

Electronic Engine Controls

Overview

This section covers the sensors and units for the engine management system, refer to section 303-14C - Electronic Engine Controls - 2.7L workshop manual section.

Inspection and Verification

- 1 . Verify the customer concern.
- 2 . Visually inspect for obvious mechanical or electrical faults.

Mechanical	Electrical
<ul style="list-style-type: none"> ● Engine oil level ● Cooling system coolant level ● Fuel level ● Fuel contamination/grade/quality ● Fuel leaks ● Accessory drive belt ● Sensor installation/condition ● Viscous fan and solenoid 	<ul style="list-style-type: none"> ● Fuses ● Wiring harness ● Electrical connector(s) ● 5 volt sensor supply ● Sensor(s) ● Engine control module (ECM) ● Transmission control module (TCM)

3 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step

4 . Use the approved diagnostic system or a scan tool to retrieve any diagnostic trouble codes (DTCs) before moving onto the symptom chart or DTC index.

▶ Make sure that all DTCs are cleared following rectification.

Make sure that all DTCs are cleared following rectification.

Symptom Chart

Symptom	Possible causes	Action
Engine cranks, but does not start	<ul style="list-style-type: none"> ● Inertia fuel shut off (IFS) switch ● Low/Contaminated fuel ● Air leakage ● Low pressure fuel system fault ● Fuel pump module fault ● Blocked fuel filter ● Fuel volume control valve (VCV) blocked/contaminated ● Fuel pressure control valve (FPCV) blocked/contaminated ● Fuel injection pump failure ● Crankshaft position (CKP) sensor ● ECM fault 	Check that the inertia switch has not tripped. Check the fuel level/condition. Check the intake air system for leaks. Check the fuel pump module operation, check the low pressure fuel system for leaks/damage. Check the fuel filter, check the VCV and FPCV. Check the fuel injection pump. Refer to the relevant workshop manual section. Check the CKP sensor circuits. Refer to the electrical guides. Refer to the warranty policy and procedures manual if a module is suspect.
Difficult to start	<ul style="list-style-type: none"> ● Glow plug system fault (very cold conditions) ● Low/Contaminated fuel ● Air leakage ● Fuel pump module fault ● Low pressure fuel system fault ● Blocked fuel filter ● Fuel volume control valve 	Check the glow plug circuits. Check the fuel level/condition. Check the intake air system for leaks. Check the fuel pump module operation, check the low pressure fuel system for leaks/damage. Check the fuel filter, check the VCV and FPCV.

	<ul style="list-style-type: none"> (VCV) blocked/contaminated ● Fuel pressure control valve (FPCV) blocked/contaminated ● Exhaust gas recirculation (EGR) valve(s) fault 	For EGR valve tests, refer to the relevant workshop manual section.
Rough idle	<ul style="list-style-type: none"> ● Air ingress ● Low/Contaminated fuel ● Low pressure fuel system fault ● Blocked fuel filter ● Fuel volume control valve (VCV) blocked/contaminated ● Fuel pressure control valve (FPCV) blocked/contaminated ● Exhaust gas recirculation (EGR) valve(s) fault 	Check the intake air system for leaks. Check the fuel level/condition. Check the low pressure fuel system for leaks/damage. Check the fuel filter, check the VCV and FPCV and EGR valve tests, refer to the relevant workshop manual section.
Lack of power when accelerating	<ul style="list-style-type: none"> ● Intake air system fault ● Restricted exhaust system ● Low fuel pressure ● Exhaust gas recirculation (EGR) valve(s) fault ● Variable geometry turbocharger (VGT) actuator fault 	Check the intake air system. Check for a blockage/restriction in the exhaust system, install new components as necessary. Check the fuel pressure. For EGR valve tests and VGT actuator tests, refer to the relevant workshop manual section.
Engine stops/stalls	<ul style="list-style-type: none"> ● Air leakage ● Low/Contaminated fuel ● Low pressure fuel system fault ● High pressure fuel leak ● Fuel volume control valve (VCV) blocked/contaminated ● Fuel pressure control valve (FPCV) blocked/contaminated ● Exhaust gas recirculation (EGR) valve fault 	Check the intake air system for leaks. Check the fuel level/condition. Check the fuel system for leaks/damage. Check for fuel system leaks, check the VCV and FPCV. For EGR valve tests, refer to the relevant workshop manual section.
Engine judders	<ul style="list-style-type: none"> ● Low/Contaminated fuel ● Air ingress ● Low pressure fuel system fault ● Fuel metering valve blocked/contaminated ● Fuel volume control valve (VCV) blocked/contaminated ● Fuel pressure control valve (FPCV) blocked/contaminated ● High pressure fuel leak ● Fuel injection pump fault 	Check the fuel level/condition. Check the intake air system for leaks. Check the low pressure fuel system for leaks/damage. Check the high pressure fuel system for leaks, check the VCV and FPCV. Check the fuel injection pump. Refer to the relevant workshop manual section.
Excessive fuel consumption	<ul style="list-style-type: none"> ● Low pressure fuel system fault ● Fuel volume control valve (VCV) blocked/contaminated ● Fuel pressure control valve (FPCV) blocked/contaminated ● Fuel temperature sensor leak ● High pressure fuel leak ● Injector(s) failure ● Exhaust gas recirculation 	Check the low pressure fuel system for leaks/damage. Check the VCV and FPCV, the fuel temperature sensor, fuel injection pump, etc for leaks. Refer to the relevant workshop manual section. Check for injector DTCs. For EGR valve tests, refer to the relevant workshop manual section.

DTC Index

NOTE :

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

Power latch

There are references to "power latch" within the DTC index. This is where the module must be reset by means of a complete power down and power up.

DTC	Description	Possible causes	Action
C003100	Left Front Wheel Speed Sensor	<ul style="list-style-type: none"> Invalid data received from ABS wheel speed signal 	Check for ABS DTCs. Refer to the relevant workshop manual section.
C003400	Right Front Wheel Speed Sensor	<ul style="list-style-type: none"> Invalid data received from ABS wheel speed signal 	Check for ABS DTCs. Refer to the relevant workshop manual section.
C003700	Left Rear Wheel Speed Sensor	<ul style="list-style-type: none"> Invalid data received from ABS wheel speed signal 	Check for ABS DTCs. Refer to the relevant workshop manual section.
C003A00	Right Rear Wheel Speed Sensor	<ul style="list-style-type: none"> Invalid data received from ABS wheel speed signal 	Check for ABS DTCs. Refer to the relevant workshop manual section.
P000100	Fuel Volume Regulator Control Circuit / Open	<ul style="list-style-type: none"> Fuel volume control valve (VCV) circuit high resistance VCV circuit open circuit VCV failure 	<p>NOTE :</p> <p>An open circuit will prevent the engine from running.</p> <p>Refer to the electrical guides and check the fuel volume control valve and circuits. Check the resistance of the valve and install a new high pressure fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). Clear the DTCs and test for normal operation. Refer to the warranty policy and procedures manual if a HPP is suspect.</p>
P000200	Fuel Volume Regulator Control Circuit Range/Performance	<ul style="list-style-type: none"> Fuel volume control valve (VCV) circuit high resistance VCV circuit short circuit to ground VCV circuit short circuit to power VCV failure 	<p>NOTE :</p> <p>An open circuit will prevent the engine from running.</p> <p>Refer to the electrical guides and check the fuel volume control valve and circuits. Check the resistance of the valve and install a new high pressure fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). Clear the DTCs and test for normal operation. Refer to the warranty policy and procedures manual if a HPP is suspect.</p>
		<ul style="list-style-type: none"> Fuel volume control valve (VCV) circuit high resistance 	<p>NOTE :</p> <p>An open circuit will prevent the engine from running.</p> <p>Refer to the electrical guides and check the fuel volume control valve and circuits. Check the resistance of the</p>

P000300	Fuel Volume Regulator Control Low	<ul style="list-style-type: none"> • VCV circuit short circuit to ground • VCV failure • ECM failure 	valve and install a new high pressure fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). Clear the DTCs and test for normal operation. Refer to the warranty policy and procedures manual if a HPP is suspect.
P000400	Fuel Volume Regulator Control Circuit High	<ul style="list-style-type: none"> • Fuel volume control valve (VCV) circuit short circuit to power • VCV failure • ECM failure 	Refer to the electrical guides and check the fuel volume control valve and circuits. Check the resistance of the valve and install a new high pressure fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). Clear the DTCs and test for normal operation. Refer to the warranty policy and procedures manual if a HPP is suspect.
P004500	Turbocharger/Supercharger Boost Control A Circuit / Open	<ul style="list-style-type: none"> • Variable geometry turbocharger (VGT) actuator circuit high resistance • VGT actuator circuit short circuit to ground • VGT actuator failure • ECM failure 	Refer to the electrical guides and check the VGT circuit. Refer to the warranty policy and procedures manual if a module is suspect.
P004600	Turbocharger/Supercharger Boost Control A Circuit Range/Performance	<ul style="list-style-type: none"> • Variable geometry turbocharger (VGT) actuator circuit high resistance • VGT actuator circuit short circuit to ground • VGT actuator circuit short circuit to power • VGT actuator failure • ECM failure 	Refer to the electrical guides and check the VGT circuit. Refer to the warranty policy and procedures manual if a module is suspect.
P004700	Turbocharger/Supercharger Boost Control A Circuit Low	<ul style="list-style-type: none"> • Variable geometry turbocharger (VGT) actuator circuit high resistance • VGT actuator circuit short circuit to ground • VGT actuator failure • ECM failure 	Refer to the electrical guides and check the VGT circuit. Refer to the warranty policy and procedures manual if a module is suspect.
P004800	Turbocharger/Supercharger Boost Control A Circuit High	<ul style="list-style-type: none"> • Variable geometry turbocharger (VGT) actuator circuit short circuit to power • VGT actuator failure • ECM failure 	Refer to the electrical guides and check the VGT circuit. Refer to the warranty policy and procedures manual if a module is suspect.
P006900	MAP - Barometric Pressure Correlation	<ul style="list-style-type: none"> • Air leakage in intake path between turbocharger and engine • MAP sensor circuit high resistance • MAP sensor circuit short circuit to ground • MAP sensor circuit short circuit to power • MAP sensor failure • ECM failure 	Refer to the relevant workshop manual section. Check the MAP sensor and circuits. Refer to the electrical guides. Refer to the warranty policy and procedures manual if a module is suspect.
P006A00	MAP - Mass or Volume Air Flow Correlation	<ul style="list-style-type: none"> • Air leakage in intake path between turbocharger and engine • MAP sensor circuit high resistance • MAP sensor circuit short circuit to ground 	Check the intake air system for leakage after the turbocharger. Refer to the relevant workshop manual section. Check the MAP sensor and circuits. Refer to the electrical guides. Refer to

		<ul style="list-style-type: none"> ● MAP sensor circuit short circuit to power ● MAP sensor failure ● ECM failure 	the warranty policy and procedures manual if a module is suspect.
P008700	Fuel rail/system pressure too low	<ul style="list-style-type: none"> ● Fuel rail pressure (FRP) sensor disconnected ● FRP sensor to ECM sensing circuit short circuit to ground ● FRP sensor supply circuit high resistance ● FRP sensor failure ● Fuel line leak ● Restricted fuel line ● Fuel pump module circuit high resistance ● Fuel pump module circuit short circuit to ground ● Fuel pump module failure ● Volume control valve fault ● Pressure control valve fault 	Refer to the electrical guides and check the FRP sensor circuits. For FRP sensor tests, refer to the relevant workshop manual section. Check the low pressure fuel lines for damage or restrictions. Check the fuel pressure. Check the low pressure fuel pump module circuits and operation. Check for fuel rail and high pressure fuel line leaks. Check for VCV and PCV DTCs and rectify as necessary.
P008800	Fuel rail/system pressure too high	<ul style="list-style-type: none"> ● Fuel rail pressure (FRP) sensor to ECM wiring (supply/sense): short circuit to each other ● FRP sensor to ECM sense circuit short circuit to power ● FRP sensor failure ● Fuel pressure control valve (FPCV) fault ● Fuel pump module circuit short circuit to power ● Fuel pump module failure 	Check the FRP sensor circuits. Refer to the electrical guides. For FRP sensor tests, refer to the relevant workshop manual section. Check the fuel lines, check the fuel pressure and the fuel pump module circuits.
P009000	Fuel Pressure Regulator 1 Control Circuit/Open	<ul style="list-style-type: none"> ● Fuel pressure control valve (PCV) circuit high resistance ● FPCV circuit short circuit to ground ● PCV failure 	Check the fuel pressure control valve and circuits. Refer to the electrical guides. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new high pressure fuel pump (the fuel pressure control valve cannot be serviced separately). Refer to the relevant section of the workshop manual. Refer to the warranty policy and procedures manual if a high pressure fuel pump is suspect. Clear the DTCs and test for normal operation.
P009100	Fuel Pressure Regulator 1 Control Circuit Low	<ul style="list-style-type: none"> ● Fuel pressure control valve (PCV) circuit high resistance ● PCV circuit short circuit to ground ● PCV failure 	Check the fuel pressure control valve and circuits. Refer to the electrical guides. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new high pressure fuel pump (the fuel pressure control valve cannot be serviced separately). Refer to the relevant section of the workshop manual. Refer to the warranty policy and procedures manual if a high pressure fuel pump is suspect. Clear the DTCs and test for normal operation.
P009200	Fuel Pressure Regulator 1 Control Circuit High	<ul style="list-style-type: none"> ● Fuel pressure control valve (PCV) circuit short circuit to power 	Check the fuel pressure control valve and circuits. Refer to the electrical guides. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new high pressure fuel pump (the fuel pressure control valve cannot be

		<ul style="list-style-type: none"> ● PCV failure 	serviced separately). Refer to the relevant section of the workshop manual. Refer to the warranty policy and procedures manual if a high pressure fuel pump is suspect. Clear the DTCs and test for normal operation.
P009700	Intake Air Temperature Sensor 2 Circuit Low (Bank 1)	<ul style="list-style-type: none"> ● Air charge temperature (ACT) sensor circuit high resistance ● ACT sensor circuit short circuit to ground ● ACT sensor failure 	Refer to the electrical guides, and check the ACT sensor and circuits.
P009800	Intake Air Temperature Sensor 2 Circuit High (Bank 1)	<ul style="list-style-type: none"> ● Air charge temperature (ACT) sensor circuit short circuit to power ● ACT sensor failure 	Refer to the electrical guides, and check the ACT sensor and circuits.
P009900	Intake Air Temperature Sensor 2 Circuit Intermittent/Erratic (Bank 1)	<ul style="list-style-type: none"> ● Air charge temperature (ACT) sensor circuit high resistance ● ACT sensor circuit short circuit to ground ● ACT sensor circuit short circuit to power ● ACT sensor failure 	Refer to the electrical guides, and check the ACT sensor and circuits.
P010000	Mass or Volume Air Flow A Circuit	<ul style="list-style-type: none"> ● Mass air flow (MAF) sensor circuit high resistance ● MAF sensor circuit short circuit to ground ● MAF sensor circuit short circuit to power ● MAF sensor failure 	Refer to the electrical guides and check the MAF sensor and circuits. Clear the DTCs and test for normal operation. If the problem persists, renew the MAF sensor.
P010400	Mass or Volume Air Flow A Circuit Intermittent/Erratic	<ul style="list-style-type: none"> ● Air leakage ● Mass air flow (MAF) sensor circuit high resistance ● MAF sensor circuit short circuit to ground ● MAF sensor circuit short circuit to power ● MAF sensor failure 	Refer to the electrical guides and check the MAF sensor and circuits. Clear the DTCs and test for normal operation. If the problem persists, renew the MAF sensor.
P010600	Manifold Absolute Pressure/BARO Sensor Range/Performance	<ul style="list-style-type: none"> ● Manifold absolute pressure (MAP) sensor circuit high resistance ● MAP sensor circuit short circuit to ground ● MAP sensor circuit short circuit to power ● MAP sensor failure 	Check the MAP sensor and circuits. Refer to the electrical guides. Refer to the warranty policy and procedures manual if a module is suspect.
P010700	Manifold Absolute Pressure/BARO Sensor Low	<ul style="list-style-type: none"> ● Manifold absolute pressure (MAP) sensor circuit high resistance ● MAP sensor circuit short circuit to ground ● MAP sensor failure 	Check the MAP sensor and circuits. Refer to the electrical guides. Refer to the warranty policy and procedures manual if a module is suspect.
P010800	Manifold Absolute Pressure/BARO Sensor High	<ul style="list-style-type: none"> ● Manifold absolute pressure (MAP) sensor circuit short circuit to power ● MAP sensor failure 	Check the MAP sensor and circuits. Refer to the electrical guides. Refer to the warranty policy and procedures manual if a module is suspect.
P010900	Manifold Absolute Pressure/BARO Sensor Intermittent	<ul style="list-style-type: none"> ● Manifold absolute pressure (MAP) sensor circuit high resistance ● MAP sensor circuit short circuit to ground ● MAP sensor circuit short circuit to power ● MAP sensor failure 	Check the MAP sensor and circuits. Refer to the electrical guides. Refer to the warranty policy and procedures manual if a module is suspect.

P010A00	Mass or Volume Air Flow B Circuit	<ul style="list-style-type: none"> • Mass air flow (MAF) sensor circuit high resistance • MAF sensor circuit short circuit to ground • MAF sensor circuit short circuit to power • MAF sensor failure 	Check the MAF sensor and circuits. Refer to the electrical guides. Refer to the warranty policy and procedures manual if a module is suspect.
P010E00	Mass or Volume Air Flow B Circuit Intermittent/Erratic	<ul style="list-style-type: none"> • Air leakage • Mass air flow (MAF) sensor circuit high resistance • MAF sensor circuit short circuit to ground • MAF sensor circuit short circuit to power • MAF sensor failure 	Refer to the relevant workshop manual section. Check the MAF sensor and circuits. Refer to the electrical guides. Refer to the warranty policy and procedures manual if a module is suspect.
P010F00	Mass or Volume Air Flow Sensor A/B Correlation	<ul style="list-style-type: none"> • Air leakage (post turbocharger) • Mass air flow (MAF) sensor circuit high resistance • MAF sensor circuit short circuit to ground • MAF sensor circuit short circuit to power • MAF sensor failure • VGT actuator circuit high resistance • VGT actuator circuit short circuit to ground • VGT actuator circuit short circuit to power • VGT actuator failure 	Refer to the relevant workshop manual section. Check the MAF sensor and circuits. Refer to the electrical guides. For VGT actuator circuit tests, refer to the relevant workshop manual section. Refer to the warranty policy and procedures manual if a module is suspect.
P011200	Intake Air Temperature Sensor 1 Circuit Low (Bank 1)	<ul style="list-style-type: none"> • Intake air temperature (IAT) sensor circuit high resistance • IAT sensor circuit short circuit to ground • IAT sensor failure 	Check the IAT sensor and circuits. Refer to the electrical guides. Measure the resistance of the IAT sensor (pins 2 and 3 of the MAF sensor). Nominal resistance at 20°C (68°F) should be 2.5 Kohms. If the values are outside this range, install a new MAF sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P011300	Intake Air Temperature Sensor 1 Circuit High (Bank 1)	<ul style="list-style-type: none"> • Intake air temperature (IAT) sensor circuit short circuit to power • IAT sensor failure 	Check the IAT sensor and circuits. Refer to the electrical guides. Measure the resistance of the IAT sensor (pins 2 and 3 of the MAF sensor). Nominal resistance at 20°C (68°F) should be 2.5 Kohms. If the values are outside this range, install a new MAF sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P011400	Intake Air Temperature Sensor 1 Intermittent/Erratic (Bank 1)	<ul style="list-style-type: none"> • Intake air temperature (IAT) sensor circuit high resistance • IAT sensor circuit short circuit to ground • IAT sensor circuit short circuit to power • IAT sensor failure 	Check the IAT sensor and circuits. Refer to the electrical guides. Measure the resistance of the IAT sensor (pins 2 and 3 of the MAF sensor). Nominal resistance at 20°C (68°F) should be 2.5 Kohms. If the values are outside this range, install a new MAF sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
	Engine Coolant Temperature	<ul style="list-style-type: none"> • Engine coolant temperature (ECT) sensor circuit high resistance 	Check the ECT sensor and circuits. Refer to the electrical guides. With the engine cold, read the coolant temperature sensor using a data logger function and start the engine. Record

P011600	Sensor 1 Circuit Range/Performance	<ul style="list-style-type: none"> ECT sensor circuit short circuit to ground ECT sensor circuit short circuit to power ECT sensor failure 	the value and allow the engine to idle for 20 minutes. After 20 minutes, recheck the value. If the value has not increased by more than 10°C, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P011700	Engine Coolant Temperature Sensor 1 Circuit Low	<ul style="list-style-type: none"> Engine coolant temperature (ECT) sensor circuit high resistance ECT sensor circuit short circuit to ground ECT sensor failure 	Check the ECT sensor and circuits. Refer to the electrical guides. With the engine cold, read the coolant temperature sensor using a data logger function and start the engine. Record the value and allow the engine to idle for 20 minutes. After 20 minutes, recheck the value. If the value has not increased by more than 10°C, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P011800	Engine Coolant Temperature Sensor 1 Circuit High	<ul style="list-style-type: none"> Engine coolant temperature (ECT) sensor circuit short circuit to power ECT sensor failure 	Check the ECT sensor and circuits. Refer to the electrical guides. With the engine cold, read the coolant temperature sensor using a data logger function and start the engine. Record the value and allow the engine to idle for 20 minutes. After 20 minutes, recheck the value. If the value has not increased by more than 10°C, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P011900	Engine Coolant Temperature Sensor 1 Circuit Intermittent/Erratic	<ul style="list-style-type: none"> Engine coolant temperature (ECT) sensor circuit high resistance ECT sensor circuit short circuit to ground ECT sensor circuit short circuit to power ECT sensor failure 	Check the ECT sensor and circuits. Refer to the electrical guides. With the engine cold, read the coolant temperature sensor using a data logger function and start the engine. Record the value and allow the engine to idle for 20 minutes. After 20 minutes, recheck the value. If the value has not increased by more than 10°C, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P018100	Fuel Temperature Sensor A Circuit Range/Performance	<ul style="list-style-type: none"> Fuel temperature sensor circuit high resistance Fuel temperature sensor circuit short circuit to ground Fuel temperature sensor circuit short circuit to power Fuel temperature sensor failure 	Check the fuel temperature sensor and circuits. Refer to the electrical guides. Check the fuel temperature using a data logger function. Make sure the fuel temperature is less than 30°C (86°F). Start the engine and allow to warm up for ten minutes. Recheck the fuel temperature. If the value has not increased by more than 8°C in this time, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P018200	Fuel Temperature Sensor A Circuit Low	<ul style="list-style-type: none"> Fuel temperature sensor circuit high resistance Fuel temperature sensor circuit short circuit to ground Fuel temperature sensor failure 	Check the fuel temperature sensor and circuits. Refer to the electrical guides. Check the fuel temperature using a data logger function. Make sure the fuel temperature is less than 30°C (86°F). Start the engine and allow to warm up for ten minutes. Recheck the fuel temperature. If the value has not increased by more than 8°C in this time, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.

P018300	Fuel Temperature Sensor A Circuit High	<ul style="list-style-type: none"> • Fuel temperature sensor circuit short circuit to power • Fuel temperature sensor failure 	Check the fuel temperature sensor and circuits. Refer to the electrical guides. Check the fuel temperature using a data logger function. Make sure the fuel temperature is less than 30°C (86°F). Start the engine and allow to warm up for ten minutes. Recheck the fuel temperature. If the value has not increased by more than 8°C in this time, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P018400	Fuel Temperature Sensor A Circuit Intermittent	<ul style="list-style-type: none"> • Fuel temperature sensor circuit high resistance • Fuel temperature sensor circuit short circuit to ground • Fuel temperature sensor circuit short circuit to power • Fuel temperature sensor failure 	Check the fuel temperature sensor and circuits. Refer to the electrical guides. Check the fuel temperature using a data logger function. Make sure the fuel temperature is less than 30°C (86°F). Start the engine and allow to warm up for ten minutes. Recheck the fuel temperature. If the value has not increased by more than 8°C in this time, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P019100	Fuel Rail Pressure Sensor A Circuit Range/Performance	<ul style="list-style-type: none"> • Fuel rail pressure (FRP) sensor circuit high resistance • FRP sensor circuit short circuit to ground • FRP sensor circuit short circuit to power • FRP sensor failure 	Check the fuel level and the condition and correct connection of the low-pressure fuel circuit lines (incorrect connection of the lines to and from the fuel filter can cause serious fuel pressure fluctuations). Check the FRP sensor and circuits. Check the fuel pump module and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P019200	Fuel Rail Pressure Sensor A Circuit Low	<ul style="list-style-type: none"> • Fuel rail pressure (FRP) sensor circuit high resistance • FRP sensor circuit short circuit to ground • FRP sensor failure 	Check the FRP sensor and circuits. Refer to the electrical guides. Start the engine and allow to idle. Check the fuel pressure value using a data logger function. If the value is 0 MPa (0 lbs/in ²), install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P019300	Fuel Rail Pressure Sensor A Circuit High	<ul style="list-style-type: none"> • Fuel rail pressure (FRP) sensor circuit short circuit to power • FRP sensor failure 	Check the FRP sensor and circuits. Refer to the electrical guides. Start the engine and allow to idle. Check the fuel pressure value using a data logger function. If the value is greater than 180 MPa (26,106 lbs/in ²), install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P019400	Fuel Rail Pressure Sensor A Circuit Intermittent/Erratic	<ul style="list-style-type: none"> • Fuel rail pressure (FRP) sensor circuit high resistance • FRP sensor circuit short circuit to ground • FRP sensor circuit short circuit to power • FRP sensor failure 	Check the FRP sensor and circuits. Refer to the electrical guides. Start the engine and allow to idle. Check the fuel pressure value using a data logger function. Increase the engine speed to 2,000 rpm and recheck the fuel pressure. If the value has changed by more than 40 MPa (5,801 lbs/in ²) per 10 ms, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
		<ul style="list-style-type: none"> • Engine oil temperature (EOT) sensor circuit high 	

P019500	Engine Oil Temperature Sensor Circuit	<ul style="list-style-type: none"> resistance • EOT sensor circuit short circuit to ground • EOT sensor circuit short circuit to power • EOT sensor failure 	Check the EOT sensor and circuits. Refer to the electrical guides. Refer to the warranty policy and procedures manual if a module is suspect.
P019600	Engine Oil Temperature Sensor Range/Performance	<ul style="list-style-type: none"> • Engine oil temperature (EOT) sensor circuit high resistance • EOT sensor circuit short circuit to ground • EOT sensor circuit short circuit to power • EOT sensor failure 	Check the EOT sensor and circuits. Refer to the electrical guides. From cold, start the engine and check the oil temperature using a data logger function. Allow the engine to idle for ten minutes and recheck the oil temperature. If the value has not increased by more than 5°C in this time, install a new sensor. Clear the DTCs and test for normal operation.
P019700	Engine Oil Temperature Sensor Circuit Low	<ul style="list-style-type: none"> • Engine oil temperature (EOT) sensor circuit high resistance • EOT sensor circuit short circuit to ground • EOT sensor failure 	Check the EOT sensor and circuits. Refer to the electrical guides. Repair/renew as necessary.
P019800	Engine Oil Temperature Sensor Circuit High	<ul style="list-style-type: none"> • Engine oil temperature (EOT) sensor circuit short circuit to power • EOT sensor failure 	Check the EOT sensor and circuits. Refer to the electrical guides. Repair/renew as necessary.
P019900	Engine Oil Temperature Sensor Circuit Intermittent/Erratic	<ul style="list-style-type: none"> • Engine oil temperature (EOT) sensor circuit high resistance • EOT sensor circuit short circuit to ground • EOT sensor circuit short circuit to power • EOT sensor failure 	Check the EOT sensor and circuits. Refer to the electrical guides. Start the engine and allow to idle. Check the oil temperature using a data logger function. Increase the engine speed to 2,000 rpm and recheck the value after two minutes at this engine speed. If the value has increased by more than 40°C per second, install a new sensor. Clear the DTCs and test for normal operation.
P020100	Cylinder 1 Injector Circuit / Open	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector failure 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P020200	Cylinder 2 Injector Circuit / Open	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector failure 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the

			electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P020300	Cylinder 3 Injector Circuit / Open	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector failure 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P020400	Cylinder 4 Injector Circuit / Open	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector failure 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P020500	Cylinder 5 Injector Circuit / Open	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector failure 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P020600	Cylinder 6 Injector Circuit / Open	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector failure 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short

			circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P020A00	Cylinder 1 Injection Timing	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Fuel injector failure 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P020B00	Cylinder 2 Injection Timing	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Fuel injector failure 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P020C00	Cylinder 3 Injection Timing	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Fuel injector failure 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P020D00	Cylinder 4 Injection Timing	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector circuit short 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector.

		<ul style="list-style-type: none"> circuit to power Fuel injector failure 	<p>If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.</p>
P020E00	Cylinder 5 Injection Timing	<ul style="list-style-type: none"> Fuel injector circuit high resistance Fuel injector circuit short circuit to ground Fuel injector circuit short circuit to power Fuel injector failure 	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.</p>
P020F00	Cylinder 6 Injection Timing	<ul style="list-style-type: none"> Fuel injector circuit high resistance Fuel injector circuit short circuit to ground Fuel injector circuit short circuit to power Fuel injector failure 	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.</p>
P021900	Engine Overspeed Condition	<ul style="list-style-type: none"> Crankshaft position (CKP) sensor circuit high resistance CKP sensor circuit short circuit to ground CKP sensor circuit short circuit to power CMP sensor circuit high resistance Camshaft position (CMP) sensor circuit short circuit to ground CMP sensor circuit short circuit to power CKP sensor failure CMP sensor failure 	<p>Check the CKP and CMP sensor circuits. Refer to the electrical guides. Rectify as necessary. If no fault is found in the circuits, install new sensors as necessary. Clear the DTCs and test for normal operation. Check for oil ingestion into the intake air path. Rectify as necessary.</p>
P023400	Turbocharger/Supercharger A Overboost Condition	<ul style="list-style-type: none"> Air leakage Manifold absolute pressure (MAP) sensor circuit high resistance MAP sensor circuit short circuit to ground MAP sensor circuit short circuit to power MAP sensor failure Exhaust gas recirculation (EGR) fault 	<p>Refer to the relevant workshop manual section. Check the MAP sensor and circuits. Refer to the electrical guides. For EGR valve tests, refer to the relevant workshop manual section. Check for DTCs indicating EGR or VGT actuator faults. Refer to the warranty policy and procedures manual if a module is suspect.</p>

		<ul style="list-style-type: none"> ● VGT actuator fault 	
P029900	Turbocharger/Supercharger A Underboost Condition	<ul style="list-style-type: none"> ● Air leakage, post turbocharger ● Manifold absolute pressure (MAP) sensor circuit high resistance ● MAP sensor circuit short circuit to ground ● MAP sensor circuit short circuit to power ● MAP sensor failure ● Exhaust gas recirculation (EGR) fault ● VGT actuator fault 	Check for a post turbocharger air leak, for additional information, refer to the relevant workshop manual section. Check the MAP sensor and circuits. Refer to the electrical guides. For EGR valve tests, refer to the relevant workshop manual section. Check for DTCs indicating EGR or VGT actuator faults. Refer to the warranty policy and procedures manual if a module is suspect.
P029A00	Cylinder 1- Fuel Trim at Max Limit	<ul style="list-style-type: none"> ● Fuel injector circuit high resistance ● Fuel injector circuit short circuit to ground ● Fuel injector circuit short circuit to power ● Injector leak ● Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc ● Injector fault 	Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
P029B00	Cylinder 1- Fuel Trim at Min Limit	<ul style="list-style-type: none"> ● Fuel injector circuit high resistance ● Fuel injector circuit short circuit to ground ● Fuel injector circuit short circuit to power ● Injector leak ● Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc ● Injector fault 	Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
P029E00	Cylinder 2- Fuel Trim at Max Limit	<ul style="list-style-type: none"> ● Fuel injector circuit high resistance ● Fuel injector circuit short circuit to ground ● Fuel injector circuit short circuit to power ● Injector leak ● Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc ● Injector fault 	Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
		<ul style="list-style-type: none"> ● Fuel injector circuit high resistance ● Fuel injector circuit short 	Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect

P029F00	Cylinder 2 - Fuel Trim at Min Limit	<ul style="list-style-type: none"> circuit to ground Fuel injector circuit short circuit to power Injector leak Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc Injector fault 	the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
P02A200	Cylinder 3 - Fuel Trim at Max Limit	<ul style="list-style-type: none"> Fuel injector circuit high resistance Fuel injector circuit short circuit to ground Fuel injector circuit short circuit to power Injector leak Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc Injector fault 	Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
P02A300	Cylinder 3 - Fuel Trim at Min Limit	<ul style="list-style-type: none"> Fuel injector circuit high resistance Fuel injector circuit short circuit to ground Fuel injector circuit short circuit to power Injector leak Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc Injector fault 	Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
P02A600	Cylinder 4 - Fuel Trim at Max Limit	<ul style="list-style-type: none"> Fuel injector circuit high resistance Fuel injector circuit short circuit to ground Fuel injector circuit short circuit to power Injector leak Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc Injector fault 	Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
		<ul style="list-style-type: none"> Fuel injector circuit high resistance Fuel injector circuit short circuit to ground 	Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as

P02A700	Cylinder 4 - Fuel Trim at Min Limit	<ul style="list-style-type: none"> • Fuel injector circuit short circuit to power • Injector leak • Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc • Injector fault 	necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
P02AA00	Cylinder 5 - Fuel Trim at Max Limit	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Injector leak • Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc • Injector fault 	Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
P02AB00	Cylinder 5 - Fuel Trim at Min Limit	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Injector leak • Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc • Injector fault 	Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
P02AE00	Cylinder 6 - Fuel Trim at Max Limit	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Injector leak • Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc • Injector fault 	Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
		<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power 	Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow

P02AF00	Cylinder 6 - Fuel Trim at Min Limit	<ul style="list-style-type: none"> • Injector leak • Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc • Injector fault 	to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
P032600	Knock Sensor 1 Circuit Range/Performance (Bank 1)	<ul style="list-style-type: none"> • Knock sensor (KS) circuit high resistance • KS circuit short circuit to ground • KS circuit short circuit to power • KS failure 	Check that the knock sensors are correctly installed and tightened to the correct torque. Check that the KS connections are connected to the correct sensor. Check the KS circuit, refer to the electrical guides. Rectify as necessary.
P033100	Knock Sensor 1 Circuit Range/Performance (Bank 2)	<ul style="list-style-type: none"> • Knock sensor (KS) circuit high resistance • KS circuit short circuit to ground • KS circuit short circuit to power • KS failure 	Check that the knock sensors are correctly installed and tightened to the correct torque. Check that the KS connections are connected to the correct sensor. Check the KS circuit, refer to the electrical guides. Rectify as necessary.
P033500	Crankshaft Position Sensor A Circuit	<ul style="list-style-type: none"> • Crankshaft position (CKP) sensor gap incorrect/foreign matter on sensor face /damaged teeth on rotor • CKP sensor circuit high resistance • CKP sensor circuit short circuit to ground • CKP sensor circuit short circuit to power • CKP sensor failure 	Check the CKP sensor and circuits. Refer to the electrical guides. Check the sensor and wheel for correct installation and condition. Rectify as necessary. Clear the DTCs and test for normal operation.
P033600	Crankshaft position (CKP) sensor circuit range/performance	<ul style="list-style-type: none"> • Crankshaft position (CKP) sensor gap incorrect/foreign matter on sensor face /damaged teeth on rotor • CKP sensor circuit high resistance • CKP sensor circuit short circuit to ground • CKP sensor circuit short circuit to power • CKP sensor failure 	Check the CKP sensor and circuits. Refer to the electrical guides. Check the sensor and wheel for correct installation and condition. Rectify as necessary. Clear the DTCs and test for normal operation.
P033700	Crankshaft Position Sensor A Circuit Low	<ul style="list-style-type: none"> • Crankshaft position (CKP) sensor gap incorrect/foreign matter on sensor face /damaged teeth on rotor • CKP sensor circuit high resistance • CKP sensor circuit short circuit to ground • CKP sensor failure 	Check the CKP sensor and circuits. Refer to the electrical guides. Check the sensor and wheel for correct installation and condition. Rectify as necessary. Clear the DTCs and test for normal operation.
P033900	Crankshaft Position Sensor A Circuit Intermittent	<ul style="list-style-type: none"> • Crankshaft position (CKP) sensor gap incorrect/foreign matter on sensor face /damaged teeth on rotor • CKP sensor circuit high resistance • CKP sensor circuit short circuit to ground • CKP sensor circuit short circuit to power • CKP sensor failure 	Check the CKP sensor and circuits. Refer to the electrical guides. Check the sensor and wheel for correct installation and condition. Rectify as necessary. Clear the DTCs and test for normal operation.

P034100	Camshaft Position Sensor A Circuit Range/Performance (Bank 1 or single sensor)	<ul style="list-style-type: none"> Camshaft position (CMP) sensor gap incorrect/foreign matter on sensor face /damaged rotor CMP sensor circuit high resistance CMP sensor circuit short circuit to ground CMP sensor circuit short circuit to power CMP sensor failure 	Check the CKP sensor and circuits. Refer to the electrical guides. Check the sensor and wheel for correct installation and condition. Rectify as necessary. Clear the DTCs and test for normal operation.
P034200	Camshaft Position Sensor A Circuit Low (Bank 1 or single sensor)	<ul style="list-style-type: none"> Camshaft position (CMP) sensor gap incorrect/foreign matter on sensor face /damaged rotor CMP sensor circuit high resistance CMP sensor circuit short circuit to ground CMP sensor failure 	Check the CKP sensor and circuits. Refer to the electrical guides. Check the sensor and wheel for correct installation and condition. Rectify as necessary. Clear the DTCs and test for normal operation.
P038300	Glow Plug Control Module Control Circuit Low	<ul style="list-style-type: none"> Glow plug relay, control circuit high resistance Glow plug relay, control circuit short circuit to ground Glow plug relay failure 	Check the battery condition and state of charge. Check the relay and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new relay. Clear the DTCs and test for normal operation.
P038400	Glow Plug Control Module Control Circuit High	<ul style="list-style-type: none"> Glow plug relay, control circuit short circuit to power Glow plug relay failure 	Check the battery condition and state of charge. Check the relay and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new relay. Clear the DTCs and test for normal operation.
P040100	Exhaust Gas Recirculation A Flow Insufficient Detected	<ul style="list-style-type: none"> Exhaust gas recirculation (EGR) valve incorrectly installed or loose EGR pipe blocked EGR valve stuck closed, blocked EGR coolers blocked EGR valve failure MAF sensor fault 	Refer to the relevant workshop manual section. Check the EGR valve, coolers and pipework. Refer to the electrical guides and check the MAF sensor and circuits. Allow the engine to warm up, switch off and turn the ignition on. Using a data logger function, check the EGR valve angle. Command the valve actuator to 0% then 100% pulse width modulated (PWM) and recheck the values. The angle should range between 5% and 95%. If this is not the case, install a new valve as necessary. Clear the DTCs and test for normal operation.
P040200	Exhaust Gas Recirculation A Flow Excessive Detected	<ul style="list-style-type: none"> Exhaust gas recirculation (EGR) valve incorrectly installed or loose EGR pipe blocked EGR valve stuck/sticking EGR coolers blocked EGR valve circuit high resistance EGR valve circuit short circuit to ground EGR valve circuit short circuit to power EGR valve failure MAF sensor fault 	Refer to the relevant workshop manual section. Check the EGR valve, coolers and pipework. Refer to the electrical guides and check the MAF sensor and circuits. Allow the engine to warm up, switch off and turn the ignition on. Using a data logger function, check the EGR valve angle. Command the valve actuator to 0% then 100% pulse width modulated (PWM) and recheck the values. The angle should range between 5% and 95%. If this is not the case, install a new valve as necessary. Clear the DTCs and test for normal operation.
		<ul style="list-style-type: none"> Exhaust gas recirculation (EGR) valve circuit high 	Refer to the relevant workshop manual section. Check the EGR valve, coolers and pipework. Refer to the electrical guides and check the MAF sensor and circuits. Allow the engine to warm up,

P040300	Exhaust Gas Recirculation A Control Circuit	<ul style="list-style-type: none"> resistance EGR valve circuit short circuit to ground EGR valve circuit short circuit to power EGR valve failure 	switch off and turn the ignition on. Using a data logger function, check the EGR valve angle. Command the valve actuator to 0% then 100% pulse width modulated (PWM) and recheck the values. The angle should range between 5% and 95%. If this is not the case, install a new valve as necessary. Clear the DTCs and test for normal operation.
P040400	Exhaust Gas Recirculation A Control Circuit Range/Performance	<ul style="list-style-type: none"> Intake air temperature (IAT) sensor fault Manifold air pressure (MAP) sensor fault MAF sensor fault Exhaust gas recirculation (EGR) valve stuck/sticking EGR valve circuit high resistance EGR valve circuit short circuit to ground EGR valve circuit short circuit to power EGR valve failure 	Refer to the relevant workshop manual section. Check the EGR valve, coolers and pipework. Refer to the electrical guides and check the MAF sensor and circuits. Allow the engine to warm up, switch off and turn the ignition on. Using a data logger function, check the EGR valve angle. Command the valve actuator to 0% then 100% pulse width modulated (PWM) and recheck the values. The angle should range between 5% and 95%. If this is not the case, install a new valve as necessary. Clear the DTCs and test for normal operation.
P040500	Exhaust Gas Recirculation Sensor A Circuit Low	<ul style="list-style-type: none"> Exhaust gas recirculation (EGR) valve circuit high resistance EGR valve circuit short circuit to ground EGR valve failure 	Refer to the relevant workshop manual section. Check the EGR valve, coolers and pipework. Refer to the electrical guides and check the MAF sensor and circuits. Allow the engine to warm up, switch off and turn the ignition on. Using a data logger function, check the EGR valve angle. Command the valve actuator to 0% then 100% pulse width modulated (PWM) and recheck the values. The angle should range between 5% and 95%. If this is not the case, install a new valve as necessary. Clear the DTCs and test for normal operation.
P040600	Exhaust Gas Recirculation Sensor A Circuit High	<ul style="list-style-type: none"> Exhaust gas recirculation (EGR) valve circuit short circuit to power EGR valve failure 	Refer to the relevant workshop manual section. Check the EGR valve, coolers and pipework. Refer to the electrical guides and check the MAF sensor and circuits. Allow the engine to warm up, switch off and turn the ignition on. Using a data logger function, check the EGR valve angle. Command the valve actuator to 0% then 100% pulse width modulated (PWM) and recheck the values. The angle should range between 5% and 95%. If this is not the case, install a new valve as necessary. Clear the DTCs and test for normal operation.
P040700	Exhaust Gas Recirculation Sensor B Circuit Low	<ul style="list-style-type: none"> Exhaust gas recirculation (EGR) throttle position sensor circuit high resistance EGR throttle position sensor circuit short circuit to ground EGR modulator failure 	Check the EGR throttle position sensor and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new EGR valve. Clear the DTCs and test for normal operation.
P040800	Exhaust Gas Recirculation Sensor B Circuit High	<ul style="list-style-type: none"> Exhaust gas recirculation (EGR) throttle position sensor circuit short circuit to power EGR modulator failure 	Check the EGR throttle position sensor and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new EGR valve. Clear the DTCs and test for normal operation.
		<ul style="list-style-type: none"> Cooling fan control circuit 	Check the cooling fan operation. Refer

P048300	Fan Performance	<ul style="list-style-type: none"> short circuit to ground Cooling fan control circuit short circuit to power Cooling fan control circuit high resistance Cooling fan fault 	to the electrical guides and check the fan circuit, repair/renew as necessary. Clear the DTCs and test for normal operation. Check the pulse width modulated (PWM) signal and check the motor for sticking. Repair/renew as necessary.
P048700	Exhaust Gas Recirculation Throttle Control Circuit A / Open	<ul style="list-style-type: none"> Exhaust gas recirculation (EGR) throttle position sensor circuit high resistance Exhaust gas recirculation (EGR) throttle position sensor circuit short circuit to ground Exhaust gas recirculation (EGR) throttle position sensor circuit short circuit to power EGR modulator failure 	Check the EGR throttle position sensor and circuits. Refer to the electrical guides. Using a data logger function, check the EGR throttle position with the ignition on, engine off and record the value. Command the actuator to 100% pulse width modulated (PWM) and recheck the position reading. The value should be 80 - 95%. Command the actuator to 0% pulse width modulated (PWM) and recheck the position reading. The value should be 5 - 20%. Manually close and open the throttle and check the resistance. The resistance should range from 300 - 2,500 ohms. If the values are not in this range, install a new EGR valve. Clear the DTCs and test for normal operation. If there is still an issue, suspect the ECM. Refer to the warranty policy and procedures manual if an ECM is suspect.
P048800	Exhaust Gas Recirculation Throttle Control Circuit A Range/Performance	<ul style="list-style-type: none"> Exhaust gas recirculation (EGR) throttle position sensor circuit high resistance Exhaust gas recirculation (EGR) throttle position sensor circuit short circuit to ground Exhaust gas recirculation (EGR) throttle position sensor circuit short circuit to power EGR modulator failure 	Check the EGR throttle position sensor and circuits. Refer to the electrical guides. Using a data logger function, check the EGR throttle position with the ignition on, engine off and record the value. Command the actuator to 100% pulse width modulated (PWM) and recheck the position reading. The value should be 80 - 95%. Command the actuator to 0% pulse width modulated (PWM) and recheck the position reading. The value should be 5 - 20%. Manually close and open the throttle and check the resistance. The resistance should range from 300 - 2,500 ohms. If the values are not in this range, install a new EGR valve. Clear the DTCs and test for normal operation. If there is still an issue, suspect the ECM. Refer to the warranty policy and procedures manual if an ECM is suspect.
P049300	Fan Overspeed (clutch locked)	<ul style="list-style-type: none"> Seized viscous coupling Fan speed sensor failure 	Check that the viscous coupling turns independently of the fan. Refer to the electrical guides and check the viscous fan speed sensor circuit. Repair/renew as necessary.
P049400	Fan Speed Low	<ul style="list-style-type: none"> Viscous fan restriction Viscous fan solenoid circuit high resistance Viscous fan solenoid circuit short circuit to ground Viscous fan solenoid failure 	Clear any obstruction from the viscous fan. Refer to the electrical guides and check the viscous fan solenoid and circuits. Refer to the relevant workshop manual section.
P049500	Fan Speed High	<ul style="list-style-type: none"> Viscous fan solenoid circuit short circuit to power Viscous fan solenoid failure 	Refer to the electrical guides and check the viscous fan solenoid and circuits. Refer to the electrical guides.

P050000	Vehicle Speed Sensor A	<ul style="list-style-type: none"> Vehicle speed invalid signal received over CAN 	Check for wheel speed sensor DTCs. Investigate and repair any codes stored in other CAN modules. Clear the codes and retest.
P050162	Vehicle Speed Sensor A Range/Performance	<ul style="list-style-type: none"> Vehicle speed range/performance 	Check for wheel speed sensor DTCs. Investigate and repair any codes stored in other CAN modules. Clear the codes and retest.
P050164	Vehicle Speed Sensor A Range/Performance	<ul style="list-style-type: none"> Vehicle speed range/performance 	Check for wheel speed sensor DTCs. Investigate and repair any codes stored in other CAN modules. Clear the codes and retest.
P050400	Brake switch A/B Correlation	<ul style="list-style-type: none"> The brake pressure reading does not agree with the brake lamp switch value Brake switch failure ECM failure 	Check the brake switch and circuits. Refer to the electrical guides. Refer to the warranty policy and procedures manual if a module is suspect.
P050429	Brake Switch A / B Correlation	<ul style="list-style-type: none"> Brake switch malfunction (sub-processor) 	Check for ABS DTCs, check the brake switch and circuits (refer to the electrical guides). Clear the DTCs and test for normal operation.
P050464	Brake Switch A / B Correlation	<ul style="list-style-type: none"> Brake switch malfunction 	Check for ABS DTCs, check the brake switch and circuits (refer to the electrical guides). Clear the DTCs and test for normal operation.
P050600	Idle Air Control System RPM Lower Than Expected	<ul style="list-style-type: none"> Intake air restriction Accessory drive overload (defective/seized component) 	Check the air intake system. Check the accessory drive belt and components. Refer to the relevant workshop manual section.
P050700	Idle Air Control System RPM Higher Than Expected	<ul style="list-style-type: none"> Intake air leak between the mass air flow (MAF) sensor and throttle Intake air leak between throttle and engine Engine crankcase breather leak 	Check the air intake system. Check the engine breather system. Refer to the relevant workshop manual section.
P051216	Starter Request Circuit	<ul style="list-style-type: none"> Crank request circuit low input 	Refer to the electrical guides and check the starter circuit. Repair/renew as necessary.
P051217	Starter Request Circuit	<ul style="list-style-type: none"> Crank request circuit high input 	Refer to the electrical guides and check the starter circuit. Repair/renew as necessary.
P051300	Incorrect Immobilizer Key	<ul style="list-style-type: none"> Security key invalid 	Program keys using the approved diagnostic system. Investigate and repair any codes stored in other CAN modules. Clear the codes and retest.
P052900	Fan Speed Sensor Circuit Intermittent	<ul style="list-style-type: none"> Fan obstruction Viscous fan circuit issue Viscous fan damage/fault 	Clear any obstruction, refer to the electrical guides and check the viscous fan solenoid and circuits. Repair/renew as necessary. Refer to the relevant workshop manual section.
P056000	System Voltage	<ul style="list-style-type: none"> Battery back-up malfunction Battery voltage low Battery ground cable: high resistance Battery connections loose/corroded Battery current drain 	Check the battery condition and state of charge. Refer to the relevant workshop manual section.
P056200	System Voltage Low	<ul style="list-style-type: none"> Battery condition/state of charge Battery ground cable high resistance Battery connections loose/corroded 	Check the battery connections and condition and charge as necessary. Refer to the electrical guides and check the battery power supplies to the ECM, etc. Repair/renew as necessary. Refer

		<ul style="list-style-type: none"> • Battery current drain • Battery power distribution circuits 	to the relevant workshop manual section.
P056300	System Voltage High	<ul style="list-style-type: none"> • System boosted from high voltage • Battery voltage high • Generator over charge condition 	Check if the vehicle has been jump-started. Check the battery condition and state of charge. Refer to the relevant workshop manual section.
P056600	Cruise Control OFF Signal	<ul style="list-style-type: none"> • Speed control (CANCEL) switch signal circuit short circuit to power • Speed control cancel switch stuck/jammed • Speed control cancel switch failure 	Check the operation of the cancel switch. Refer to the electrical guides and check the circuit. Repair/renew as necessary. Refer to the relevant workshop manual section.
P056700	Cruise Control RESUME Signal	<ul style="list-style-type: none"> • Speed control (RESUME) switch signal circuit short circuit to power • Speed control resume switch stuck/jammed • Speed control resume switch failure 	Check the switch operation. Check the switch circuits. Refer to the electrical guides. Repair/renew as necessary. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.
P056900	Cruise Control COAST Signal	<ul style="list-style-type: none"> • Speed control (-) switch signal circuit short circuit to power • Speed control - switch stuck/jammed • Speed control - switch failure 	Check the switch operation. Check the switch circuits. Refer to the electrical guides. Repair/renew as necessary. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.
P057000	Cruise Control ACCEL Signal	<ul style="list-style-type: none"> • Speed control + switch signal circuit short circuit to power • Speed control + switch stuck/jammed • Speed control + switch failure 	Check the switch operation. Check the switch circuits. Refer to the electrical guides. Repair/renew as necessary. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.
P057100	Brake Switch A Circuit	<ul style="list-style-type: none"> • The brake pressure reading does not agree with the brake lamp switch value • Brake switch failure • ECM failure 	Check the brake switch and circuits. Refer to the electrical guides. Refer to the warranty policy and procedures manual if a module is suspect.
P057400	Cruise Control System - Vehicle Speed Too High	<ul style="list-style-type: none"> • Incorrect speed sensor signal 	Check for ABS DTCs. Refer to the relevant workshop manual section.
P057600	Cruise Control Input Circuit Low	<ul style="list-style-type: none"> • Speed control switch short circuit to ground • Speed control switch high resistance 	Refer to the electrical guides and check the cruise control circuit between the ECM and switch. Check the switch operation and renew/renew as necessary.
P057700	Cruise Control Input Circuit High	<ul style="list-style-type: none"> • Speed control switch short circuit to power 	Refer to the electrical guides and check the cruise control circuit between the ECM and switch. Check the switch operation and renew/renew as necessary.
P057800	Cruise Control Multi-Function Input A Circuit Stuck	<ul style="list-style-type: none"> • Speed control multi-function input A circuit high resistance • Speed control multi-function input A circuit short circuit to ground • Speed control multi-function input A circuit short circuit to power • Speed control switch stuck 	Refer to the electrical guides and check the cruise control circuit between the ECM and switch. Check the switch operation and renew/renew as necessary.
		<ul style="list-style-type: none"> • Speed control multi- 	

P057900	Cruise Control Multi-Function Input A Circuit Range/Performance	<ul style="list-style-type: none"> function input A circuit high resistance Speed control multi-function input A circuit short circuit to ground Speed control multi-function input A circuit short circuit to power Speed control switch stuck 	Refer to the electrical guides and check the cruise control circuit between the ECM and switch. Check the switch operation and renew/renew as necessary.
P058500	Cruise Control Multi-Function Input A / B Correlation	<ul style="list-style-type: none"> Cruise control acceleration monitor fault 	Check for other DTCs and Repair/renew those first. Clear this DTC and retest.
P060000	Serial Communication Link	<ul style="list-style-type: none"> Internal control module communication link 	Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, refer to the warranty policy and procedures manual if a module is suspect.
P060143	Internal Control Module Memory Check Sum Error	<ul style="list-style-type: none"> Transmission control module (TCM) internal control module memory check sum error - special memory failure 	Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, refer to the warranty policy and procedures manual if a module is suspect.
P060145	Internal Control Module Memory Check Sum Error	<ul style="list-style-type: none"> Transmission control module (TCM) internal control module memory check sum error - program memory failure 	Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, refer to the warranty policy and procedures manual if a module is suspect.
P060300	Internal Control Module Keep Alive Memory (KAM) Error	<ul style="list-style-type: none"> ECM internal control module KAM error 	Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, refer to the warranty policy and procedures manual if a module is suspect.
P060400	Internal Control Module Random Access Memory (RAM) Error	<ul style="list-style-type: none"> ECM internal control module RAM error 	Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, refer to the warranty policy and procedures manual if a module is suspect.
P060442	Internal Control Module Random Access Memory (RAM) Error	<ul style="list-style-type: none"> ECM general memory failure 	Clear DTC and retest. If the problem persists, renew the TCM. Refer to the warranty policy and procedures manual if a module is suspect.
P060443	Internal Control Module Random Access Memory (RAM) Error	<ul style="list-style-type: none"> ECM shut off RAM test - special memory failure 	Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, refer to the warranty policy and procedures manual if a module is suspect.
P060444	Internal Control Module Random Access Memory (RAM) Error	<ul style="list-style-type: none"> ECM RAM check sum - data memory failure 	Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, refer to the warranty policy and procedures manual if a module is suspect.
P060445	Internal Control Module Random Access Memory (RAM) Error	<ul style="list-style-type: none"> ECM failure - program memory failure 	Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, refer to the warranty policy and procedures manual if a module is suspect.
P060500	Internal Control Module Read Only Memory (ROM) Error	<ul style="list-style-type: none"> ECM internal control module ROM error 	Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, refer to the warranty policy and procedures manual if a module is suspect.
P060542	Internal Control Module Read Only Memory (ROM) Error	<ul style="list-style-type: none"> TCM - general memory failure ROM checksum 	Clear DTC and retest. If the problem persists, renew the TCM. Refer to the warranty policy and procedures manual if a module is suspect.

P060543	Internal Control Module Read Only Memory (ROM) Error	<ul style="list-style-type: none"> • TCM - shut off ROM test 	Clear DTC and retest. If the problem persists, renew the TCM. Refer to the warranty policy and procedures manual if a module is suspect.
P060544	Internal Control Module Read Only Memory (ROM) Error	<ul style="list-style-type: none"> • TCM - initial ROM test 	Clear DTC and retest. If the problem persists, renew the TCM. Refer to the warranty policy and procedures manual if a module is suspect.
P060545	Internal Control Module Read Only Memory (ROM) Error	<ul style="list-style-type: none"> • TCM - continuous ROM test 	Clear DTC and retest. If the problem persists, renew the TCM. Refer to the warranty policy and procedures manual if a module is suspect.
P060546	Internal Control Module Read Only Memory (ROM) Error	<ul style="list-style-type: none"> • TCM - continuous ROM test 	Clear DTC and retest. If the problem persists, renew the TCM. Refer to the warranty policy and procedures manual if a module is suspect.
P060548	Internal Control Module Read Only Memory (ROM) Error	<ul style="list-style-type: none"> • ECM circuits short circuit to ground • ECM circuits short circuit to power • ECM circuits high resistance • TCM - shut off ROM test - supervision software fault 	Check the ECM circuits. Refer to the electrical guides. Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060601	Control Module Processor	<ul style="list-style-type: none"> • PCM/ECM processor • Controller test - general electrical failure 	Clear DTC and retest. If the problem persists, renew the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060604	Control Module Processor	<ul style="list-style-type: none"> • PCM/ECM processor error capturing instructions 	Clear DTC and retest. If the problem persists, renew the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060605	Control Module Processor	<ul style="list-style-type: none"> • PCM/ECM processor scheduling sequence check - system programming failures 	Program the module using the approved diagnostic system.
P060641	Control Module Processor	<ul style="list-style-type: none"> • PCM/ECM processor watch dog timer fault - general checksum failure 	Clear DTC and retest. If the problem persists, renew the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060642	Control Module Processor	<ul style="list-style-type: none"> • PCM/ECM processor error capturing instructions - general memory failure 	Clear DTC and retest. If the problem persists, renew the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060643	Control Module Processor	<ul style="list-style-type: none"> • PCM/ECM processor duplication memory fault - special memory failure 	Clear DTC and retest. If the problem persists, renew the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060644	Control Module Processor	<ul style="list-style-type: none"> • PCM/ECM processor duplication memory fault - data memory failure 	Clear DTC and retest. If the problem persists, renew the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060645	Control Module Processor	<ul style="list-style-type: none"> • PCM/ECM processor detection of write to internal ROM - program memory failure 	Clear DTC and retest. If the problem persists, renew the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060646	Control Module Processor	<ul style="list-style-type: none"> • PCM/ECM processor detection of write to internal ROM - calibration/parameter memory failure 	Clear DTC and retest. If the problem persists, renew the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060647	Control Module Processor	<ul style="list-style-type: none"> • PCM/ECM processor watch dog timer fault/processor fault 	Clear DTC and retest. If the problem persists, renew the ECM. Refer to the warranty policy and procedures manual

			if a module is suspect.
P060648	Control Module Processor	<ul style="list-style-type: none"> PCM/ECM processor scheduling sequence check/processor - supervision software failure 	Clear DTC and retest. If the problem persists, renew the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060649	Control Module Processor	<ul style="list-style-type: none"> PCM/ECM processor controller test/processor - internal electronic failure 	Clear DTC and retest. If the problem persists, renew the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060700	Control Module Performance	<ul style="list-style-type: none"> ECM - event information - CPU watch dog 	Check the ECM circuits and connectors. Refer to the electrical guides. Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060A00	Internal Control Module Monitoring Processor Performance	<ul style="list-style-type: none"> ECM - event information - CPU watch dog 	Check the ECM circuits and connectors. Refer to the electrical guides. Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060B00	Internal Control Module A/D Processing Performance	<ul style="list-style-type: none"> ECM - event information - Processor monitoring conversion not plausible 	Check the ECM circuits and connectors. Refer to the electrical guides. Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060C00	Internal Control Module Main Processor Performance	<ul style="list-style-type: none"> ECM - event information processor monitoring speed not plausible 	Check the ECM circuits and connectors. Refer to the electrical guides. Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060D00	Internal Control Module Accelerator Pedal Position Performance	<ul style="list-style-type: none"> ECM internal communication error 	Clear DTC and retest. If the problem persists, renew the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060E62	Internal Control Module Throttle Position Performance	<ul style="list-style-type: none"> Throttle motor amplifier failure for valve sensor malfunction - ECM internal signal compare failure 	Clear DTC and retest. If the problem persists, renew the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060E64	Internal Control Module Throttle Position Performance	<ul style="list-style-type: none"> Throttle position communication - ECM internal signal plausibility failure 	Clear DTC and retest. If the problem persists, renew the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P061000	Control Module Vehicle Options Error	<ul style="list-style-type: none"> Car configuration file (CCF) settings mismatch 	Configure the module using the approved diagnostic system.
P061600	Starter Relay Circuit Low	<ul style="list-style-type: none"> Starter relay drive circuit short circuit to ground Starter relay drive circuit high resistance Starter relay failure 	Check the starter relay operation. Refer to the electrical guides and check the starter relay circuit. Repair/renew as necessary.
P061700	Starter Relay Circuit High	<ul style="list-style-type: none"> Starter relay drive circuit short circuit to battery Starter relay failure 	Check the starter relay operation. Refer to the electrical guides and check the starter relay circuit. Repair/renew as necessary.

P061A00	Internal Control Module Torque Performance	<ul style="list-style-type: none"> ● Pedal follower error 	Retrieve the flight recorder data using the approved diagnostic system and the customer statement relating to the concern. Check and rectify other DTCs first. If this code still sets, contact the technical help desk.
P061A29	Internal Control Module Torque Performance	<ul style="list-style-type: none"> ● Absolute engine torque calculation failure - sub-processor 	Retrieve the flight recorder data using the approved diagnostic system and the customer statement relating to the concern. Check and rectify other DTCs first. If this code still sets, contact the technical help desk.
P061A64	Internal Control Module Torque Performance	<ul style="list-style-type: none"> ● Absolute engine torque calculation failure 	Retrieve the flight recorder data using the approved diagnostic system and the customer statement relating to the concern. Check and rectify other DTCs first. If this code still sets, contact the technical help desk.
P061B29	Internal Control Module Torque Calculation Performance	<ul style="list-style-type: none"> ● Internal control module torque calculation performance 	Retrieve the flight recorder data using the approved diagnostic system and the customer statement relating to the concern. Check and rectify other DTCs first. If this code still sets, contact the technical help desk.
P061B64	Internal Control Module Torque Calculation Performance	<ul style="list-style-type: none"> ● Internal control module torque calculation performance 	Retrieve the flight recorder data using the approved diagnostic system and the customer statement relating to the concern. Check and rectify other DTCs first. If this code still sets, contact the technical help desk.
P061C00	Internal Control Module Engine RPM Performance	<ul style="list-style-type: none"> ● Processor monitoring speed not plausible 	Retrieve the flight recorder data using the approved diagnostic system and the customer statement relating to the concern. Check and rectify other DTCs first. If this code still sets, contact the technical help desk.
P061E00	Internal Control Module Brake Signal Performance	<ul style="list-style-type: none"> ● Cruise intervention not plausible 	Retrieve the flight recorder data using the approved diagnostic system and the customer statement relating to the concern. Check and rectify other DTCs first. If this code still sets, contact the technical help desk.
P062000	Generator Control Circuit	<ul style="list-style-type: none"> ● Generator failure 	Check the charging voltage. Check the charging system circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new generator. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.
P062200	Generator Field Terminal Circuit	<ul style="list-style-type: none"> ● Generator circuit fault ● Generator failure 	Refer to the electrical guides and check the generator circuit. Repair/renew as necessary. Refer to the relevant workshop manual section.
P062500	Generator Field Terminal Circuit Low	<ul style="list-style-type: none"> ● Voltage sense circuit high resistance ● Generator B+ circuit high resistance/intermittent ● Generator monitor circuit short circuit to ground 	Check the main charging circuit fuse. Check the charging voltage. Check the charging system circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new generator. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.
P062600	Generator Field Terminal Circuit High	<ul style="list-style-type: none"> ● Generator connector loose/not connected ● Generator monitor circuit short circuit to power ● Generator monitor circuit high resistance 	Check the charging voltage. Check the charging system circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new generator. Refer to the relevant workshop manual section. Clear the DTCs and test for

			normal operation.
P062700	Fuel Pump A Control Circuit / Open	<ul style="list-style-type: none"> Fuel pump module relay control circuit short circuit to power Fuel pump module relay failure 	Check the fuel pump and circuits. Refer to the electrical guides. Activate the relay and listen for an audible 'click'. Refer to the relevant workshop manual section. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P062800	Fuel Pump A Control Circuit Low	<ul style="list-style-type: none"> Fuel pump control circuit short circuit to ground Fuel pump control circuit high resistance Fuel pump relay fault 	Refer to the electrical guides and check the fuel pump circuits. Activate the relay and listen for an audible 'click'. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P062900	Fuel Pump A Control Circuit High	<ul style="list-style-type: none"> Fuel pump control circuit short circuit to power Fuel pump relay fault 	Refer to the electrical guides and check the fuel pump circuits. Activate the relay and listen for an audible 'click'. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P062B00	Internal Control Module Fuel Injector Control Performance	<ul style="list-style-type: none"> Fuel cut not plausible Monitoring of post injection Monitoring of fuel mass adaption Monitoring of accelerator pedal position 	Check and Repair/renew other DTCs first. If this code still sets, contact the technical help desk.
P062D00	Fuel Injector Driver Circuit Performance Bank 1	<ul style="list-style-type: none"> Injector(s) disconnected Injector circuit high resistance, short circuit to ground, short circuit to power Injector failure ECM failure 	Refer to the electrical guides and check the injector circuits. Rectify as necessary. Clear the DTCs and test for normal operation. Refer to the relevant workshop manual section. Refer to the warranty policy and procedures manual if a module is suspect.
P062E00	Fuel Injector Driver Circuit Performance Bank 2	<ul style="list-style-type: none"> Injector(s) disconnected Injector circuit high resistance, short circuit to ground, short circuit to power Injector failure ECM failure 	Refer to the electrical guides and check the injector circuits. Rectify as necessary. Clear the DTCs and test for normal operation. Refer to the relevant workshop manual section. Refer to the warranty policy and procedures manual if a module is suspect.
P063000	VIN Not Programmed or Incompatible - ECM/PCM	<ul style="list-style-type: none"> VIN not programmed VIN incompatible with vehicle specification 	Configure the module using the approved diagnostic system.
P063305	Immobilizer Key Not Programmed - ECM/PCM	<ul style="list-style-type: none"> Security target ID transfer process failed 	Program the key using the approved diagnostic system.
P063355	Immobilizer Key Not Programmed - ECM/PCM	<ul style="list-style-type: none"> Security no target in EMS 	Program the module using the approved diagnostic system.
P063400	PCM / ECM / TCM Internal Temperature A Too High	<ul style="list-style-type: none"> ECM internal temperature too high E box cooling fan obstruction E box cooling fan operation ECM internal sensor error 	Consider atmospheric and customer driving conditions before carrying out any other action. Check the E box cooling fan function. Refer to the electrical guides and check the ECM circuits. Using a datalogger function, check the ECM temperature. If the temperature value is greater than 130° C (266°F) suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P063422	PCM / ECM / TCM Internal Temperature A Too High	<ul style="list-style-type: none"> ECM internal temperature too high E box cooling fan obstruction E box cooling fan operation ECM internal sensor error 	Consider atmospheric and customer driving conditions before carrying out any other action. Check the E box cooling fan function. Refer to the electrical guides and check the ECM circuits. Using a datalogger function, check the ECM temperature. If the temperature value is greater than 130° C (266°F) suspect the ECM. Refer to the warranty policy and procedures

			manual if a module is suspect.
P063424	PCM / ECM / TCM Internal Temperature A Too High	<ul style="list-style-type: none"> • ECM internal temperature too high • E box cooling fan obstruction • E box cooling fan operation • ECM internal sensor error 	Consider atmospheric and customer driving conditions before carrying out any other action. Check the E box cooling fan function. Refer to the electrical guides and check the ECM circuits. Using a datalogger function, check the ECM temperature. If the temperature value is greater than 130° C (266°F) suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P064200	Sensor Reference Voltage A Circuit Low	<ul style="list-style-type: none"> • ECM power supply circuit high resistance • ECM power supply circuit short circuit to ground • ECM ground circuit high resistance • 5 Volt supply • ECM relay malfunction • ECM failure 	Check the ECM power supply and relay circuits. Check the 5 volt sensor supply. Refer to the electrical guides. Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, refer to the warranty policy and procedures manual if a module is suspect.
P064300	Sensor Reference Voltage A Circuit High	<ul style="list-style-type: none"> • ECM power supply circuit short circuit to power • ECM ground circuit short circuit to power • 5 Volt supply • ECM relay malfunction • ECM failure 	Check the ECM power supply and relay circuits. Check the 5 volt sensor supply. Refer to the electrical guides. Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, refer to the warranty policy and procedures manual if a module is suspect.
P060644	Control Module Processor	<ul style="list-style-type: none"> • PCM/ECM processor duplication memory fault - data memory failure 	Clear DTC and retest. If the problem persists, renew the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P065200	Sensor Reference Voltage B Circuit Low	<ul style="list-style-type: none"> • ECM power supply circuit high resistance • ECM power supply circuit short circuit to ground • ECM ground circuit high resistance • 5 Volt supply • ECM relay malfunction • ECM failure 	Check the ECM power supply and relay circuits. Check the 5 volt sensor supply. Refer to the electrical guides. Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, refer to the warranty policy and procedures manual if a module is suspect.
P065300	Sensor Reference Voltage B Circuit High	<ul style="list-style-type: none"> • ECM power supply circuit short circuit to power • ECM ground circuit short circuit to power • 5 Volt supply • ECM relay malfunction • ECM failure 	Check the ECM power supply and relay circuits. Check the 5 volt sensor supply. Refer to the electrical guides. Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, refer to the warranty policy and procedures manual if a module is suspect.
P066700	PCM / ECM / TCM Internal Temperature Sensor A Range/Performance	<ul style="list-style-type: none"> • ECM internal temperature sensor range/performance 	Check the ECM circuits. Refer to the electrical guides. Using a data logger function, check the ECM internal temperature. Start the engine and allow to idle for five minutes before rechecking the temperature. If the temperature has increased by more than 10°C per 100 ms suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P066800	PCM / ECM / TCM Internal Temperature Sensor A Circuit Low	<ul style="list-style-type: none"> • ECM temperature sensor circuit short circuit to ground 	Clear the DTC, cycle the ignition, allow power latch and retest. If the DTC resets, check the ECM circuits. Refer to the electrical guides. Using a datalogger function, check the ECM internal temperature. If the value is less than -40°C (-40°F), suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.

			suspect.
P066900	PCM / ECM / TCM Internal Temperature Sensor A Circuit High	<ul style="list-style-type: none"> TCM temperature sensor circuit short circuit to power 	Clear the DTC, cycle the ignition, allow power latch and retest. If the DTC resets, refer to the warranty policy and procedures manual if a module is suspect.
P067000	Glow Plug Control Module Control Circuit / Open	<ul style="list-style-type: none"> Glow plug relay, control circuit high resistance Glow plug relay, control circuit short circuit to ground Glow plug relay failure 	Check the glow plug relay circuits. Refer to the electrical guides. Check the relay operation. Activate the relay and listen for an audible 'click'. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P068700	ECM/PCM Power Relay Control Circuit High	<ul style="list-style-type: none"> ECM control relay malfunction 	Check the ECM relay and circuit. Refer to the electrical guides.
P069300	Fan 2 Control Circuit Low	<ul style="list-style-type: none"> Viscous fan control circuit short circuit to ground Viscous fan control circuit high resistance Viscous fan solenoid failure 	Check the viscous fan solenoid and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P069400	Fan 2 Control Circuit High	<ul style="list-style-type: none"> Viscous fan control circuit short circuit to power Viscous fan solenoid failure 	Check the viscous fan solenoid and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P069500	Fan 3 Control Circuit Low	<ul style="list-style-type: none"> E box fan circuit short circuit to ground 	Check the E box fan operation and circuit. Refer to the electrical guides.
P069600	Fan 3 Control Circuit High	<ul style="list-style-type: none"> E box fan circuit short circuit to power 	Check the E box fan operation and circuit. Refer to the electrical guides.
P070000	Transmission Control System (MIL Request)	<ul style="list-style-type: none"> Transmission fault 	Check for other DTCs and rectify those first. Clear this DTC and retest.
P085100	Park / Neutral Switch Input Circuit Low	<ul style="list-style-type: none"> Park/Neutral switch circuit short to ground 	Check the switch and circuits. Refer to the electrical guides and repair/renew as necessary. Clear the DTCs and test for normal operation.
P085200	Park / Neutral Switch Input Circuit High	<ul style="list-style-type: none"> Park/Neutral switch circuit short to power 	Check the switch and circuits. Refer to the electrical guides and repair/renew as necessary. Clear the DTCs and test for normal operation.
P0A0900	DC/DC Converter Status Circuit Low	<ul style="list-style-type: none"> DC/DC converter circuit low 	Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, refer to the warranty policy and procedures manual if a module is suspect.
P0A1000	DC/DC Converter Status Circuit High	<ul style="list-style-type: none"> DC/DC converter circuit high 	Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, refer to the warranty policy and procedures manual if a module is suspect.
P113600	E box fan circuit performance	<ul style="list-style-type: none"> E box fan circuit short circuit to ground E box fan circuit short circuit to power E box fan circuit high resistance E box fan failure 	Check the E box fan and circuits and fan operation. Refer to the electrical guides.
P120000	Injector Range/Performance	<ul style="list-style-type: none"> Fuel injector circuit high resistance Fuel injector circuit short circuit to ground Fuel injector circuit short circuit to power Fuel injector leaking Fuel injector failure 	Refer to the electrical guides and check the injector circuits. Refer to the relevant workshop manual section. Refer to the warranty policy and procedures manual if a module is suspect.

		<ul style="list-style-type: none"> • ECM failure 	
P125900	Immobilizer to PCM Signal Error	<ul style="list-style-type: none"> • Incorrect ID received from instrument pack 	Configure the system using the approved diagnostic system.
P133400	EGR Throttle Position Sensor Minimum/Maximum Stop Performance	<ul style="list-style-type: none"> • Exhaust gas recirculation (EGR) valve stuck/sticking • EGR valve circuit high resistance • EGR valve circuit short circuit to ground • EGR valve circuit short circuit to power • Intake air shut off throttle stuck/sticking • Intake air shut off throttle circuit high resistance • Intake air shut off throttle circuit short circuit to ground • Intake air shut off throttle circuit short circuit to power • Intake air shut off throttle failure • ECM failure 	Check the EGR valve and circuits. Refer to the electrical guides. Refer to the relevant workshop manual section. Refer to the warranty policy and procedures manual if a module is suspect.
P133500	EGR Position Sensor Minimum/Maximum Stop Performance	<ul style="list-style-type: none"> • EGR valve circuit high resistance • EGR valve circuit short circuit to ground • EGR valve circuit short circuit to power • EGR valve failure 	Check the EGR valve and circuits. Refer to the electrical guides. Using a datalogger function, check the EGR valve angles and command the valve to 0% pulse width modulated (PWM). Recheck the angle. The value should be 0 - 20%. If the value is outside this range, install a new valve. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.
P133600	Crankshaft/Camshaft Sensor Range/Performance	<ul style="list-style-type: none"> • CKP sensor circuit high resistance • CKP sensor circuit short circuit to ground • CKP sensor circuit short circuit to power • CMP sensor circuit high resistance • CMP sensor circuit short circuit to ground • CMP sensor circuit short circuit to power • CKP sensor failure • CMP sensor failure 	Check the CMP and CKP sensors and circuits. Refer to the electrical guides. If no fault is found in the circuits, install new sensors as necessary. Clear the DTCs and test for normal operation.
P140A00	Exhaust Gas Recirculation Sensor C Circuit Low	<ul style="list-style-type: none"> • EGR valve circuit (left-hand bank) high resistance • EGR valve circuit short circuit to ground • EGR valve failure 	Check the EGR valve and circuits. Refer to the electrical guides. Using a datalogger function, check the EGR valve angle with the ignition on and the engine off. Command the valve angle to 0% pulse width modulated (PWM), then to 100% pulse width modulated (PWM) and recheck the angles. The angles should range between 0 - 20% and 80 - 95%. If this is not the case, install a new valve. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.
	Exhaust Gas Recirculation	<ul style="list-style-type: none"> • EGR valve circuit (left-hand bank) short circuit 	Check the EGR valve and circuits. Refer to the electrical guides. Using a datalogger function, check the EGR valve angle with the ignition on and the engine off. Command the valve angle to 0% pulse width modulated (PWM), then

P140B00	Sensor C Circuit High	<ul style="list-style-type: none"> to power EGR valve failure 	to 100% pulse width modulated (PWM) and recheck the angles. The angles should range between 0 - 20% and 80 - 95%. If this is not the case, install a new valve. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.
P140C00	Exhaust Gas Recirculation Control Circuit B	<ul style="list-style-type: none"> Intake air shut off throttle circuit high resistance Intake air shut off throttle circuit short circuit to ground Intake air shut off throttle circuit short circuit to power Intake air shut off throttle failure ECM failure 	Check the EGR valve and circuits. Refer to the electrical guides. Refer to the warranty policy and procedures manual if a module is suspect.
P140D00	Exhaust Gas Recirculation Control Circuit B Range/Performance	<ul style="list-style-type: none"> Exhaust gas recirculation (EGR) control circuit range/performance (left-hand bank) Intake air temperature (IAT) sensor fault Manifold absolute pressure (MAP) sensor fault Mass air flow (MAF) sensor fault EGR valve stuck closed, blocked EGR valve circuit high resistance EGR valve circuit short circuit to ground EGR valve circuit short circuit to power EGR valve failure 	Check the IAT, MAP and MAF sensors and circuits. Refer to the electrical guides. For left-hand bank EGR valve circuit tests, refer to the relevant workshop manual section.
P140E00	EGR Position Sensor C Minimum/Maximum Stop Performance	<ul style="list-style-type: none"> Exhaust gas recirculation (EGR) valve circuit (left-hand bank) high resistance EGR valve circuit short circuit to ground EGR valve circuit short circuit to power EGR valve failure 	Check the EGR valve and circuits. Refer to the electrical guides. Using a datalogger function, check the EGR valve angles and command the valve to 0% pulse width modulated (PWM). Recheck the angle. The value should be between 0 - 20%. If the value is outside this range, install a new valve. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.
P141A00	Exhaust Gas Recirculation Sensor A Circuit Intermittent/Erratic	<ul style="list-style-type: none"> EGR valve circuit (right-hand bank) high resistance EGR valve circuit short circuit to ground EGR valve circuit short circuit to power EGR valve failure 	Check the EGR valve and circuits. Refer to the electrical guides. Start the engine and allow to warm up. Using a datalogger function, check the EGR valve position. After a further 5 seconds, recheck the position. If the value has increased by more than 80% per 10 ms, recheck the circuits. If no fault is found in the circuits, install a new EGR valve. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.
P141B00	Exhaust Gas Recirculation Sensor B Circuit Intermittent/Erratic	<ul style="list-style-type: none"> Intake air shut off throttle circuit high resistance Intake air shut off throttle circuit short circuit to ground Intake air shut off throttle circuit short circuit to 	Check the EGR valve and circuits. Refer to the electrical guides. Start the engine and allow to warm up. Using a datalogger function, check the EGR valve position. After a further 5 seconds, recheck the position. If the value has increased by more than 80% per 10 ms, recheck the circuits. If no

		<ul style="list-style-type: none"> power Intake air shut off throttle failure 	<p>fault is found in the circuits, install a new EGR valve. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.</p>
P141C00	Exhaust Gas Recirculation Sensor C Circuit Intermittent/Erratic	<ul style="list-style-type: none"> EGR valve circuit (left-hand bank) high resistance EGR valve circuit short circuit to ground EGR valve circuit short circuit to power EGR valve failure ECM failure 	<p>Check the EGR valve and circuits. Refer to the electrical guides. Start the engine and allow to warm up. Using a datalogger function, check the EGR valve position. After a further 5 seconds, recheck the position. If the value has increased by more than 80% per 10 ms, recheck the circuits. If no fault is found in the circuits, install a new EGR valve. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.</p>
P151B00	Idle Speed Control - RPM Lower Than Expected	<ul style="list-style-type: none"> Oil level Intake air restriction Accessory drive overload (defective/seized component) Engine compression 	<p>Check the engine oil level and condition. Check the driven components (generator, air conditioning compressor, etc). Repair/renew as necessary. Check the engine compressions only once other options are ruled out. Repair/renew as necessary. Clear the DTCs and test for normal operation.</p>
P151C00	Idle Speed Control - RPM Higher Than Expected	<ul style="list-style-type: none"> Intake air leak between MAF sensor and intake air shut off throttle Intake air leak between intake air shut off throttle and engine Engine crankcase breather leak 	<p>Inspect the engine intake AND breather system, refer to the relevant workshop manual section.</p>
P155100	Cylinder 1 Injector Circuit Range/Performance	<ul style="list-style-type: none"> Injector disconnected Injector circuit high resistance, short circuit to ground, short circuit to power Injector failure 	<p>Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Refer to the relevant workshop manual section.</p>
P155200	Cylinder 2 Injector Circuit Range/Performance	<ul style="list-style-type: none"> Injector disconnected Injector circuit high resistance, short circuit to ground, short circuit to power Injector failure 	<p>Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Refer to the relevant workshop manual section.</p>
P155300	Cylinder 3 Injector Circuit Range/Performance	<ul style="list-style-type: none"> Injector disconnected Injector circuit high resistance, short circuit to ground, short circuit to power Injector failure 	<p>Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Refer to the relevant workshop manual section.</p>
P155400	Cylinder 4 Injector Circuit Range/Performance	<ul style="list-style-type: none"> Injector disconnected Injector circuit high resistance, short circuit to ground, short circuit to power Injector failure 	<p>Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Refer to the relevant workshop manual section.</p>
P155500	Cylinder 5 Injector Circuit Range/Performance	<ul style="list-style-type: none"> Injector disconnected Injector circuit high resistance, short circuit to ground, short circuit to power Injector failure 	<p>Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Refer to the relevant workshop manual section.</p>
P155600	Cylinder 6 Injector Circuit Range/Performance	<ul style="list-style-type: none"> Injector disconnected Injector circuit high resistance, short circuit to ground, short circuit to power 	<p>Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Refer to the relevant workshop manual section.</p>

		<ul style="list-style-type: none"> • Injector failure 	
P156300	Injection Pump Control Module Requesting Engine Stop	<ul style="list-style-type: none"> • Internal control module monitoring performance 	Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, refer to the warranty policy and procedures manual if a module is suspect.
P159000	Cruise Control INCREASE DISTANCE Signal	<ul style="list-style-type: none"> • Speed control headway plus switch stuck/jammed • Speed control headway plus switch signal circuit short circuit to power • Speed control headway plus switch failure 	Check the cruise control switch operation. Refer to the electrical guides and check the circuits. Rectify as necessary. Refer to the relevant workshop manual section.
P159100	Cruise Control DECREASE DISTANCE Signal	<ul style="list-style-type: none"> • Speed control headway minus switch stuck/jammed • Speed control headway minus switch signal circuit short circuit to power • Speed control headway minus switch failure 	Check the cruise control switch operation. Refer to the electrical guides and check the circuits. Rectify as necessary. Refer to the relevant workshop manual section.
P160200	Immobilizer/ECM Communication Error	<ul style="list-style-type: none"> • CAN Link ECM/instrument cluster CAN timeout 	Refer to the Network Communications section in the workshop manual.
P162100	Immobilizer Code Words Do Not Match	<ul style="list-style-type: none"> • Challenge does not match 	Configure the system using the approved diagnostic system.
P162200	Immobilizer ID Does Not Match	<ul style="list-style-type: none"> • Key status unknown 	Program the key using the approved diagnostic system.
P163900	Vehicle ID Block Corrupted, Not Programmed	<ul style="list-style-type: none"> • Vehicle configuration 	Configure the system using the approved diagnostic system.
P193400	Vehicle Speed Signal	<ul style="list-style-type: none"> • Vehicle speed invalid signal received over CAN 	Check for ABS and TCM DTCs and rectify as necessary. Refer to the relevant workshop manual section. Refer to the Network Communications section in the workshop manual.
P193500	Brake Switch/Sensor Signal	<ul style="list-style-type: none"> • Error on brake switch sensor coming on CAN 	Check the brake switch operation. Refer to the electrical guides and check the circuits. Refer to the Network Communications section in the workshop manual.
P193600	Clutch Switch/Sensor Signal	<ul style="list-style-type: none"> • Clutch switch/sensor CAN signal plausibility 	Check for DTCs indicating CAN serial bus errors. Refer to the Network Communications section in the workshop manual.
P193A00	Invalid Scan Tool Communication/Request	<ul style="list-style-type: none"> • Invalid scan tool communication request 	This is not a fault, but event information of the communication between the scan tool and ECM. Clear/ignore this DTC.
P200800	Intake Manifold Runner Control Circuit / Open (Bank 1)	<ul style="list-style-type: none"> • Port de-activation solenoid circuit high resistance • Port de-activation solenoid circuit short circuit to ground • Port de-activation solenoid failure 	Check the port deactivation valve and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new valve. Clear the DTCs and test for normal operation.
P200900	Intake Manifold Runner Control Circuit Low (Bank 1)	<ul style="list-style-type: none"> • Port de-activation solenoid circuit high resistance • Port de-activation solenoid circuit short circuit to ground • Port de-activation solenoid failure 	Check the port deactivation valve and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new valve. Clear the DTCs and test for normal operation.

P201000	Intake Manifold Runner Control Circuit High (Bank 1)	<ul style="list-style-type: none"> Port de-activation solenoid circuit short circuit to power Port de-activation solenoid failure 	Check the port deactivation valve and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new valve. Clear the DTCs and test for normal operation.
P212200	Throttle/Pedal Position Sensor/Switch D Circuit Low	<ul style="list-style-type: none"> Circuit voltage below threshold - track 1 Accelerator pedal position (APP) sensor circuits short circuit to ground APP sensor circuits short circuit to power APP sensor fault 	Check the APP sensor circuits. Refer to the electrical guides. Using a datalogger function, check the APP sensor track 1 value with the pedal in the rest position. If the value is not approximately 0%, install a new pedal. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.
P212300	Throttle/Pedal Position Sensor/Switch D Circuit High	<ul style="list-style-type: none"> Circuit voltage above threshold - track 1 Accelerator pedal position (APP) sensor circuits short circuit to ground APP sensor circuits short circuit to power APP sensor fault 	Check the APP sensor circuits. Refer to the electrical guides. Using a datalogger function, check the APP sensor track 1 value with the pedal in the rest position. If the value is not approximately 99%, install a new pedal. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.
P212700	Throttle/Pedal Position Sensor/Switch E Circuit Low	<ul style="list-style-type: none"> Circuit voltage below threshold - track 2 Accelerator pedal position (APP) sensor circuits short circuit to ground APP sensor circuits short circuit to power APP sensor fault 	Check the APP sensor circuits. Refer to the electrical guides. Using a datalogger function, check the APP sensor track 2 value with the pedal in the rest position. If the value is not approximately 0%, install a new pedal. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.
P212800	Throttle/Pedal Position Sensor/Switch E Circuit High	<ul style="list-style-type: none"> Circuit voltage above threshold - track 2 Accelerator pedal position (APP) sensor circuits short circuit to ground APP sensor circuits short circuit to power APP sensor fault 	Check the APP sensor circuits. Refer to the electrical guides. Using a datalogger function, check the APP sensor track 2 value with the pedal in the wide open position. If the value is not approximately 99%, install a new pedal. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.
P213800	Throttle/Pedal Position Sensor/Switch D / E Voltage Correlation	<ul style="list-style-type: none"> Signal compare fault (the value difference between channels is greater than it should be) Accelerator pedal position (APP) sensor circuits short circuit to ground APP sensor circuits short circuit to power APP sensor fault 	Check the APP sensor circuits. Refer to the electrical guides. Using a datalogger function, check the APP sensor values for tracks 1 and 2 with the pedal in the idle position, and again in the wide open position. Both tracks should read approximately 0% in the idle position and 99% in the wide open position. If any of the values are incorrect, install a new pedal. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.
P214100	Exhaust Gas Recirculation Throttle Control Circuit A Low	<ul style="list-style-type: none"> EGR sensor circuits short circuit (to ground/power/other circuits) EGR sensor circuits high resistance EGR sensor fault 	Check the EGR sensor circuits. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation. Using a datalogger function, read the difference between the EGR throttle set point and the actual throttle position, and the EGR throttle position. Check that the throttle is open and command the throttle closed. Check that the throttle position value increases to above 90%. Check the difference between set point and actual. This value should not exceed either maximum 5% or minimum -15%. Check that the EGR throttle is not

			sticking. Install a new right-hand valve as necessary. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.
P214200	Exhaust Gas Recirculation Throttle Control Circuit A High	<ul style="list-style-type: none"> • EGR sensor circuits short circuit (to ground/power/other circuits) • EGR sensor circuits high resistance • EGR sensor fault 	Check the EGR sensor circuits. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation. Using a datalogger function, read the difference between the EGR throttle set point and the actual throttle position. Check that the throttle is open and command the throttle closed. Check that the throttle position value increases to above 90%. Check the difference between set point and actual. This value should not exceed either maximum 5% or minimum -15%. Check that the EGR throttle is not sticking. Install a new left-hand valve as necessary. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.
P219900	Intake Air Temperature ½ Correlation	<ul style="list-style-type: none"> • Intake air temperature (IAT) sensor circuit high resistance, short circuit to ground, short circuit to power • Air charge temperature (ACT) sensor circuit high resistance, short circuit to ground, short circuit to power • IAT sensor failure • ACT sensor failure • ECM failure 	Check the IAT sensor and circuits. Refer to the electrical guides. For ACT sensor, refer to the relevant workshop manual section. Refer to the warranty policy and procedures manual if a module is suspect.
P222800	Barometric Pressure Sensor A Circuit Low	<ul style="list-style-type: none"> • Barometric sensor failure (internal ECM fault) 	Using a datalogger function, check the ambient pressure and the manifold absolute pressures in both banks with the engine off. If the ambient pressure is significantly different to the manifold pressures suspect the ECM. Refer to the warranty policy and procedures manual if an ECM is suspect.
P222900	Barometric Pressure Sensor A Circuit High	<ul style="list-style-type: none"> • Barometric sensor failure (internal ECM fault) 	Using a datalogger function, check the ambient pressure and the manifold absolute pressures in both banks with the engine off. If the ambient pressure is significantly different to the manifold pressures suspect the ECM. Refer to the warranty policy and procedures manual if an ECM is suspect.
P223000	Barometric Pressure Sensor A Circuit Intermittent/Erratic	<ul style="list-style-type: none"> • BARO sensor failure (internal ECM fault) 	Check the ECM circuits. Refer to the electrical guides. Using a datalogger function, check the ambient pressure. Increase the engine speed to 1,500 rpm and recheck the pressure. If the pressure has increased by more than 30 KPa (4.35 lbs/in ²) per 100 ms, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
		<ul style="list-style-type: none"> • Air leakage post turbocharger • Intake air temperature (IAT) sensor circuit high resistance, short circuit to ground, short circuit to power 	Check the turbocharger and linkage mechanical condition. Check the intake air system condition, rectify as necessary. Check for sensor DTCs. Check the IAT and MAP sensor circuits.

P226300	Turbocharger/Supercharger Boost System Performance	<ul style="list-style-type: none"> Manifold absolute pressure (MAP) sensor circuit high resistance, short circuit to ground, short circuit to power Mass air flow (MAF) sensor circuit high resistance, short circuit to ground, short circuit to power Exhaust gas recirculation (EGR) circuit high resistance, short circuit to ground, short circuit to power VGT actuator failure Turbocharger vanes stuck/sticking 	Refer to the electrical guides and rectify as necessary. Using a datalogger function, check the turbocharger actuator position. Turn the ignition on, engine off and command the turbocharger actuator to 95% pulse width modulated (PWM) then to 5% pulse width modulated (PWM) and recheck the turbocharger actuator position. The value at 95% pulse width modulated (PWM) should be 80 - 95%, and at 5% pulse width modulated (PWM), 0 - 20%. If this is not the case, install a new turbocharger. Clear the DTCs and test for normal operation.
P226900	Water in Fuel Condition	<ul style="list-style-type: none"> Water in fuel condition Water in fuel sensor circuit short circuit to ground Water in fuel sensor fault 	Drain the water from the fuel filter. Clear the DTC and retest. If the DTC resets, check the sensor circuit. Refer to the electrical guides. If no fault is found in the circuits, install a new sensor.
P228800	Injector Control Pressure Too High	<ul style="list-style-type: none"> Fuel pressure control valve (FPCV) minimum limit reached Fuel injector control pressure too high FPCV circuit fault FPCV failure Fuel pump module circuit short circuit to power Fuel pump module failure Fuel injection pump failure 	Check the fuel pressure, refer to the relevant section of the workshop manual. Check the fuel pump module circuits and the FPCV circuits. Refer to the electrical guides. For FPCV and fuel injection pump, refer to the relevant workshop manual section.
P229000	Injector Control Pressure Too Low	<ul style="list-style-type: none"> Fuel pressure control valve (FPCV) maximum limit reached Fuel injector control pressure too low Fuel line leak Fuel filter/system restriction FPCV circuit fault FPCV failure Fuel pump module circuit short circuit to ground Fuel pump module failure Fuel injection pump failure 	Check the fuel pressure, refer to the relevant section of the workshop manual. Check the fuel pump module circuits and the FPCV circuits. Refer to the electrical guides. For FPCV and fuel injection pump, refer to the relevant workshop manual section.
P229200	Injector Control Pressure Erratic	<ul style="list-style-type: none"> Fuel injector control pressure erratic FPCV circuit fault FPCV failure Fuel pump module circuit high resistance, short circuit to ground, short circuit to power Fuel pump module failure Fuel injection pump failure 	Check the fuel pressure, refer to the relevant section of the workshop manual. Check the fuel pump module circuits and the FPCV circuits. Refer to the electrical guides. For FPCV and fuel injection pump, refer to the relevant workshop manual section.
		<ul style="list-style-type: none"> Event information (this code indicates unexpected simultaneous operation of the accelerator and brake pedals) Brake lamp switch fault Accelerator pedal 	Check the brake lamp function. If the brake lights function correctly, check the APP sensor using a datalogger function. Check both APP sensor tracks with the pedal in the rest position.

P229900	Brake Pedal Position/Accelerator Pedal Position Incompatible	<ul style="list-style-type: none"> position (APP) sensor fault • APP sensor circuits short circuit to ground • APP sensor circuits short circuit to power • APP sensor circuits high resistance • Brake lamp switch circuits short circuit to ground • Brake lamp switch circuits short circuit to power • Brake lamp switch circuits high resistance 	<p>Recheck the values with the pedal in the wide-open position. Both tracks should range between 0% at idle to 99% at wide open throttle. If the values are correct, check the APP sensor and brake lamp switch circuits. Refer to the electrical guides. Also note that the driver may have been left-foot-braking. If the values are incorrect, install a new pedal. Refer to the relevant workshop manual section. Clear the DTCs and test for normal operation.</p>
P250500	ECM / PCM Power Input Signal	<ul style="list-style-type: none"> • ECM relay circuit high resistance • ECM relay circuit short circuit to ground • ECM relay failure 	<p>Check the ECM relay circuits. Refer to the electrical guides. Activate the relay and check for an audible 'click'. Install a new relay as necessary. Clear the DTCs and test for normal operation.</p>
P250700	ECM / PCM Power Input Signal Low	<ul style="list-style-type: none"> • ECM relay circuit high resistance • ECM relay circuit short circuit to ground • ECM relay failure 	<p>Check the ECM relay circuits. Refer to the electrical guides. Activate the relay and check for an audible 'click'. Install a new relay as necessary. Clear the DTCs and test for normal operation.</p>
P250800	ECM / PCM Power Input Signal High	<ul style="list-style-type: none"> • ECM relay circuit short circuit to power • ECM relay failure 	<p>Check the ECM relay circuits. Refer to the electrical guides. Activate the relay and check for an audible 'click'. Install a new relay as necessary. Clear the DTCs and test for normal operation.</p>
U000100	High Speed CAN Communication Bus	<ul style="list-style-type: none"> • CAN Mute 	<p>Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.</p>
U007300	Control Module Communication Bus "A" Off	<ul style="list-style-type: none"> • CAN Link circuit malfunction 	<p>Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.</p>
U010100	Lost Communication With TCM	<ul style="list-style-type: none"> • CAN Link ECM/TCM network malfunction 	<p>Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.</p>
U010200	Lost Communication With Transfer Case Control Module	<ul style="list-style-type: none"> • CAN Link ECM/transfer case control module network malfunction 	<p>Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.</p>

			Refer to the Network Communications section of the workshop manual.
U010400	Lost Communication With Cruise Control Module	<ul style="list-style-type: none"> • CAN Link engine control module ECM/Speed control module CAN timeout 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U012100	Lost Communication With Anti-Lock Brake System (ABS) Control Module	<ul style="list-style-type: none"> • CAN Link ECM/ABS network malfunction 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U012600	Lost Communication With Steering Angle Sensor Module	<ul style="list-style-type: none"> • CAN Link ECM/steering angle sensor network malfunction 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U012800	Lost Communication With Park Brake Control Module	<ul style="list-style-type: none"> • CAN Link ECM/electric park brake signal missing network malfunction 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U013300	Lost Communication With Suspension Control Module "A"	<ul style="list-style-type: none"> • CAN Link ECM/active roll control module network malfunction 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U013800	Lost Communication with All Terrain Control Module	<ul style="list-style-type: none"> • CAN Link ECM/terrain optimization switch network malfunction 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U015100	Lost Communication With Restraints Control Module	<ul style="list-style-type: none"> • Lost communications - CAN or hardwired 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the

			DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U01511F	Lost Communication With Restraints Control Module	<ul style="list-style-type: none"> • Lost communications - SRS fault 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U015157	Lost Communication With Restraints Control Module	<ul style="list-style-type: none"> • Lost communications - CAN fault 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U015500	Lost Communication With Instrument Panel Cluster (IPC) Control Module	<ul style="list-style-type: none"> • CAN Link ECM/IPC network malfunction 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U016400	Lost Communication With HVAC Control Module	<ul style="list-style-type: none"> • CAN communication error 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U016700	Lost Communication With Vehicle Immobilizer Control Module	<ul style="list-style-type: none"> • Security challenge response timeout 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U017000	Lost Communication With "Restraints System Sensor A"	<ul style="list-style-type: none"> • CAN Link ECM/restraints control module (RCM) network malfunction 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U023500	Lost Communication With Cruise Control Front	<ul style="list-style-type: none"> • Lost communication • Fault status transmitted 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides.

	Distance Range Sensor		Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U040264	Invalid Data Received from TCM	<ul style="list-style-type: none"> Invalid data received from transmission control module - actual gear position status 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U040267	Invalid Data Received from TCM	<ul style="list-style-type: none"> Invalid data received from transmission control module - gear shifter position status 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U040281	Invalid Data Received from TCM	<ul style="list-style-type: none"> Invalid data received from transmission control module - output shaft speed signal 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U042381	Invalid Data Received From Instrument Panel Control Module	<ul style="list-style-type: none"> External ambient temperature 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
U042386	Invalid Data Received From Instrument Panel Control Module	<ul style="list-style-type: none"> Battery voltage level 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U042600	Invalid Data Received From Vehicle Immobilizer Control Module	<ul style="list-style-type: none"> Security code mismatch 	Check the configuration of the modules using the approved diagnostic system.
U040500	Invalid Data Received From Cruise Control Module	<ul style="list-style-type: none"> ECM/speed control module invalid data received 	Check for other CAN DTCs or apparently unrelated customer complaints. Carry out a complete vehicle DTC read. Check the CAN and module power and ground circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.

DTC	Description	Possible causes	Action

B10A231	Crash Input	<ul style="list-style-type: none"> • Inertia event circuit open circuit 	Refer to the electrical guides and check the inertia event circuit between the restraints control module and the engine control module.
B10A236	Crash Input	<ul style="list-style-type: none"> • Inertia event circuit frequency low 	Refer to the electrical guides and check the inertia event circuit between the restraints control module and the engine control module.
B10A237	Crash Input	<ul style="list-style-type: none"> • Inertia event circuit frequency high 	Refer to the electrical guides and check the inertia event circuit between the restraints control module and the engine control module.
B10A239	Crash Input	<ul style="list-style-type: none"> • Inertia event circuit frequency below mid level 	Refer to the electrical guides and check the inertia event circuit between the restraints control module and the engine control module.
B10A23A	Crash Input	<ul style="list-style-type: none"> • Inertia event circuit frequency above mid level 	Refer to the electrical guides and check the inertia event circuit between the restraints control module and the engine control module.
P000113	Fuel Volume Regulator Control Circuit / Open	<ul style="list-style-type: none"> • Fuel volume control valve circuit high resistance • Fuel volume control valve circuit open circuit • Fuel volume control valve fault 	<p>NOTE : An open circuit will prevent the engine from running.</p> <p>Refer to the electrical guides and check the fuel volume control valve and circuits. Check the resistance of the valve and install a new high pressure fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). Clear the DTCs and test for normal operation. Refer to the warranty policy and procedures manual if a HPP is suspect.</p>
P000311	Fuel Volume Regulator Control Circuit Low	<ul style="list-style-type: none"> • Fuel volume control valve circuit short circuit to ground • Fuel volume control valve fault 	<p>NOTE : An open circuit will prevent the engine from running.</p> <p>Refer to the electrical guides and check the fuel volume control valve and circuits. Check the resistance of the valve and install a new high pressure fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). Clear the DTCs and test for normal operation.</p>
P000319	Fuel Volume Regulator Control Circuit Low	<ul style="list-style-type: none"> • Fuel volume control valve circuit short circuit to ground • Fuel volume control valve fault 	<p>NOTE : An open circuit will prevent the engine from running.</p> <p>Refer to the electrical guides and check the fuel volume control valve and circuits. Check the resistance of the valve and install a new high pressure fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). Clear the DTCs and test for normal operation. Refer to the warranty policy and procedures manual if a HPP is suspect.</p>
			Refer to the electrical guides and check the fuel volume control valve and circuits. Check the resistance of the valve and install a new high pressure

P000412	Fuel Volume Regulator Control Circuit High	<ul style="list-style-type: none"> Fuel volume control valve (VCV) circuit short circuit to power VCV failure 	fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). Clear the DTCs and test for normal operation. Refer to the warranty policy and procedures manual if a HPP is suspect.
P000E21	Fuel Volume Regulator Control Exceeded Learning Limit	<ul style="list-style-type: none"> Fuel volume control valve amplitude is less than the minimum specified 	Refer to the electrical guides and check the fuel volume control valve and circuits. Check the resistance of the valve and install a new high pressure fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). Clear the DTCs and test for normal operation.
P000E22	Fuel Volume Regulator Control Exceeded Learning Limit	<ul style="list-style-type: none"> Fuel volume control valve amplitude is greater than the maximum specified 	Refer to the electrical guides and check the fuel volume control valve and circuits. Check the resistance of the valve and install a new high pressure fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). Clear the DTCs and test for normal operation.
P006A21	MAP - Mass or Volume Air Flow Correlation	<ul style="list-style-type: none"> Air leakage in the intake path between the turbocharger and the engine 	Check the intake air system for leakage after the turbocharger. Check for DTCs indicating a MAP sensor fault. Rectify as necessary. Clear the DTCs and test for normal operation.
P006A22	MAP - Mass or Volume Air Flow Correlation	<ul style="list-style-type: none"> Mass or volume air flow correlation: right-hand bank - signal amplitude greater than maximum Oil ingress into the intake manifold Manifold absolute sensor and temperature (MAPT) sensor circuit fault MAPT sensor fault MAF sensor fault Turbocharger fault 	With the engine at idle, check the manifold air pressure and indicated torque set points using a data logger function. If the manifold air pressure is greater than 140 KPa (20.31 lbs/in ²) or the torque less than 70 Nm (51.63 lbf/ft), check for oil being drawn into the intake manifold. Repair/renew as necessary. Clear the DTCs and test for normal operation. Stop the engine and turn the ignition on. Using a data logger function, monitor the turbocharger actuator angles. Command the actuator to 5% pulse width modulated (PWM) then to 95% pulse width modulated (PWM) and check the angle values. The angle at 5% pulse width modulated (PWM) should be 0 - 20%, and at 95% 80 - 95%. If the values are inside this range, install a new MAF sensor. Refer to the relevant section of the workshop manual. If the values are outside this range, install a new turbocharger. Clear the DTCs and test for normal operation.
P007C16	Charge Air Cooler Temperature Sensor Circuit Low (Bank 1)	<ul style="list-style-type: none"> Right-hand charge air temperature sensor circuit high resistance (the charge air temperature sensor is part of the manifold absolute pressure and temperature (MAPT) sensor) Charge air temperature sensor circuit short circuit to ground Right-hand MAPT sensor fault 	Check the right-hand MAPT sensor and circuits. Refer to the electrical guides. Check the resistance of the temperature sensor (pins 1 and 4 of the MAPT). Nominal resistance at 20°C (68°F) should be 2.5 Kohms. Install a new MAPT if necessary. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
		<ul style="list-style-type: none"> Charge air temperature 	Check the right-hand MAPT sensor and

P007D17	Charge Air Cooler Temperature Sensor Circuit High (Bank 1)	<p>sensor circuit short circuit to power (the charge air temperature sensor is part of the manifold absolute pressure and temperature (MAPT) sensor)</p> <ul style="list-style-type: none"> • Right-hand MAPT sensor fault 	<p>circuits. Refer to the electrical guides. Check the resistance of the temperature sensor (pins 1 and 4 of the MAPT). Nominal resistance at 20°C (68°F) should be 2.5 Kohms. Install a new MAPT if necessary. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.</p>
P007E27	Charge Air Cooler Temperature Sensor Circuit Intermittent/Erratic (Bank 1)	<ul style="list-style-type: none"> • Right-hand charge air temperature sensor circuit high resistance (the charge air temperature sensor is part of the manifold absolute pressure and temperature (MAPT) sensor) • Charge air temperature sensor circuit short circuit to ground • Charge air temperature sensor circuit short circuit to power • Right-hand MAPT sensor fault 	<p>Check the right-hand MAPT sensor and circuits. Refer to the electrical guides. With the engine running and at operating temperature, check the charge air temperature using a data logger function. Record the measurement at idle and increase the engine speed to 3,000 rpm. Record the reading and compare with the idle figure. If the value has increased by more than 20°C in 100 ms, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.</p>
P008772	Fuel rail/system pressure too low	<ul style="list-style-type: none"> • Pressure control valve fault 	<p>Refer to the electrical guides and check the PCV actuator circuits and rectify as necessary. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new high pressure fuel pump (the fuel pressure control valve cannot be serviced separately). Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation. Refer to the warranty policy and procedures manual if a high pressure fuel pump is suspect.</p>
P008873	Fuel rail/system pressure too high	<ul style="list-style-type: none"> • Fuel pressure control valve (PCV) stuck closed 	<p>Refer to the electrical guides and check the PCV actuator circuits and rectify as necessary. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new high pressure fuel pump (the fuel pressure control valve cannot be serviced separately). Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation. Refer to the warranty policy and procedures manual if a high pressure fuel pump is suspect.</p>
P008921	Fuel Pressure Regulator Performance	<ul style="list-style-type: none"> • Fuel pressure control valve performance - signal amplitude less than minimum • Fuel pressure control valve circuit high resistance • Fuel pressure control valve circuit short circuit to ground • Fuel pressure control valve circuit short circuit to power • Fuel pressure control valve fault 	<p>Check the fuel pressure control valve and circuits. Refer to the electrical guides. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new high pressure fuel pump (the fuel pressure control valve cannot be serviced separately). Refer to the relevant section of the workshop manual. Refer to the warranty policy and procedures manual if a high pressure fuel pump is suspect. Clear the DTCs and test for normal operation.</p>
		<ul style="list-style-type: none"> • Fuel pressure control valve performance - 	<p>Check the fuel pressure control valve</p>

P008922	Fuel Pressure Regulator Performance	<p>signal amplitude greater than maximum</p> <ul style="list-style-type: none"> • Fuel pressure control valve circuit high resistance • Fuel pressure control valve circuit short circuit to ground • Fuel pressure control valve circuit short circuit to power • Fuel pressure control valve fault 	<p>and circuits. Refer to the electrical guides. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new high pressure fuel pump (the fuel pressure control valve cannot be serviced separately). Refer to the warranty policy and procedures manual if a high pressure fuel pump is suspect. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.</p>
P00892F	Fuel Pressure Regulator Performance	<ul style="list-style-type: none"> • Fuel pressure control valve performance - signal erratic • Fuel pressure control valve circuit high resistance • Fuel pressure control valve circuit short circuit to ground • Fuel pressure control valve circuit short circuit to power • Fuel pressure control valve fault 	<p>Check the fuel pressure control valve and circuits. Refer to the electrical guides. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new high pressure fuel pump (the fuel pressure control valve cannot be serviced separately). Refer to the warranty policy and procedures manual if a high pressure fuel pump is suspect. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.</p>
P009013	Fuel Pressure Regulator 1 Control Circuit/Open	<ul style="list-style-type: none"> • Fuel pressure control valve circuit high resistance • Fuel pressure control valve circuit open circuit • Fuel pressure control valve fault 	<p>Check the fuel pressure control valve and circuits. Refer to the electrical guides. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new high pressure fuel pump (the fuel pressure control valve cannot be serviced separately). Refer to the relevant section of the workshop manual. Refer to the warranty policy and procedures manual if a high pressure fuel pump is suspect. Clear the DTCs and test for normal operation.</p>
P009111	Fuel Pressure Regulator 1 Control Circuit Low	<ul style="list-style-type: none"> • Fuel pressure control valve circuit short circuit to ground • Fuel pressure control valve fault 	<p>Check the fuel pressure control valve and circuits. Refer to the electrical guides. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new high pressure fuel pump (the fuel pressure control valve cannot be serviced separately). Refer to the relevant section of the workshop manual. Refer to the warranty policy and procedures manual if a high pressure fuel pump is suspect. Clear the DTCs and test for normal operation.</p>
P009119	Fuel Pressure Regulator 1 Control Circuit Low	<ul style="list-style-type: none"> • Fuel pressure control valve circuit short circuit to power (circuit current above threshold) • Fuel pressure control valve fault 	<p>Check the fuel pressure control valve and circuits. Refer to the electrical guides. Check the resistance of the fuel pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new high pressure fuel pump (the fuel pressure control valve cannot be serviced separately). Refer to the relevant section of the workshop manual. Refer to the warranty policy and procedures manual if a high pressure fuel pump is suspect. Clear the DTCs and test for normal operation.</p>
			<p>Check the fuel pressure control valve and circuits. Refer to the electrical guides. Check the resistance of the fuel</p>

P009212	Fuel Pressure Regulator 1 Control Circuit High	<ul style="list-style-type: none"> Fuel pressure control valve circuit short circuit to power Fuel pressure control valve fault 	pressure control valve. If the resistance is not between 0 and 5.4 ohms, install a new high pressure fuel pump (the fuel pressure control valve cannot be serviced separately). Refer to the relevant section of the workshop manual. Refer to the warranty policy and procedures manual if a high pressure fuel pump is suspect. Clear the DTCs and test for normal operation.
P010036	Mass or Volume Air Flow A Circuit	<ul style="list-style-type: none"> Mass air flow (MAF) sensor circuit short circuit to ground MAF sensor circuit short circuit to power MAF sensor circuit high resistance MAF sensor fault 	Refer to the electrical guides and check the MAF sensor and circuits. Clear the DTCs and test for normal operation. If the problem persists, renew the MAF sensor.
P010116	Mass or Volume Air Flow A Circuit Range/Performance	<ul style="list-style-type: none"> Intake air path fault Mass air flow (MAF) sensor circuit high resistance MAF sensor circuit short circuit to ground MAF sensor circuit short circuit to power MAF sensor fault 	Check the intake air system for leaks, restrictions, etc. Check the MAF sensor and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. If the problem persists, renew the MAF sensor.
P010117	Mass or Volume Air Flow A Circuit Range/Performance	<ul style="list-style-type: none"> Intake air path fault Mass air flow (MAF) sensor circuit high resistance MAF sensor circuit short circuit to ground MAF sensor circuit short circuit to power MAF sensor fault 	Check the intake air system for leaks, restrictions, etc. Check the MAF sensor and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. If the problem persists, renew the MAF sensor.
P010221	Mass or Volume Air Flow A Circuit Low	<ul style="list-style-type: none"> Intake air system fault Mass air flow (MAF) sensor circuit high resistance MAF sensor circuit short circuit to ground MAF sensor circuit short circuit to power Exhaust gas recirculation (EGR) valve fault 	Check the intake air system for leaks, etc. Repair/renew as necessary. Check the MAF sensor and circuits. Refer to the electrical guides. Repair/renew as necessary. Check that the EGR valves are not stuck. Using a data logger function, monitor the air flow and EGR valve position for both banks and road test the vehicle. Check that the EGR valves are in synch. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P010322	Mass or Volume Air Flow A Circuit High	<ul style="list-style-type: none"> Check for water ingress into the Mass air flow (MAF) sensor Water in the air intake can give the impression of high air flow Intake air system fault MAF sensor circuit high resistance MAF sensor circuit short circuit to ground MAF sensor circuit short circuit to power MAF sensor fault Turbocharger fault 	Check the intake air system for leaks, etc. Repair/renew as necessary. Check the MAF sensor and circuits. Refer to the electrical guides. Repair/renew as necessary. With the ignition on, engine off, and using a data logger function, monitor the turbocharger actuator angles. Command the actuator to 5% pulse width modulated (PWM) then to 95% pulse width modulated (PWM) and check the angle values. The angle at 5% pulse width modulated (PWM) should be 0 - 20%, and at 95% pulse width modulated (PWM) 80 - 95%. If the values are inside this range, install a new MAF sensor. If the values are outside this range, install a new turbocharger. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
			Check the MAF sensor and circuits.

P010438	Mass or Volume Air Flow A Circuit Intermittent/Erratic	<ul style="list-style-type: none"> • Mass air flow (MAF) sensor circuit short circuit to ground • MAF sensor circuit short circuit to power • MAF sensor circuit high resistance 	Refer to the electrical guides. Measure the mass air flow at idle using a data logger function and record the value. Increase the engine speed to 2,000 rpm and record the value. If the value has changed by more than 30.55 g/s install a new MAF sensor and recheck. Clear the DTCs and test for normal operation.
P011216	Intake Air Temperature Sensor 1 Circuit Low (Bank 1)	<ul style="list-style-type: none"> • Intake air temperature (IAT) sensor circuit low input - voltage below threshold • IAT sensor circuit high resistance • IAT sensor circuit short circuit to ground • IAT sensor fault 	Check the IAT sensor and circuits. Refer to the electrical guides. Measure the resistance of the IAT sensor (pins 2 and 3 of the MAF sensor). Nominal resistance at 20 °C (68 °F) should be 2.5 Kohms. If the values are outside this range, install a new MAF sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P011317	Intake Air Temperature Sensor 1 Circuit High (Bank 1)	<ul style="list-style-type: none"> • Intake air temperature (IAT) sensor circuit short circuit to power • IAT sensor fault 	Check the IAT sensor and circuits. Refer to the electrical guides. Measure the resistance of the IAT sensor (pins 2 and 3 of the MAF sensor). Nominal resistance at 20 °C (68 °F) should be 2.5 Kohms. If the resistance is outside this range, install a new MAF sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P011427	Intake Air Temperature Sensor 1 Intermittent/Erratic (Bank 1)	<ul style="list-style-type: none"> • Intake air temperature (IAT) sensor circuit intermittent high resistance • IAT sensor fault 	Check the IAT sensor and circuits. Refer to the electrical guides. Start the engine and allow to warm up. Read the intake air temperature using a data logger function and record the value. After ten minutes, read the value again and compare to the first reading. If the value has increased by more than 10° C per 100 ms, install a new MAF sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P011626	Engine Coolant Temperature Sensor 1 Circuit Range/Performance	<ul style="list-style-type: none"> • Engine coolant temperature (ECT) sensor circuit range/performance - signal rate of change below threshold • ECT sensor circuit intermittent high resistance • ECT sensor fault 	Check the ECT sensor and circuits. Refer to the electrical guides. With the engine cold, read the coolant temperature sensor using a data logger function and start the engine. Record the value and allow the engine to idle for 20 minutes. After 20 minutes, recheck the value. If the value has not increased by more than 10 °C, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P011716	Engine Coolant Temperature Sensor 1 Circuit Low	<ul style="list-style-type: none"> • Engine coolant temperature (ECT) sensor circuit low input - voltage below threshold • ECT sensor circuit short circuit to ground • ECT sensor fault 	Check the ECT sensor and circuits. Refer to the electrical guides. Measure the resistance of the sensor. Nominal resistance at 20 °C (68 °F) should be between 35.47 and 39.21 Kohms. If the resistance is outside this range, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P011817	Engine Coolant Temperature Sensor 1 Circuit High	<ul style="list-style-type: none"> • Engine coolant temperature (ECT) sensor circuit high input - voltage above threshold • ECT sensor circuit short circuit to power • ECT sensor fault 	Check the ECT sensor and circuits. Refer to the electrical guides. Measure the resistance of the sensor. Nominal resistance at 20 °C (68 °F) should be between 35.47 and 39.21 Kohms. If the resistance is outside this range, install a new sensor. Refer to the relevant section of the workshop manual. Clear

			the DTCs and test for normal operation.
P011927	Engine Coolant Temperature Sensor 1 Circuit Intermittent/Erratic	<ul style="list-style-type: none"> • Engine coolant temperature (ECT) sensor circuit intermittent/erratic - signal rate of change above threshold • ECT sensor circuit intermittent high resistance • ECT sensor fault 	Check the ECT sensor and circuits. Refer to the electrical guides. Start the engine and allow to warm up. Read the coolant temperature using a data logger function and record the value. Increase the engine speed to 2,000 rpm and recheck the value after two minutes at this engine speed. If the value has increased faster than 5°C per second, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P018126	Fuel Temperature Sensor A Circuit Range/Performance	<ul style="list-style-type: none"> • Fuel temperature sensor circuit range/performance - signal rate of change below threshold • Fuel temperature sensor circuit intermittent high resistance • Fuel temperature sensor fault 	Check the fuel temperature sensor and circuits. Refer to the electrical guides. Check the fuel temperature using a data logger function. Make sure the fuel temperature is less than 30°C (86°F). Start the engine and allow to warm up for ten minutes. Recheck the fuel temperature. If the value has not increased by more than 8°C in this time, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P018216	Fuel Temperature Sensor A Circuit Low	<ul style="list-style-type: none"> • Fuel temperature sensor circuit low input - voltage below threshold • Fuel temperature sensor circuit short circuit to ground • Fuel temperature sensor fault 	Check the fuel temperature sensor and circuits. Refer to the electrical guides. Measure the sensor resistance. Nominal resistance at 20°C (68°F) should be between 5.86 and 6.62 Kohms. If the resistance is outside this range, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P018317	Fuel Temperature Sensor A Circuit High	<ul style="list-style-type: none"> • Fuel temperature sensor circuit high input - voltage above threshold • Fuel temperature sensor circuit short circuit to power • Fuel temperature sensor fault 	Check the fuel temperature sensor and circuits. Refer to the electrical guides. Measure the sensor resistance. Nominal resistance at 20°C (68°F) should be between 5.86 and 6.62 Kohms. If the resistance is outside this range, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P018427	Fuel Temperature Sensor A Circuit Intermittent	<ul style="list-style-type: none"> • Fuel temperature sensor circuit intermittent - signal rate of change above threshold • Fuel temperature sensor circuit intermittent high resistance • Fuel temperature sensor fault 	Check the fuel temperature sensor and circuits. Refer to the electrical guides. Start the engine and allow to warm up. Check the fuel temperature using a data logger function. Increase the engine speed to 2,000 rpm and recheck the value. If the value has increased by more than 10°C per 100 ms, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P019123	Fuel Rail Pressure Sensor A	<ul style="list-style-type: none"> • Fuel rail pressure (FRP) sensor circuit range/performance - signal stuck low • Low fuel level • Blocked/incorrectly connected low-pressure fuel lines • FRP sensor circuit short circuit to ground • FRP sensor circuit short 	Check the fuel level and the condition and correct connection of the low-pressure fuel circuit lines (incorrect connection of the lines to and from the fuel filter can cause serious fuel pressure fluctuations). Check the FRP

	Circuit Range/Performance	<ul style="list-style-type: none"> circuit to power ● FRP sensor circuit high resistance ● FRP sensor fault ● Fuel pump module circuit short circuit to ground ● Fuel pump module circuit short circuit to power ● Fuel pump module circuit high resistance ● Fuel pump module fault 	sensor and circuits. Check the fuel pump module and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P019124	Fuel Rail Pressure Sensor A Circuit Range/Performance	<ul style="list-style-type: none"> ● Fuel rail pressure (FRP) sensor circuit range/performance - signal stuck high ● FRP sensor circuit short circuit to ground ● FRP sensor circuit short circuit to power ● FRP sensor circuit high resistance ● FRP sensor fault 	Check the FRP sensor and circuits. Refer to the electrical guides. Start the engine and allow to idle. Check the fuel pressure value using a data logger function. Stop the engine, turn the ignition on, and recheck the fuel pressure. If the pressure is greater than 10 MPa (1,450 lbs/in ²) after 0.4 seconds, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P019165	Fuel Rail Pressure Sensor A Circuit Range/Performance	<ul style="list-style-type: none"> ● Fuel rail pressure (FRP) sensor circuit range/performance - signal has too few transitions/events ● FRP sensor circuit high resistance ● FRP sensor fault 	Check the FRP sensor and circuits. Refer to the electrical guides. Start the engine and allow to idle. Check the fuel pressure value using a data logger function. Increase the engine speed to 2,000 rpm and recheck the fuel pressure. If the value has changed by more than 40 MPa (5,801 lbs/in ²) per 10 ms, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P019216	Fuel Rail Pressure Sensor A Circuit Low	<ul style="list-style-type: none"> ● Fuel rail pressure (FRP) sensor circuit low input - voltage below threshold ● FRP sensor circuit short circuit to ground ● FRP sensor fault 	Check the FRP sensor and circuits. Refer to the electrical guides. Start the engine and allow to idle. Check the fuel pressure value using a data logger function. If the value is 0 MPa (0 lbs/in ²), install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P019317	Fuel Rail Pressure Sensor A Circuit High	<ul style="list-style-type: none"> ● Fuel rail pressure (FRP) sensor circuit high input - voltage above threshold ● FRP sensor circuit short circuit to power ● FRP sensor fault 	Check the FRP sensor and circuits. Refer to the electrical guides. Start the engine and allow to idle. Check the fuel pressure value using a data logger function. If the value is greater than 180 MPa (26,106 lbs/in ²), install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P019427	Fuel Rail Pressure Sensor A Circuit Intermittent/Erratic	<ul style="list-style-type: none"> ● Fuel rail pressure (FRP) sensor circuit intermittent/erratic - signal rate of change above threshold ● FRP sensor circuit high resistance ● FRP sensor fault 	Check the FRP sensor and circuits. Refer to the electrical guides. Start the engine and allow to idle. Check the fuel pressure value using a data logger function. Increase the engine speed to 2,000 rpm and recheck the fuel pressure. If the value has changed by more than 40 MPa (5,801 lbs/in ²) per 10 ms, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
		<ul style="list-style-type: none"> ● Engine oil temperature (EOT) sensor circuit range/performance - signal rate of change 	Check the EOT sensor and circuits. Refer to the electrical guides. From cold, start the engine and check the oil temperature using a data logger

P019626	Engine Oil Temperature Sensor Range/Performance	<ul style="list-style-type: none"> below threshold EOT sensor circuit intermittent high resistance EOT sensor fault 	function. Allow the engine to idle for ten minutes and recheck the oil temperature. If the value has not increased by more than 5°C in this time, install a new sensor. Clear the DTCs and test for normal operation.
P019716	Engine Oil Temperature Sensor Circuit Low	<ul style="list-style-type: none"> Engine oil temperature (EOT) sensor circuit low input - voltage below threshold EOT sensor circuit short circuit to ground EOT sensor fault 	Check the EOT sensor and circuits. Refer to the electrical guides. Repair/renew as necessary.
P019817	Engine Oil Temperature Sensor Circuit High	<ul style="list-style-type: none"> Engine oil temperature (EOT) sensor circuit high input - voltage above threshold EOT sensor circuit short circuit to power EOT sensor fault 	Check the EOT sensor and circuits. Refer to the electrical guides. Repair/renew as necessary.
P019927	Engine Oil Temperature Sensor Circuit Intermittent/Erratic	<ul style="list-style-type: none"> Engine oil temperature (EOT) sensor circuit intermittent - signal rate of change above threshold EOT sensor circuit intermittent high resistance EOT sensor fault 	Check the EOT sensor and circuits. Refer to the electrical guides. Start the engine and allow to idle. Check the oil temperature using a data logger function. Increase the engine speed to 2,000 rpm and recheck the value after two minutes at this engine speed. If the value has increased by more than 40°C per second, install a new sensor. Clear the DTCs and test for normal operation.
P020101	Cylinder 1 Injector Circuit / Open	<ul style="list-style-type: none"> Fuel injector circuit open cylinder 1 - general electrical fault Fuel injector circuit short circuit to ground Fuel injector circuit short circuit to power Fuel injector circuit high resistance Fuel injector fault 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P020201	Cylinder 2 Injector Circuit / Open	<ul style="list-style-type: none"> Fuel injector circuit open cylinder 2 - general electrical fault Fuel injector circuit short circuit to ground Fuel injector circuit short circuit to power Fuel injector circuit high resistance Fuel injector fault 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
			During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before

P020301	Cylinder 3 Injector Circuit / Open	<ul style="list-style-type: none"> ● Fuel injector circuit open cylinder 3 - general electrical fault ● Fuel injector circuit short circuit to ground ● Fuel injector circuit short circuit to power ● Fuel injector circuit high resistance ● Fuel injector fault 	<p>turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.</p>
P020401	Cylinder 4 Injector Circuit / Open	<ul style="list-style-type: none"> ● Fuel injector circuit open cylinder 4 - general electrical fault ● Fuel injector circuit short circuit to ground ● Fuel injector circuit short circuit to power ● Fuel injector circuit high resistance ● Fuel injector fault 	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.</p>
P020501	Cylinder 5 Injector Circuit / Open	<ul style="list-style-type: none"> ● Fuel injector circuit open cylinder 5 - general electrical fault ● Fuel injector circuit short circuit to ground ● Fuel injector circuit short circuit to power ● Fuel injector circuit high resistance ● Fuel injector fault 	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.</p>
P020601	Cylinder 6 Injector Circuit / Open	<ul style="list-style-type: none"> ● Fuel injector circuit open cylinder 6 - general electrical fault ● Fuel injector circuit short circuit to ground ● Fuel injector circuit short circuit to power ● Fuel injector circuit high resistance ● Fuel injector fault 	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.</p>
			<p>During the following, clear DTCs and</p>

P020A33	Cylinder 1 Injection Timing	<ul style="list-style-type: none"> ● Cylinder 1 injection timing - signal low time greater than maximum ● Fuel injector circuit short circuit to ground ● Fuel injector circuit short circuit to power ● Fuel injector circuit high resistance ● Fuel injector fault 	recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P020A35	Cylinder 1 Injection Timing	<ul style="list-style-type: none"> ● Cylinder 1 injection timing - signal high time greater than maximum ● Fuel injector circuit short circuit to ground ● Fuel injector circuit short circuit to power ● Fuel injector circuit high resistance ● Fuel injector fault 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P020B33	Cylinder 2 Injection Timing	<ul style="list-style-type: none"> ● Cylinder 2 injection timing - signal low time greater than maximum ● Fuel injector circuit short circuit to ground ● Fuel injector circuit short circuit to power ● Fuel injector circuit high resistance ● Fuel injector fault 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P020B35	Cylinder 2 Injection Timing	<ul style="list-style-type: none"> ● Cylinder 2 injection timing - signal high time greater than maximum ● Fuel injector circuit short circuit to ground ● Fuel injector circuit short circuit to power ● Fuel injector circuit high resistance ● Fuel injector fault 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for

			normal operation.
P020C33	Cylinder 3 Injection Timing	<ul style="list-style-type: none"> • Cylinder 3 injection timing - signal low time greater than maximum • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Fuel injector circuit high resistance • Fuel injector fault 	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.</p>
P020C35	Cylinder 3 Injection Timing	<ul style="list-style-type: none"> • Cylinder 3 injection timing - signal high time greater than maximum • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Fuel injector circuit high resistance • Fuel injector fault 	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.</p>
P020D33	Cylinder 4 Injection Timing	<ul style="list-style-type: none"> • Cylinder 4 injection timing - signal low time greater than maximum • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Fuel injector circuit high resistance • Fuel injector fault 	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.</p>
P020D35	Cylinder 4 Injection Timing	<ul style="list-style-type: none"> • Cylinder 4 injection timing - signal high time greater than maximum • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Fuel injector circuit high resistance • Fuel injector fault 	<p>During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the</p>

			electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P020E33	Cylinder 5 Injection Timing	<ul style="list-style-type: none"> • Cylinder 5 injection timing - signal low time greater than maximum • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Fuel injector circuit high resistance • Fuel injector fault 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P020E35	Cylinder 5 Injection Timing	<ul style="list-style-type: none"> • Cylinder 5 injection timing - signal high time greater than maximum • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Fuel injector circuit high resistance • Fuel injector fault 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.
P020F33	Cylinder 6 Injection Timing	<ul style="list-style-type: none"> • Cylinder 6 injection timing - signal low time greater than maximum • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Fuel injector circuit high resistance • Fuel injector fault 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.
P020F35	Cylinder 6 Injection Timing	<ul style="list-style-type: none"> • Cylinder 6 injection timing - signal high time greater than maximum • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Fuel injector circuit high resistance 	During the following, clear DTCs and recheck after each step. Turn the ignition off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections for security. Disconnect the injector and measure the resistance and capacitance of the injector. If the resistance is not between 180 and 220 Kohms, or the capacitance not greater than 3 microfarad, install a new injector. If the injector is within specification, check the injector circuits for short

		<ul style="list-style-type: none"> Fuel injector fault 	circuit to ground, short circuit to power and for high resistance. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.
P023627	Turbocharger/Supercharger Boost Sensor A Circuit Range/Performance	<ul style="list-style-type: none"> Right-hand turbocharger boost sensor circuit high - signal rate of change above threshold Manifold absolute pressure and temperature (MAPT) sensor circuit intermittent high resistance Manifold absolute pressure and temperature (MAPT) sensor fault 	During the following, clear DTCs and recheck after each step. Check the MAPT sensor and circuits. Refer to the electrical guides. Start the engine and check the manifold air pressure at idle using a data logger function. Increase the engine speed to 1,500 rpm and recheck the manifold air pressure. If the pressure has increased by more than 50 KPa per 10 ms, install a new sensor. Clear the DTCs and test for normal operation.
P023716	Turbocharger/Supercharger Boost Sensor A Circuit Low	<ul style="list-style-type: none"> Right-hand turbocharger boost sensor circuit low - voltage below threshold Manifold absolute pressure and temperature (MAPT) sensor circuit short circuit to ground Manifold absolute pressure and temperature (MAPT) sensor fault 	During the following, clear DTCs and recheck after each step. Check the MAPT sensor and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new sensor. Clear the DTCs and test for normal operation.
P023817	Turbocharger/Supercharger Boost Sensor A Circuit High	<ul style="list-style-type: none"> Right-hand turbocharger boost sensor circuit high - voltage above threshold Manifold absolute pressure and temperature (MAPT) sensor circuit short circuit to power Manifold absolute pressure and temperature (MAPT) sensor fault 	During the following, clear DTCs and recheck after each step. Check the MAPT sensor and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new sensor. Clear the DTCs and test for normal operation.
P023D21	Manifold Absolute Pressure - Turbocharger/Supercharger Boost Sensor A Correlation	<ul style="list-style-type: none"> Manifold absolute pressure (MAP) sensor/right-hand turbocharger boost sensor correlation - signal amplitude less than minimum Intake air system fault Turbocharger mechanical fault Oil ingestion into manifold 	Check the intake air system. Check the turbocharger mechanical condition and operation. Check for oil being drawn into the intake manifold. Rectify as necessary. Using a data logger function, monitor the turbocharger actuator position and command the actuator to 5% pulse width modulated (PWM), then 95% pulse width modulated (PWM) in 5% steps. Check the results. There should be a smooth curve between the minimum and maximum values. If not, install a new turbocharger. Clear the DTCs and test for normal operation.
P023D22	Manifold Absolute Pressure - Turbocharger/Supercharger Boost Sensor A Correlation	<ul style="list-style-type: none"> Manifold absolute pressure (MAP) sensor/right-hand turbocharger boost sensor correlation - signal amplitude greater than maximum Intake air system fault Turbocharger mechanical fault Intake air temperature (IAT) sensor fault 	Check the intake air system. Check the turbocharger mechanical condition and operation. Check for DTCs indicating a listed sensor fault. Rectify as necessary. Using a data logger function, monitor the turbocharger actuator position and command the actuator to 5% pulse width modulated (PWM), then 95% pulse width

		<ul style="list-style-type: none"> • Mass air flow (MAF) sensor fault • Manifold absolute pressure and temperature (MAPT) sensor fault • Exhaust gas recirculation (EGR) sensor fault • Turbocharger actuator position sensor fault 	modulated (PWM) in 5% steps. Check the results. There should be a smooth curve between the minimum and maximum values. If not, install a new turbocharger. Clear the DTCs and test for normal operation.
P026300	Cylinder 1 Contribution/Balance	<ul style="list-style-type: none"> • Injector leak • Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc • Injector fault 	Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for blow-by etc and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
P026600	Cylinder 2 Contribution/Balance	<ul style="list-style-type: none"> • Injector leak • Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc • Injector fault 	Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for blow-by etc and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
P026900	Cylinder 3 Contribution/Balance	<ul style="list-style-type: none"> • Injector leak • Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc • Injector fault 	Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for blow-by etc and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
P027200	Cylinder 4 Contribution/Balance	<ul style="list-style-type: none"> • Injector leak • Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc • Injector fault 	Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for blow-by etc and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.

P027500	Cylinder 5 Contribution/Balance	<ul style="list-style-type: none"> • Injector leak • Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc • Injector fault 	<p>Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for blow-by etc and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.</p>
P027800	Cylinder 6 Contribution/Balance	<ul style="list-style-type: none"> • Injector leak • Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc • Injector fault 	<p>Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for blow-by etc and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.</p>
P029C00	Cylinder 1 - Injector Restricted	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Injector leak • Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc • Injector fault 	<p>Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.</p>
P029D00	Cylinder 1- Injector Leaking	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Injector leak • Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc • Injector fault 	<p>Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60°C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.</p>
		<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground 	<p>Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify</p>

P02A000	Cylinder 2 - Injector Restricted	<ul style="list-style-type: none"> • Fuel injector circuit short circuit to power • Injector leak • Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc • Injector fault 	<p>as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60° C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.</p>
P02A100	Cylinder 2 - Injector Leaking	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Injector leak • Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc • Injector fault 	<p>Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60° C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.</p>
P02A400	Cylinder 3 - Injector Restricted	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Injector leak • Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc • Injector fault 	<p>Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60° C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.</p>
P02A500	Cylinder 3 - Injector Leaking	<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power • Injector leak • Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc • Injector fault 	<p>Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60° C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.</p>
		<ul style="list-style-type: none"> • Fuel injector circuit high resistance • Fuel injector circuit short circuit to ground • Fuel injector circuit short circuit to power 	<p>Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the</p>

P02A800	Cylinder 4 - Injector Restricted	<ul style="list-style-type: none"> ● Injector leak ● Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc ● Injector fault 	engine. Allow to warm up to above 60° C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
P02A900	Cylinder 4 - Injector Leaking	<ul style="list-style-type: none"> ● Fuel injector circuit high resistance ● Fuel injector circuit short circuit to ground ● Fuel injector circuit short circuit to power ● Injector leak ● Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc ● Injector fault 	Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60° C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
P02AC00	Cylinder 5 - Injector Restricted	<ul style="list-style-type: none"> ● Fuel injector circuit high resistance ● Fuel injector circuit short circuit to ground ● Fuel injector circuit short circuit to power ● Injector leak ● Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc ● Injector fault 	Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60° C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
P02AD00	Cylinder 5 - Injector Leaking	<ul style="list-style-type: none"> ● Fuel injector circuit high resistance ● Fuel injector circuit short circuit to ground ● Fuel injector circuit short circuit to power ● Injector leak ● Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc ● Injector fault 	Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60° C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.
P02B000	Cylinder 6 - Injector Restricted	<ul style="list-style-type: none"> ● Fuel injector circuit high resistance ● Fuel injector circuit short circuit to ground ● Fuel injector circuit short circuit to power ● Injector leak ● Cylinder compression 	Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60° C (140°F) and allow to idle (cylinder

		<p>low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc</p> <ul style="list-style-type: none"> Injector fault 	<p>balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.</p>
P02B100	Cylinder 6 - Injector Leaking	<ul style="list-style-type: none"> Fuel injector circuit high resistance Fuel injector circuit short circuit to ground Fuel injector circuit short circuit to power Injector leak Cylinder compression low Cylinder leakage past the injector Cylinder leakage past the glow plug Mechanical fault, valve, piston/ring, etc Injector fault 	<p>Refer to the electrical guides and check the fuel injector circuit. Check the injector and surrounding area for evidence of fuel leakage. Disconnect the injector and check for evidence of fuel leakage in the connector. Rectify as necessary. Clear the DTCs. Reconnect the injector and start the engine. Allow to warm up to above 60° C (140°F) and allow to idle (cylinder balance diagnosis is now active). If the DTC resets, check for Cylinder leakage and rectify as necessary. Clear the DTCs and recheck. Carry out a compression test only if the DTC resets. If the above tests are all within range, install a new injector.</p>
P032621	Knock Sensor 1 Circuit Range/Performance (Bank 1)	<ul style="list-style-type: none"> Knock sensor (KS) 1 circuit range/performance, right-hand bank (rear) - signal amplitude less than minimum KS incorrectly installed KS connections reversed KS circuit short circuit to ground 	<p>Check that the knock sensors are correctly installed and tightened to the correct torque. Check that the KS connections are connected to the correct sensor. Check the KS circuit, refer to the electrical guides. Rectify as necessary.</p>
P032622	Knock Sensor 1 Circuit Range/Performance (Bank 1)	<ul style="list-style-type: none"> Knock sensor (KS) 1 circuit range/performance, right-hand bank (rear) - signal amplitude greater than maximum KS incorrectly installed KS connections reversed KS circuit short circuit to ground 	<p>Check that the KNOCK SENSORS are correctly installed and tightened to the correct torque. Check that the KS connections are connected to the correct sensor. Check the KS circuit, refer to the electrical guides. Rectify as necessary.</p>
P033121	Knock Sensor 1 Circuit Range/Performance (Bank 2)	<ul style="list-style-type: none"> Knock sensor (KS) 2 circuit range/performance, left-hand bank (rear) - signal amplitude less than minimum KS incorrectly installed KS connections reversed KS circuit short circuit to ground 	<p>Check that the (KS) are correctly installed and tightened to the correct torque. Check that the KS connections are connected to the correct sensor. Check the KS circuit, refer to the electrical guides. Rectify as necessary.</p>
P033122	Knock Sensor 1 Circuit Range/Performance (Bank 2)	<ul style="list-style-type: none"> Knock sensor (KS) 2 circuit range/performance, left-hand bank (rear) - signal amplitude greater than maximum KS incorrectly installed (KS) connections reversed (KS) circuit short circuit to ground 	<p>Check that the KNOCK SENSORS are correctly installed and tightened to the correct torque. Check that the KS connections are connected to the correct sensor. Check the KS circuit, refer to the electrical guides. Rectify as necessary.</p>
		<ul style="list-style-type: none"> Crankshaft position (CKP) sensor - alignment or adjustment incorrect CKP sensor circuit short 	<p>Check the CKP sensor and circuits. Refer to the electrical guides. Check</p>

P033578	Crankshaft Position Sensor A Circuit	<ul style="list-style-type: none"> ● circuit to ground ● CKP sensor circuit short circuit to power ● CKP sensor circuit high resistance ● CKP sensor fault ● CKP sensor wheel fault 	the sensor and wheel for correct installation and condition. Rectify as necessary. Clear the DTCs and test for normal operation.
P033631	Crankshaft position (CKP) sensor circuit range/performance	<ul style="list-style-type: none"> ● Crankshaft position (CKP) sensor range/performance - signal missing ● CKP sensor circuit short circuit to ground ● CKP sensor circuit short circuit to power ● CKP sensor circuit high resistance ● CKP sensor fault ● CKP sensor wheel fault 	Check the CKP sensor and circuits. Refer to the electrical guides. Check the sensor and wheel for correct installation and condition. Rectify as necessary. Clear the DTCs and test for normal operation.
P033638	Crankshaft position (CKP) sensor circuit range/performance	<ul style="list-style-type: none"> ● Crankshaft position (CKP) sensor range/performance - signal frequency ● CKP sensor circuit short circuit to ground ● CKP sensor circuit short circuit to power ● CKP sensor circuit high resistance ● CKP sensor fault ● CKP sensor wheel fault 	Check the CKP sensor and circuits. Refer to the electrical guides. Check the sensor and wheel for correct installation and condition. Rectify as necessary. Clear the DTCs and test for normal operation.
P033664	Crankshaft position (CKP) sensor circuit range/performance	<ul style="list-style-type: none"> ● Crankshaft position (CKP) sensor range/performance - signal plausibility fault ● CKP sensor circuit short circuit to ground ● CKP sensor circuit short circuit to power ● CKP sensor circuit high resistance ● CKP sensor fault ● CKP sensor wheel fault 	Check the CKP sensor and circuits. Refer to the electrical guides. Check the sensor and wheel for correct installation and condition. Rectify as necessary. Clear the DTCs and test for normal operation.
P033666	Crankshaft position (CKP) sensor circuit range/performance	<ul style="list-style-type: none"> ● Crankshaft position (CKP) sensor range/performance - signal has too many transitions/events ● CKP sensor circuit short circuit to ground ● CKP sensor circuit short circuit to power ● CKP sensor circuit high resistance ● CKP sensor fault ● CKP sensor wheel fault 	Check the CKP sensor and circuits. Refer to the electrical guides. Check the sensor and wheel for correct installation and condition. Rectify as necessary. Clear the DTCs and test for normal operation.
P034129	Camshaft Position Sensor A Circuit Range/Performance (Bank 1 or single sensor)	<ul style="list-style-type: none"> ● Camshaft position (CMP) sensor range/performance - signal invalid ● CMP sensor circuit short circuit to ground ● CMP sensor circuit short circuit to power ● CMP sensor circuit high resistance ● CMP sensor fault 	Check the CMP sensor and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new sensor. Clear the DTCs and test for normal operation.
	Camshaft Position Sensor A	<ul style="list-style-type: none"> ● Camshaft position (CMP) sensor 	Check the CMP sensor and circuits. Refer to the electrical guides. If no fault

P03413A	Circuit Range/Performance (Bank 1 or single sensor)	<ul style="list-style-type: none"> range/performance - too many pulses Camshaft segment period too short 	is found in the circuits, install a new sensor. Clear the DTCs and test for normal operation.
P034231	Camshaft Position Sensor A Circuit Low (Bank 1 or single sensor)	<ul style="list-style-type: none"> Camshaft position (CMP) sensor circuit low input - no signal CMP sensor circuit short circuit to ground CMP sensor circuit short circuit to power CMP sensor circuit high resistance CMP sensor fault 	Check the CMP sensor and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new sensor. Clear the DTCs and test for normal operation.
P038072	Glow Plug/Heater Circuit A	<ul style="list-style-type: none"> Right-hand bank glow plug circuit - actuator stuck open Low battery voltage Relay circuit from relay 	Check the battery condition and state of charge. Check the relay and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new relay. Clear the DTCs and test for normal operation.
P038073	Glow Plug/Heater Circuit A	<ul style="list-style-type: none"> Right-hand bank glow plug circuit - actuator stuck closed Low battery voltage Relay circuit to relay 	Check the battery condition and state of charge. Check the relay and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new relay. Clear the DTCs and test for normal operation.
P040121	Exhaust Gas Recirculation A Flow Insufficient Detected	<ul style="list-style-type: none"> Exhaust gas recirculation (EGR) insufficient flow detected - signal amplitude less than minimum EGR control deviation lower limit right-hand bank (intake manifold tuning (IMT) valve closed) bank specific control of EGR 	Allow the engine to warm up, switch off and turn the ignition on. Using a data logger function, check the EGR valve angles for both banks. Command the valve actuators to 100% then 0% pulse width modulated (PWM), and recheck the valve angles. The angles should range between 95% and 5%. If this is not the case, install new valves as necessary. Clear the DTCs and test for normal operation.
P040222	Exhaust Gas Recirculation A Flow Excessive Detected	<ul style="list-style-type: none"> Right-hand exhaust gas recirculation (EGR) excessive flow detected - signal amplitude greater than maximum EGR control deviation upper limit right-hand bank (intake manifold tuning (IMT) valve closed) bank specific control of EGR 	Allow the engine to warm up, switch off and turn the ignition on. Using a data logger function, check the EGR valve angle. Command the valve actuator to 0% then 100% pulse width modulated (PWM), and recheck the valve angles. The angles should range between 5% and 95%. If this is not the case, install a new valve as necessary. Clear the DTCs and test for normal operation.
P040319	Exhaust Gas Recirculation A Control Circuit	<ul style="list-style-type: none"> Right-hand exhaust gas recirculation (EGR) control circuit - current over threshold EGR valve control circuit short circuit to ground EGR valve control circuit short circuit to power 	Check the EGR valve and circuits. Refer to the electrical guides. Using a data logger function, turn the ignition on and check the EGR valve values for both banks. Turn the ignition off and make sure the cleaning cycle is performed (the valves should cycle from 0% to 100% approximately 6 times). Turn the ignition on, command the actuators to 0% pulse width modulated (PWM) and check the sensor reading. The value should be 0 - 20%. Command the actuators to 100% pulse width modulated (PWM) and check the sensor reading. The value should be 80 - 95%. If the values are outside this range, install a new valve as necessary. Clear the DTCs and test for normal operation. If there is still an issue, suspect the ECM. Refer to the warranty policy and procedures manual

			if an ECM is suspect.
P040521	Exhaust Gas Recirculation Sensor A Circuit Low	<ul style="list-style-type: none"> • Right-hand exhaust gas recirculation (EGR) sensor circuit low - signal amplitude less than minimum • EGR valve position sensor circuit short circuit to ground • EGR valve position sensor fault 	Check the right-hand EGR sensor and circuits. Refer to the electrical guides. Using a data logger function, check the EGR valve angle. With the ignition on, engine off, command the valve actuator to 0% pulse width modulated (PWM), and then to 100% pulse width modulated (PWM) and recheck the EGR valve angle. The value should range from 0 - 20% to 80 - 95%. If this is not the case, install a new sensor. Clear the DTCs and test for normal operation.
P040622	Exhaust Gas Recirculation Sensor A Circuit High	<ul style="list-style-type: none"> • Right-hand exhaust gas recirculation (EGR) sensor circuit high - signal amplitude greater than maximum • EGR valve position sensor circuit short circuit to power • EGR valve position sensor fault 	Check the right-hand EGR sensor and circuits. Refer to the electrical guides. Using a data logger function, check the EGR valve angle. With the ignition on, engine off, command the valve actuator to 0% pulse width modulated (PWM), and then to 100% pulse width modulated (PWM) and recheck the EGR valve angle. The value should range from 0 - 20% to 80 - 95%. If this is not the case, install a new sensor. Clear the DTCs and test for normal operation.
P040721	Exhaust Gas Recirculation Sensor B Circuit Low	<ul style="list-style-type: none"> • Right-hand exhaust gas recirculation (EGR) throttle position sensor circuit low - signal amplitude less than minimum • EGR throttle position sensor circuit short circuit to ground • EGR throttle position sensor circuit high resistance • EGR sensor fault 	Check the EGR throttle position sensor and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new EGR valve. Clear the DTCs and test for normal operation.
P040822	Exhaust Gas Recirculation Sensor B Circuit High	<ul style="list-style-type: none"> • Right-hand exhaust gas recirculation (EGR) throttle position sensor circuit low - signal amplitude greater than maximum • EGR throttle position sensor circuit short circuit to power • EGR throttle position sensor fault 	Check the EGR throttle position sensor and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new EGR valve. Clear the DTCs and test for normal operation.
P045A00	Exhaust Gas Recirculation B Control Circuit	<ul style="list-style-type: none"> • EGR valve circuit fault • EGR valve fault • engine control module (ECM) fault 	Check the EGR valve and circuits. Refer to the electrical guides. Using a data logger function, turn the ignition on and check the EGR valve values for both banks. Turn the ignition off and make sure the cleaning cycle is performed (the valves should cycle from 0% to 100% approximately 6 times). Turn the ignition on, command the actuators to 0% pulse width modulated (PWM) and check the sensor reading. The value should be 0 - 20%. Command the actuators to 100% pulse width modulated (PWM) and check the sensor reading. The value should be 80 - 95%. If the values are outside this range, install a new valve as necessary. Clear the DTCs and test

			for normal operation. If there is still an issue, suspect the ECM. Refer to the warranty policy and procedures manual if an ECM is suspect.
P045A19	Exhaust Gas Recirculation B Control Circuit	<ul style="list-style-type: none"> • Left-hand exhaust gas recirculation (EGR) control circuit - current over threshold • EGR valve control circuit short circuit to ground • EGR valve control circuit short circuit to power 	Check the EGR valve and circuits. Refer to the electrical guides. Using a data logger function, turn the ignition on and check the EGR valve values for both banks. Turn the ignition off and make sure the cleaning cycle is performed (the valves should cycle from 0% to 100% approximately 6 times). Turn the ignition on, command the actuators to 0% pulse width modulated (PWM) and check the sensor reading. The value should be 0 - 20%. Command the actuators to 100% pulse width modulated (PWM) and check the sensor reading. The value should be 80 - 95%. If the values are outside this range, install a new valve as necessary. Clear the DTCs and test for normal operation. If there is still an issue, suspect the ECM. Refer to the warranty policy and procedures manual if an ECM is suspect.
P045C00	Exhaust Gas Recirculation B Control Circuit Low	<ul style="list-style-type: none"> • Left-hand exhaust gas recirculation (EGR) control circuit low • EGR valve sticking • Intake air temperature (IAT) sensor circuit fault • Ambient pressure (AMP) sensor circuit fault • Manifold absolute pressure and temperature (MAPT) sensor circuit fault • Mass air flow (MAF) sensor circuit fault • EGR sensor circuit fault 	Check for DTCs indicating a sensor fault. Check the IAT, AMP, MAPT, MAF and EGR sensor circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new EGR valve. Clear the DTCs and test for normal operation.
P045D00	Exhaust Gas Recirculation B Control Circuit High	<ul style="list-style-type: none"> • Left-hand exhaust gas recirculation (EGR) control circuit high • EGR valve sticking • Intake air temperature (IAT) sensor circuit fault • Ambient pressure (AMP) sensor circuit fault • Manifold absolute pressure and temperature (MAPT) sensor circuit fault • Mass air flow (MAF) sensor circuit fault • EGR sensor circuit fault 	Check for DTCs indicating a sensor fault. Check the IAT, AMP, MAPT, MAF and EGR sensor circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new EGR valve. Clear the DTCs and test for normal operation.
P048811	Exhaust gas recirculation (EGR) - intake air shut off throttle range/performance	<ul style="list-style-type: none"> • Exhaust gas recirculation (EGR) throttle position sensor circuit short circuit to ground • EGR modulator failure 	Check the EGR throttle position sensor and circuits. Refer to the electrical guides. Using a data logger function, check the EGR throttle position with the ignition on, engine off and record the value. Command the actuator to 100% pulse width modulated (PWM) and recheck the position reading. The value should be 80 - 95%. Command the actuator to 0% pulse width modulated (PWM) and recheck the position reading. The value should be 5 - 20%. Manually close and open the throttle and check the resistance. The

			resistance should range from 300 - 2,500 ohms. If the values are not in this range, install a new EGR valve. Clear the DTCs and test for normal operation. If there is still an issue, suspect the ECM. Refer to the warranty policy and procedures manual if an ECM is suspect.
P048812	Exhaust gas recirculation (EGR) - intake air shut off throttle range/performance	<ul style="list-style-type: none"> Exhaust gas recirculation (EGR) throttle position sensor circuit short circuit to power EGR modulator failure 	Check the EGR throttle position sensor and circuits. Refer to the electrical guides. Using a data logger function, check the EGR throttle position with the ignition on, engine off and record the value. Command the actuator to 100% pulse width modulated (PWM) and recheck the position reading. The value should be 80 - 95%. Command the actuator to 0% pulse width modulated (PWM) and recheck the position reading. The value should be 5 - 20%. Manually close and open the throttle and check the resistance. The resistance should range from 300 - 2,500 ohms. If the values are not in this range, install a new EGR valve. Clear the DTCs and test for normal operation. If there is still an issue, suspect the ECM. Refer to the warranty policy and procedures manual if an ECM is suspect.
P048813	Exhaust gas recirculation (EGR) - intake air shut off throttle range/performance	<ul style="list-style-type: none"> Exhaust gas recirculation (EGR) throttle position sensor circuit high resistance Exhaust gas recirculation (EGR) throttle position sensor circuit open circuit EGR modulator failure 	Check the EGR throttle position sensor and circuits. Refer to the electrical guides. Using a data logger function, check the EGR throttle position with the ignition on, engine off and record the value. Command the actuator to 100% pulse width modulated (PWM) and recheck the position reading. The value should be 80 - 95%. Command the actuator to 0% pulse width modulated (PWM) and recheck the position reading. The value should be 5 - 20%. Manually close and open the throttle and check the resistance. The resistance should range from 300 - 2,500 ohms. If the values are not in this range, install a new EGR valve. Clear the DTCs and test for normal operation. If there is still an issue, suspect the ECM. Refer to the warranty policy and procedures manual if an ECM is suspect.
P048821	Exhaust Gas Recirculation Throttle Control Circuit A Range/Performance	<ul style="list-style-type: none"> Right-hand exhaust gas recirculation (EGR) throttle control circuit range/performance - signal amplitude less than minimum Right-hand EGR throttle adaption is at the bottom limit 	Check the EGR valve and circuits. Refer to the electrical guides. Using a data logger function, check the EGR throttle position then command the throttle position set point to 0% pulse width modulated (PWM) and recheck the position. If the 0% pulse width modulated (PWM) position is not between 0% and 20%, install a new EGR valve. Clear the DTCs and test for normal operation.
P048822	Exhaust Gas Recirculation Throttle Control Circuit A Range/Performance	<ul style="list-style-type: none"> Right-hand exhaust gas recirculation (EGR) throttle control circuit range/performance - signal amplitude greater 	Check the EGR valve and circuits. Refer to the electrical guides. Using a data logger function, check the EGR throttle position then command the throttle position set point to 0% pulse width modulated (PWM) and recheck the position. If the 0% pulse width

		<ul style="list-style-type: none"> • than maximum • Right-hand EGR throttle adaption is at the top limit 	modulated (PWM) position is not between 0% and 20%, install a new EGR valve. Clear the DTCs and test for normal operation.
P048900	Exhaust Gas Recirculation Control Circuit Low	<ul style="list-style-type: none"> • Right-hand exhaust gas recirculation (EGR) control circuit low • EGR valve sticking • Intake air temperature (IAT) sensor circuit fault • Ambient pressure (AMP) sensor circuit fault • Manifold absolute pressure and temperature (MAPT) sensor circuit fault • Mass air flow (MAF) sensor circuit fault • EGR sensor circuit fault 	Check for DTCs indicating a sensor fault. Check the IAT, AMP, MAPT, MAF and EGR sensor circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new EGR valve. Clear the DTCs and test for normal operation.
P049000	Exhaust Gas Recirculation A Control Circuit High	<ul style="list-style-type: none"> • Right-hand exhaust gas recirculation (EGR) control circuit high • EGR valve sticking • Intake air temperature (IAT) sensor circuit fault • Ambient pressure (AMP) sensor circuit fault • Manifold absolute pressure and temperature (MAPT) sensor circuit fault • Mass air flow (MAF) sensor circuit fault • EGR sensor circuit fault 	Check for DTCs indicating a sensor fault. Check the IAT, AMP, MAPT, MAF and EGR sensor circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new EGR valve. Clear the DTCs and test for normal operation.
P049313	Fan Overspeed (clutch locked)	<ul style="list-style-type: none"> • Fan circuit open circuit 	Refer to the electrical guides and check the viscous fan speed sensor circuit. Repair/renew as necessary.
P049411	Fan Speed Low	<ul style="list-style-type: none"> • Viscous fan solenoid circuit short circuit to ground • Viscous fan solenoid failure 	Refer to the electrical guides and check the viscous fan solenoid and circuits. Refer to the relevant workshop manual section.
P049512	Fan Speed High	<ul style="list-style-type: none"> • Viscous fan solenoid circuit short circuit to power • Viscous fan solenoid failure 	Refer to the electrical guides and check the viscous fan solenoid and circuits. Refer to the relevant workshop manual section.
P050100	Vehicle Speed Sensor A Range/Performance	<ul style="list-style-type: none"> • Vehicle speed sensor 1 range/performance - signal out of range • Investigate for anti-lock braking system (ABS) faults the signal from the wheel speed sensors is not plausible 	Check for DTCs indicating an ABS fault. Speed sensor codes are listed at the head of this table.
P050462	Brake Switch A / B Correlation	<ul style="list-style-type: none"> • Brake switch A/B correlation - signal compare fault • Brake lamp switch fault • Brake lamp switch circuit fault 	Check the brake switch and circuits. Refer to the electrical guides. Clear the DTCs and test for normal operation.
P052721	Fan Speed Sensor Circuit Range/Performance	<ul style="list-style-type: none"> • Fan speed sensor circuit range/performance - signal amplitude less than minimum • Fan circuit short circuit to ground • Fan circuit short circuit to 	Check the fan and circuits, including the pulse width modulated (PWM) signal circuit. Refer to the electrical guides. Check the motor for sticking. Repair/renew as necessary. Clear the

		<ul style="list-style-type: none"> power Fan circuit high resistance Fan fault 	DTCs and test for normal operation.
P052722	Fan Speed Sensor Circuit Range/Performance	<ul style="list-style-type: none"> Fan speed sensor circuit range/performance - signal amplitude greater than maximum Fan circuit short circuit to ground Fan circuit short circuit to power Fan circuit high resistance Fan fault 	Check the fan and circuits, including the pulse width modulated (PWM) signal circuit. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P052727	Fan Speed Sensor Circuit Range/Performance	<ul style="list-style-type: none"> Fan speed sensor circuit range/performance - signal rate of change above threshold Fan circuit intermittent high resistance Loose connections 	Check the fan and circuits, including the pulse width modulated (PWM) signal circuit. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P056216	System Voltage Low	<ul style="list-style-type: none"> Battery condition/state of charge Battery ground cable high resistance Battery connections loose/corroded Battery current drain Battery power distribution circuits 	Check the battery connections and condition and charge as necessary. Refer to the electrical guides and check the battery power supplies to the ECM, etc. Repair/renew as necessary. Refer to the relevant workshop manual section.
P056317	System Voltage High	<ul style="list-style-type: none"> System voltage high - circuit voltage above threshold Battery voltage greater than maximum threshold 	Check the battery connections and condition and charge as necessary. Check the battery power supplies to the ECM, etc. Repair/renew as necessary.
P056A00	Cruise Control INCREASE DISTANCE Signal	<ul style="list-style-type: none"> Speed control switch 3 stuck closed (HEADDOWN) 	Check the switch operation. Check the switch circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P056B00	Cruise Control DECREASE DISTANCE Signal	<ul style="list-style-type: none"> Speed control switch 4 stuck closed (HEADUP) 	Check the switch operation. Check the switch circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P057162	Brake Switch A Circuit	<ul style="list-style-type: none"> Brake switch A circuit - signal compare fault Brake lamp switch circuit fault 	Check the brake switch and circuits. Refer to the electrical guides. Clear the DTCs and test for normal operation.
P05781C	Cruise Control Multi-Function Input A Circuit Stuck	<ul style="list-style-type: none"> Speed control multi-function input A circuit stuck - circuit voltage out of range Switch circuit high resistance Switch fault 	Check the switch and circuits. Refer to the electrical guides. Clear the DTCs and test for normal operation.
P05791C	Cruise Control Multi-Function Input A Circuit Range/Performance	<ul style="list-style-type: none"> Speed control multi-function input A circuit stuck - circuit voltage out of range Switch circuit high resistance Switch fault 	Check the switch and circuits. Refer to the electrical guides. Clear the DTCs and test for normal operation.
		<ul style="list-style-type: none"> Speed control multi-function input A circuit range/performance - 	

P057929	Cruise Control Multi-Function Input A Circuit Range/Performance	<ul style="list-style-type: none"> signal invalid Switch circuit short circuit to ground Switch circuit short circuit to power Switch fault 	Check the switch and circuits. Refer to the electrical guides. Clear the DTCs and test for normal operation.
P060448	Internal Control Module Random Access Memory (RAM) Error	<ul style="list-style-type: none"> ECM circuits short circuit to ground ECM circuits short circuit to power ECM circuits high resistance 	Check the ECM circuits. Refer to the electrical guides. Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060768	Control Module Performance	<ul style="list-style-type: none"> Engine control module (ECM) performance - event information ECM circuits short circuit to ground ECM circuits short circuit to power ECM circuits high resistance 	Check the ECM circuits. Refer to the electrical guides. Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060A48	Internal Control Module Monitoring Processor Performance	<ul style="list-style-type: none"> Engine control module (ECM) monitoring processor performance - supervision software fault ECM circuits short circuit to ground ECM circuits short circuit to power ECM circuits high resistance 	Check the ECM circuits. Refer to the electrical guides. Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060B48	Internal Control Module A/D Processing Performance	<ul style="list-style-type: none"> Engine control module (ECM) A/D processing performance - supervision software fault ECM circuits short circuit to ground ECM circuits short circuit to power ECM circuits high resistance 	Check the ECM circuits. Refer to the electrical guides. Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P060D46	Internal Control Module Accelerator Pedal Position Performance	<ul style="list-style-type: none"> Internal control module accelerator pedal position performance - calibration/parameter memory fault Pedal value not plausible Engine control module (ECM) circuits short circuit to ground Engine control module (ECM) circuits short circuit to power Engine control module (ECM) circuits high resistance 	Check and Repair/renew other DTCs first. If this code still sets, contact the technical help desk.
P061712	Starter Relay Circuit High	<ul style="list-style-type: none"> Starter relay drive circuit short circuit to power Starter relay fault 	Check the starter circuits. Refer to the electrical guides. Activate the relay and listen for an audible 'click'. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P061A46	Internal Control Module Torque Performance	<ul style="list-style-type: none"> Calibration/parameter memory fault Torque not plausible Monitoring of driveability functions 	Retrieve the flight recorder data using the approved diagnostic system and the customer statement relating to the concern. Check and rectify other DTCs first. If this code still sets, contact the technical help desk.

P061C48	Internal Control Module Engine RPM Performance	<ul style="list-style-type: none"> Supervision software fault Processor monitoring speed not plausible 	Retrieve the flight recorder data using the approved diagnostic system and the customer statement relating to the concern. Check and rectify other DTCs first. If this code still sets, contact the technical help desk.
P061E46	Internal Control Module Brake Signal Performance	<ul style="list-style-type: none"> Calibration/parameter memory fault Cruise intervention not plausible 	Retrieve the flight recorder data using the approved diagnostic system and the customer statement relating to the concern. Check and rectify other DTCs first. If this code still sets, contact the technical help desk.
P062101	Generator Lamp Terminal Circuit	<ul style="list-style-type: none"> Generator brushes low 	Check the charging voltage. Check the charging system circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new generator. Clear the DTCs and test for normal operation.
P062116	Generator Lamp Terminal Circuit	<ul style="list-style-type: none"> Generator system voltage low 	Check the charging voltage. Check the charging system circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new generator. Clear the DTCs and test for normal operation.
P062229	Generator Lamp Terminal Circuit	<ul style="list-style-type: none"> Charging circuit fault Generator fault 	Check the charging voltage. Check the charging system circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new generator. Clear the DTCs and test for normal operation.
P062511	Generator Field Terminal Circuit Low	<ul style="list-style-type: none"> Generator field terminal (altmon) circuit short circuit to ground Generator control (altcom) circuit short circuit to ground Generator control (altcom) circuit high resistance Generator fault 	Check the charging voltage. Check the charging system circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new generator. Clear the DTCs and test for normal operation.
P062615	Generator Field Terminal Circuit High	<ul style="list-style-type: none"> Generator field terminal (altmon) circuit short circuit to power Generator field terminal (altmon) circuit high resistance Generator fault 	Check the charging voltage. Check the charging system circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new generator. Clear the DTCs and test for normal operation.
P062712	Fuel Pump A Control Circuit / Open	<ul style="list-style-type: none"> Fuel pump relay control circuit short circuit to power Fuel pump relay fault 	Check the fuel pump and circuits. Refer to the electrical guides. Activate the relay and listen for an audible 'click'. Refer to the relevant workshop manual section. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P062811	Fuel Pump A Control Circuit Low	<ul style="list-style-type: none"> Fuel pump relay control circuit short circuit to ground Fuel pump relay fault 	Check the fuel pump and circuits. Refer to the electrical guides. Activate the relay and listen for an audible 'click'. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P062913	Fuel Pump A Control Circuit High	<ul style="list-style-type: none"> Fuel pump relay control circuit high resistance Fuel pump relay control circuit open circuit Fuel pump relay fault 	Check the fuel pump and circuits. Refer to the electrical guides. Activate the relay and listen for an audible 'click'. Repair/renew as necessary. Clear the DTCs and test for normal operation.
			During the following, clear DTCs and recheck after each step. Turn the ignition switch off and wait 20 seconds

P062D01	Fuel Injector Driver Circuit Performance Bank 1	<ul style="list-style-type: none"> Fuel injector circuits short circuit to ground Fuel injector circuits short circuit to power Fuel injector circuits high resistance Fuel injector fault 	<p>before turning the ignition back on to recheck DTCs. Check the connections at fuel injectors 1, 2, 3 and 4. Disconnect the injectors and measure the resistance and capacitance of each injector. Resistance should be 180 - 220 Kohms, capacitance should be greater than 3 microfarad at 20°C (68° F). If one or more injectors are outside this range, install new injectors as necessary. Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.</p>
P062E01	Fuel Injector Driver Circuit Performance Bank 2	<ul style="list-style-type: none"> Fuel injector circuits short circuit to ground Fuel injector circuits short circuit to power Fuel injector circuits high resistance Fuel injector fault 	<p>During the following, clear DTCs and recheck after each step. Turn the ignition switch off and wait 20 seconds before turning the ignition back on to recheck DTCs. Check the connections at fuel injectors 5, 6, 7 and 8. Disconnect the injectors and measure the resistance and capacitance of each injector. Resistance should be 180 - 220 Kohms, capacitance should be greater than 3 microfarad at 20°C (68° F). If one or more injectors are outside this range, install new injectors as necessary. Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Clear the DTCs and test for normal operation.</p>
P063468	PCM / ECM / TCM Internal Temperature A Too High	<ul style="list-style-type: none"> ECM internal temperature too high E box cooling fan obstruction E box cooling fan operation ECM internal sensor error 	<p>Consider atmospheric and customer driving conditions before carrying out any other action. Check the ECM circuits. Refer to the electrical guides. Using a data logger function, check the ECM temperature. If the temperature value is greater than 130°C (266°F) suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.</p>
P064216	Sensor Reference Voltage A Circuit Low	<ul style="list-style-type: none"> ECM circuits short circuit to ground ECM circuits high resistance ECM fault 	<p>Check the ECM power supply and relay circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.</p>
P064317	Sensor Reference Voltage A Circuit High	<ul style="list-style-type: none"> ECM circuits short circuit to power ECM fault 	<p>Check the ECM power supply and relay circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.</p>
P065216	Sensor Reference Voltage B Circuit Low	<ul style="list-style-type: none"> ECM circuits short circuit to ground ECM circuits high resistance ECM fault 	<p>Check the ECM power supply and relay circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTC. Cycle the ignition, allow power latch and retest. If the DTC resets suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.</p>
P065317	Sensor Reference Voltage B	<ul style="list-style-type: none"> ECM circuits short circuit to power 	<p>Check the ECM power supply and relay circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTC. Cycle the ignition, allow power</p>

	Circuit High	<ul style="list-style-type: none"> ECM fault 	latch and retest. If the DTC resets suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P065B11	Generator Control Circuit Range/Performance	<ul style="list-style-type: none"> Generator control circuit (altcom) short circuit to ground Generator control circuit (altcom) high resistance Generator fault 	Check the generator and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P065B12	Generator Control Circuit Range/Performance	<ul style="list-style-type: none"> Generator control circuit (altcom) short circuit to power Generator fault 	Check the generator and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P066727	PCM / ECM / TCM Internal Temperature Sensor A Range/Performance	<ul style="list-style-type: none"> ECM circuits intermittent high resistance ECM fault 	Check the ECM circuits. Refer to the electrical guides. Using a data logger function, check the ECM internal temperature. Start the engine and allow to idle for five minutes before rechecking the temperature. If the temperature has increased by more than 10°C per 100 ms suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P066816	PCM / ECM / TCM Internal Temperature Sensor A Circuit Low	<ul style="list-style-type: none"> ECM circuits short circuit to ground ECM fault 	Clear the DTC, cycle the ignition, allow power latch and retest. If the DTC resets, check the ECM circuits. Refer to the electrical guides. Using a data logger function, check the ECM internal temperature. If the value is less than -40°C (-40°F), suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P066917	PCM / ECM / TCM Internal Temperature Sensor A Circuit High	<ul style="list-style-type: none"> ECM circuits short circuit to power ECM fault 	Clear the DTC, cycle the ignition, allow power latch and retest. If the DTC resets, check the ECM circuits. Refer to the electrical guides. Using a data logger function, check the ECM internal temperature. If the value is greater than 130°C (266°F), suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P067013	Glow Plug Control Module Control Circuit / Open	<ul style="list-style-type: none"> Glow plug relay, control circuit high resistance Glow plug relay, control circuit short circuit to ground Glow plug relay failure 	Check the glow plug relay circuits. Refer to the electrical guides. Check the relay operation. Activate the relay and listen for an audible 'click'. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P069311	Fan 2 Control Circuit Low	<ul style="list-style-type: none"> Viscous fan control circuit high resistance Viscous fan solenoid fault 	Check the viscous fan solenoid and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P069313	Fan 2 Control Circuit Low	<ul style="list-style-type: none"> Viscous fan control circuit short circuit to ground Viscous fan solenoid fault 	Check the viscous fan solenoid and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P069412	Fan 2 Control Circuit High	<ul style="list-style-type: none"> Viscous fan control circuit short circuit to power Viscous fan solenoid fault 	Check the viscous fan solenoid and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P083100	Clutch Pedal Switch A Circuit Low	<ul style="list-style-type: none"> Clutch pedal switch circuit short to ground 	Check the switch and circuits. Refer to the electrical guides and repair/renew as necessary. Clear the DTCs and test for normal operation.
	Clutch Pedal Switch A Circuit	<ul style="list-style-type: none"> Clutch pedal switch 	Check the switch and circuits. Refer to the electrical guides and repair/renew

P083200	High	circuit short to battery	as necessary. Clear the DTCs and test for normal operation.
P085062	Park/Neutral Switch Input Circuit	<ul style="list-style-type: none"> • Park/Neutral switch plausibility check - signal compare fault • Controller area network (CAN) circuit fault 	Check the switch and circuits. Refer to the electrical guides. Check for DTCs indicating a CAN fault. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P085212	Park / Neutral Switch Input Circuit High	<ul style="list-style-type: none"> • Park/Neutral switch circuit short circuit to power 	Check the switch and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P0A0916	DC/DC Converter Status Circuit Low	<ul style="list-style-type: none"> • DC/DC converter less than minimum 	Clear the DTCs, turn the ignition off and allow power latch. Check for DTCs. If the DTC resets, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P0A1017	DC/DC Converter Status Circuit High	<ul style="list-style-type: none"> • DC/DC converter greater than maximum 	Clear the DTCs, turn the ignition off and allow power latch. Check for DTCs. If the DTC resets, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P115A68	Low Fuel Level - Forced Limited Power	<ul style="list-style-type: none"> • Low fuel level - forced limited power - event information (anti air suction intervention occurred) • Low fuel • Fuel level sensor circuit short circuit to ground • Fuel level sensor circuit high resistance • Fuel level sensor fault 	Check that there is sufficient fuel in the tank. Check the fuel level sensor and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new fuel level sensor. Clear the DTCs and test for normal operation.
P115B68	Low Fuel Level - Forced Engine Shutdown	<ul style="list-style-type: none"> • Low fuel level - forced engine shutdown - event information (anti air suction intervention occurred) • Low fuel • Fuel level sensor circuit short circuit to ground • Fuel level sensor circuit high resistance • Fuel level sensor fault 	Check that there is sufficient fuel in the tank. Check the fuel level sensor and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new fuel level sensor. Clear the DTCs and test for normal operation.
P115F11	Electronic Control Module Cooling Fan Circuit	<ul style="list-style-type: none"> • E-box fan circuits short circuit to ground • E-box fan fault 	Check the E-box fan and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new fan. Clear the DTCs and test for normal operation.
P115F12	Electronic Control Module Cooling Fan Circuit	<ul style="list-style-type: none"> • E-box fan circuits short circuit to power • E-box fan fault 	Check the E-box fan and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new fan. Clear the DTCs and test for normal operation.
P115F13	Electronic Control Module Cooling Fan Circuit	<ul style="list-style-type: none"> • E-box fan circuits high resistance • E-box fan fault 	Check the E-box fan and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new fan. Clear the DTCs and test for normal operation.
P116F2F	Fuel Volume Regulator Control Exceeded Control Limits	<ul style="list-style-type: none"> • Fuel volume control valve circuit fault - signal erratic • Fuel volume control valve fault 	Check the fuel volume control valve and circuits. Refer to the electrical guides. Check the resistance of the valve and install a new high pressure fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be

			serviced separately). Clear the DTCs and test for normal operation.
P117D00	Fuel Volume Regulator Control Exceeded Maximum Control Limit	<ul style="list-style-type: none"> • Fuel volume control valve circuit fault • Fuel volume control valve fault 	Check the fuel volume control valve and circuits. Refer to the electrical guides. Check the resistance of the valve and install a new high pressure fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). Clear the DTCs and test for normal operation.
P117E00	Fuel Volume Regulator Control Exceeded Minimum Control Limit	<ul style="list-style-type: none"> • Fuel volume control valve circuit fault • Fuel volume control valve fault 	Check the fuel volume control valve and circuits. Refer to the electrical guides. Check the resistance of the valve and install a new high pressure fuel pump if the resistance is not between 1.5 and 15 ohms (the fuel volume control valve cannot be serviced separately). Clear the DTCs and test for normal operation.
P123A21	BARO - Turbocharger/Supercharger Boost Sensor A Correlation	<ul style="list-style-type: none"> • Barometric - turbocharger boost sensor A (manifold absolute pressure temperature [MAPT] sensor) correlation - signal amplitude less than minimum • MAPT sensor circuit fault • MAPT sensor fault • Engine control module (ECM) fault 	Recover the freeze-frame data to determine when the code was set. Check the MAPT sensor and circuits. Refer to the electrical guides. Make sure the coolant temperature is above 0°C (32°F) and with the ignition on, engine not running, check the manifold absolute pressure using a data logger function. If the values are significantly different from ambient pressure, install a new MAPT sensor. Clear the DTCs and test for normal operation. Start the engine and allow to idle. Check the manifold absolute pressure and compare with the values at ignition on, engine not running. The pressure should have increased to between 52.7 Kpa and 120 Kpa (7.64 and 17.40 lbs/in ²). If this is not the case, install a new MAPT sensor. Refer to the relevant section of the workshop manual. If the problem persists, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P123A22	BARO - Turbocharger/Supercharger Boost Sensor A Correlation	<ul style="list-style-type: none"> • Barometric - turbocharger boost sensor A (manifold absolute pressure temperature [MAPT] sensor) correlation - signal amplitude greater than maximum • MAPT sensor circuit fault • MAPT sensor fault • Engine control module (ECM) fault 	Recover the freeze-frame data to determine when the code was set. Check the MAPT sensor and circuits. Refer to the electrical guides. Make sure the coolant temperature is above 0°C (32°F) and with the ignition on, engine not running, check the manifold absolute pressure using a data logger function. If the values are significantly different from ambient pressure, install a new MAPT sensor. Clear the DTCs and test for normal operation. Start the engine and allow to idle. Check the manifold absolute pressure and compare with the values at ignition on, engine not running. The pressure should have increased to between 52.7 Kpa and 120 Kpa (7.64 and 17.40 lbs/in ²). If this is not the case, install a new MAPT sensor. Refer to the relevant section of the workshop manual. If the problem persists, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.

P123B21	BARO - Turbocharger/Supercharger Boost Sensor B Correlation	<ul style="list-style-type: none"> ● Barometric - turbocharger boost sensor B (manifold absolute pressure temperature [MAPT] sensor) correlation - signal amplitude less than minimum ● MAPT sensor circuit fault ● MAPT sensor fault ● Engine control module (ECM) fault 	<p>Recover the freeze-frame data to determine when the code was set. Check the MAPT sensor and circuits. Refer to the electrical guides. Make sure the coolant temperature is above 0°C (32°F) and with the ignition on, engine not running, check the manifold absolute pressure using a data logger function. If the values are significantly different from ambient pressure, install a new MAPT sensor. Clear the DTCs and test for normal operation. Start the engine and allow to idle. Check the manifold absolute pressure and compare with the values at ignition on, engine not running. The pressure should have increased to between 52.7 Kpa and 120 Kpa (7.64 and 17.40 lbs/in²). If this is not the case, install a new MAPT sensor. Refer to the relevant section of the workshop manual. If the problem persists, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.</p>
P123B22	BARO - Turbocharger/Supercharger Boost Sensor B Correlation	<ul style="list-style-type: none"> ● Barometric - turbocharger boost sensor B (manifold absolute pressure temperature [MAPT] sensor) correlation - signal amplitude greater than maximum ● MAPT sensor circuit fault ● MAPT sensor fault ● Engine control module (ECM) fault 	<p>Recover the freeze-frame data to determine when the code was set. Check the MAPT sensor and circuits. Refer to the electrical guides. Make sure the coolant temperature is above 0°C (32°F) and with the ignition on, engine not running, check the manifold absolute pressure using a data logger function. If the values are significantly different from ambient pressure, install a new MAPT sensor. Clear the DTCs and test for normal operation. Start the engine and allow to idle. Check the manifold absolute pressure and compare with the values at ignition on, engine not running. The pressure should have increased to between 52.7KPa and 120 Kpa (7.64 and 17.40lbs/in²). If this is not the case, install a new MAPT sensor. Refer to the relevant section of the workshop manual. If the problem persists, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.</p>
P125987	Immobilizer to PCM Signal Error	<ul style="list-style-type: none"> ● ECM ID timeout occurred 	<p>Check the circuits between the modules. Refer to the electrical guides. Check for network DTCs. Repair/renew as necessary. Clear the DTCs and test for normal operation. If the DTC resets, contact the technical help desk.</p>
P132A00	Turbocharger/Supercharger Boost Control A Electrical	<ul style="list-style-type: none"> ● Turbocharger boost control A electrical ● Turbocharger circuit fault ● Turbocharger fault ● Engine control module (ECM) fault 	<p>Check the turbocharger and circuits. Refer to the electrical guides. Turn the ignition on and using a data logger function, record the turbocharger actuator angles. Command the turbocharger actuator to 5% pulse width modulated (PWM), then 95% pulse width modulated (PWM) and recheck the recorded angles. The value at 5% pulse width modulated (PWM) should be 0 - 20%, and at 95% pulse width modulated (PWM), 80 - 95%. If the angles are within these ranges, clear the codes and retest. If the angles are</p>

			outside the range, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P132A19	Turbocharger/Supercharger Boost Control A Electrical	<ul style="list-style-type: none"> • Turbocharger boost control A electrical - circuit current above threshold • Turbocharger circuit fault • Turbocharger fault • Engine control module (ECM) fault 	Check the turbocharger and circuits. Refer to the electrical guides. Turn the ignition on and using a data logger function, record the turbocharger actuator angles. Command the turbocharger actuator to 5% pulse width modulated (PWM), then 95% pulse width modulated (PWM) and recheck the recorded angles. The value at 5% pulse width modulated (PWM) should be 0 - 20%, and at 95% pulse width modulated (PWM), 80 - 95%. If the angles are within these ranges, clear the codes and retest. If the angles are outside the range, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P132B21	Turbocharger/Supercharger Boost Control A Performance	<ul style="list-style-type: none"> • Turbocharger boost control A performance - signal amplitude less than minimum • Turbocharger connections: water ingress, poor contacts • Turbocharger actuator circuits short circuit to ground • Turbocharger actuator circuits short circuit to power • Turbocharger actuator circuits high resistance • Turbocharger actuator fault Turbocharger actuator control deviation below minimum threshold 	Check the turbocharger and circuits. Refer to the electrical guides. Using a data logger function, record the turbocharger actuator angle at idle and at 3,000 rpm. From idle, 'blip' the throttle to maximum and allow to idle and record the turbocharger actuator angles. At idle, the angle should be approximately 95%, at 3,000 rpm, approximately 40%, and when 'blipped' the voltage should change smoothly at approximately 25% per 100 ms. If the angles do not change, or do not change at the expected rate, suspect the turbocharger actuator is sticking. Install a new turbocharger. Clear the DTCs and test for normal operation.
P132B22	Turbocharger/Supercharger Boost Control A Performance	<ul style="list-style-type: none"> • Turbocharger boost control A performance - signal amplitude greater than maximum • Turbocharger connections: water ingress, poor contacts • Turbocharger actuator circuits short circuit to ground • Turbocharger actuator circuits short circuit to power • Turbocharger actuator circuits high resistance • Turbocharger actuator fault Turbocharger actuator control deviation above maximum threshold 	Check the turbocharger and circuits. Refer to the electrical guides. Using a data logger function, record the turbocharger actuator angle at idle and at 3,000 rpm. From idle, 'blip' the throttle to maximum and allow to idle and record the turbocharger actuator angles. At idle, the angle should be approximately 95%, at 3,000 rpm, approximately 40%, and when 'blipped' the voltage should change smoothly at approximately 25% per 100 ms. If the angles do not change, or do not change at the expected rate, suspect the turbocharger actuator is sticking. Install a new turbocharger. Clear the DTCs and test for normal operation.
P133521	EGR Position Sensor Minimum/Maximum Stop Performance	<ul style="list-style-type: none"> • Right-hand exhaust gas recirculation (EGR) position sensor - signal amplitude less than minimum • EGR valve circuit short circuit to ground • EGR valve fault 	Check the EGR valve and circuits. Refer to the electrical guides. Using a data logger function, check the EGR valve angles and command the valve to 0% pulse width modulated (PWM). Recheck the angle. The value should be 0 - 20%. If the value is outside this range, install a new valve. Clear the DTCs and test for normal operation.

P133522	EGR Position Sensor Minimum/Maximum Stop Performance	<ul style="list-style-type: none"> Right-hand exhaust gas recirculation (EGR) position sensor minimum/maximum stop performance - signal amplitude greater than maximum EGR valve circuit short circuit to power EGR valve fault 	Check the EGR valve and circuits. Refer to the electrical guides. Using a data logger function, check the EGR valve angles and command the valve to 0% pulse width modulated (PWM). Recheck the angle. The value should be 0 - 20%. If the value is outside this range, install a new valve. Clear the DTCs and test for normal operation.
P133676	Crankshaft/Camshaft Sensor Range/Performance	<ul style="list-style-type: none"> CKP sensor incorrectly installed/damaged CMP sensor incorrectly installed/damaged CKP sensor fault CMP sensor fault 	Check the CMP and CKP sensors and circuits. Refer to the electrical guides. If no fault is found in the circuits, install new sensors as necessary. Clear the DTCs and test for normal operation.
P133678	Crankshaft/Camshaft Sensor Range/Performance	<ul style="list-style-type: none"> Camshaft - one tooth off 	Check the CMP and CKP sensors and circuits. Refer to the electrical guides. If no fault is found in the circuits, install new sensors as necessary. Clear the DTCs and test for normal operation.
P138E21	Turbocharger Boost Control Position Sensor A Minimum/Maximum Stop Performance	<ul style="list-style-type: none"> Signal amplitude less than minimum Right-hand turbocharger boost control position sensor A adaption diagnosis below bottom limit 	Check the turbocharger and circuits. Refer to the electrical guides. Using a data logger function, record the turbocharger actuator angles. Command the turbocharger actuator to 5% pulse width modulated (PWM), then 95% pulse width modulated (PWM) and recheck the recorded angles. The value at 5% pulse width modulated (PWM) should be 0 - 20%, and at 95% pulse width modulated (PWM), 80 - 95%. If the angles are outside these ranges, install a new turbocharger. Clear the DTCs and test for normal operation.
P138E22	Turbocharger Boost Control Position Sensor A Minimum/Maximum Stop Performance	<ul style="list-style-type: none"> Signal amplitude greater than maximum Right-hand turbocharger boost control position sensor A adaption diagnosis above top limit 	Check the turbocharger and circuits. Refer to the electrical guides. Using a data logger function, record the turbocharger actuator angles. Command the turbocharger actuator to 5% pulse width modulated (PWM), then 95% pulse width modulated (PWM) and recheck the recorded angles. The value at 5% pulse width modulated (PWM) should be 0 - 20%, and at 95% pulse width modulated (PWM), 80 - 95%. If the angles are outside these ranges, install a new turbocharger. Clear the DTCs and test for normal operation.
P140E21	EGR Position Sensor C Minimum/Maximum Stop Performance	<ul style="list-style-type: none"> Signal amplitude less than minimum EGR valve adaption 1 bottom limit check 	Check the EGR valve and circuits. Refer to the electrical guides. Using a data logger function, check the EGR valve angles and command the valve to 0% pulse width modulated (PWM). Recheck the angle. The value should be between 0 - 20%. If the value is outside this range, install a new valve. Clear the DTCs and test for normal operation.
P140E22	EGR Position Sensor C Minimum/Maximum Stop Performance	<ul style="list-style-type: none"> Signal amplitude greater than maximum EGR valve adaption 1 top limit check 	Check the EGR valve and circuits. Refer to the electrical guides. Using a data logger function, check the EGR valve angles and command the valve to 0% pulse width modulated (PWM). Recheck the angle. The value should be between 0 - 20%. If the value is outside this range, install a new valve. Clear the DTCs and test for normal operation.

P141A27	Exhaust Gas Recirculation Sensor A Circuit Intermittent/Erratic	<ul style="list-style-type: none"> • Signal rate of change above threshold • EGR valve position sensor circuit intermittent high resistance • EGR sensor fault 	Check the EGR valve and circuits. Refer to the electrical guides. Start the engine and allow to warm up. Using a data logger function, check the EGR valve position. After a further 5 seconds, recheck the position. If the value has increased by more than 80% per 10 ms, recheck the circuits. If no fault is found in the circuits, install a new EGR valve. Clear the DTCs and test for normal operation.
P141B1C	Exhaust Gas Recirculation Sensor B Circuit Intermittent/Erratic	<ul style="list-style-type: none"> • Circuit voltage out of range • EGR throttle position sensor circuit intermittent high resistance • EGR sensor fault 	Check the EGR valve and circuits. Refer to the electrical guides. Start the engine and allow to warm up. Using a data logger function, check the EGR valve position. After a further 5 seconds, recheck the position. If the value has increased by more than 80% per 10 ms, recheck the circuits. If no fault is found in the circuits, install a new EGR valve. Clear the DTCs and test for normal operation.
P141C27	Exhaust Gas Recirculation Sensor C Circuit Intermittent/Erratic	<ul style="list-style-type: none"> • signal rate of change above threshold • EGR valve position sensor circuit intermittent high resistance • EGR sensor fault 	Check the EGR valve and circuits. Refer to the electrical guides. Start the engine and allow to warm up. Using a data logger function, check the EGR valve position. After a further 5 seconds, recheck the position. If the value has increased by more than 80% per 10 ms, recheck the circuits. If no fault is found in the circuits, install a new EGR valve. Clear the DTCs and test for normal operation.
P150A01	Cylinder 1 Injector Circuit Range/Performance	<ul style="list-style-type: none"> • Injector circuit short circuit to ground • Injector circuit short circuit to power • Injector circuit high resistance • Injector fault 	Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Disconnect the injector and measure the resistance and capacitance of the component. Resistance should be 180 - 220 Kohms, capacitance should be greater than 3 microfarad at 20°C (68° F). If the values are outside this range, install a new injector as necessary.
P150B01	Cylinder 2 Injector Circuit Range/Performance	<ul style="list-style-type: none"> • Injector circuit short circuit to ground • Injector circuit short circuit to power • Injector circuit high resistance • Injector fault 	Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Disconnect the injector and measure the resistance and capacitance of the component. Resistance should be 180 - 220 Kohms, capacitance should be greater than 3 microfarad at 20°C (68° F). If the values are outside this range, install a new injector as necessary.
P150C01	Cylinder 3 Injector Circuit Range/Performance	<ul style="list-style-type: none"> • Injector circuit short circuit to ground • Injector circuit short circuit to power • Injector circuit high resistance • Injector fault 	Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Disconnect the injector and measure the resistance and capacitance of the component. Resistance should be 180 - 220 Kohms, capacitance should be greater than 3 microfarad at 20°C (68° F). If the values are outside this range, install a new injector as necessary.
P155401	Cylinder 4 Injector Circuit Range/Performance	<ul style="list-style-type: none"> • Injector circuit short circuit to ground • Injector circuit short circuit to power • Injector circuit high resistance • Injector fault 	Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Disconnect the injector and measure the resistance and capacitance of the component. Resistance should be 180 - 220 Kohms, capacitance should be greater than 3 microfarad at 20°C (68° F). If the values are outside this range, install a new injector as necessary.

P155501	Cylinder 5 Injector Circuit Range/Performance	<ul style="list-style-type: none"> • Injector circuit short circuit to ground • Injector circuit short circuit to power • Injector circuit high resistance • Injector fault 	Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Disconnect the injector and measure the resistance and capacitance of the component. Resistance should be 180 - 220 Kohms, capacitance should be greater than 3 microfarad at 20°C (68° F). If the values are outside this range, install a new injector as necessary.
P155601	Cylinder 6 Injector Circuit Range/Performance	<ul style="list-style-type: none"> • Injector circuit short circuit to ground • Injector circuit short circuit to power • Injector circuit high resistance • Injector fault 	Check the injector circuits. Refer to the electrical guides. Rectify as necessary. Disconnect the injector and measure the resistance and capacitance of the component. Resistance should be 180 - 220 Kohms, capacitance should be greater than 3 microfarad at 20°C (68° F). If the values are outside this range, install a new injector as necessary.
P157262	Brake Pedal Switch Circuit	<ul style="list-style-type: none"> • Brake lamp switch/brake travel switch circuit fault - signal compare fault • Engine control module (ECM) fault 	Check the brake lamp switch/brake travel switch and circuits. Refer to the electrical guides. Clear the DTCs and test for normal operation. Refer to the warranty policy and procedures manual if a module is suspect.
P162300	Immobilizer Code Word/ID Number Write Failure	<ul style="list-style-type: none"> • Challenge failed due to timeout 	Check the circuits between the modules. Refer to the electrical guides. Check for network DTCs. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P167C00	CAN Link PCM/PCM Circuit/Network	<ul style="list-style-type: none"> • Controller area network (CAN) link to engine control module (ECM) circuit network • ECM circuits short circuit to ground • ECM circuits short circuit to power • ECM circuits high resistance • ECM fault 	Cycle the ignition and allow power latch. Check the ECM and circuits. Refer to the electrical guides. Repair/renew as necessary. If no fault is found in the circuits, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P193A68	Invalid Scan Tool Communication/Request	<ul style="list-style-type: none"> • Invalid scan tool communication request 	This is not a fault, but event information of the communication between the scan tool and ECM. Clear/ignore this DTC.
P200813	Intake Manifold Runner Control Circuit / Open (Bank 1)	<ul style="list-style-type: none"> • Port de-activation solenoid circuit high resistance • Port de-activation solenoid circuit short circuit to ground • Port de-activation solenoid failure 	Check the port deactivation valve and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new valve. Clear the DTCs and test for normal operation.
P200911	Intake Manifold Runner Control Circuit Low (Bank 1)	<ul style="list-style-type: none"> • Port de-activation solenoid circuit high resistance • Port de-activation solenoid circuit short circuit to ground • Port de-activation solenoid failure 	Check the port deactivation valve and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new valve. Clear the DTCs and test for normal operation.
P201012	Intake Manifold Runner Control Circuit High (Bank 1)	<ul style="list-style-type: none"> • Port deactivation control circuit short circuit to power • Port de-activation solenoid failure 	Check the port deactivation valve and circuits. Refer to the electrical guides. If no fault is found in the circuits, install a new valve. Clear the DTCs and test for normal operation.
P210502	Throttle Actuator Control System - Forced Engine Shutdown	<ul style="list-style-type: none"> • Engine stop by throttle 	Check for associated DTCs and Repair/renew as necessary. If this DTC resets, contact the technical help desk.

P212216	Throttle/Pedal Position Sensor/Switch D Circuit Low	<ul style="list-style-type: none"> • Circuit voltage below threshold - track 1 • Accelerator pedal position (APP) sensor circuits short circuit to ground • APP sensor circuits short circuit to power • APP sensor fault 	Check the APP sensor circuits. Refer to the electrical guides. Using a data logger function, check the APP sensor track 1 value with the pedal in the rest position. If the value is not approximately 0%, install a new pedal. Clear the DTCs and test for normal operation.
P212317	Throttle/Pedal Position Sensor/Switch D Circuit High	<ul style="list-style-type: none"> • Circuit voltage above threshold - track 1 • Accelerator pedal position (APP) sensor circuits short circuit to ground • APP sensor circuits short circuit to power • APP sensor fault 	Check the APP sensor circuits. Refer to the electrical guides. Using a data logger function, check the APP sensor track 1 value with the pedal in the wide open position. If the value is not approximately 99%, install a new pedal. Clear the DTCs and test for normal operation.
P212716	Throttle/Pedal Position Sensor/Switch E Circuit Low	<ul style="list-style-type: none"> • Circuit voltage below threshold - track 2 • Accelerator pedal position (APP) sensor circuits short circuit to ground • APP sensor circuits short circuit to power • APP sensor fault 	Check the APP sensor circuits. Refer to the electrical guides. Using a data logger function, check the APP sensor track 2 value with the pedal in the rest position. If the value is not approximately 0%, install a new pedal. Clear the DTCs and test for normal operation.
P212817	Throttle/Pedal Position Sensor/Switch E Circuit High	<ul style="list-style-type: none"> • Circuit voltage above threshold - track 2 • Accelerator pedal position (APP) sensor circuits short circuit to ground • APP sensor circuits short circuit to power • APP sensor fault 	Check the APP sensor circuits. Refer to the electrical guides. Using a data logger function, check the APP sensor track 2 value with the pedal in the wide open position. If the value is not approximately 99%, install a new pedal. Clear the DTCs and test for normal operation.
P213862	Throttle/Pedal Position Sensor/Switch D / E Voltage Correlation)	<ul style="list-style-type: none"> • Signal compare fault (the value difference between channels is greater than it should be) • Accelerator pedal position (APP) sensor circuits short circuit to ground • APP sensor circuits short circuit to power • APP sensor fault 	Check the APP sensor circuits. Refer to the electrical guides. Using a data logger function, check the APP sensor values for tracks 1 and 2 with the pedal in the idle position, and again in the wide open position. Both tracks should read approximately 0% in the idle position and 99% in the wide open position. If any of the values are incorrect, install a new pedal. Clear the DTCs and test for normal operation.
P213E01	Fuel Injection System Fault Forced Engine Shutdown	<ul style="list-style-type: none"> • Engine stop by electrical 	Check for associated DTCs and Repair/renew as necessary. If this DTC resets, contact the technical help desk.
P213F07	Fuel Injection System Fault Forced Engine Shutdown	<ul style="list-style-type: none"> • Engine stop by hydraulic 	Check for associated DTCs and Repair/renew as necessary. If this DTC resets, contact the technical help desk.
P219921	Intake Air Temperature ½ Correlation	<ul style="list-style-type: none"> • Sensor signal amplitude below minimum threshold • Intake air temperature (IAT) sensor circuit high resistance, short circuit to ground • Air charge temperature (ACT) sensor circuit high resistance, short circuit to ground • IAT sensor failure • ACT sensor failure • ECM failure 	Check the IAT sensor and circuits. Refer to the electrical guides. For ACT sensor, refer to the relevant workshop manual section. Refer to the warranty policy and procedures manual if a module is suspect.
		<ul style="list-style-type: none"> • Sensor signal amplitude above maximum 	

P219922	Intake Air Temperature ½ Correlation	<ul style="list-style-type: none"> threshold Intake air temperature (IAT) sensor circuit high resistance, short circuit to power Air charge temperature (ACT) sensor circuit high resistance, short circuit to power IAT sensor failure ACT sensor failure ECM failure 	Check the IAT sensor and circuits. Refer to the electrical guides. For ACT sensor, refer to the relevant workshop manual section. Refer to the warranty policy and procedures manual if a module is suspect.
P222816	Barometric Pressure Sensor A Circuit Low	<ul style="list-style-type: none"> Circuit voltage below threshold Sensor fault The BARO sensor is internal to the Engine control module (ECM) 	Using a data logger function, check the ambient pressure and the manifold absolute pressure with the engine off. If the ambient pressure is significantly different to the manifold pressure suspect the ECM. Refer to the warranty policy and procedures manual if an ECM is suspect.
P222917	Barometric Pressure Sensor A Circuit High	<ul style="list-style-type: none"> Circuit voltage above threshold Sensor fault The BARO sensor is internal to the Engine control module (ECM) 	Using a data logger function, check the ambient pressure and the manifold absolute pressure with the engine off. If the ambient pressure is significantly different to the manifold pressure suspect the ECM. Refer to the warranty policy and procedures manual if an ECM is suspect.
P223027	Barometric Pressure Sensor A Circuit Intermittent/Erratic	<ul style="list-style-type: none"> Signal rate of change above threshold Engine control module (ECM) fault 	Check the ECM circuits. Refer to the electrical guides. Using a data logger function, check the ambient pressure. Increase the engine speed to 1,500 rpm and recheck the pressure. If the pressure has increased by more than 30 KPa (4.35 lbs/in ²) per 100 ms, suspect the ECM. Refer to the warranty policy and procedures manual if a module is suspect.
P226413	Water in Fuel Sensor Circuit	<ul style="list-style-type: none"> Sensor circuit high resistance 	Check the sensor and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P226532	Water in Fuel Sensor Circuit Range/Performance	<ul style="list-style-type: none"> Water in fuel sensor connector fault - signal low time less than minimum - Initialization error, edge too short Water in fuel sensor circuit fault 	Check the sensor and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P226533	Water in Fuel Sensor Circuit Range/Performance	<ul style="list-style-type: none"> Water in fuel sensor connector fault - signal low time greater than maximum - Initialization error, edge too long Water in fuel sensor circuit fault 	Check the sensor and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P226611	Water in Fuel Sensor Circuit Low	<ul style="list-style-type: none"> Sensor circuit short circuit to ground 	Check the sensor and circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation.
P226968	Water in Fuel Condition	<ul style="list-style-type: none"> Water in fuel condition Water in fuel sensor circuit short circuit to ground Water in fuel sensor fault 	Drain the water from the fuel filter. Clear the DTC and retest. If the DTC resets, check the sensor circuit. Refer to the electrical guides. If no fault is found in the circuits, install a new sensor.
		<ul style="list-style-type: none"> ECM relay circuit high resistance 	Check the ECM relay circuits. Refer to the electrical guides. Activate the relay

P250513	ECM / PCM Power Input Signal	<ul style="list-style-type: none"> ECM relay circuit short circuit to ground ECM relay failure 	and check for an audible 'click'. Install a new relay as necessary. Clear the DTCs and test for normal operation.
P250711	ECM / PCM Power Input Signal Low	<ul style="list-style-type: none"> ECM relay circuit high resistance ECM relay circuit short circuit to ground ECM relay failure 	Check the ECM relay circuits. Refer to the electrical guides. Activate the relay and check for an audible 'click'. Install a new relay as necessary. Clear the DTCs and test for normal operation.
P250812	ECM / PCM Power Input Signal High	<ul style="list-style-type: none"> Main relay short circuit to power 	Check the ECM relay circuits. Refer to the electrical guides. Activate the relay and check for an audible 'click'. Install a new relay as necessary. Clear the DTCs and test for normal operation.
P256327	Turbocharger Boost Control Position Sensor A Circuit Range/Performance	<ul style="list-style-type: none"> Turbocharger boost control position sensor A circuit range/performance - signal rate of change above threshold Turbocharger position sensor circuit high resistance 	Check the turbocharger circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. If any DTCs reset, recheck the circuits.
P256421	Turbocharger Boost Control Position Sensor A Circuit Low	<ul style="list-style-type: none"> Turbocharger boost control position sensor A circuit low - signal amplitude less than minimum Turbocharger position sensor circuit short circuit to ground Turbocharger fault 	Check the turbocharger circuits. Refer to the electrical guides. Rectify as necessary. If no fault is found in the circuits, install a new turbocharger. Clear the DTCs and test for normal operation.
P256522	Turbocharger Boost Control Position Sensor A Circuit High	<ul style="list-style-type: none"> Turbocharger boost control position sensor A circuit high - signal amplitude greater than maximum Turbocharger position sensor circuit short circuit to power Turbocharger fault 	Check the turbocharger circuits. Refer to the electrical guides. Rectify as necessary. If no fault is found in the circuits, install a new turbocharger. Clear the DTCs and test for normal operation.
U000200	High Speed CAN Communication Bus Performance	<ul style="list-style-type: none"> CAN performance 	Check the high-speed CAN circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U040581	Invalid Data Received From Cruise Control Module	<ul style="list-style-type: none"> Invalid serial data received 	Check the CAN circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U040585	Invalid Data Received From Cruise Control Module	<ul style="list-style-type: none"> Signal received is above maximum allowable range the vehicle speed set point delivered by CAN is invalid 	Check the CAN circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U041600	Invalid Data Received From Vehicle Dynamics Control Module	<ul style="list-style-type: none"> Invalid data received from vehicle dynamics control module stability control - ESP Error on BLS sensor coming on CAN 	Check the CAN circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network Communications section of the workshop manual.
U041700	Invalid Data Received From Park Brake Control Module	<ul style="list-style-type: none"> Error signal over CAN 	Check the CAN circuits. Refer to the electrical guides. Repair/renew as necessary. Clear the DTCs and test for normal operation. Refer to the Network

DTC	Description	Possible causes	Action
P02CD00	Cylinder 1 Fuel Injector Offset Learning at Max Limit	Fuel injector failure	Replace fuel injector for related cylinder
P02CF00	Cylinder 2 Fuel Injector Offset Learning at Max Limit	Fuel injector failure	Replace fuel injector for related cylinder
P02D100	Cylinder 3 Fuel Injector Offset Learning at Max Limit	Fuel injector failure	Replace fuel injector for related cylinder
P02D300	Cylinder 4 Fuel Injector Offset Learning at Max Limit	Fuel injector failure	Replace fuel injector for related cylinder
P02D500	Cylinder 5 Fuel Injector Offset Learning at Max Limit	Fuel injector failure	Replace fuel injector for related cylinder
P02D700	Cylinder 6 Fuel Injector Offset Learning at Max Limit	Fuel injector failure	Replace fuel injector for related cylinder
P042562	Catalyst Temperature Sensor Circuit (Bank 1, Sensor Circuit 1)	<ul style="list-style-type: none"> Pre-catalytic converter temperature sensor signal compare failure (right hand bank sensor 1) Pre-catalytic converter temperature sensor correlation compare with at least two other sensors Pre-catalytic converter temperature sensor failure Pre-catalytic converter temperature sensor circuit - short to ground, power or open circuit 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check pre-catalytic converter temperature sensor circuit for open circuit, short to ground, short to power. Check pre-catalytic converter temperature sensor for dirt contamination, corrosion, water ingress damage. Replace pre-catalytic converter temperature sensor
P042600	Catalyst Temperature Sensor Circuit Range/Performance (Bank 1, Sensor Circuit 1)	<ul style="list-style-type: none"> Pre-catalytic converter temperature sensor gradient check (right hand bank sensor 1) Pre-catalytic converter temperature sensor failure Pre-catalytic converter temperature sensor circuit - short to ground, power or open circuit Pre-catalytic converter temperature sensor circuit high resistance 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check pre-catalytic converter temperature sensor circuit for open circuit, short to ground, short to power. Intermittent poor or dirty connections. Install a new sensor as required
		<ul style="list-style-type: none"> Pre-catalytic converter temperature sensor circuit resistance 	

P04261A	Catalyst Temperature Sensor Circuit Range/Performance (Bank 1, Sensor Circuit 1)	<ul style="list-style-type: none"> below threshold (right hand bank sensor 1) Pre-catalytic converter temperature sensor plausibility at cold start, temperature difference too high Pre-catalytic converter temperature sensor stuck at high temperature value 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check pre-catalytic converter temperature sensor circuit for low resistance, short to ground. Replace pre-catalytic converter temperature sensor
P04261B	Catalyst Temperature Sensor Circuit Range/Performance (Bank 1, Sensor Circuit 1)	<ul style="list-style-type: none"> Pre-catalytic converter temperature sensor circuit resistance above threshold (right hand bank sensor 1) Pre-catalytic converter temperature sensor plausibility at cold start, temperature difference too low Pre-catalytic converter temperature sensor stuck at high temperature value 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check pre-catalytic converter temperature sensor circuit for high resistance, open circuit. Replace pre-catalytic converter temperature sensor
P04261E	Catalyst Temperature Sensor Circuit Range/Performance (Bank 1, Sensor Circuit 1)	<ul style="list-style-type: none"> Pre-catalytic converter temperature sensor circuit resistance out of range (right hand bank sensor 1) Pre-catalytic converter temperature sensor plausibility at engine running, temperature too low Pre-catalytic converter temperature sensor stuck at low temperature value 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check pre-catalytic converter temperature sensor circuit for open circuit, short to ground, short to power. Check pre-catalytic converter temperature sensor for dirt contamination, corrosion, water ingress damage. Replace pre-catalytic converter temperature sensor
P042700	Catalyst Temperature Sensor Circuit Low (Bank 1, Sensor Circuit 1)	<ul style="list-style-type: none"> Pre-catalytic converter temperature sensor signal below minimum threshold voltage (right hand bank sensor 1) Pre-catalytic converter temperature sensor failure Pre-catalytic converter temperature sensor circuit - short to ground 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check pre-catalytic converter temperature sensor circuit for short to ground. Install a new sensor as required
	Catalyst Temperature	<ul style="list-style-type: none"> Pre-catalytic converter temperature sensor signal above maximum threshold voltage (right hand bank sensor 1) 	Carry out any pinpoint test associated with this DTC using the manufacturer approved

P042800	Sensor Circuit High (Bank 1, Sensor Circuit 1)	<ul style="list-style-type: none"> • Pre-catalytic converter temperature sensor failure • Pre-catalytic converter temperature sensor circuit - short power, open circuit 	diagnostic system. Refer to the electrical guides and check Pre-catalytic converter temperature sensor circuit for short to power, open circuit. Install a new sensor as required
P042A62	Catalyst Temperature Sensor Circuit (Bank 1, Sensor Circuit 2)	<ul style="list-style-type: none"> • Post-catalytic converter temperature sensor signal compare failure (right hand bank sensor 2) • Post-catalytic converter temperature sensor correlation compare with at least two other sensors • Post-catalytic converter temperature sensor failure • Post-catalytic converter temperature sensor circuit - short to ground, power or open circuit 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check post-catalytic converter temperature sensor circuit for open circuit, short to ground, short to power. check post-catalytic converter temperature sensor for dirt contamination, corrosion, water ingress damage. Replace post-catalytic converter temperature sensor
P042B00	Catalyst Temperature Sensor Circuit Range/Performance (Bank1, Sensor Circuit 2)	<ul style="list-style-type: none"> • Post-catalytic converter temperature sensor gradient check (right hand bank sensor 2) • Post-catalytic converter temperature sensor failure • Post-catalytic converter temperature sensor circuit - short to ground, power or open circuit • Post-catalytic converter temperature sensor circuit - high resistance 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check post-catalytic converter temperature sensor circuit for open circuit, short to ground, short to power. Intermittent poor or dirty connections. Install a new sensor as required
P042B1A	Catalyst Temperature Sensor Circuit Range/Performance (Bank1, Sensor Circuit 2)	<ul style="list-style-type: none"> • Post-catalytic converter temperature sensor circuit resistance below threshold (right hand bank sensor 2) • Post-catalytic converter temperature sensor plausibility at cold start, temperature difference too high • Post-catalytic converter temperature sensor stuck at high temperature value 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check post-catalytic converter temperature sensor circuit for low resistance, short to ground. Replace post-catalytic converter temperature sensor
		<ul style="list-style-type: none"> • Post-catalytic converter 	

P042B1B	Catalyst Temperature Sensor Circuit Range/Performance (Bank1, Sensor Circuit 2)	<ul style="list-style-type: none"> temperature sensor circuit resistance above threshold (right hand bank sensor 2) • Post-catalytic converter temperature sensor plausibility at cold start, temperature difference too low • Post-catalytic converter temperature sensor stuck at high temperature value 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check post-catalytic converter temperature sensor circuit for high resistance, open circuit. Replace post-catalytic converter temperature sensor
P042B1E	Catalyst Temperature Sensor Circuit Range/Performance (Bank1, Sensor Circuit 2)	<ul style="list-style-type: none"> • Post-catalytic converter temperature sensor circuit resistance out of range (right hand bank sensor 2) • Post-catalytic converter temperature sensor plausibility at engine running, temperature too low • Post-catalytic converter temperature sensor stuck at low temperature value 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check post-catalytic converter temperature sensor circuit for open circuit, short to ground, short to power. check post-catalytic converter temperature sensor for dirt contamination, corrosion, water ingress damage. Replace post-catalytic converter temperature sensor
P042C00	Catalyst Temperature Sensor Circuit Low (Bank 1, Sensor Circuit 2)	<ul style="list-style-type: none"> • Post-catalytic converter temperature sensor signal below minimum threshold voltage (right hand bank sensor 2) • Post-catalytic converter temperature sensor failure • Post-catalytic converter temperature sensor circuit - short to ground 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check post-catalytic converter temperature sensor circuit for short to ground. Install a new sensor as required
P042D00	Catalyst Temperature Sensor Circuit High (Bank 1, Sensor Circuit 2)	<ul style="list-style-type: none"> • Post-catalytic converter temperature sensor signal above maximum threshold voltage (right hand bank sensor 2) • Post-catalytic converter temperature sensor failure • Post-catalytic converter temperature sensor circuit - short to power, open circuit 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check post-catalytic converter temperature sensor circuit for short to power, open circuit. Install a new sensor as required
	Exhaust Gas	<ul style="list-style-type: none"> • Post DPF temperature sensor signal compare failure (right hand bank sensor 3) • Post DPF 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check post DPF temperature

P242A62	Temperature Sensor Circuit Bank 1 Sensor 3	<p>temperature sensor correlation compare with at least two other sensors</p> <ul style="list-style-type: none"> • Post DPF temperature sensor failure 	<p>sensor circuit for open circuit, short to ground, short to power. Check post DPF temperature sensor for dirt contamination, corrosion, water ingress damage. Replace post DPF temperature sensor</p>
P242B1A	Exhaust Gas Temperature Sensor Circuit Range/Performance Bank 1 Sensor 3	<ul style="list-style-type: none"> • Post DPF temperature sensor circuit resistance below threshold (right hand bank sensor 3) • Post DPF temperature sensor plausibility at cold start, temperature difference too high • Post DPF temperature sensor failure • Post DPF temperature sensor stuck at high temperature value 	<p>Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check post DPF temperature sensor circuit for low resistance, short to ground. Replace post DPF temperature sensor</p>
P242B1B	Exhaust Gas Temperature Sensor Circuit Range/Performance Bank 1 Sensor 3	<ul style="list-style-type: none"> • Post DPF temperature sensor circuit resistance above threshold (right hand bank sensor 3) • Post DPF temperature sensor plausibility at cold start, temperature difference too low • Post DPF temperature sensor failure • Post DPF temperature sensor stuck at high temperature value 	<p>Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check post DPF temperature sensor circuit for high resistance, open circuit. Replace post DPF temperature sensor</p>
P242B1E	Exhaust Gas Temperature Sensor Circuit Range/Performance Bank 1 Sensor 3	<ul style="list-style-type: none"> • Post DPF temperature sensor circuit resistance out of range (right hand bank sensor 3) • Post DPF temperature sensor plausibility at engine running, temperature too low • Post DPF temperature sensor failure • Post DPF temperature sensor stuck at low temperature value 	<p>Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check post DPF temperature sensor circuit for open circuit, short to ground, short to power. Check post DPF temperature sensor for dirt contamination, corrosion, water ingress damage. Replace post DPF temperature sensor</p>
P242C00	Exhaust Gas Temperature Sensor Circuit Low Bank 1 Sensor 3	<ul style="list-style-type: none"> • Post DPF temperature sensor signal below minimum threshold voltage (right hand bank sensor 3) • Post DPF temperature sensor failure • Post DPF temperature sensor circuit -short to 	<p>Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check post DPF temperature sensor circuit for short to ground, high resistance. Install a new sensor as required</p>

		ground, high resistance	
P242D00	Exhaust Gas Temperature Sensor Circuit High Bank 1 Sensor 3	<ul style="list-style-type: none"> • Post DPF temperature sensor signal above max threshold voltage (right hand bank sensor 3) • Post DPF temperature sensor failure • Post DPF temperature sensor circuit - short to power, open circuit 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check post DPF temperature sensor circuit for short to power, open circuit. Install a new sensor as required
P242E00	Exhaust Gas Temperature Sensor Circuit Intermittent/Erratic Bank 1 Sensor 3	<ul style="list-style-type: none"> • Post DPF temperature sensor gradient check (right hand bank sensor 3) • Post DPF temperature sensor failure • Post DPF temperature sensor circuit - short to ground, power or open circuit 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check post DPF temperature sensor circuit for open circuit, short to ground, short to power. Intermittent poor or dirty connections. Install a new sensor as required
P242F68	Diesel Particulate Filter Restriction - Ash Accumulation	<ul style="list-style-type: none"> • DPF event information • DPF partially blocked • DPF circuit internal to ECM 	DPF regeneration required. Refer to driver handbook.
P244A00	Diesel Particulate Filter Differential Pressure Too Low(Bank1)	<ul style="list-style-type: none"> • Differential pressure on particulate filter too low right hand bank 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check DPS circuit for open circuit, short to ground, short to power. Check DPS system external pipework for breakage or leakage. Check DPF internal filter brick for failure. Install DPF as required
P244B00	Diesel Particulate Filter Differential Pressure Too High (Bank 1)	<ul style="list-style-type: none"> • Differential pressure on particulate filter too high right hand bank • Diesel particulate filter internal failure 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Contact Dealer Technical Support
P245300	Diesel Particulate Filter Pressure Sensor A Circuit Range/Performance	<ul style="list-style-type: none"> • Differential pressure on particulate filter sensor plausibility before start • DPS system contaminated or blocked • DPS stuck • DPS - short to ground, power or open circuit 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check DPS circuit for open circuit, short to ground, short to power. Check DPS system for contamination or blockage. Check DPS for sticking. Install sensor as required
P245329	Diesel Particulate Filter Pressure Sensor A Circuit Range/Performance	<ul style="list-style-type: none"> • DPS signal invalid • Differential pressure on particulate filter sensor plausibility check at engine running • DPS system contaminated or blocked • DPS stuck • DPS - short to ground, power or 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check DPS circuit for open circuit, short to ground, short to power. Check DPS system external pipework for breakage or leakage. Check DPS for sticking. Install sensor as required

		open circuit	
P245400	Diesel Particulate Filter Pressure Sensor A Circuit Low	<ul style="list-style-type: none"> • DPS signal below minimum threshold • DPS failure • DPS circuit - short to ground, high resistance 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check DPS circuit for short to ground, high resistance. Install sensor as required
P245500	Diesel Particulate Filter Pressure Sensor A Circuit High	<ul style="list-style-type: none"> • DPS signal above maximum threshold • DPS failure • DPS circuit - short to power, open circuit 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check DPS circuit for open circuit, short to power. Install sensor as required
P245600	Diesel Particulate Filter Pressure Sensor A Circuit Intermittent/Erratic	<ul style="list-style-type: none"> • DPS signal gradient not plausible • DPS failure • DPS circuit - short to ground, power or open circuit 	Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical guides and check DPS circuit for open circuit, short to ground, short to power. Install sensor as required
P245800	Diesel Particulate Filter Regeneration Duration	<ul style="list-style-type: none"> • Delay timer for regeneration exceeds threshold • DPF circuit internal to ECM 	Contact Dealer Technical Support