post-Torque Phase Delay	
						OR	OR	
						C3 Torque-Based	C3_Oncoming	
						Pressure Clip	Post-Torque	
						OR		
						C4 Torque-Based	C4_Oncoming	
						Pressure Clip	Post-Torque	
							Phase Delay	
						C5 Torque-Based	C5 Oncoming	
						Pressure Clip	Post-Torque	
							Phase Delay	
						clip thresholds for all other shift types:		
						garage shifts:		
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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						Clutch Clip Press GS Shifts		
						closed throttle downshift: Clutch Clip Press CD Shifts		
						negative torque upshift: Clutch Clip Press NU Shifts		
						open throttle downshift: Clutch Clip Press PD Shifts		
					C6 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed	= TRUE		
					calculation	*****		
					conditions needed to trigger test:			
					(current shift type	# Garage shift		
					shift type enable cal for current shift type)	Clutch Stuck On Shift = Type Enable		
					OR	(0 table value will disable, 1 will enable)		
					(Intrusive shift active AND	= FALSE		
					shift type enable cal for garage shift	<ul> <li>1 (0 will enable, 1 will enable)</li> </ul>		
					Attained Gear AND	= NEUTRAL OR commanded gear		
					(stuck on enable cal for forward garge shifts	= 1 (0 to disable, 1 to		
					driver requested direction_	= FORWARD		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System	Code	Description			AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state	<ul> <li>= a FORWARD gear</li> <li>= 1 (0 to disable, 1 to enable)</li> <li>= REVERSE</li> <li>= REVERSE</li> <li>= FALSE</li> <li>= FALSE</li> <li>= TRUE</li> <li>= TRUE</li> <li>transitions to TestState or TUT_HOLD (see note</li> </ul>		
					**************************************	below about state transitions) ************************************		
						P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state			
					is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System	Code	Description			NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTC stoset P0747			llium.
					P0777, P0797, P2715, P2724, P2733, P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid F Control Circuit Open	P2736	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1) clutch, 10 speed C45678910R clutch, 8 speed Line Pressure Control Circuit, or CVT binary pump, solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_NOHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid F Control Circuit Low	P2738	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1), 10 speed C4567891OR clutch, 8 speed line pressure control, or CVT binary pump, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_NoHSD will disable) = ON</pre>	fail time > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid F Control Circuit High	P2739	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1), 10 speed C4567891OR clutch, 8 speed line pressure control, or CVT binary pump, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_NoHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio n Range Sensor A/B Correlation	P2805	Internal range sensor A is wired independently to the TCM while internal range sensor B is wired independently to the ECM. The monitor diagnoses the internal range sensor A PWM duty cycle by comparing the raw	ABS((TCM internal range sesnorA+ ECM internal range sesnor B raw adjusted for high or low time) - 100 %)) Increment fail and sample time, update rate 25 milliseconds	> 4.849 % duty cycle	diagnostic monitor enable P0707 fault active P0708 fault active U0100 fault active ECM internal range sesnor B available from ECM ECM internal range sesnor B fault active	= 1 Boolean = FALSE = FALSE = FALSE = TRUE = FALSE	PWM fail time > 1.000 seconds out of sample time > 1.500 seconds	Type A, 1 Trips
		the raw sensor B adjusted value, to verify signals are consistent,			battery voltage	>0.00 volts	battery voltage time > 1.000 seconds	
		internal range sensor A does not correlate to the ECM internal range sensor B. The ECM transmits internal range sensor B raw PWM to the TCM over the serial data bus.			ABS(TCM internal range sesnor A current loop value - TCM internal range sesnor A previous loop value), update TCM internal range sesnor A stablity time, update rate 25 milliseconds	< 1.001 % duty cycle	TCM internal range sesnor A stability time > 1.000 seconds	
					ABS(ECM internal range sesnor B current loop value - ECM internal range sesnor B previous loop value), update ECM internal range sesnor B stablity time, update rate 25 milliseconds	< 1.001 % duty cycle	ECM internal range sesnor B stability time > 1.000 seconds	
					TCM internal range sesnor A stability time met OR ECM internal range sesnor B stability time met ECM internal range	= ABS(ECM internal		
					sesnor B raw adjusted for	range sensor B raw DC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					high or low time	signal - 0.000 %)		
					Vehicle is in a mode that enables accessory power	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid G Control Circuit Open	P2812	Controller specific circuit diagnoses 9 speed Line Pressure Control Circuit, 10 speed Line Pressure Control Circuit, 8 speed TCC Control, or CVT Mode Valve A Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2) OR (solenoid is mapped to high side driver 3) (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON</pre>	fail time > 0.60 seconds out of sample time > 0.65 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid G Control Circuit Low	P2814	Controller specific circuit diagnoses 9 speed Line Pressure Circuit, 10 speed Line Pressure Circuit, 8 speed TCC Control, or CVT Mode ValveA Circuit for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_NoHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid G Control Circuit High	P2815	Controller specific circuit diagnoses 9 speed Line Pressure Circuit, 10 speed Line Pressure Circuit, 8 speed TCC Control, or CVT Mode Valve A Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_NoHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System Pressure Control Solenoid H Performance /Stuck Off - GR10 Specific	P2817	Monitor Strategy Description	Malfunction Criteria if use TCC slip speed error OR TCC control mode TCC slip speed error = TCC slip speed - TCC comand slip speed else if TCC control mode torque convert slip = engine speed - transmission input shaft speed then update fail time 25 millisecond update rate	Threshold Value = 0 Boolean = ON mode (controlled slip mode) > P2817TCC stuck off fail TCC slip speed see supporting table = LOCK > 130.0 RPM	Secondary Parameters diagnostic monitor enable TCC command capacity TCC command pressure (TCC control mode previous TCC control mode previous TCC control mode previous TCC control mode previous) AND (TCC control mode current OR TCC control mode	Enable Conditions = 1 Boolean > 0.00 % > 400.0 kPa # TCC control mode current # ON mode (controlled slip mode) # LOCK = ON mode (controlled slip mode) = LOCK	Time Required fail time > 4.000 seconds increment fail count fail count > 3 counts 25 millisecond update rate TCC command capacity time > 0.00 seconds TCC command pressure time > 2.00 seconds	MIL Ilium. Type A, 1 Trips
		when the "on" mode slip speed error is excessive.			current) (TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed	= 1 Boolean = 1 Boolean > 500.0 RPM	engine speed time > engine speed time for transmission hydraulic pressure available	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							see supporting table	
					service fast learn active	= FALSE		
					battery voltage	>9.00 volts	battery voltage time > 0.100 seconds	
					run crank voltage	>9.00 volts	run crank voltage time > 0.100 seconds	
					P281B falut active	= FALSE		
					P281D falut active	= FALSE		
					P281E falut active	= FALSE		
					P0722 fault pending	= FALSE		
					P0723 fault pending	= FALSE		
					P0716 fault pending	= FALSE		
					P0717 fault pending	= FALSE		
					P07BF fault pending	= FALSE		
					P07C0 fault pending	= FALSE		
					(PTO active OR	= FALSE		
					PTO disable calibration)	= 1 Boolean		
					accelerator pedal position	> 8.0 %		
					accelerator pedal position	< 99.0 %		
					range shift state	= range shift complete		
					transmission fluid	> -6.66 °C		
					temperature			
					transmission fluid	< 130.0 °C		
					temperature			
					engine torque	> 50.0 Nm		
					engine torque	< 8,191.8 Nm		
					P2817 test fail this key on	= FALSE		
					(TCC control mode OR	= ON mode (controlled		
						slip mode)		
					TCC control mode)	= LOCK		
					break latch state (clutch	= disabled (clutch select		
					select valve solenoid)	valve not transitioning)		
					attained gear	>		
						CeCGSR_e_CR_Second		
					DTCs not fault active	AcceleratorPedalFailure		
						EngineTorqueEstInaccura		
						te		
						P0716. P0717. P07BF		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P07C0 P0722, P0723, P077C, P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid H Stuck On - GR10 specific	P2818	The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically on. This is evaluated by monitoring slip across the torque converter in two cases: 1) during low speed shifts into drive and reverse while monitoring engine speed and 2) outside of garage shifts by monitoring engine speed decel and torque for potential engine stall	when: [active clutch control ABS(TCC slip speed) (set point engine speed) (maximum engine speed) engine speed) engine torque update TCC stuck on fail time garage shift] OR when: [active clutch control ABS(TCC slip speed) engine torque (set point engine speed - engine speed) rate of change of engine speed update TCC stuck on stall pending time]	= garage shift < 40.0 RPM > 50.0 RPM > 50.0 RPM > 40.0 Nm # garage shift < 30.0 RPM > 50.0 Nm > 150.0 RPM < -2,000.0 RPM/ second	(TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed	= 1 Boolean = 1 Boolean > 500.0 RPM	when: TCC stuck on fail time garage shift <b>P2818TCC</b> <b>stuck on fail</b> time garage > <b>shift -GR10</b> update fail count when: fail count 25 millisecond update rate when: TCC stuck on stall pending time > <b>P2818TCC</b> <b>stuck on fail</b> <b>time stall</b> <b>pending - GR10</b> when: fail count > 4 counts set DTC fault active 25 millisecond update rate engine speed time >	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					service fast learn active	= FALSE	engine speed time for transmission hydraulic pressure available	
					battery voltage	>9.00 volts		
					run crank voltage	>9.00 volts	battery voltage time > 0.100	
					P281B falut active P281D falut active P281E falut active	= FALSE = FALSE = FALSE	seconds run crank voltage time > 0.100	
					P0722 fault pending P0723 fault pending P0716 fault pending	= FALSE = FALSE = FALSE	seconds	
					P0717 fault pending P07BF fault pending P07C0 fault pending	= FALSE = FALSE = FALSE		
					P0746 fault pending P0747 fault pending P0776 fault pending	= FALSE = FALSE = FALSE		
					P0777 fault pending P0796 fault pending P0797 fault pending	= FALSE = FALSE = FALSE		
					P2714 fault pending P2715 fault pending P2722 fault pending	= FALSE = FALSE = FALSE		
					P2723 fault pending P2724 fault pending P2732 fault pending	= FALSE = FALSE = FALSE		
					P2733 fault pending P2820 fault pending P2821 fault pending	= FALSE = FALSE = FALSE		
					PRNDL PRNDL diagnostic monitor enable	# NEUTRAL # REVERSE 1 Boolean		
					TCC command mode (PTO active OR PTO disable calibration)	= OFF = FALSE = 1 Boolean		
					transmission fluid	> -6.66 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					temperature transmission fluid temperature engine torque P2818 test fail this key on vehicle speed (garage shift) vehicle speed (not garage shift) engine speed accelerator pedal position 4WD low state (driver shift mode active OR driver shift mode calibration) (misfire requests TCC off OR misfire TCC off calibration) clucth control solenoid stuck ON AND stuck OFF intrusive shift active TCC solenoid pulse request minumum trubine speed	< 130.00 °C > -25.0 Nm < 800.0 Nm = FALSE < 4.0 KPH < 15.0 KPH > 200.0 RPM < 800.0 RPM < 800.0 RPM < 5.0 % = FALSE = 0 Boolean = FALSE = 0 Boolean = FALSE = OBOOLEAN = FALSE =		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid H Control Circuit Open	P281B	Controller specific circuit diagnoses 9 speed TCC Control Circuit, 10 speed TCC Control Circuit, 8 speed T93 Default Valve Control Circuit, or CVT Mode Valve B Control Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_NOHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid H Control Circuit Low	P281D	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit, 10 speed TCC Control Circuit, 8 speed Default Valve Control Circuit, or CVT Mode Valve B for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. For 8 speed T87a controllers, an open circuit on the Default Valve Control Circuit will also set P281D.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NOHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid H Control Circuit High	P281E	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit, 10 speed TCC Control Circuit, 8 speed Default Valve Control Circuit, or CVT Mode Valve B Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_NoHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC)	P2820	Each pressure control solenoid stuck off	(gear ratio AND	> 1.020			fail time > 0.25 seconds	Type A, 1 Trips
Solenoid J		diagnostic monitor	gear ratio)	< 0.980			6 25 milliogood	
		solenoid failed	(gear ratio	> 0.980			undate	
(01(10)		bydraulically off while	AND	- 0.300	*****	*******	upuale	
		the solenoid is	gear ratio)	< 1.020	system-level enables:			
		electrically functional.	g					
		This diagnostic monitor	(C1 clutch slip speed	< 50.00	use battery voltage	= 1 Boolean		
		detects the default	C2 clutch slip speed	< 50.00	calibration is FALSE			
		disable valve solenoid	C3 clutch slip speed	< 50.00				
		failed hydraulically off.	C4 clutch slip speed	< 50.00	OR			
		The default disable						
		valve is used to route	OR		(use battery voltage	= 1 Boolean		
		hydraulic fluid to	OO shutsh slip an a sh	50.00	calibration is TRUE			
		transmission clutches	C3 clutch slip speed	< 50.00				
		to achieve a hydraulic	C4 clutch slip speed	< 50.00	AND		bottomuvoltogo	
		overt that a fault	C5 clutch slip speed	< 50.00	battery voltage)		time > 0.100	
		occurs which requires	Co cluten silp speed)	< 50.00	ballery vollage)	29.00 1013	seconds	
		the solenoid electrical	update fail time		use run crank voltage		cocondo	
		drivers to be turned off.	6.25 milliscond update		calibration is FALSE	= 1 Boolean		
		If the default disable			OR			
		solenoid is hydraulically			(use run crank voltage			
		stuck off, the			calibration is TRUE	= 1 Boolean		
		transmission will enter			AND		run crank voltage	
		hydraulic default			run crank voltage)	>9.00 volts	time > 0.100	
		unintentionally while			TOM autout driver high		seconds	
		the control system is			r CM output ariver high			
		another dear which			pressure control solenoid	- TRUE Boolean		
		can result in a tie-up			driver circuit enabled			
		condition.						
					TCM output driver high			
		When the default			side driver 2, clutch			
		disable valve solenoid			pressure control solenoid	= TRUE Boolean		
		is hydraulically off while			driver circuit enabled			
		in drive, hydraulic fluid						
		will be routed to			service fast learn active	= FALSE Boolean		
		clutches to achieve						
		either 7th or 2nd gear.			service solenoid cleaning			
		If the vehicle is moving		L	procedure active	= FALSE Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		and the control system is commanding a different gear, the solenoid fault can be			hydraulic pressure available	= TRUE		
		detected as either a clutch tie-up or startle mitigation event. Shifting to neutral while			conditions to trigger start of test:	*****		
		monitoring gear ratio will isolate the fault as either a stuck on clutch solenoid or a stuck off default disable valve			(clutch control solenoid test state OR clutch control solenoid	= Tie Up TestActive		
		solenoid.			test state)	= Tie Up Test Hold		
		For GR10 non-ETRS applications, the stuck off solenoid can be			Offgoing clutch stuck on test result (for any clutch)	= Test Failing		
		dected by monitoring transmission input speed deceleration magnitude and timing			Default disable stuck off enable cal for tie-up events	= 1 (1 to enable, 0 to disable)		
		during a stationary shift into drive from park, neutral, or reverse while commanding neutral.			current predicted hydraulic default gear if solenoid drivers are turned off	= a drive gear (i.e. 2nd or 7th gear)		
					(current attained gear	= CeCGSR_e_SecondLckd (low gear bydraulic		
					current attained gear)	default)		
					*****	= CeCGSR_e_Seventh (high gear hydraulic default)		
					conditions needed through duration of test:	**************************************		
					commanded gear	= NEUTRAL		
					transmission output speed_			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						> 36.00 RPM		
					driver direction request	= FORWARD		
					DTCs not fault pending	*****		
						P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not test fail this kev	1 1700 1 1700		
					on	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure		
					DTCs not fault active	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
			(gear ratio AND	> 1.020			fail time > 0.50 seconds	
			year ralio)	< 0.980				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			OR (gear ratio AND	> 0.980	*****	*****	6.25 milliscond update	
			gear ratio)	< 1.020	system-level enables:			
			(C1 clutch slip speed C2 clutch slip speed C3 clutch slip speed C4 clutch slip speed	< 40.00 < 40.00 < 40.00 < 40.00	use battery voltage calibration is FALSE OR	= 1 Boolean		
			OR	. 40.00	(use battery voltage calibration is TRUE	= 1 Boolean		
			C3 clutch slip speed	< 40.00 < 40.00	AND			
			C5 clutch slip speed C6 clutch slip speed)	< 40.00 < 40.00	battery voltage)	>9.00 volts	battery voltage time > 0.100 seconds	
			update fail time 6.25 milliscond update		use run crank voltage calibration is FALSE OR	= 1 Boolean		
					(use run crank voltage calibration is TRUE AND	= 1 Boolean	run crank voltage	
					run crank voltage)	>9.00 volts	time > 0.100	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean	3000103	
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					conditions to trigger start of test:	*****		
					(clutch control solenoid test state OR clutch control solenoid	= Tie Up Test Active		
					test state) Offgoing clutch stuck on test result (for any clutch)	= Tie Up Test Hold = Test Failing		
					Default disable stuck off enable cal for tie-up events	= 1 (1 to enable, 0 to disable)		
					(current attained gear OR	= CeCGSR_e_SecondLckd (low gear hydraulic default)		
					current attained gear) hydraulic default at launch	= CeCGSR_e_Seventh (high gear hydraulic default)		
					conditions needed through duration of test:	<b>= FALSE</b>		
					current predicted hydraulic default gear if solenoid drivers are turned off	= a drive gear (i.e. 2nd or		
					commanded gear driver direction request	7th gear) = NEUTRAL = FORWARD		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
<b>-</b> ,					DTCs not fault pending	<ul> <li>P17CE P1783 P178F</li> <li>P17C6 P17C4 P17C7</li> <li>P17D3 P17C5 P0721</li> <li>P172AP172B P0716</li> <li>P0717 P07C0 P07BF</li> <li>P0723 P0722 P077D</li> <li>P077C P176C P176D</li> <li>P176B P17D6</li> <li>P2534 P0707 P0708</li> <li>P0716 P0717 P07C0</li> <li>P07BF P077D P077C</li> <li>P126C P176D P17CC</li> <li>P17CD P0962 P0966</li> <li>P0970 P2720 P2729</li> <li>P2738 P0963 P0967</li> </ul>		
					DTCs not fault active	P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
			input speed deceleration	> P2820 GR10 hydraulic default input speed deceleration threshold			fail time >0.10 seconds observed within:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			transmission output shaft speed update fail time 6.25 millisecond update	< 36 RPM	**************************************	*****	P2820GR10 hydraulic default at launch test window 6.25 milliscond	
					use battery voltage calibration is FALSE	= 1 Boolean	update	
					OR	= 1 Boolean		
					battery voltage)	>9.00 volts		
					use run crank voltage calibration is FALSE OR	= 1 Boolean		
					(use run crank voltage calibration is TRUE AND	= 1 Boolean		
					run crank voltage)	>9.00 volts		
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					hydraulic pressure available	= TRUE		
					*****	*****		
					conditions needed to trigger test:			
					Driver direction change request	= TRUE		
					default disable stuck off at launch enable cal	= 1 (1 to enable, 0 to disable)		
					ETRS system type	= CeTRGR_e_NoETRS		
					deceleration test on	enable)		
					failed	= TRUE		
					*******	*******		
					conditions needed through duration of test:			
					commanded gear	= NEUTRAL		
					Driver direction request	= FORWARD		
					current predicted hydraulic default gear if solenoid drivers are turned off	= a drive gear (i.e. 2nd)		
					*****			
					DTCs not fault pending	P17C6 P1765 P1767 P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0726		
						P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not test fail this key on	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid J Control Circuit Open (T93 Controller only)	P2824	Controller specific circuit diagnoses 10 speed Default Disable Control Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NOHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid J Control Circuit Low	P2826	Controller specific circuit diagnoses 9 speed Clutch Select Valve Control Circuit, 10 speed Default Disable Control Circuit, or 8 speed Boost Valve Control Circuit for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. For T87a controllers, an open circuit on solenoid I/J will also set P2826	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2) OR (solenoid is mapped to high side driver 3) (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_NoHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid J Control Circuit High	P2827	Controller specific circuit diagnoses 9 speed Clutch Valve Control Circuit, 10 speed Default Disable Control Circuit, or 8 speed Boost Valve Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 2) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	<pre>&gt; 9.00 volts and &lt; 32.00 volts &gt;5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_NoHSD will disable) = ON</pre>	fail time > 0.30 seconds out of sample time > 0.50 seconds > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communicati on Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures equals or exceeds before the sample time of is reached	3 counts (equivalent to 480.01 milliseconds) 800.01 milliseconds	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for CAN channel is requesting full communications Normal CAN transmission on Bus is enabled Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDI	<ul> <li>&gt; 15,000.00 milliseconds</li> <li>&gt; 11.00 Volts</li> <li>&gt;= 5,000.00 milliseconds</li> <li>&gt;11.00 Volts</li> <li>&lt;11.00 Volts</li> <li>&lt;= 18.00 Volts</li> </ul>	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
					lf EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition	> 15,000.00 milliseconds > 11.00 Volts		
					voltage If Hybrid Secure: Run/Crank ignition voltage	>=8.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Enabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Component/ System	Fault Code U0100	Monitor Strategy Description	Malfunction Criteria Message is not received from controller for Message \$0BE: Message \$0C9: Message \$18E: Message \$18E: Message \$1141: Message \$1A3: Message \$1AA:	Threshold Value <ul> <li>&gt; 500 milliseconds</li> <li>&gt; 500 milliseconds</li> <li>&gt; 500 milliseconds</li> <li>&gt; 12,000 milliseconds</li> </ul>	Secondary Parameters General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications	Enable Conditions	Time Required Diagnostic runs in 12.5 ms loop	MIL Ilium. Type A, 1 Trips
			Message \$1BA: Message \$1DF: Message \$1F7: Message \$287: Message \$3D1: Message \$3E9: Message \$4A3: Message \$4A3: Message \$4F1: Message \$589:	<ul> <li>&gt; 12,000 milliseconds</li> <li>&gt; 12,000 milliseconds</li> <li>&gt; 12,000 milliseconds</li> <li>&gt; 500 milliseconds</li> <li>&gt; 12,000 milliseconds</li> </ul>	Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>11.00 Volts <=18.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds > 11.00 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=8.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Enabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Batterv voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communicati on With Power Steering Control Module (Emissions Neutral Diagnostic)	U0131	This DTC monitors for a loss of communication with the Power Steering Control Module. Emissions neutral default action is to disable auto-stop inhibits and perform auto-stops as originally intended.	Message is not received from controller for Message \$1E5	> 12,000 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Emissio ns Neutral Diagnost ic - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds > 11.00 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=8.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Enabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Batterv voltage	>=11.00 Volts		

### Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

#### Initial Supporting table - intermediate spe;ed sensor 1 or 2 predicted direction

#### **Description:**

Value Units: predicted direction: forward, reverse, unknown X Unit: attained gear Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted	d direction - Part 1		
y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_Directionllnknown	CeTNSR_e_DirectionIInknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionIInknown	CeTNSR_e_Directionllnknown	CeTNSR_e_DirectionIInknown
intermediate speed sensor 1 or 2 predicted	d direction - Part 2		
y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_Directionllnknown	CeTNSR_e_DirectionIInknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionIInknown	CeTNSR_e_Directionllnknown	CeTNSR_e_DirectionIInknown
intermediate speed sensor 1 or 2 predicted	d direction - Part 3		
y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_Directionllnknown	CeTNSR_e_DirectionIInknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
intermediate speed sensor 1 or 2 predicted	d direction - Part 4		
y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
intermediate speed sensor 1 or 2 predicted	d direction - Part 5		
y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

#### Initial Supporting table - P0606\_Last Seed Timeout f(Loop Time)

**Description:** The max time for the Last Seed Timeout as a function of operating loop time sequence.

Value Units: Max Time for Last Seed Timeout (ms) X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1									
y/x	CePISR_e_2p5msS	CePISR_e_3p125m	CePISR_e_5msSeq	CePISR_e_6p25ms	CePISR_e_10msSe	CePISR e 12p5ms	CePISR_e_20msSe	CePISR_e_25msSe	
	eq	sSeq		Seq	q	Seq	q	q	
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000	
P0606_Last Seed	P0606_Last Seed Timeout f(Loop Time) - Part 2								
y/x	CePISR_e_40msSe	CePISR_e_50msSe	CePISR_e_80msSe	CePISR_e_100msS	CePISR_e_250msS	CePISR_e_EventA	CePISR_e_EventB	CePISR_e_EventC	
	q	q	q	eq	eq	_Seq	_Seq	_Seq	
1	200.000	500.000	500.000	1.000.000	2.000.000	8.191.875	8.191.875	8.191.875	

#### Initial Supporting table - P0606\_Program Sequence Watch Enable f(Core, Loop Time)

**Description:** The enabling flags for the program sequence watch as a function of processor core and operating loop time sequence.

Value Units: PSW enable flag (boolean) X Unit: Processor Core (enum)

Y Units: Operating Loop Time Sequence (enum)

y/x	CeTSKR_e_CPU	CeTSKR_e_CPU2	CeTSKR_e_CPU3	CeTSKR_e_CPU4
CePISR_e_2p5msSeq	0	0	0	0
CePISR_e_3p125msSeq	0	0	0	0
CePISR_e_5msSeq	0	0	0	0
CePISR_e_6p25msSeq	1	1	0	0
CePISR_e_1OmsSeq	0	0	0	0
CePISR_e_12p5msSeq	1	1	0	0
CePISR_e_20msSeq	0	0	0	0
CePISR_e_25msSeq	1	1	0	0
CePISR_e_40msSeq	0	0	0	0
CePISR_e_50msSeq	1	1	0	0
CePISR_e_80msSeq	0	0	0	0
CePISR_e_100msSeq	0	0	0	0
CePISR_e_250msSeq	0	0	0	0
CePISR_e_EventA_Seq	0	0	0	0
CePISR_e_EventB_Seq	0	0	0	0
CePISR_e_EventC_Seq	1	0	0	0

# Initial Supporting table - P0606\_PSW Sequence Fail f(Loop Time)

**Description:** Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count) X Unit: Operating Loop (enum)

. 0									
P0606_PSW Sequence Fail f(Loop Time) - Part 1									
y/x	CePISR_e_2p5msS	CePISR_e_3p125m	CePISR_e_5msSeq	CePISR_e_6p25ms	CePISR_e_10msSe	CePISR e 12p5ms	CePISR_e_20msSe	CePISR_e_25msSe	
	eq	sSeq		Seq	q	Seq	q	q	
1	3	3	3	3	3	3	3	3	
P0606_PSW Seque	P0606_PSW Sequence Fail f(Loop Time) - Part 2								
y/x	CePISR_e_40msSe	CePISR_e_50msSe	CePISR_e_80msSe	CePISR_e_100msS	CePISR_e_250msS	CePISR_e_EventA	CePISR_e_EventB	CePISR_e_EventC	
	q	q	q	eq	eq	_Seq	_Seq	_Seq	
1	3	3	3	3	3	3	3	3	

#### Initial Supporting table - P0606 PSW Sequence Sample f(Loop Time)

**Description:** Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count) X Unit: Operating Loop (enum)

P0606_PSW Sequence Sample f(Loop Time) - Part 1								
y/x	CePISR_e_2p5msS	CePISR_e_3p125m	CePISR_e_5msSeq	CePISR_e_6p25ms	CePISR_e_10msSe	CePISR e 12p5ms	CePISR_e_20msSe	CePISR_e_25msSe
	eq	sSeq		Seq	q	Seq	q	q
1	4	4	4	4	4	4	4	4
P0606_PSW Seque	P0606_PSW Sequence Sample f(Loop Time) - Part 2							
y/x	CePISR_e_40msSe	CePISR_e_50msSe	CePISR_e_80msSe	CePISR_e_100msS	CePISR_e_250msS	CePISR_e_EventA	CePISR_e_EventB	CePISR_e_EventC
	q	q	q	eq	eq	_Seq	_Seq	_Seq
1	4	4	4	4	4	4	4	4

#### Initial Supporting table - P0723 transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmission engaged to allow P0723 enable

#### Value Units: seconds

**X Unit:** transmission fluid temperature °C

y/x	-40.000	-20.000	20.000
1	5.000	3.000	1.000

#### Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

#### Value Units: seconds

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

#### Initial Supporting table - P176B holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sessor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE X Unit: intermediate speed sensor select

Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

# Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

#### Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

#### Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

### Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

# Value Units: transmission input speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

#### Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio

X Unit: commanded gear Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Ge ar1	CeTGRR_e_Ge ar2	CeTGRR_e_Ge ar3	CeTGRR_e_Ge ar4	CeTGRR_e_Ge ar5	CeTGRR_e_Ge ar6	CeTGRR_e_Ge ar7	CeTGRR_e_Ge ar8	CeTGRR_e_Ge ar9	CeTGRR_e_Ge ar10
CeTSRR_e_C2 C_ClchSpdSnsr 1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2 C_ClchSpdSnsr 2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

#### Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

#### Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

# Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update				
Value Units: intermediate speed sensor RPM X Unit: intermediate speed sensor 1 or 2				
y/x 0 1				
1	350	225		

#### Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

#### Value Units: seconds

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

#### Initial Supporting table - P17D6 holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sessor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE

X Unit: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

#### Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

#### Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

**Description:** P17D6 intermediate speed sensor fail RPM speed threshold

#### Value Units: RPM

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

#### Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

**Description:** P17D6 intermediate speed sensor fail time threshold

Value Units: seconds

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

#### Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2		
1	192	192		

### Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

# Value Units: transmission input speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

#### Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio

X Unit: commanded gear Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Ge ar1	CeTGRR_e_Ge ar2	CeTGRR_e_Ge ar3	CeTGRR_e_Ge ar4	CeTGRR_e_Ge ar5	CeTGRR_e_Ge ar6	CeTGRR_e_Ge ar7	CeTGRR_e_Ge ar8	CeTGRR_e_Ge ar9	CeTGRR_e_Ge ar10
CeTSRR_e_C2 C_ClchSpdSnsr 1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2 C_ClchSpdSnsr 2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

# Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

# Initial Supporting table - transmission fluid temperature warm up time

Descr	iption:	

Value Units: transmission fluid temperature normal warn up time, seconds X Unit: transmission fluid temperature at controller power up,  $^{\circ}C$ 

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

# Initial Supporting table - Clutch Connectivity Wrong Direction FP

Description: Fault pending time for cluch connectivity detecting wrong direction

Value Units: time (sec) X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	1	1	1	1	1

# Initial Supporting table - Clutch PCS Pressure Gain

Description: Gain value to convert clutch pressure command to regulator valve command

Value Units: Gain (unitless)

X Unit: Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTS ER_e_C6_Clutch
1	1	1	1	1	1	1

# Initial Supporting table - Clutch PCS Pressure Offset

Description: Offset value to convert clutch pressure command to regulator valve command

Value Units: offset (kPa)

X Unit: Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTS ER_e_C6_Clutch
1	0	0	0	0	0	0

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

Description: Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up

Value Units: Pressure (kPa) X Unit: Commanded Gear

Y Units: Clutch

Cmnd Tie Up Monito	r Multi-Clutch Thresh	- Part 1					
y/x	CeCGSR_e_NullForS ched	CeCGSR_e_NeutralN oClutch	CeCGSR_e_NeutralC	CeCGSR_e_NeutralC 2	CeCGSR_e_NeutralC	CeCGSR_e_NeutralC 4	CeCGSR_e_NeutralC 5
CeTRMR_e_C1_Clutc h	147	147	4,096	147	147	154	147
CeTRMR_e_C2_Clutc h	152	152	152	4,096	152	152	154
CeTRMR_e_C3_Clutc h	205	205	205	205	4,096	205	920
CeTRMR_e_C4_Clutc h	350	350	350	350	350	4,096	350
CeTRMR_e_C5_Clutc h	149	149	149	149	561	149	4,096
CeTRMR_e_C6_Clutc h	91	91	91	91	91	155	91
CeTRMR_e_C7_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	4,096
Cmnd Tie Up Monito	r Multi-Clutch Thresh	- Part 2					
y/x	CeCGSR_e_NeutralC 6	CeCGSR_e_NeutralC 7	CeCGSR_e_NeutralC 1C2	CeCGSR_e_NeutralC 1C3	CeCGSR_e_NeutralC 1C4	CeCGSR_e_NeutralC 1C5	CeCGSR_e_NeutralC 2C3
CeTRMR_e_C1_Clutc h	147	4,096	4,096	4,096	4,096	4,096	147
CeTRMR_e_C2_Clutc h	152	4,096	4,096	152	152	154	4,096
CeTRMR_e_C3_Clutc	205	4,096	205	4,096	205	920	4,096
CeTRMR_e_C4_Clutc	1,814	4,096	350	350	4,096	350	350
CeTRMR_e_C5_Clutc h	149	4,096	149	561	149	4,096	561
CeTRMR_e_C6_Clutc	4,096	4,096	91	91	155	91	91
CeTRMR_e_C7_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	4,096
Cmnd Tie Up Monito	r Multi-Clutch Thresh	- Part 3			•		•

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh							
y/x	CeCGSR_e_NeutralC 2C4	CeCGSR_e_NeutralC 2C5	CeCGSR_e_NeutralC 2C6	CeCGSR_e_NeutralC 3C4	CeCGSR_e_NeutralC 3C5	CeCGSR_e_NeutralC 3C6	CeCGSR_e_NeutralC 4C5
CeTRMR_e_C1_Clutc h	154	147	147	158	147	147	154
CeTRMR_e_C2_Clutc h	4,096	4,096	4,096	152	168	152	154
CeTRMR_e_C3_Clutc h	205	1,693	205	4,096	4,096	4,096	920
CeTRMR_e_C4_Clutc h	4,096	350	1,814	4,096	350	1,814	4,096
CeTRMR_e_C5_Clutc h	149	4,096	149	561	4,096	869	4,096
CeTRMR_e_C6_Clutc h	155	91	4,096	155	91	4,096	411
CeTRMR_e_C7_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	4,096
Cmnd Tie Up Monitor	r Multi-Clutch Thresh -	Part 4		<u>~</u>	~ 		
y/x	CeCGSR_e_NeutralC 4C6	CeCGSR_e_NeutralC 1C2C3C6	CeCGSR_e_Park_wN C	CeCGSR_e_Park_wN C1	CeCGSR_e_Park_wN C2	CeCGSR_e_Park_wN C3	CeCGSR_e_Park_wN C4
CeTRMR_e_C1_Clutc h	154	147	147	4,096	147	147	154
CeTRMR_e_C2_Clutc h	152	152	152	152	4,096	152	152
CeTRMR_e_C3_Clutc h	205	205	205	205	205	4,096	205
CeTRMR_e_C4_Clutc h	4,096	350	350	350	350	350	4,096
CeTRMR_e_C5_Clutc h	149	149	149	149	149	561	149
CeTRMR_e_C6_Clutc h	4,096	91	91	91	91	91	155
CeTRMR_e_C7_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	4,096
Cmnd Tie Up Monitor	r Multi-Clutch Thresh -	Part 5					
y/x	CeCGSR_e_Park_wN C5	CeCGSR_e_Park_wN C6	CeCGSR_e_Park_wN C7	CeCGSR_e_Park_wN C1C2	CeCGSR_e_Park_wN C2C3	CeCGSR_e_Park_wN C2C4	CeCGSR_e_Park_wN C2C5
CeTRMR_e_C1_Clutc h	147	147	4,096	4,096	147	154	147
CeTRMR_e_C2_Clutc h	154	152	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutc h	920	205	4,096	205	4,096	205	1,693
	Ini	itial Supporting ta	able - Cmnd Tie l	Jp Monitor Multi-	Clutch Thresh		
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CeTRMR_e_C4_Clutc h	350	1,814	4,096	350	350	4,096	350
CeTRMR_e_C5_Clutc h	4,096	149	4,096	149	561	149	4,096
CeTRMR_e_C6_Clutc h	91	4,096	4,096	91	91	155	91
CeTRMR_e_C7_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	4,096
Cmnd Tie Up Monitor	r Multi-Clutch Thresh -	Part 6	-	<u> </u>		<u>.</u>	<u>~</u>
y/x	CeCGSR_e_Park_wN C2C6	CeCGSR_e_Park_wN C3C4	CeCGSR_e_Park_wN C3C5	CeCGSR_e_Park_wN C3C6	CeCGSR_e_Park_wN C4C5	CeCGSR_e_Park_wN C4C6	CeCGSR_e_Park_wN C1C2C3C6
CeTRMR_e_C1_Clutc h	147	158	147	147	154	154	147
CeTRMR_e_C2_Clutc h	4,096	152	168	152	154	152	152
CeTRMR_e_C3_Clutc h	205	4,096	4,096	4,096	920	205	205
CeTRMR_e_C4_Clutc h	1,814	4,096	350	1,814	4,096	4,096	350
CeTRMR_e_C5_Clutc h	149	561	4,096	869	4,096	149	149
CeTRMR_e_C6_Clutc h	4,096	155	91	4,096	411	4,096	91
CeTRMR_e_C7_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	4,096
Cmnd Tie Up Monitor	r Multi-Clutch Thresh -	Part 7	•	^	•	^	^
y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondL ckd	CeCGSR_e_SecondF W	CeCGSR_e_Third	CeCGSR_e_Fourth
CeTRMR_e_C1_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutc h	4,096	4,096	4,096	4,096	4,096	236	152
CeTRMR_e_C3_Clutc h	205	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutc h	4,096	350	350	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutc h	149	4,096	4,096	561	561	4,096	869
CeTRMR_e_C6_Clutc h	4,096	91	91	155	155	411	4,096
CeTRMR_e_C7_Clutc	4,096	4,096	4,096	4,096	4,096	4,096	4,096

# Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

Cmnd Tie Up Monitor	Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 8						
y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	
CeTRMR_e_C1_Clutc h	4,096	4,096	239	154	147	158	
CeTRMR_e_C2_Clutc h	168	154	441	4,096	4,096	4,096	
CeTRMR_e_C3_Clutc h	4,096	920	4,096	1,693	4,096	4,096	
CeTRMR_e_C4_Clutc h	1,962	4,096	4,096	4,096	1,814	4,096	
CeTRMR_e_C5_Clutc h	4,096	4,096	4,096	4,096	4,096	1,682	
CeTRMR_e_C6_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	
CeTRMR_e_C7_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	

## Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

**Description:** Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up when transfer case is in 4WD low range

Value Units: Pressure (kPa) X Unit: Commanded Gear

Y Units: Clutch

Cmnd Tie Up Monit	or Multi-Clutch Thresh	4WD Lo - Part 1					
y/x	CeCGSR_e_NullForS ched	CeCGSR_e_NeutralN oClutch	CeCGSR_e_NeutralC	CeCGSR_e_NeutralC 2	CeCGSR_e_NeutralC 3	CeCGSR_e_NeutralC 4	CeCGSR_e_NeutralC 5
CeTRMR_e_C1_Clut h	c 54	54	4,096	54	54	57	54
CeTRMR_e_C2_Clut h	c 56	56	56	4,096	56	56	57
CeTRMR_e_C3_Clut	c 76	76	76	76	4,096	76	341
 CeTRMR_e_C4_Clut h	c 130	130	130	130	130	4,096	130
 CeTRMR_e_C5_Clut h	c 55	55	55	55	208	55	4,096
 CeTRMR_e_C6_Clut h	c 34	34	34	34	34	58	34
 CeTRMR_e_C7_Clut h	c 4,096	4,096	4,096	4,096	4,096	4,096	4,096
Cmnd Tie Up Monit	or Multi-Clutch Thresh	4WD Lo - Part 2	•	,	•	•	•
y/x	CeCGSR_e_NeutralC 6	CeCGSR_e_NeutralC 7	CeCGSR_e_NeutralC 1C2	CeCGSR_e_NeutralC 1C3	CeCGSR_e_NeutralC 1C4	CeCGSR_e_NeutralC 1C5	CeCGSR_e_NeutralC 2C3
CeTRMR_e_C1_Clut	c 54	4,096	4,096	4,096	4,096	4,096	54
CeTRMR_e_C2_Clut	c 56	4,096	4,096	56	56	57	4,096
CeTRMR_e_C3_Clut	c 76	4,096	76	4,096	76	341	4,096
 CeTRMR_e_C4_Clut h	c 672	4,096	130	130	4,096	130	130
 CeTRMR_e_C5_Clut h	c 55	4,096	55	208	55	4,096	208
CeTRMR_e_C6_Clut h	c 4,096	4,096	34	34	58	34	34
CeTRMR_e_C7_Clut	c 4,096	4,096	4,096	4,096	4,096	4,096	4,096

	Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo								
y/x	CeCGSR_e_NeutralC 2C4	CeCGSR_e_NeutralC 2C5	CeCGSR_e_NeutralC 2C6	CeCGSR_e_NeutralC 3C4	CeCGSR_e_NeutralC 3C5	CeCGSR_e_NeutralC 3C6	CeCGSR_e_NeutralC 4C5		
CeTRMR_e_C1_Clutc h	57	54	54	58	54	54	57		
CeTRMR_e_C2_Clutc h	4,096	4,096	4,096	56	62	56	57		
CeTRMR_e_C3_Clutc h	76	627	76	4,096	4,096	4,096	341		
CeTRMR_e_C4_Clutc h	4,096	130	672	4,096	130	672	4,096		
CeTRMR_e_C5_Clutc h	55	4,096	55	208	4,096	322	4,096		
CeTRMR_e_C6_Clutc h	58	34	4,096	58	34	4,096	152		
CeTRMR_e_C7_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	4,096		
Cmnd Tie Up Monitor	r Multi-Clutch Thresh 4	WD Lo - Part 4		A					
y/x	CeCGSR_e_NeutralC 4C6	CeCGSR_e_NeutralC 1C2C3C6	CeCGSR_e_Park_wN C	CeCGSR_e_Park_wN C1	CeCGSR_e_Park_wN C2	CeCGSR_e_Park_wN C3	CeCGSR_e_Park_wN C4		
CeTRMR_e_C1_Clutc h	57	54	54	4,096	54	54	57		
CeTRMR_e_C2_Clutc h	56	56	56	56	4,096	56	56		
CeTRMR_e_C3_Clutc h	76	76	76	76	76	4,096	76		
CeTRMR_e_C4_Clutc h	4,096	130	130	130	130	130	4,096		
CeTRMR_e_C5_Clutc h	55	55	55	55	55	208	55		
CeTRMR_e_C6_Clutc h	4,096	34	34	34	34	34	58		
CeTRMR_e_C7_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	4,096		
Cmnd Tie Up Monitor	r Multi-Clutch Thresh 4	WD Lo - Part 5		-	-				
y/x	CeCGSR_e_Park_wN C5	CeCGSR_e_Park_wN C6	CeCGSR_e_Park_wN C7	CeCGSR_e_Park_wN C1C2	CeCGSR_e_Park_wN C2C3	CeCGSR_e_Park_wN C2C4	CeCGSR_e_Park_wN C2C5		
CeTRMR_e_C1_Clutc h	54	54	4,096	4,096	54	57	54		
CeTRMR_e_C2_Clutc h	57	56	4,096	4,096	4,096	4,096	4,096		
CeTRMR_e_C3_Clutc h	341	76	4,096	76	4,096	76	627		

	Initial	Supporting table	- Cmnd Tie Up M	onitor Multi-Clut	ch Thresh 4WD L	-0	
CeTRMR_e_C4_Clutc h	130	672	4,096	130	130	4,096	130
CeTRMR_e_C5_Clutc h	4,096	55	4,096	55	208	55	4,096
CeTRMR_e_C6_Clutc h	34	4,096	4,096	34	34	58	34
CeTRMR_e_C7_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	4,096
Cmnd Tie Up Monitor	r Multi-Clutch Thresh 4	WD Lo - Part 6	•	A	•	A	*
y/x	CeCGSR_e_Park_wN C2C6	CeCGSR_e_Park_wN C3C4	CeCGSR_e_Park_wN C3C5	CeCGSR_e_Park_wN C3C6	CeCGSR_e_Park_wN C4C5	CeCGSR_e_Park_wN C4C6	CeCGSR_e_Park_wN C1C2C3C6
CeTRMR_e_C1_Clutc h	54	58	54	54	57	57	54
CeTRMR_e_C2_Clutc h	4,096	56	62	56	57	56	56
CeTRMR_e_C3_Clutc h	76	4,096	4,096	4,096	341	76	76
CeTRMR_e_C4_Clutc h	672	4,096	130	672	4,096	4,096	130
CeTRMR_e_C5_Clutc h	55	208	4,096	322	4,096	55	55
CeTRMR_e_C6_Clutc h	4,096	58	34	4,096	152	4,096	34
CeTRMR_e_C7_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	4,096
Cmnd Tie Up Monitor	r Multi-Clutch Thresh 4	WD Lo - Part 7	•	•	•	A	
y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondL ckd	CeCGSR_e_SecondF W	CeCGSR_e_Third	CeCGSR_e_Fourth
CeTRMR_e_C1_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutc h	4,096	4,096	4,096	4,096	4,096	88	56
CeTRMR_e_C3_Clutc h	76	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutc h	4,096	130	130	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutc h	55	4,096	4,096	208	208	4,096	322
CeTRMR_e_C6_Clutc	4,096	34	34	58	58	152	4,096
CeTRMR_e_C7_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4	ND Lo
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Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 8							
y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	
CeTRMR_e_C1_Clutc h	4,096	4,096	89	57	54	58	
CeTRMR_e_C2_Clutc h	62	57	163	4,096	4,096	4,096	
CeTRMR_e_C3_Clutc h	4,096	341	4,096	627	4,096	4,096	
CeTRMR_e_C4_Clutc h	727	4,096	4,096	4,096	672	4,096	
CeTRMR_e_C5_Clutc h	4,096	4,096	4,096	4,096	4,096	623	
CeTRMR_e_C6_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	
CeTRMR_e_C7_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	

# Initial Supporting table - Cmnd Tie Up Monitor Output Lock Thresh

Description: Maximum pressure command allowed for each invalid combination of clutches which can lead to an output tie-up

Value Units: Pressure (kPa) X Unit: Possible Output Tie-up Combination (unitless) Y Units: Clutch

y/x	CeTCLR_e_TUM_Out Lockl	CeTCLR_e_TUM_Out Lock2	CeTCLR_e_TUM_Out Lock3	CeTCLR_e_TUM_Out Lock4	CeTCLR_e_TUM_Out Lock5	CeTCLR_e_TUM_Out Lock6	CeTCLR_e_TUM_Out Lock7
CeTRMR_e_C1_Clutc h	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C2_Clutc h	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C3_Clutc h	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C4_Clutc h	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C5_Clutc h	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C6_Clutc h	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C7_Clutc h	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096

### Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

### Initial Supporting table - Illegal Drive Clutch Combinations

**Description:** All combinations of clutch commands which can lead to reverse when the driver is requesting drive (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off) X Unit: Illegal Clutch Combination Y Units: Clutch

y/x	CeTRMR_e_IllegalDrv_Rev1	CeTRMR_e_IllegalDrv_Rev2
CeTRMR_e_C1_Clutch	1	1
CeTRMR_e_C2_Clutch	1	1
CeTRMR_e_C3_Clutch	0	0
CeTRMR_e_C4_Clutch	1	1
CeTRMR_e_C5_Clutch	0	0
CeTRMR_e_C6_Clutch	1	1
CeTRMR_e_C7_Clutch	0	0

### Initial Supporting table - Illegal Park-Neutral Clutch Combinations

**Description:** All combinations of clutch commands which can lead to drive or reverse when the driver is requesting park or neutral (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off) X Unit: Illegal Clutch Combination Y Units: Clutch

Illegal Park-Neutral Clutch C	ombinations - Part 1				
y/x	CeTRMR_e_IllegalPN_Rev	CeTRMR.e_IllegalPN.1A	CeTRMR.e.IllegalPN.I Ac	CeTRMR.e.IllegalPN.I Ad	CeTRMR.e.IllegalPN.I Af
CeTRMR_e_C1.Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	0	0	0	0
CeTRMR_e_C3_Clutch	0	0	1	0	0
CeTRMR_e_C4_Clutch	1	0	0	1	0
CeTRMR_e_C5_Clutch	0	1	1	1	1
CeTRMR_e_C6_Clutch	1	0	0	0	1
CeTRMR_e_C7_Clutch	0	0	0	0	0
Illegal Park-Neutral Clutch C	ombinations - Part 2				
y/x	CeTRMR.e.IIIegalPN.I M	CeTRMR.e.IllegalPN.I Me	CeTRMR.e.IllegalPN.I Md	CeTRMR.e.IllegalPN.I Mf	CeTRMR_e_IIIegaIPN_2A
CeTRMR_e_C1.Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	1	1	1	0
CeTRMR_e_C3_Clutch	0	1	0	0	1
CeTRMR_e_C4_Clutch	0	0	1	0	1
CeTRMR_e_C5_Clutch	1	1	1	1	0
CeTRMR_e_C6_Clutch	0	0	0	1	0
CeTRMR_e_C7_Clutch	0	0	0	0	0
Illegal Park-Neutral Clutch C	ombinations - Part 3				
y/x	CeTRMR_e_IllegalPN_2M	CeTRMR_e_IllegalPN_3	CeTRMR_e_IllegalPN_4	CeTRMR_e_IllegalPN_5	CeTRMR_e_IIIegaIPN_6
CeTRMR.e.CI .Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	0	0	0	0
CeTRMR_e_C3_Clutch	1	1	1	1	0
CeTRMR_e_C4_Clutch	1	1	1	0	1
CeTRMR_e_C5_Clutch	0	1	0	1	1
CeTRMR_e_C6_Clutch	0	0	1	1	1
CeTRMR_e_C7_Clutch	0	0	0	0	0
Illegal Park-Neutral Clutch C	ombinations - Part 4				
y/x	CeTRMR_e_IllegalPN_7	CeTRMR_e_IllegalPN_8	CeTRMR_e_IIIegalPN_9	CeTRMR.e.IllegalPN.I 0	
CeTRMR.e.Cl .Clutch	0	0	0	0	
CeTRMR_e_C2_Clutch	0	1	1	1	

Initial Supporting table - Illegal Park-Neutral Clutch Combinations							
CeTRMR_e_C3_Clutch	1	0	1	1			
CeTRMR_e_C4_Clutch	1	1	0	1			
CeTRMR_e_C5_Clutch	1	1	1	0			
CeTRMR_e_C6_Clutch	1	1	1	1			
CeTRMR_e_C7_Clutch	0	0	0	0			

### Initial Supporting table - Illegal Reverse Clutch Combinations

**Description:** All combinations of clutch commands which can lead to drive when the driver is requesting reverse (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off) X Unit: Illegal Clutch Combination Y Units: Clutch

Illegal Reverse Clutch C	combinations - Part 1					
y/x	CeTRMR_e_IllegalRev_1 A	CeTRMR_e_IllegalRev_1 Ac	CeTRMR_e_IllegalRev_1 Ad	CeTRMR_e_IllegalRev_1 Af	CeTRMR_e_IllegalRev_1 M	CeTRMR_e_IIIegalRev_1 Me
CeTRMR_e_C1.Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	0	0	0	0	1	1
CeTRMR_e_C3_Clutch	0	1	0	0	0	1
CeTRMR_e_C4_Clutch	0	0	1	0	0	0
CeTRMR_e_C5_Clutch	1	1	1	1	1	1
CeTRMR_e_C6_Clutch	0	0	0	1	0	0
CeTRMR_e_C7_Clutch	0	0	0	0	0	0
Illegal Reverse Clutch C	combinations - Part 2					
y/x	CeTRMR_e_IllegalRev_1 Md	CeTRMR_e_IllegalRev_1 Mf	CeTRMR_e_IIIegalRev_2 A	CeTRMR_e_IIIegalRev_2 M	CeTRMR_e_IIIegalRev_3	CeTRMR_e_IIIegalRev_4
CeTRMR_e_C1.Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	1	0	1	0	0
CeTRMR_e_C3_Clutch	0	0	1	1	1	1
CeTRMR_e_C4_Clutch	1	0	1	1	1	1
CeTRMR_e_C5_Clutch	1	1	0	0	1	0
CeTRMR_e_C6_Clutch	0	1	0	0	0	1
CeTRMR_e_C7_Clutch	0	0	0	0	0	0
Illegal Reverse Clutch C	combinations - Part 3					
y/x	CeTRMR_e_IIIegalRev_5	CeTRMR_e_IllegalRev_6	CeTRMR_e_IllegalRev_7	CeTRMR_e_IIIegalRev_8	CeTRMR_e_IIIegalRev_9	CeTRMR_e_IIIegalRev_1 0
CeTRMR_e_C1.Clutch	1	1	0	0	0	0
CeTRMR_e_C2_Clutch	0	0	0	1	1	1
CeTRMR_e_C3_Clutch	1	0	1	0	1	1
CeTRMR_e_C4_Clutch	0	1	1	1	0	1
CeTRMR_e_C5_Clutch	1	1	1	1	1	0
CeTRMR_e_C6_Clutch	1	1	1	1	1	1
CeTRMR e C7 Clutch	0	0	0	0	0	0

### Initial Supporting table - Incorrect Direction Range Change Delay Time

Description: Time delay after PRNDL change before incorrect direction monitor will be enabled

y/x	-40	-20	0	20	120
1	1	1	1	1	1

## Initial Supporting table - Incorrect Drive Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded drive condition

y/x	-40	-20	0	20	120
1	0	0	0	0	0

# Initial Supporting table - Incorrect Neutral Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded neutral condition

y/x	-40	-20	0	20	120
1	0	0	0	0	0

## Initial Supporting table - Incorrect Park Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded park condition

y/x	-40	-20	0	20	120
1	0	0	0	0	0

## Initial Supporting table - Incorrect Reverse Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded reverse condition

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initi	al Supporting table - intermedia	te spe;ed sensor 1 or 2 predicted	direction
Description: intermediate speed senso	or 1 or 2 predicted direction		
Value Units: predicted direction: forward X Unit: attained gear Y Units: intermediate speed sensor 1 o	rd, reverse, unknown r 2		
intermediate speed sensor 1 or 2 pre-	dicted direction - Part 1		
y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown
intermediate speed sensor 1 or 2 pred	dicted direction - Part 2		
y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown
intermediate speed sensor 1 or 2 pre-	dicted direction - Part 3		
y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_Directionllnknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
intermediate speed sensor 1 or 2 pred	dicted direction - Part 4		
y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
intermediate speed sensor 1 or 2 pred	dicted direction - Part 5		
y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

### Initial Supporting table - P0606\_Last Seed Timeout f(Loop Time)

**Description:** The max time for the Last Seed Timeout as a function of operating loop time sequence.

Value Units: Max Time for Last Seed Timeout (ms) X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1								
y/x	CePISR_e_2p5msS	CePISR_e_3p125m	CePISR_e_5msSeq	CePISR_e_6p25ms	CePISR_e_10msSe	CePISR e 12p5ms	CePISR_e_20msSe	CePISR_e_25msSe
	eq	sSeq		Seq	q	Seq	q	q
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000
P0606_Last Seed	I Timeout f(Loop Time	e) - Part 2						
y/x	CePISR_e_40msSe	CePISR_e_50msSe	CePISR_e_80msSe	CePISR_e_100msS	CePISR_e_250msS	CePISR_e_EventA	CePISR_e_EventB	CePISR_e_EventC
	q	q	q	eq	eq	_Seq	_Seq	_Seq
1	200.000	500.000	500.000	1,000.000	2,000.000	8,191.875	8,191.875	8,191.875

### Initial Supporting table - P0606\_Program Sequence Watch Enable f(Core, Loop Time)

**Description:** The enabling flags for the program sequence watch as a function of processor core and operating loop time sequence.

Value Units: PSW enable flag (boolean) X Unit: Processor Core (enum)

Y Units: Operating Loop Time Sequence (enum)

y/x	CeTSKR_e_CPU	CeTSKR_e_CPU2	CeTSKR_e_CPU3	CeTSKR_e_CPU4
CePISR_e_2p5msSeq	0	0	0	0
CePISR_e_3p125msSeq	0	0	0	0
CePISR_e_5msSeq	0	0	0	0
CePISR_e_6p25msSeq	1	1	0	0
CePISR_e_1OmsSeq	0	0	0	0
CePISR_e_12p5msSeq	1	1	0	0
CePISR_e_20msSeq	0	0	0	0
CePISR_e_25msSeq	1	1	0	0
CePISR_e_40msSeq	0	0	0	0
CePISR_e_50msSeq	1	1	0	0
CePISR_e_80msSeq	0	0	0	0
CePISR_e_100msSeq	0	0	0	0
CePISR_e_250msSeq	0	0	0	0
CePISR_e_EventA_Seq	0	0	0	0
CePISR_e_EventB_Seq	0	0	0	0
CePISR_e_EventC_Seq	1	0	0	0

## Initial Supporting table - P0606\_PSW Sequence Fail f(Loop Time)

**Description:** Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count) X Unit: Operating Loop (enum)

P0606_PSW Seque	ence Fail f(Loop Tim	e) - Part 1						
y/x	CePISR_e_2p5msS	CePISR_e_3p125m	CePISR_e_5msSeq	CePISR_e_6p25ms	CePISR_e_10msSe	CePISR e 12p5ms	CePISR_e_20msSe	CePISR_e_25msSe
	eq	sSeq		Seq	q	Seq	q	q
1	3	3	3	3	3	3	3	3
P0606_PSW Seque	ence Fail f(Loop Tim	e) - Part 2						
y/x	CePISR_e_40msSe	CePISR_e_50msSe	CePISR_e_80msSe	CePISR_e_100msS	CePISR_e_250msS	CePISR_e_EventA	CePISR_e_EventB	CePISR_e_EventC
	q	q	q	eq	eq	_Seq	_Seq	_Seq
1	3	3	3	3	3	3	3	3

## Initial Supporting table - P0606 PSW Sequence Sample f(Loop Time)

**Description:** Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count) X Unit: Operating Loop (enum)

P0606_PSW Seque	P0606_PSW Sequence Sample f(Loop Time) - Part 1							
y/x	CePISR_e_2p5msS	CePISR_e_3p125m	CePISR_e_5msSeq	CePISR_e_6p25ms	CePISR_e_10msSe	CePISR e 12p5ms	CePISR_e_20msSe	CePISR_e_25msSe
	eq	sSeq		Seq	q	Seq	q	q
1	4	4	4	4	4	4	4	4
P0606_PSW Seque	ence Sample f(Loop	Time) - Part 2						
y/x	CePISR_e_40msSe	CePISR_e_50msSe	CePISR_e_80msSe	CePISR_e_100msS	CePISR_e_250msS	CePISR_e_EventA	CePISR_e_EventB	CePISR_e_EventC
	q	q	q	eq	eq	_Seq	_Seq	_Seq
1	4	4	4	4	4	4	4	4

### Initial Supporting table - P0723 transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmission engaged to allow P0723 enable

### Value Units: seconds

**X Unit:** transmission fluid temperature °C

y/x	-40.000	-20.000	20.000
1	5.000	3.000	1.000

### Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

### Value Units: seconds

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

### Initial Supporting table - P176B holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sessor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE X Unit: intermediate speed sensor select

Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

# Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

### Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

### Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

### Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

# Value Units: transmission input speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

### Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio

X Unit: commanded gear Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Ge ar1	CeTGRR_e_Ge ar2	CeTGRR_e_Ge ar3	CeTGRR_e_Ge ar4	CeTGRR_e_Ge ar5	CeTGRR_e_Ge ar6	CeTGRR_e_Ge ar7	CeTGRR_e_Ge ar8	CeTGRR_e_Ge ar9	CeTGRR_e_Ge ar10
CeTSRR_e_C2 C_ClchSpdSnsr 1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2 C_ClchSpdSnsr 2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

### Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

### Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

# Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update			
Value Units: intermediate speed sensor RPM X Unit: intermediate speed sensor 1 or 2			
y/x 0 1			
1	350	225	

### Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

### Value Units: seconds

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

### Initial Supporting table - P17D6 holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sessor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE

X Unit: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

## Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

### Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

**Description:** P17D6 intermediate speed sensor fail RPM speed threshold

### Value Units: RPM

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100
### Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

#### Value Units: seconds

X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

### Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

### Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

**Description:** minimum transmission input speed to enable fail evaluation

# Value Units: transmission input speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

### Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio

X Unit: commanded gear Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Ge ar1	CeTGRR_e_Ge ar2	CeTGRR_e_Ge ar3	CeTGRR_e_Ge ar4	CeTGRR_e_Ge ar5	CeTGRR_e_Ge ar6	CeTGRR_e_Ge ar7	CeTGRR_e_Ge ar8	CeTGRR_e_Ge ar9	CeTGRR_e_Ge ar10
CeTSRR_e_C2 C_ClchSpdSnsr 1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2 C_ClchSpdSnsr 2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

## Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

### Initial Supporting table - Ratio Monitor Clutch States

**Description:** Array of valid combinations of clutch held/off which constitues a valid gear (1 = clutch held, 0 = clutch off)

Value Units: Clutch Held Boolean

X Unit: Gear

Y Units: Clutch

Ratio Monitor Clutch Sta	tes - Part 1				
y/x	CeTRMR_e_GRX_GearR	CeTRMR_e_GRX_Gear1A	CeTRMR_e_GRX_Gear1Ac	CeTRMR_e_GRX_Gear1Ad	CeTRMR_e_GRX_Gear1Af
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	0	0	0	0
CeTSER_e_C3_Clutch	0	0	1	0	0
CeTSER_e_C4_Clutch	1	0	0	1	0
CeTSER_e_C5_Clutch	0	1	1	1	1
CeTSER_e_C6_Clutch	1	0	0	0	1
Ratio Monitor Clutch Sta	tes - Part 2				
y/x	CeTRMR_e_GRX_Gear1M	CeTRMR_e_GRX_Gear1Me	CeTRMR_e_GRX_Gear1Md	CeTRMR_e_GRX_Gear1Mf	CeTRMR_e_GRX_Gear2A
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	1	1	1	0
CeTSER_e_C3_Clutch	0	1	0	0	1
CeTSER_e_C4_Clutch	0	0	1	0	1
CeTSER_e_C5_Clutch	1	1	1	1	0
CeTSER_e_C6_Clutch	0	0	0	1	0
Ratio Monitor Clutch Sta	tes - Part 3				
y/x	CeTRMR_e_GRX_Gear2M	CeTRMR_e_GRX_Gear3	CeTRMR_e_GRX_Gear4	CeTRMR_e_GRX_Gear5	CeTRMR_e_GRX_Gear6
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	0	0	0	0
CeTSER_e_C3_Clutch	1	1	1	1	0
CeTSER_e_C4_Clutch	1	1	1	0	1
CeTSER_e_C5_Clutch	0	1	0	1	1
CeTSER_e_C6_Clutch	0	0	1	1	1
Ratio Monitor Clutch Sta	tes - Part 4				
y/x	CeTRMR_e_GRX_Gear7	CeTRMR_e_GRX_Gear8	CeTRMR_e_GRX_Gear9	CeTRMR_e_GRX_Gear10	
CeTSER_e_C1_Clutch	0	0	0	0	
CeTSER_e_C2_Clutch	0	1	1	1	
CeTSER_e_C3_Clutch	1	0	1	1	
CeTSER_e_C4_Clutch	1	1	0	1	
CeTSER_e_C5_Clutch	1	1	1	0	

Initial Supporting table - Ratio Monitor Clutch States					
CeTSER_e_C6_Clutch	<u>ן</u>	ħħ	<u> </u>	 ]	

## Initial Supporting table - Ratio Monitor Fail Increment Rate (Percent per Loop)

Description: Ratio Monitor Fail Increment Rate						
Value Units: Percent Increment Per Loop X Unit: Transmission Oil Temperature (deg C)						
y/x	-40	-20	0	20	120	
1	0	0	0	0	0	

Initial Supporting table - Ratio Monitor Slip Threshold						
Description: Threshold sl	Description: Threshold slip value below which the clutch is considered holding					
Value Units: clutch slip (RPM) X Unit: Clutch						
y/x	CeTRMR_e_ClchSlipC1	CeTRMR_e_ClchSlipC2	CeTRMR_e_ClchSlipC5	CeTRMR_e_ClchSlipC3C 4	CeTRMR_e_ClchSlipC3C 6	CeTRMR_e_ClchSlipC4C 6
1	30	30	30	25	25	25

## Initial Supporting table - Shift Monitor Lowest Allowed Gear

Description: Y axis shows lowest allowed gear for the current vehicle speed and transfer case range

Value Units: Vehicle Speed (kph) X Unit: Transfer Case Range Y Units: Lowest Allowed Gear

y/x	CeTCLR_e_4WD_Hi	CeTCLR_e_4WD_Lo
CeTGRR_e_Gear1	76	28
CeTGRR_e_Gear2	119	44
CeTGRR_e_Gear3	165	61
CeTGRR_e_Gear4	201	74
CeTGRR_e_Gear5	234	87
CeTGRR_e_Gear6	279	103
CeTGRR_e_Gear7	355	132
CeTGRR_e_Gear8	416	154
CeTGRR_e_Gear9	515	191
CeTGRR_e_Gear10	559	207

## Initial Supporting table - speed sensor directional rationality enable calibration

Description: speed sensor directional rationality enable calibration

Value Units: Boolean X Unit: scheduled gear Y Units: unitless

y/x	CeCGSR_FwdCmded	CeCGSR-NeutCmded	CeCGSR_RvrsCmded	CeCGSR-ParkCmded
1	1	1	0	1

## Initial Supporting table - transmission fluid temperature warm up time

Descr	iption:	

Value Units: transmission fluid temperature normal warn up time, seconds X Unit: transmission fluid temperature at controller power up,  $^{\circ}C$ 

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

# Initial Supporting table - P0606\_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.								
P0606_Last Seed T	Timeout f(Loop Time	e) - Part 1						
y/x	CePISR_e_2p5msS CePISR_e_3p125m CePISR_e_5msSeq CePISR_e_6p25ms CePISR_e_10msSe CePISR e 12p5ms CePISR_e_20msSe CePISR_e_25msSe eq eq sSeq eq e							
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000
P0606_Last Seed T	P0606_Last Seed Timeout f(Loop Time) - Part 2							
y/x	CePISR_e_40msSe	CePISR_e_50msSe	CePISR_e_80msSe	CePISR_e_100msS	CePISR_e_250msS	CePISR_e_EventA	CePISR_e_EventB	CePISR_e_EventC
	q	q	q	eq	eq	_Seq	_Seq	_Seq
1	200.000	500.000	500.000	1,000.000	2,000.000	8,191.875	8,191.875	8,191.875

## Initial Supporting table - P0606\_PSW Sequence Fail f(Loop Time)

**Description:** Fail threshold for PSW per operating loop.

•		1 5 1						
P0606_PSW Sequence Fail f(Loop Time) - Part 1								
y/x	CePISR_e_2p5msS	CePISR_e_3p125m	CePISR_e_5msSeq	CePISR_e_6p25ms	CePISR_e_10msSe	CePISR e 12p5ms	CePISR_e_20msSe	CePISR_e_25msSe
	eq	sSeq		Seq	q	Seq	q	q
1	3	3	3	3	3	3	3	3
P0606_PSW Sequence Fail f(Loop Time) - Part 2								
y/x	CePISR_e_40msSe	CePISR_e_50msSe	CePISR_e_80msSe	CePISR_e_100msS	CePISR_e_250msS	CePISR_e_EventA	CePISR_e_EventB	CePISR_e_EventC
	q	q	q	eq	eq	_Seq	_Seq	_Seq
1	3	3	3	3	3	3	3	3

## Initial Supporting table - P0606 PSW Sequence Sample f(Loop Time)

**Description:** Sample threshold for PSW per operating loop.

P0606_PSW Sequence Sample f(Loop Time) - Part 1								
y/x	CePISR_e_2p5msS	CePISR_e_3p125m	CePISR_e_5msSeq	CePISR_e_6p25ms	CePISR_e_10msSe	CePISR e 12p5ms	CePISR_e_20msSe	CePISR_e_25msSe
	eq	sSeq		Seq	q	Seq	q	q
1	4	4	4	4	4	4	4	4
P0606_PSW Sequence Sample f(Loop Time) - Part 2								
y/x	CePISR_e_40msSe	CePISR_e_50msSe	CePISR_e_80msSe	CePISR_e_100msS	CePISR_e_250msS	CePISR_e_EventA	CePISR_e_EventB	CePISR_e_EventC
	q	q	q	eq	eq	_Seq	_Seq	_Seq
1	4	4	4	4	4	4	4	4

## Initial Supporting table - C1 exhaust delay closed throttle down shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in closed throttle down shift

#### Value Units: seconds

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

### Initial Supporting table - C1 exhaust delay closed throttle lift foot up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

# Initial Supporting table - C1 exhaust delay garage shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in garage shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

## Initial Supporting table - C1 exhaust delay negative torque up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

## Initial Supporting table - C1 exhaust delay open throttle power down shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

## Initial Supporting table - C1 exhaust delay open throttle power on up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in open throttle power on up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.500	1.000	0.750	0.750	0.750

# Initial Supporting table - C2 exhaust delay closed throttle down shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in closed throttle down shift

#### Value Units: seconds

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

# Initial Supporting table - C2 exhaust delay garage shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in garage shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

## Initial Supporting table - C2 exhaust delay negative torque up shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in negative torque up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

## Initial Supporting table - C2 exhaust delay open throttle power down shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

## Initial Supporting table - C2 exhaust delay open throttle power on up shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in open throttle power on up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

## Initial Supporting table - C3 exhaust delay closed throttle down shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle down shift

#### Value Units: seconds

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

### Initial Supporting table - C3 exhaust delay closed throttle lift foot up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

# Initial Supporting table - C3 exhaust delay garage shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in garage shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

# Initial Supporting table - C3 exhaust delay negative torque up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in negative torque up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

## Initial Supporting table - C3 exhaust delay open throttle power down shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

## Initial Supporting table - C3 exhaust delay open throttle power on up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in open throttle power on up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	3.000	0.750	0.750	0.750	0.750

## Initial Supporting table - C4 exhaust delay closed throttle down shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in closed throttle down shift

#### Value Units: seconds

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

### Initial Supporting table - C4 exhaust delay closed throttle lift foot up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

## Initial Supporting table - C4 exhaust delay garage shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in garage shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

## Initial Supporting table - C4 exhaust delay negative torque up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in negative torque up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500
### Initial Supporting table - C4 exhaust delay open throttle power down shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

### Initial Supporting table - C4 exhaust delay open throttle power on up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

### Initial Supporting table - C5 exhaust delay closed throttle down shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in closed throttle down shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

#### Initial Supporting table - C5 exhaust delay closed throttle lift foot up shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

### Initial Supporting table - C5 exhaust delay garage shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in garage shift
Value Units: seconds X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

### Initial Supporting table - C5 exhaust delay negative torque up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

### Initial Supporting table - C5 exhaust delay open throttle power down shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

### Initial Supporting table - C5 exhaust delay open throttle power on up shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in open throttle power on up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

#### Initial Supporting table - C6 exhaust delay closed throttle lift foot up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

## Initial Supporting table - C6 exhaust delay garage shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in garage shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

## Initial Supporting table - C6 exhaust delay negative torque up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in negative torque up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

### Initial Supporting table - C6 exhaust delay open throttle power down shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

### Initial Supporting table - C6 exhaust delay open throttle power on up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power on up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

### Initial Supporting table - Clutch Clip Press CD Shifts

**Description:** Oncoming clutch clip pressure for closed throttle down shifts

Value Units: kPa

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTS ER_e_C6_Clutch
1	250	400	400	400	400	400

### Initial Supporting table - Clutch Clip Press GS Shifts

Description: Oncoming clutch clip pressure for garage shifts

Value Units: kPa

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTS ER_e_C6_Clutch
1	450	750	850	400	400	400

### Initial Supporting table - Clutch Clip Press NU Shifts

**Description:** Oncoming clutch clip pressure for negative torque up shifts

#### Value Units: kPa

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTS ER_e_C6_Clutch
1	450	450	450	600	450	450

### Initial Supporting table - Clutch Clip Press PD Shifts

**Description:** Oncoming clutch clip pressure for open throttle power down shifts

#### Value Units: kPa

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTS ER_e_C6_Clutch
1	450	500	600	750	750	500

### Initial Supporting table - Clutch Stuck On Fail Offset Time CD Shifts

Description: Used for closed throttle down shifts to add additional fail time based on oil temperature

y/x	-40	-20	0	30	110
1	0	0	0	0	0

## Initial Supporting table - Clutch Stuck On Fail Offset Time GS Shifts

Description: Used for garage shifts to add additional fail time based on oil temperature

y/x	-40	-20	0	30	110
1	0	0	0	0	0

### Initial Supporting table - Clutch Stuck On Fail Offset Time PD Shifts

Description: Used for open throttle power down shifts to add additional fail time based on oil temperature

y/x	-40	-20	0	30	110
1	0	0	0	0	0

## Initial Supporting table - Clutch Stuck On Fail Offset Time PU Shifts

Description: Used for powered up shifts to add additional fail time based on oil temperature

y/x	-40	-20	0	30	110
1	1	0	0	0	0

### Initial Supporting table - Clutch Stuck On Fail Offset Time STGR Shifts

Description: Used for clutch staging shifts to add additional fail time based on oil temperature

y/x	-40	-20	0	30	110
1	0	0	0	0	0

### Initial Supporting table - Clutch Stuck On Shift Type Enable

Description: Calibration to enable the clutch stuck on test for each shift type

XUnit: Shift Type Y Units: Boolean

y/x	CeTSER_e_STGR	CeTSER_e_GSCR	CeTSER_e_NUCR	CeTSER_e_PUCR	CeTSER_e_CDCR	CeTSER_e_PDCR	CeTSER_e_CLAR
1	0	1	1	1	1	1	0

### Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

### Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

#### Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

Initi	al Supporting table - intermedia	te spe;ed sensor 1 or 2 predicted	direction
Description: intermediate speed senso	r 1 or 2 predicted direction		
Value Units: predicted direction: forward X Unit: attained gear Y Units: intermediate speed sensor 1 or	d, reverse, unknown r 2		
intermediate speed sensor 1 or 2 pred	dicted direction - Part 1		
y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionIInknown	CeTNSR_e_Directionllnknown	CeTNSR_e_DirectionIInknown
intermediate speed sensor 1 or 2 pred	dicted direction - Part 2		
y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionIInknown	CeTNSR_e_Directionllnknown	CeTNSR_e_DirectionIInknown
intermediate speed sensor 1 or 2 pred	dicted direction - Part 3		
y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
intermediate speed sensor 1 or 2 pred	dicted direction - Part 4		
y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
intermediate speed sensor 1 or 2 pred	dicted direction - Part 5		
y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

#### Initial Supporting table - P0723 transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmission engaged to allow P0723 enable

#### Value Units: seconds

y/x	-40.000	-20.000	20.000
1	5.000	3.000	1.000

#### Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

#### Value Units: seconds

X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

#### Initial Supporting table - P176B holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sessor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE X Unit: intermediate speed sensor select

Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

## Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

#### Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds

X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

#### Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

#### Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

# Value Units: transmission input speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

#### Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio

X Unit: commanded gear Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Ge ar1	CeTGRR_e_Ge ar2	CeTGRR_e_Ge ar3	CeTGRR_e_Ge ar4	CeTGRR_e_Ge ar5	CeTGRR_e_Ge ar6	CeTGRR_e_Ge ar7	CeTGRR_e_Ge ar8	CeTGRR_e_Ge ar9	CeTGRR_e_Ge ar10
CeTSRR_e_C2 C_ClchSpdSnsr 1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2 C_ClchSpdSnsr 2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

#### Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

#### Value Units: ratio

X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000
# Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update					
Value Units: intermediate speed sensor RPM X Unit: intermediate speed sensor 1 or 2					
y/x	0	1			
1	350	225			

### Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

### Value Units: seconds

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

### Initial Supporting table - P17D6 holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sessor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE

X Unit: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

# Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

### Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

**Description:** P17D6 intermediate speed sensor fail RPM speed threshold

### Value Units: RPM

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

### Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

**Description:** P17D6 intermediate speed sensor fail time threshold

Value Units: seconds

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

### Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

### Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

# Value Units: transmission input speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

### Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio

X Unit: commanded gear Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Ge ar1	CeTGRR_e_Ge ar2	CeTGRR_e_Ge ar3	CeTGRR_e_Ge ar4	CeTGRR_e_Ge ar5	CeTGRR_e_Ge ar6	CeTGRR_e_Ge ar7	CeTGRR_e_Ge ar8	CeTGRR_e_Ge ar9	CeTGRR_e_Ge ar10
CeTSRR_e_C2 C_ClchSpdSnsr 1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2 C_ClchSpdSnsr 2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

# Initial Supporting table - P17D6 ratio calibration when REVERSE

**Description:** used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

### Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM

X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

# Initial Supporting table - transmission fluid temperature warm up time

Descr	iption:	

Value Units: transmission fluid temperature normal warn up time, seconds X Unit: transmission fluid temperature at controller power up,  $^{\circ}C$ 

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

# Initial Supporting table - C1 exhaust delay closed throttle down shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in closed throttle down shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

# Initial Supporting table - C1 exhaust delay closed throttle lift foot up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

# Initial Supporting table - C1 exhaust delay garage shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in garage shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

# Initial Supporting table - C1 exhaust delay negative torque up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

# Initial Supporting table - C1 exhaust delay open throttle power down shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

# Initial Supporting table - C1 exhaust delay open throttle power on up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in open throttle power on up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.500	1.000	0.750	0.750	0.750

### Initial Supporting table - C1 Torque-Based Pressure Clip

Description: Pressure clip values for C1 based on clutch torque. Clutch torque calculated from engine torque using torque lever ratios, which are hardware and shift specific.

# Value Units: Clutch Pressure (kPa) X Unit: C1 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	690	690	690	690	690

### Initial Supporting table - C1\_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C1 is the oncoming clutch

y/x	-40	-20	0	30	110
1	0	0	0	0	0

# Initial Supporting table - C2 exhaust delay closed throttle down shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in closed throttle down shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

# Initial Supporting table - C2 exhaust delay garage shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in garage shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

# Initial Supporting table - C2 exhaust delay negative torque up shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in negative torque up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

# Initial Supporting table - C2 exhaust delay open throttle power down shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

# Initial Supporting table - C2 exhaust delay open throttle power on up shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in open throttle power on up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

# Initial Supporting table - C2 Torque-Based Pressure Clip

Description:	Description:								
Value Units: Clutch Pressure X Unit: C2 Oncoming Clutch T	Value Units: Clutch Pressure (kPa) X Unit: C2 Oncoming Clutch Torque (Nm)								
/x 0 100 200 300 600									
1	300	400	500	500	500				

### Initial Supporting table - C2\_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C2 is the oncoming clutch

y/x	-40	-20	0	30	110
1	0	0	0	0	0

# Initial Supporting table - C3 exhaust delay closed throttle down shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle down shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

### Initial Supporting table - C3 exhaust delay closed throttle lift foot up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

# Initial Supporting table - C3 exhaust delay garage shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in garage shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

# Initial Supporting table - C3 exhaust delay negative torque up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in negative torque up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

# Initial Supporting table - C3 exhaust delay open throttle power down shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

# Initial Supporting table - C3 exhaust delay open throttle power on up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in open throttle power on up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	3.000	0.750	0.750	0.750	0.750

# Initial Supporting table - C3 Torque-Based Pressure Clip

Description:									
Value Units: Clutch Pressure X Unit: C3 Oncoming Clutch T	Value Units: Clutch Pressure (kPa) X Unit: C3 Oncoming Clutch Torque (Nm)								
/x 0 100 200 300 600									
1	300	400	500	575	800				

### Initial Supporting table - C3\_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C3 is the oncoming clutch

y/x	-40	-20	0	30	110
1	0	0	0	0	0

# Initial Supporting table - C4 exhaust delay closed throttle down shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in closed throttle down shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850
#### Initial Supporting table - C4 exhaust delay closed throttle lift foot up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

## Initial Supporting table - C4 exhaust delay garage shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in garage shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

## Initial Supporting table - C4 exhaust delay negative torque up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in negative torque up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

## Initial Supporting table - C4 exhaust delay open throttle power down shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

## Initial Supporting table - C4 exhaust delay open throttle power on up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in open throttle power on up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

# Initial Supporting table - C4 Torque-Based Pressure Clip

Description:								
Description: Value Units: Clutch Pressure (kPa) X Unit: C4 Oncoming Clutch Torque (Nm)								
y/x	0	100	200	300	600			
1	400	650	750	800	900			

#### Initial Supporting table - C4\_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C4 is the oncoming clutch

y/x	-40	-20	0	30	110
1	0	0	0	0	0

## Initial Supporting table - C5 exhaust delay closed throttle down shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in closed throttle down shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

#### Initial Supporting table - C5 exhaust delay closed throttle lift foot up shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

# Initial Supporting table - C5 exhaust delay garage shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in garage shift								
Value Units: seconds X Unit: transmission fluid temp	perature °C							
y/x	-40	-20	0	30	110			
1	0	0	0	0	0			

## Initial Supporting table - C5 exhaust delay negative torque up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

## Initial Supporting table - C5 exhaust delay open throttle power down shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

## Initial Supporting table - C5 exhaust delay open throttle power on up shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in open throttle power on up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

# Initial Supporting table - C5 Torque-Based Pressure Clip

[									
Description:									
Value Units: Clutch Pressure X Unit: C5 Oncoming Clutch	Value Units: Clutch Pressure (kPa) X Unit: C5 Oncoming Clutch Torque (Nm)								
ı/x 0 100 200 300 600									
1	300	600	700	750	900				

#### Initial Supporting table - C5\_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C5 is the oncoming clutch

y/x	-40	-20	0	30	110
1	0	0	0	0	0

#### Initial Supporting table - C6 exhaust delay closed throttle lift foot up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

# Initial Supporting table - C6 exhaust delay garage shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in garage shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

## Initial Supporting table - C6 exhaust delay negative torque up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in negative torque up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

## Initial Supporting table - C6 exhaust delay open throttle power down shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

## Initial Supporting table - C6 exhaust delay open throttle power on up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power on up shift

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

# Initial Supporting table - C6 Torque-Based Pressure Clip

Description:									
Value Units: Clutch Pressure X Unit: C6 Oncoming Clutch T	Value Units: Clutch Pressure (kPa) X Unit: C6 Oncoming Clutch Torque (Nm)								
//x 0 100 200 300 600									
1	350	650	750	800	950				

#### Initial Supporting table - C6\_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C6 is the oncoming clutch

y/x	-40	-20	0	30	110
1	0	0	0	0	0

## Initial Supporting table - Clutch Clip Press CD Shifts

**Description:** Oncoming clutch clip pressure for closed throttle down shifts

Value Units: kPa

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTS ER_e_C6_Clutch
1	250	400	400	400	400	400

# Initial Supporting table - Clutch Clip Press GS Shifts

Description: Oncoming clutch clip pressure for garage shifts

Value Units: kPa

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTS ER_e_C6_Clutch
1	450	750	850	400	400	400

## Initial Supporting table - Clutch Clip Press NU Shifts

**Description:** Oncoming clutch clip pressure for negative torque up shifts

#### Value Units: kPa

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTS ER_e_C6_Clutch
1	450	450	450	600	450	450

## Initial Supporting table - Clutch Clip Press PD Shifts

**Description:** Oncoming clutch clip pressure for open throttle power down shifts

#### Value Units: kPa

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTS ER_e_C6_Clutch
1	450	500	600	750	750	500

## Initial Supporting table - Clutch Stuck On Fail Offset Time CD Shifts

Description: Used for closed throttle down shifts to add additional fail time based on oil temperature

y/x	-40	-20	0	30	110
1	0	0	0	0	0

# Initial Supporting table - Clutch Stuck On Fail Offset Time GS Shifts

Description: Used for garage shifts to add additional fail time based on oil temperature

y/x	-40	-20	0	30	110
1	0	0	0	0	0

## Initial Supporting table - Clutch Stuck On Fail Offset Time PD Shifts

Description: Used for open throttle power down shifts to add additional fail time based on oil temperature

y/x	-40	-20	0	30	110
1	0	0	0	0	0

# Initial Supporting table - Clutch Stuck On Fail Offset Time PU Shifts

Description: Used for powered up shifts to add additional fail time based on oil temperature

y/x	-40	-20	0	30	110
1	1	0	0	0	0

## Initial Supporting table - Clutch Stuck On Fail Offset Time STGR Shifts

Description: Used for clutch staging shifts to add additional fail time based on oil temperature

y/x	-40	-20	0	30	110
1	0	0	0	0	0

# Initial Supporting table - Clutch Stuck On Shift Type Enable

Description: Calibration to enable the clutch stuck on test for each shift type

XUnit: Shift Type Y Units: Boolean

y/x	CeTSER_e_STGR	CeTSER_e_GSCR	CeTSER_e_NUCR	CeTSER_e_PUCR	CeTSER_e_CDCR	CeTSER_e_PDCR	CeTSER_e_CLAR
1	0	1	1	1	1	1	0

## Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

## Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

#### Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

Initia	l Supporting table - intermedia	te spe;ed sensor 1 or 2 predicted	direction
Description: intermediate speed sensor	1 or 2 predicted direction		
Value Units: predicted direction: forward X Unit: attained gear Y Units: intermediate speed sensor 1 or 1	, reverse, unknown 2		
intermediate speed sensor 1 or 2 pred	icted direction - Part 1		
y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown
intermediate speed sensor 1 or 2 pred	icted direction - Part 2		
y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown
intermediate speed sensor 1 or 2 pred	icted direction - Part 3		
y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
intermediate speed sensor 1 or 2 pred	icted direction - Part 4		
y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
intermediate speed sensor 1 or 2 pred	icted direction - Part 5		
y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
#### Initial Supporting table - P0723 transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmission engaged to allow P0723 enable

#### Value Units: seconds

**X Unit:** transmission fluid temperature °C

y/x	-40.000	-20.000	20.000
1	5.000	3.000	1.000

#### Initial Supporting table - P0741 GR10 torque converter K factor fail limit

#### **Description:**

Value Units: transmission torque converter K factor X Unit: transmission torque converter speed ratio = transmission turbine shaft speed / engine speed

y/x	0.000	0.100	0.200	0.300	0.500	0.700	0.800	0.945	0.950
1	400.0	300.0	225.0	200.0	200.0	200.0	250.0	1,000.0	16,383.8

#### Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

#### Value Units: seconds

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

#### Initial Supporting table - P176B holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sessor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE X Unit: intermediate speed sensor select

Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

# Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

#### Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

#### Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

#### Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

# Value Units: transmission input speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

#### Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio

X Unit: commanded gear Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Ge ar1	CeTGRR_e_Ge ar2	CeTGRR_e_Ge ar3	CeTGRR_e_Ge ar4	CeTGRR_e_Ge ar5	CeTGRR_e_Ge ar6	CeTGRR_e_Ge ar7	CeTGRR_e_Ge ar8	CeTGRR_e_Ge ar9	CeTGRR_e_Ge ar10
CeTSRR_e_C2 C_ClchSpdSnsr 1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2 C_ClchSpdSnsr 2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

#### Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

#### Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

# Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update				
Value Units: intermediate speed sensor RPM X Unit: intermediate speed sensor 1 or 2				
/x 0 1				
1	350	225		

#### Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

#### Value Units: seconds

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

#### Initial Supporting table - P17D6 holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sessor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE

X Unit: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

# Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

#### Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

**Description:** P17D6 intermediate speed sensor fail RPM speed threshold

#### Value Units: RPM

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

#### Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

**Description:** P17D6 intermediate speed sensor fail time threshold

Value Units: seconds

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

#### Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

#### Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

**Description:** minimum transmission input speed to enable fail evaluation

# Value Units: transmission input speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

#### Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio

X Unit: commanded gear Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Ge ar1	CeTGRR_e_Ge ar2	CeTGRR_e_Ge ar3	CeTGRR_e_Ge ar4	CeTGRR_e_Ge ar5	CeTGRR_e_Ge ar6	CeTGRR_e_Ge ar7	CeTGRR_e_Ge ar8	CeTGRR_e_Ge ar9	CeTGRR_e_Ge ar10
CeTSRR_e_C2 C_ClchSpdSnsr 1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2 C_ClchSpdSnsr 2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

# Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

#### Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM

X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

# Initial Supporting table - P2818 TCC stuck on fail time garage shift - GR10

Description: GR10 P2818 TCC stuck on fail time garage shift

Value Units: seconds X Unit: rate of change of engine speed, RPM/second Y Units: unitless

y/x	50	100	150	250	300
1	0.250	0.200	0.125	0.100	0.100

# Initial Supporting table - P2818 TCC stuck on fail time stall pending - GR10

Description: GR10 P2818 TCC stuck on fail time stall pending

Value Units: seconds X Unit: rate of change of engine speed, RPM/second Y Units: unitless

y/x	50	100	150	250	300
1	0.750	0.300	0.300	0.200	0.100

# Initial Supporting table - P2820 GR10 hydraulic default at launch test window Description: Value Units: RPM/sec X Unit: °C Value 10 S 15 30 110 y/x -10 5 15 30 110 1 0 0 1 1 1

#### Initial Supporting table - P2820 GR10 hydraulic default input speed deceleration threshold

Description: Negative acceleration needed to increment fail timer for GR10 default disable solenoid stuck off at launch diagnostic

Value Units: RPM/sec

X Unit: °C

y/x	-10	5	15	30	110
1	-32,768	-32,768	-3,500	-2,000	-2,000

# Initial Supporting table - speed sensor directional rationality enable calibration

Description: speed sensor directional rationality enable calibration

Value Units: Boolean X Unit: scheduled gear Y Units: unitless

y/x	CeCGSR_FwdCmded	CeCGSR-NeutCmded	CeCGSR_RvrsCmded	CeCGSR-ParkCmded
1	1	1	0	1

# Initial Supporting table - transmission fluid temperature warm up time

Descr	iption:	

Value Units: transmission fluid temperature normal warn up time, seconds X Unit: transmission fluid temperature at controller power up,  $^{\circ}C$ 

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

# Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

# Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

#### Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds X Unit: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - intermediate spe;ed sensor 1 or 2 predicted direction					
Description: intermediate speed senso	or 1 or 2 predicted direction				
Value Units: predicted direction: forward X Unit: attained gear Y Units: intermediate speed sensor 1 o	rd, reverse, unknown r 2				
intermediate speed sensor 1 or 2 pre-	dicted direction - Part 1				
y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park		
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown		
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown		
intermediate speed sensor 1 or 2 pred	dicted direction - Part 2				
y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second		
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown		
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown		
intermediate speed sensor 1 or 2 pre-	dicted direction - Part 3				
y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth		
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_Directionllnknown	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionIInknown		
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward		
intermediate speed sensor 1 or 2 pred	dicted direction - Part 4				
y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth		
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionIInknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward		
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward		
intermediate speed sensor 1 or 2 pred	dicted direction - Part 5				
y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth			
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward			
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward			

#### Initial Supporting table - P0723 transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmission engaged to allow P0723 enable

#### Value Units: seconds

**X Unit:** transmission fluid temperature °C

y/x	-40.000	-20.000	20.000
1	5.000	3.000	1.000

#### Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

#### Value Units: seconds

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

#### Initial Supporting table - P176B holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sessor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE X Unit: intermediate speed sensor select

Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

# Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

#### Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500
#### Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

## Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

**Description:** minimum transmission input speed to enable fail evaluation

# Value Units: transmission input speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

## Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio

X Unit: commanded gear Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Ge ar1	CeTGRR_e_Ge ar2	CeTGRR_e_Ge ar3	CeTGRR_e_Ge ar4	CeTGRR_e_Ge ar5	CeTGRR_e_Ge ar6	CeTGRR_e_Ge ar7	CeTGRR_e_Ge ar8	CeTGRR_e_Ge ar9	CeTGRR_e_Ge ar10
CeTSRR_e_C2 C_ClchSpdSnsr 1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2 C_ClchSpdSnsr 2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

#### Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

#### Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

# Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update			
Value Units: intermediate speed sensor RPM X Unit: intermediate speed sensor 1 or 2			
y/x 0 1			
1	350	225	

#### Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

#### Value Units: seconds

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

#### Initial Supporting table - P17D6 holding clutch states

**Description:** inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sessor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE

X Unit: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

## Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

#### Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

**Description:** P17D6 intermediate speed sensor fail RPM speed threshold

#### Value Units: RPM

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

#### Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

**Description:** P17D6 intermediate speed sensor fail time threshold

Value Units: seconds

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

#### Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

**Description:** minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

## Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

# Value Units: transmission input speed RPM X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

## Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio

X Unit: commanded gear Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Ge ar1	CeTGRR_e_Ge ar2	CeTGRR_e_Ge ar3	CeTGRR_e_Ge ar4	CeTGRR_e_Ge ar5	CeTGRR_e_Ge ar6	CeTGRR_e_Ge ar7	CeTGRR_e_Ge ar8	CeTGRR_e_Ge ar9	CeTGRR_e_Ge ar10
CeTSRR_e_C2 C_ClchSpdSnsr 1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2 C_ClchSpdSnsr 2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

# Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

### Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM

X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

## Initial Supporting table - transmission fluid temperature warm up time

Descr	iption:	

Value Units: transmission fluid temperature normal warn up time, seconds X Unit: transmission fluid temperature at controller power up,  $^{\circ}C$ 

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0