

Electronic Engine Controls

Inspection and Verification

1. Verify the customer concern.
2. Confirm which, if any, warning lights and/or messages were displayed on the instrument cluster.

NOTE:

If any warning lights and/or messages were displayed when the fault occurred, refer to the Driver Information table for DTCs associated with the display, then to the DTC index table for possible sources and actions. Some warnings will appear to clear when the ignition is cycled. This is often because the warning has flagged as a result of one of the vehicle's on-board diagnostic routines having run to detect the fault. If the same routine is not run when the ignition is switched **ON**, the warning will not reflag until the routine does run. See the DTC summaries for drive cycle routines.

3. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none">• Engine oil level• Cooling system coolant level• Fuel Contamination• Throttle body• Poly-vee belt	<ul style="list-style-type: none">• Fuses• Wiring harness• Electrical connector(s)• Sensor(s)• Engine control module (ECM)• Transmission control module• Check spark plug type. Only resisted plugs should be fitted. Refer to specifications section for gap• Relay date codes. If the date on the relay is between R6 k1 and R6 k8, replace the relay

4. Verify the following systems are working correctly:
 - Air intake system
 - Cooling system
 - Charging system
 - Fuel charging system
5. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
6. Where the Jaguar approved diagnostic system is available, complete the S93 report before clearing any or all fault codes from the vehicle.

NOTE:

If a DTC cannot be cleared, then there is a permanent fault present that flags again as soon as it is cleared. (The exception to this is P1260, which will only clear following an ignition **OFF/ON** cycle after rectification.)

7. If the cause is not visually evident and the Jaguar approved diagnostic system is not available, use a fault code reader to retrieve the fault codes before proceeding to the Diagnostic Trouble Code (DTC) Index Chart, or the Symptom Chart if no DTCs are set.

NOTE:

If the DTC flagged was not present for two or more consecutive cycles, it is classed as temporary, and will be

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deleted following three cycles during which no fault was present. This could result in a reported warning light/message with no stored DTCs. If a fault is present for three consecutive cycles, the DTC becomes permanent, and will remain in the module's memory for 40 drive cycles. (A cycle is an ignition **ON/OFF**, which will occur during the owner's normal use of the vehicle. No action on the part of the technician is necessary to perform this cycle. A drive cycle is a series of conditions needed to make the on-board diagnostic routine run, and may need a specific action on the part of the technician. See the DTC summaries for drive cycle routines)

8. Using the Jaguar approved diagnostic system where available, and a scan tool where not, check the freeze frame data for information on the conditions applicable when the fault was flagged. The format of this will vary, depending on the tool used, but can provide information useful to the technician in diagnosing the fault.



CAUTION:

When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00.

NOTE:

When performing electrical voltage or resistance tests, always use a digital multimeter (DMM) accurate to 3 decimal places, and with an up-to-date calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.

NOTE:

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Symptom Chart

Symptom (general)	Symptom (specific)	Possible source	Action
Non-Start	Engine does not crank	<ul style="list-style-type: none"> • Starter relay • ECM relay • Battery • Park/Neutral switch • Starting system • Harness damage • Engine siezed 	Check relay dates. Check for DTCS. For starting system, <<303-06>> For ECM relay tests, Goto <<AE>> . For battery information, <<414-01>> For Park/Neutral tests, Goto <<AD>> . For engine information, <<303-01>>
	Engine cranks, but does not fire	<ul style="list-style-type: none"> • Security system /Immobiliser engaged • Throttle contaminated • Harness damage • Fuel pump relay • Fuel system • Refer to service action S491 	Contact dealer technical support for information on security system. For fuel system, <<303-04>> Check bulletins for throttle cleaning procedure. Check service actions.

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	<p>Engine cranks and fires, but will not start</p>	<ul style="list-style-type: none"> • Fuel pump relay • Throttle contaminated • Purge valve • Fuel pump • Engine coolant temperature (ECT) sensor • Spark plugs fouled • Ignition coil failure(s) • Check for water ingress into spark plug wells (SC only) • HT short to ground (tracking) check rubber boots for cracks/damage • Cylinder compression loss (short-term. Refer to bulletin; 303-52) • Refer to service action S491 	<p>For fuel pump relay tests, Goto <<U>></p> <p>. Check bulletins for throttle cleaning procedure. Check fuel pressure. Refer to Technical service bulletins. For ECT sensor tests, Goto <<C>></p> <p>. For ignition system, <<303-07>> Check bulletins and service actions.</p>
<p>Difficult to start</p>	<p>Difficult to start cold</p>	<ul style="list-style-type: none"> • Rochester valve • Battery • Throttle contaminated • Fuel pump • Engine coolant temperature (ECT) sensor • Purge valve • Cylinder compression loss (short-term. Refer to bulletin; 303-52) • Blocked part-load breather (service action S474) • Refer to service action S491 	<p>For Rochester valve test, Goto <<AG>></p> <p>. For battery information, <<414-01>> Check bulletins for throttle cleaning procedure. Check fuel pressure. For ECT sensor circuit tests, Goto <<C>></p> <p>. For evaporative emissions tests, <<303-13>> Refer to bulletins for compression information, and service actions for part-load breather procedure and compressions.</p>

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	Difficult to start hot	<ul style="list-style-type: none"> • Rochester valve • Purge valve • Throttle contaminated • Fuel pump • Engine coolant temperature (ECT) sensor • Blocked part-load breather (service action S474) • Injector leak 	<p>For Rochester valve test, Goto <<AG>></p> <p>. For evaporative emissions tests, <<303-13>> Check bulletins for throttle cleaning procedure. Check fuel pressure. For ECT sensor circuit tests, Goto <<C>></p> <p>. Refer to Service action S474 for part-load breather procedure. For injector leak test, Refer to technical service bulletin 303-39.</p>
		Difficult to start after hot soak (vehicle standing after engine has reached operating temperature)	<ul style="list-style-type: none"> • Rochester valve • Throttle contaminated • Purge valve • Fuel pump • Engine coolant temperature (ECT) sensor • Blocked part-load breather (service action S474) • Injector leak
	Engine cranks too fast/slow	<ul style="list-style-type: none"> • Battery • Starter relay • Harness • Cylinder compression loss (NA short term only. Refer to technical service bulletin; 303-39) • Refer to service action S491 	<p>For battery information, <<414-01>></p> <p>For starting system. <<303-06>> Refer to technical service bulletins and service actions.</p>

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Engine stalls	Engine stalls soon after start	<ul style="list-style-type: none"> • Fuel pump relay • ECM relay • Throttle contaminated • CMP/CKP sensor synchronization malfunction • Harness • Fuel pump • MAF sensor malfunction • Engine coolant temperature (ECT) sensor • Fuel lines • Air leakage • Fuel pressure regulator 	<p>Check relay dates. Check for DTCS. For fuel pump relay tests, Goto <<U>></p> <p>. For ECM relay tests, Goto <<AE>></p> <p>. Check bulletins for throttle cleaning procedure. For CMP sensor circuit tests, Goto <<O>></p> <p>, for CKP sensor circuit tests, Goto <<N>></p> <p>. Check fuel pressure. For MAF sensor circuit tests, Goto <<A>></p> <p>. For ECT sensor tests, Goto <<C>></p> <p>. For fuel system, <<303-04>> and <<310-01>> For intake system information, <<303-12>></p>
'	Engine stalls on overrun	<ul style="list-style-type: none"> • Throttle contaminated • ECM relay • Fuel pump relay • CMP/CKP sensor synchronization malfunction 	<p>Check bulletins for throttle cleaning procedure. Check relay dates. For ECM relay tests, Goto <<AE>></p> <p>. For fuel pump relay tests, Goto <<U>></p> <p>. For CMP sensor circuit tests, Goto <<O>></p> <p>, for CKP sensor circuit tests, Goto <<N>></p> <p>.</p>
'	Engine stalls at steady speed, with or without cruise enabled	<ul style="list-style-type: none"> • Throttle contaminated • ECM relay • Fuel pump relay • CMP/CKP sensor synchronization malfunction • Harness • Blocked part-load breather (service action S474) 	<p>Check bulletins for throttle cleaning procedure. Check relay dates. For ECM relay circuit tests, Goto <<AE>></p> <p>. For fuel pump relay circuit tests, Goto <<U>></p> <p>. For CMP sensor circuit tests, Goto <<O>></p> <p>, for CKP sensor circuit tests, Goto <<N>></p> <p>. Check service actions.</p>

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	Engine stalls when maneuvering	<ul style="list-style-type: none"> • ECM relay • Fuel pump relay • CMP/CKP sensor synchronization malfunction 	<p>Check relay dates. For ECM relay circuit tests, Goto <<AE>></p> <p>. For fuel pump relay circuit tests, Goto <<U>></p> <p>. For CMP sensor circuit tests, Goto <<O>></p> <p>, for CKP sensor circuit tests, Goto <<N>></p> <p>.</p>
Poor driveability	Engine hesitates/poor acceleration	<ul style="list-style-type: none"> • Fuel pump • Exhaust gas recirculation (EGR) • Air leakage • Stop lamp switch • Throttle sensors • Throttle motor • Spark plugs fouled • Check for water ingress into spark plug wells (SC only) • Ignition coil failure(s) • HT short to ground (tracking) check rubber boots for cracks/damage • ECM failure 	<p>Check fuel pressure. For EGR information, <<303-08>> For intake system information, <<303-12>> For stop lamp switch information, refer to the wiring diagrams. For throttle position sensor tests, Goto <<D>></p> <p>. For throttle motor control circuit tests, Goto <<S>></p> <p>. For ignition system, <<303-07>> For ECM circuit tests, Goto <<AE>></p> <p>.</p>
	Engine backfires	<ul style="list-style-type: none"> • Fuel pump • Air leakage • MAF sensor • HO2 sensors • Spark plugs • Check for water ingress into spark plug wells (SC only) • HT short to ground (tracking) check rubber boots for cracks/damage • Ignition coil failure(s) 	<p>Check fuel pressure. For intake system information, <<303-12>> For MAF sensor circuit tests, Goto <<A>></p> <p>. For HO2 sensor circuit tests, check for DTC indicating which sensor and follow indicated pinpoint test. For ignition system, <<303-07>></p>

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	Engine surges	<ul style="list-style-type: none"> • Air leakage • Fuel pump • Stop lamp switch • MAF sensor • Harness • Throttle sensors • Throttle motor • Spark plugs • Check for water ingress into spark plug wells (SC only) • HT short to ground (tracking) check rubber boots for cracks/damage • ECM failure 	<p>For intake system, <<303-12>> Check fuel pressure. For stop lamp information, refer to the wiring diagrams. For MAF sensor tests, Goto <<A>></p> <p>. For throttle position sensor tests, Goto <<D>></p> <p>, and</p> <p>Goto <<K>></p> <p>. For throttle motor circuit tests, Goto <<S>></p> <p>. For ignition system, <<303-07>> For ECM circuit tests, Goto <<AE>></p> <p>.</p>
	Engine detonates/knocks	<ul style="list-style-type: none"> • Fuel pump • HO2 sensors • Air leakage • Blocked part-load breather (service action S474) • Mass air flow (MAF) sensor 	<p>Check fuel pressure. For HO2 sensor circuit tests, check for DTC indicating which sensor and follow indicated pinpoint test. For intake system information, <<303-12>> Check service action S474. For MAF sensor tests, Goto <<A>></p> <p>.</p>
	No throttle response	<ul style="list-style-type: none"> • Traction control invoked • Throttle sensors • Throttle motor 	<p>For throttle position sensor tests, Goto <<D>></p> <p>, and</p> <p>Goto <<K>></p> <p>. For throttle motor circuit tests, Goto <<S>></p> <p>.</p>
	Cruise control inhibited or disabled	<ul style="list-style-type: none"> • Cruise control switch • Throttle sensors • Stop lamp switch 	<p>For cruise control switches, <<310-03>> For throttle position sensor tests, Goto <<D>></p> <p>, and</p> <p>Goto <<K>></p> <p>. For stop light switch information, refer to the wiring diagrams.</p>

Driver Information Chart

NOTE:

Use this table to identify DTCs associated with the message centre display, then refer to the DTC index for possible sources and actions.

NOTE:

For definitions of Default Modes, see the foot of this table.

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Warning light	Message	Default Mode	DTC
Red	Engine Failsafe Mode	Limp-Home	P1224
Red	Engine Failsafe Mode	Limp-Home	P1229
Red	Engine Failsafe Mode	Limp-Home	P0122, P0123,
Red	Engine Failsafe Mode	Limp-Home	P0222, P0223
Red	Engine Failsafe Mode	Limp-Home	P0121
Red	Engine Failsafe Mode	Limp-Home	P1122, P1123
Red	Engine Failsafe Mode	Limp-Home	P1222, P1223
Red	Engine Failsafe Mode	Limp-Home	P1121, P1632
Red	Engine Failsafe Mode	Limp-Home	P1251, P0560, P1658
Red	Engine Failsafe Mode	Limp-Home	P1631
Red	Engine Failsafe Mode	Limp-Home	P1611
Red	Engine Failsafe Mode	Limp-Home	P1633
Red	Engine Failsafe Mode	Limp-Home	P1609
Red	Engine Failsafe Mode	Limp-Home	P0506, P0507
Red	Engine Failsafe Mode	Limp-Home	P1656
Red	Engine Failsafe Mode	Engine shut-down when combined with other throttle failures	P1254
Red	Engine Failsafe Mode	Engine shut-down when combined with other throttle failures	P1250
Amber	Engine Failsafe Mode	Cruise inhibited	P1516
Amber	Engine Failsafe Mode	Cruise inhibited	P1517
Amber	Engine Failsafe Mode	Cruise inhibited	P1571
Amber	Engine Failsafe Mode	Cruise inhibited	P1696
Amber	Engine Failsafe Mode	Cruise inhibited	P0568
Amber	Engine Failsafe Mode	Cruise inhibited	P0570
Amber	Engine Failsafe Mode	Cruise inhibited	P0569

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Amber	Engine Failsafe Mode	Cruise inhibited	P0567
Amber	Engine Failsafe Mode	Cruise inhibited	P0566
Amber	Engine Failsafe Mode	Cruise inhibited	P1697
Red	Restricted Performance	Limp-Home unavailable. Reverse throttle progression enabled	P0560, P1254
Amber	Restricted Performance	Limp-Home unavailable. Reverse throttle progression enabled. High idle speed	P1250, P1254
Red	Restricted Performance	Limp-Home unavailable. Reverse throttle progression enabled	P1250
Amber	Restricted Performance	Engine Speed Limit (runs normally, limited to 3000 RPM)	P0116, P0117, P0118, P0125
Amber	Restricted Performance	Engine Speed Limit (runs normally, limited to 3000 RPM)	P0101, P0102, P0103, P0104
Amber	Restricted Performance	Engine Speed Limit (runs normally, limited to 3000 RPM)	P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P1313, P1314
Amber	Restricted Performance	Engine Speed Limit (runs normally, limited to 3000 RPM)	P0327, P0328, P0332, P0333, P1648
Amber	Restricted Performance	Reverse throttle progression enabled	P1474
Amber	Restricted Performance	Engine Speed Limit (runs normally, limited to 3000 RPM)	P1230
Amber	Restricted Performance	Engine Speed Limit (runs normally, limited to 3000 RPM)	P1671
Amber	Restricted Performance	Engine Speed Limit (runs normally, limited to 3000 RPM)	P1112, P1113
Amber	Restricted Performance	Gearbox default to 4th gear	P1601 (SC only)
Amber	Restricted Performance	Gearbox default to 4th gear	P1605 (NA only)
Amber	Restricted Performance	Gearbox default to 4th gear	P0702
Amber	Restricted Performance	Gearbox default to 4th gear	P1795
Amber	Restricted Performance	Gearbox default to 4th gear	P1796
Amber	Restricted Performance	Gearbox default to 4th gear	P1797
Amber	Restricted Performance	Gearbox default to 4th gear	P1605
Amber	None	Gearbox default to 4th gear	P0705 (SC only)
Amber	None	Gearbox default to 4th gear	P0706
Amber	None	Gearbox default to 4th gear	P1720

Default mode Definitions

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MECHANICAL LIMP-HOME MODE

- No electronic throttle operation. (Mechanical operation for last quarter of pedal travel)
- Maximum 25° throttle opening, depending on adjustment of throttle mechanical linkage.
- Engine speed restricted to 3000 RPM maximum, by fuel cut-off.
- High idle speed. (1200 RPM approx.)
- Misfire at idle, due to cylinder cut as a means of controlling idle speed. (The misfire will switch cylinders, as the strategy varies the cylinder cut)
- Cruise Control Inhibited

REVERSE THROTTLE PROGRESSION ENABLED

- Electronic throttle operation, limited to maximum 25°
- Cruise Control Inhibited

NOTE:

The throttle operation uses the same map as for reverse gear.

ENGINE SPEED LIMIT

- Engine runs normally, up to 3000 RPM.
- Engine speed restricted to 3000 RPM maximum, by fuel cut-off.
- Cruise Control Inhibited

LIMP-HOME UNAVAILABLE

- Cruise Control Inhibited
- Reverse throttle progression engaged at second occurrence of DTC flagging.

Diagnostic Trouble Code (DTC) Index

DTC	Description	Possible Source	Action
P0101	Mass air flow (MAF) sensor range/performance	<ul style="list-style-type: none">• Air intake leak• Engine breather leak• MAF sensor to ECM sensing circuit high resistance• MAF sensor to ECM sensing circuit intermittent short circuit to ground• MAF sensor supply circuit high resistance• MAF sensor failure	Check the air intake syst for leaks, <<303-12>> Check the engine breath system, <<303-08>> Check the throttle body, <<303-04>> For throttle control circuit tests, Goto <<S>> . For MAF sensor circuit tests, Goto <<A>> .

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P0102	Mass air flow (MAF) sensor sense circuit low voltage	<ul style="list-style-type: none"> • MAF sensor to ECM sensing circuit high resistance or open circuit • MAF sensor to ECM sensing circuit intermittent short circuit to ground • MAF sensor supply circuit open circuit or short circuit to ground • MAF sensor failure 	For MAF sensor circuit tests, Goto <<A>>
P0103	Mass air flow (MAF) sensor sense circuit high voltage	<ul style="list-style-type: none"> • MAF sensor to ECM reference ground circuit open circuit • MAF sensor to ECM sensing circuit short circuit to high voltage • MAF sensor failure 	For MAF sensor circuit tests, Goto <<A>>
P0106	BARO circuit, low voltage	<ul style="list-style-type: none"> • BARO failure (internal ECM fault) 	Contact dealer technical support for advice on possible ECM failure.
P0107	BARO circuit, high voltage	<ul style="list-style-type: none"> • BARO failure (internal ECM fault) 	Contact dealer technical support for advice on possible ECM failure.
P0111	Intake air temperature (IAT) sensor range/performance	<ul style="list-style-type: none"> • Air intake leak • Engine breather leak • IAT sensor to ECM wiring open circuit or high resistance • IAT sensor to ECM sensing circuit short circuit to high voltage • IAT sensor failure 	Check the air intake syst for leaks, <<303-12>> Check the engine breath system, <<303-08>> For IAT sensor circuit tests, Goto <>
P0112	Intake air temperature (IAT) sensor sense circuit high voltage (low air temperature)	<ul style="list-style-type: none"> • IAT sensor to ECM wiring open circuit or high resistance • IAT sensor to ECM sensing circuit short circuit to high voltage • IAT sensor failure 	For IAT sensor circuit tes Goto <>

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P0113	Intake air temperature (IAT) sensor sense circuit low voltage (high air temperature)	<ul style="list-style-type: none"> • IAT sensor to ECM wiring short circuit to ground • IAT sensor failure 	For IAT sensor circuit tests Goto <>
P0116	Engine coolant temperature (ECT) sensor range/ performance	<ul style="list-style-type: none"> • Low/contaminated coolant • ECT sensor to ECM sensing circuit high resistance when hot • ECT sensor to ECM sensing circuit intermittent high resistance • ECT sensor failure 	Check coolant level and condition. For ECT sensor circuit tests, Goto <<C>>
P0117	Engine coolant temperature (ECT) sensor sense circuit high voltage (low coolant temperature)	<ul style="list-style-type: none"> • ECT sensor disconnected • ECT sensor to ECM sensing circuit high resistance, open circuit or short circuit to high voltage • ECT sensor failure 	For ECT sensor circuit tests, Goto <<C>>
P0118	Engine coolant temperature (ECT) sensor sense circuit low voltage (high coolant temperature)	<ul style="list-style-type: none"> • Engine overheat condition • ECT sensor to ECM wiring short circuit to ground • ECT sensor failure 	Check engine for overheating. For ECT sensor circuit tests, Goto <<C>>
P0121	Throttle position (TP) sensor circuit range/performance	<ul style="list-style-type: none"> • TP sensor to ECM wiring open circuit or high resistance • TP sensor to ECM sensing circuits 1 or 2 short circuit to high voltage • TP sensor failure 	For TP sensor circuit tests Goto <<D>> , and Goto <<K>>
P0122	Throttle position (TP) sensor 1 low voltage	<ul style="list-style-type: none"> • TP sensor to ECM sensing circuit 1 (TPS pin 3) open circuit or high resistance • TP sensor failure 	For TP sensor circuit tests Goto <<D>> , and Goto <<K>>
P0123	Throttle position (TP) sensor 1 high voltage	<ul style="list-style-type: none"> • TP sensor to ECM sensing circuit 1 (TPS pin 3) short circuit to high voltage • TP sensor failure 	For TP sensor circuit tests Goto <<D>> , and Goto <<K>>

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P0131	Right-hand H02S sense circuit low voltage	<ul style="list-style-type: none"> • H02S disconnected • H02S to ECM wiring open circuit • H02S short circuit to ground • H02S failure 	For Right-hand HO2 sen circuit tests, Goto <<E>>
P0132	Right-hand H02S sense circuit high voltage	<ul style="list-style-type: none"> • H02S sensing circuit short circuit to high voltage • H02S ground braided shield open circuit • H02S failure 	For Right-hand HO2 sen circuit tests, Goto <<E>>
P0133	Right-hand H02S sense circuit slow response	<ul style="list-style-type: none"> • H02S disconnected • H02S mechanical damage • H02S to ECM wiring intermittent open circuit • H02S sensing circuit short circuit to high voltage • H02S short circuit to ground • H02S ground braided shield open circuit • H02S heater circuit fault • Exhaust leak • H02S failure 	Check for 'engine misfire detected' DTCs. For HO2 circuit tests, Goto <<E>> , and Goto <<F>> . Check for exhaust leak: <<309-00>> Check injectors, <<303-04>>
P0135	Right-hand H02S heater circuit malfunction	<ul style="list-style-type: none"> • H02S disconnected • H02S heater power supply open circuit • H02S heater to ECM wiring short circuit or open circuit • H02S heater failure 	For Right-hand HO2 sen heater circuit tests, Goto <<F>>
P0137	Right-hand catalyst monitor sensor sense circuit low voltage	<ul style="list-style-type: none"> • Catalyst monitor sensor disconnected • Catalyst monitor sensor to ECM wiring open circuit • Catalyst monitor sensor short circuit to ground • Catalyst monitor sensor failure 	For Right-hand catalyst monitor sensor circuit tes Goto <<G>>

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P0138	Right-hand catalyst monitor sensor sense circuit high voltage	<ul style="list-style-type: none"> • Catalyst monitor sensor sensing circuit short circuit to high voltage • Catalyst monitor sensor ground braided shield open circuit • Catalyst monitor sensor failure 	For Right-hand catalyst monitor sensor circuit tests, Goto <<G>>
P0140	Right-hand catalyst monitor sensor sense circuit no activity	<ul style="list-style-type: none"> • Catalyst monitor sensor disconnected • Catalyst monitor sensor mechanical damage • Catalyst monitor sensor to ECM wiring open circuit • Catalyst monitor sensor sensing circuit short circuit to high voltage • Catalyst monitor sensor short circuit to ground • Catalyst monitor sensor ground braided shield open circuit • Exhaust leak • Catalyst monitor sensor failure 	For Right-hand catalyst monitor sensor circuit tests, Goto <<G>> . Check for exhaust leaks, <<309-00>> Check injectors, <<303-04>>
P0151	Left-hand H02 sensor sense circuit low voltage	<ul style="list-style-type: none"> • H02S disconnected • H02S to ECM wiring open circuit • H02S short circuit to ground • H02S failure 	For Left-hand HO2 sensor circuit tests, Goto <<H>>
P0152	Left-hand H02 sensor sense circuit high voltage	<ul style="list-style-type: none"> • H02S sensing circuit short circuit to high voltage • H02S ground braided shield open circuit • H02S failure 	For Left-hand HO2 sensor circuit tests, Goto <<H>>

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P0153	Left-hand H02 sensor sense circuit slow response	<ul style="list-style-type: none"> • Engine misfire • H02S disconnected • H02S mechanical damage • H02S to ECM wiring intermittent open circuit • H02S sensing circuit short circuit to high vaoltage • H02S short circuit to ground • H02S ground braided shield open circuit • H02S heater circuit fault • Exhaust leak • H02S failure 	Check for 'engine misfire detected' DTCs. For HO ₂ S sensor circuit tests, Goto <<H>> , and Goto <<I>> . Check for exhaust leak: <<309-00>> Check injectors, <<303-04>>
P0155	Left-hand H02 sensor heater circuit malfunction	<ul style="list-style-type: none"> • H02S disconnected • H02S heater power supply open circuit • H02S heater to ECM wiring short circuit or open circuit • H02S heater failure 	For Left-hand HO ₂ S sensor heater circuit tests, Goto <<I>> .
P0157	Left-hand catalyst monitor sensor sense circuit low voltage	<ul style="list-style-type: none"> • Catalyst monitor sensor disconnected • Catalyst monitor sensor to ECM wiring open circuit • Catalyst monitor sensor short circuit to ground • Catalyst monitor sensor failure 	For Left-hand catalyst monitor Goto <<J>> .
P0158	Left-hand catalyst monitor sensor sense circuit high voltage	<ul style="list-style-type: none"> • Catalyst monitor sensor sensing circuit short circuit to high voltage • Catalyst monitor sensor ground braided shield open circuit • Catalyst monitor sensor failure 	For Left-hand catalyst monitor Goto <<J>> .

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P0160	Left-hand catalyst monitor sensor sense circuit no activity	<ul style="list-style-type: none"> • Catalyst monitor sensor disconnected • Catalyst monitor sensor mechanical damage • Catalyst monitor sensor to ECM wiring open circuit • Catalyst monitor sensor sensing circuit short circuit to high voltage • Catalyst monitor sensor short circuit to ground • Catalyst monitor sensor ground braided shield open circuit • Exhaust leak • Catalyst monitor sensor failure 	<p>For Left-hand catalyst monitor sensor circuit test Goto <<J>> . Check for exhaust leaks <<309-00>></p>
P0171	Right-hand cylinders combustion too lean	<ul style="list-style-type: none"> • Air intake leak between MAF sensor and throttle • Inlet manifold/breather leak • Fuel filter system blockage • Fuel injector blockage • Fuel pressure regulator failure (low fuel pressure) • Low fuel pump output • H02S harness wiring fault • Exhaust leak (before catalyst) • ECM receiving incorrect signal from one or more of the following sensors - ECT, MAF, IAT, TP 	<p>Check air intake system leaks, <<303-12>> Check the fuel filter, <<310-01>> Check the fuel injectors ; fuel pressure regulator, <<303-04>> Check the fuel pressure. Check the exhaust system for leaks <<309-00>> Refer to pinpoint tests for sensors listed.</p>

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P0172	Right-hand cylinders combustion too rich	<ul style="list-style-type: none"> • Engine misfire • Blocked air filter • Fuel system return blockage • Leaking fuel injector(s) • Fuel pressure regulator failure (high fuel pressure) • ECM receiving incorrect signal from one or more of the following sensors - ECT, MAF, IAT, TP 	<p>Check for 'engine misfire detected' DTCs. Check the air filter element, <<303-12>> Check the fuel lines, <<310-01>> Check the fuel injectors and fuel pressure regulator, <<303-04>> Refer to pinpoint tests for sensors listed.</p>
P0174	Left-hand cylinders combustion too lean	<ul style="list-style-type: none"> • Air intake leak between MAF sensor and throttle • Inlet manifold/breather leak • Fuel filter system blockage • Fuel injector blockage • Fuel pressure regulator failure (low fuel pressure) • Low fuel pump output • HO2S harness wiring fault • Exhaust leak (before catalyst) • ECM receiving incorrect signal from one or more of the following sensors - ECT, MAF, IAT, TP 	<p>Check the air intake system for leaks, <<303-12>> Check the fuel filter, <<310-01>> Check the fuel injectors and fuel pressure regulator, <<303-04>> Check the fuel pressure. For HO2S circuit tests, Goto <<H>> , and Goto <<I>> . Check the exhaust system for leaks, <<309-00>> Refer to pinpoint tests for sensors listed.</p>

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P0175	Left-hand cylinders combustion too rich	<ul style="list-style-type: none"> • Engine misfire • Blocked air filter • Fuel system return blockage • Leaking fuel injector(s) • Fuel pressure regulator failure (high fuel pressure) • ECM receiving incorrect signal from one or more of the following sensors - ECT, MAF, IAT, TP 	Check for 'engine misfire detected' DTCs. Check the air filter element, <<303-12>> Check the fuel lines, <<310-01>> Check the fuel injectors and fuel pressure regulator, <<303-04>> Refer to pinpoint tests for sensors listed.
P0201	Fuel injector circuit malfunction, Cyl 1	<ul style="list-style-type: none"> • Injector disconnected • Injector wiring open or short circuit • Injector failure 	For injector circuit tests, <<303-04>>
'	'	P0202	Fuel injector circuit malfunction, Cyl 3
'	'	P0203	Fuel injector circuit malfunction, Cyl 5
'	'	P0204	Fuel injector circuit malfunction, Cyl 7
'	'	P0205	Fuel injector circuit malfunction, Cyl 2
'	'	P0206	Fuel injector circuit malfunction, Cyl 4
'	'	P0207	Fuel injector circuit malfunction, Cyl 6
'	'	P0208	Fuel injector circuit malfunction, Cyl 8

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P0222	Throttle position (TP) sensor circuit 2 low voltage	<ul style="list-style-type: none"> • TP sensor to ECM sensing circuit 2 (TP sensor pin 2) open circuit or high resistance • TP sensor failure 	For TP sensor circuit tests Goto <<K>>
P0223	Throttle position (TP) sensor circuit 2 high voltage	<ul style="list-style-type: none"> • TP sensor to ECM sensing circuit 2 (TP sensor pin 2) • TP sensor failure 	For TP sensor circuit tests Goto <<K>>
P0300	Random misfire detected	<ul style="list-style-type: none"> • ECM to ignition module primary circuit faults (cylinder misfire detected DTCs also logged) • Ignition module to ignition coil primary circuit fault(s) (cylinder misfire DTC also logged) • Ignition module ground circuit; open circuit, high resistance • Ignition coil failure(s) • Ignition module failure(s) • HT short to ground (tracking) check rubber boots for cracks/damage • Spark plug failure/fouled/incorrect gap • Cylinder compression low • Fuel injector circuit fault(s) [injector DTCs also logged] • Fuel delivery pressure (low/high) • Fuel injectors restricted/leaking • Fuel contamination • Compression loss (bore wear, head gasket, etc) 	For ignition circuit tests, <<303-07>> For engine information, <<303-00>> For fuel system information, <<303-04>>
P0301	Misfire detected, Cyl 1	Refer to possible sources for P0300	Refer to actions for P0300
'	'	P0302	Misfire detected, Cyl 3
'	'	P0303	Misfire detected, Cyl 5
'	'	P0304	Misfire detected, Cyl 7
'	'	P0305	Misfire detected, Cyl 2
'	'	P0306	Misfire detected, Cyl 4
'	'	P0307	Misfire detected, Cyl 6
'	'	P0308	Misfire detected, Cyl 8

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P0327	Right-hand knock sensor (KS) sense circuit out of range (low voltage)	<ul style="list-style-type: none"> • Poor sensor contact with cylinder block • KS to ECM sense circuit short circuit to ground • KS failure 	For Right-hand KS circuit tests, Goto <<L>>
P0328	Right-hand knock sensor (KS) sense circuit out of range (high voltage)	<ul style="list-style-type: none"> • Poor sensor contact with cylinder block • KS to ECM sense circuit high resistance or open circuit • KS to ECM sense circuit short circuit to high voltage • KS failure 	For Right-hand KS circuit tests, Goto <<L>>
P0332	Left-hand knock sensor (KS) sense circuit out of range (low voltage)	<ul style="list-style-type: none"> • Poor sensor contact with cylinder block • KS to ECM sense circuit short circuit to ground • KS failure 	For Left-hand KS circuit tests, Goto <<M>>
P0333	Left-hand knock sensor (KS) sense circuit out of range (high voltage)	<ul style="list-style-type: none"> • Poor sensor contact with cylinder block • KS to ECM sense circuit high resistance or open circuit • KS to ECM sense circuit short circuit to high voltage • KS failure 	For Left-hand KS circuit tests, Goto <<M>>
P0335	Crankshaft position (CKP) sensor circuit malfunction	<ul style="list-style-type: none"> • CKP sensor disconnected • CKP sensor air gap incorrect/foreign matter on face • CKP sensor sensing circuit open circuit, short circuit to ground, short circuit to high voltage • CKP sensor failure 	For CKP sensor circuit tests, Goto <<N>>
P0340	Camshaft position (CMP) sensor circuit malfunction	<ul style="list-style-type: none"> • CMP sensor disconnected • CMP sensor air gap incorrect/foreign matter on face • CMP sensor sensing circuit open circuit, short circuit to ground, short circuit to high voltage • CMP sensor failure 	For CMP sensor circuit tests, Goto <<O>>

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P0351	Ignition coil primary/secondary circuit malfunction, cyl 1	<ul style="list-style-type: none"> • ECM to ignition module primary circuit open circuit, short circuit to ground, high resistance • Ignition module to ignition coil primary circuit open circuit, short circuit to ground, high resistance • Ignition module ground circuit open circuit, high resistance • Ignition coil failure • Ignition module failure 	For ignition circuit tests, <<303-07>>
'	'	P0352	Ignition coil primary/secondary circuit malfunction, cyl 3
'	'	P0353	Ignition coil primary/secondary circuit malfunction, cyl 5
'	'	P0354	Ignition coil primary/secondary circuit malfunction, cyl 7
'	'	P0355	Ignition coil primary/secondary circuit malfunction, cyl 2
'	'	P0356	Ignition coil primary/secondary circuit malfunction, cyl 4
'	'	P0357	Ignition coil primary/secondary circuit malfunction, cyl 6
'	'	P0358	Ignition coil primary/secondary circuit malfunction, cyl 8
P0400	Exhaust gas recirculation (EGR) flow malfunction	<ul style="list-style-type: none"> • EGR valve connector pins high resistance • EGR pipe/exhaust manifold leak • EGR pipe blocked • EGR valve stuck open/closed, blocked • EGR valve failure 	For EGR pinpoint tests, <<303-08>>

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P0405	Exhaust gas recirculation (EGR) drive circuits open circuit	<ul style="list-style-type: none"> • EGR valve power supply circuit open circuit • EGR valve to ECM drive circuit pair - EGR pins 1/3, 4/6 open circuit, high resistance • EGR valve failure (stepper motor open circuit) 	For EGR pinpoint tests, <<303-08>>
P0406	Exhaust gas recirculation (EGR) drive circuits short circuit	<ul style="list-style-type: none"> • EGR valve to ECM drive circuit pair - EGR pins 1/3, 4/6 short circuit to ground or high voltage • EGR valve failure (stepper motor short circuit) 	For EGR pinpoint tests, <<303-08>>
P0420	Right-hand catalytic converter efficiency below threshold	<ul style="list-style-type: none"> • HO2 sensor disconnected. • HO2 sensor to ECM wiring fault. • HO2 sensor heater to ECM wiring fault. • HO2 sensor heater failure. • HO2S failure. • Catalyst monitor sensor failure. • Catalytic converter failure. 	Refer to pinpoint tests for components listed. Visually inspect catalytic converters.
P0430	Left-hand catalytic converter efficiency below threshold	<ul style="list-style-type: none"> • HO2 sensor disconnected. • HO2 sensor to ECM wiring fault. • HO2 sensor heater to ECM wiring fault. • HO2 sensor heater failure. • HO2S failure. • Catalyst monitor sensor failure. • Catalytic converter failure. 	Refer to pinpoint tests for components listed. Visually inspect catalytic converters.

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P0441	Evaporative emissions system (EVAP) incorrect purge flow	<ul style="list-style-type: none"> • EVAP to ECM drive circuit open circuit, short circuit or high resistance • EVAP power supply circuit open circuit • EVAP to engine purge pipe damaged/blocked/leaking • EVAP operating vacuum hose leak/blockage • EVAP failure 	For evaporative emission pinpoint tests, <<303-13>>
P0444	Evaporative emissions system (EVAP) valve circuit open circuit	<ul style="list-style-type: none"> • EVAP to ECM drive circuit open circuit or high resistance • EVAP failure 	For evaporative emission pinpoint tests, <<303-13>>
P0445	Evaporative emissions system (EVAP) valve circuit short circuit	<ul style="list-style-type: none"> • EVAP to ECM drive circuit short circuit to ground • EVAP failure 	For evaporative emission pinpoint tests, <<303-13>>
P0460	Fuel level sense signal performance	<ul style="list-style-type: none"> • Sensor float stuck • Fuel level sensor to instrument cluster circuits intermittent short or open circuit • Fuel level sensor failure • Instrument cluster fault (incorrect fuel level data) 	Check level sensor float. For fuel level sensor circuit tests, <<303-04>>
P0506	Idle RPM lower than expected	<ul style="list-style-type: none"> • Air intake blockage • Accessory drive overload (defective/seized component) • Throttle valve stuck closed • Throttle assembly failure 	Check the air intake system. <<303-12>> Check the accessory drive components, <<303-05>> For throttle body information, <<303-04>>

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P0507	Idle RPM higher than expected	<ul style="list-style-type: none"> • Intake air leak between MAF sensor and throttle • Intake air leak between throttle and engine • Engine breather leak • Cruise control vacuum failure • Throttle valve stuck open • Throttle assembly failure 	Check the air intake system. <<303-12>> Check the engine breather system. <<303-08>> For cruise control information, <<310-03>> For throttle body information, <<303-04>>
P0560	Vehicle voltage malfunction	<ul style="list-style-type: none"> • ECM battery power supply open circuit, high resistance 	For ECM power supply circuit tests, Goto <<P>>
P0566	Cruise control CANCEL switch ON fault	<ul style="list-style-type: none"> • Cruise control switches internal steering wheel short circuit to ground • Steering wheel cassette reel short circuit to ground • Cassette reel to ECM circuit short circuit to ground • CANCEL switch failure (stuck ON) 	For cruise control circuit tests, <<310-03>>
P0567	Cruise control RESUME switch ON fault	<ul style="list-style-type: none"> • Cruise control switches internal steering wheel short circuit to ground • Steering wheel cassette reel short circuit to ground • Cassette reel to ECM circuit short circuit to ground • RESUME switch failure (stuck ON) 	For cruise control circuit tests, <<310-03>>
P0568	Cruise control switch ground malfunction	<ul style="list-style-type: none"> • Cruise control switches internal steering wheel open circuit • Steering wheel cassette reel open circuit or high resistance • Cassette reel to ECM circuit (ACCEL/DECCEL) open circuit or high resistance • ACCEL/DECCEL switch failure 	For cruise control circuit tests, <<310-03>>

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P0569	Cruise control DECEL/SET (SET-) switch ON fault	<ul style="list-style-type: none"> • Cruise control switches internal steering wheel short circuit to ground • Steering wheel cassette reel short circuit to ground • Cassette reel to ECM circuit short circuit to ground • DECEL/SET switch failure (stuck ON) 	For cruise control circuit tests, << 310-03 >>
P0570	Cruise control ACCEL/SET (SET+) switch ON fault	<ul style="list-style-type: none"> • Cruise control switches internal steering wheel short circuit to ground • Steering wheel cassette reel short circuit to ground • Cassette reel to ECM circuit short circuit to ground • ACCEL/SET switch failure (stuck ON) 	For cruise control circuit tests, << 310-03 >>
P0603	ECM data corrupted	<ul style="list-style-type: none"> • ECM failure 	Contact dealer technical support for advice on possible ECM failure.
P1000	System checks not complete since last memory clear	OBD diagnostic monitors have not completed	Carry out comprehensive component monitor drive cycle. Refer to the DTC section of JTIS, accessed by the icon on the openir page.
P1104	Mass air flow (MAF) sensor ground malfunction	<ul style="list-style-type: none"> • MAF sensor to ECM reference ground circuit open circuit, short circuit to high voltage, high resistance • MAF sensor to ECM sensing circuit open circuit • MAF sensor failure 	For MAF sensor circuit tests, Goto << A >>
P1111	System checks complete since last memory clear	OBD diagnostic monitors have completed	No action necessary

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P1121	Accelerator pedal position (APP) sensor circuit 'A' range/performance	<ul style="list-style-type: none"> • APP sensor to ECM sense circuit 'A' (sensor pin 5) open circuit, short circuit or high resistance • Sensor power supply fault • Sensor reference ground fault • APP sensor failure 	For APP sensor circuit tests, Goto <<Q>>
P1122	Accelerator pedal position (APP) sensor circuit 'A' low voltage	<ul style="list-style-type: none"> • APP sensor to ECM sense circuit 'A' (sensor pin 5) open circuit or high resistance • Sensor power supply fault • APP sensor failure 	For APP sensor circuit tests, Goto <<Q>>
P1123	Accelerator pedal position (APP) sensor circuit 'A' high voltage	<ul style="list-style-type: none"> • APP sensor to ECM sense circuit 'A' (sensor pin 5) short circuit to high voltage • APP sensor failure 	For APP sensor circuit tests, Goto <<Q>>
P1221	Accelerator pedal position (APP) sensor circuit 'B' range/performance	<ul style="list-style-type: none"> • APP sensor to ECM sense circuit 'B' (sensor pin 3) open circuit, short circuit or high resistance • Sensor power supply fault • Sensor reference ground fault • APP sensor failure 	For APP sensor circuit tests, Goto <<R>>
P1222	Accelerator pedal position (APP) sensor circuit 'B' low voltage	<ul style="list-style-type: none"> • APP sensor to ECM sense circuit 'B' (sensor pin 3) open circuit or high resistance • Sensor power supply fault • APP sensor failure 	For APP sensor circuit tests, Goto <<R>>
P1223	Accelerator pedal position (APP) sensor circuit 'B' high voltage	<ul style="list-style-type: none"> • APP sensor to ECM sense circuit 'B' (sensor pin 3) short circuit to high voltage • APP sensor failure 	For APP sensor circuit tests, Goto <<R>>

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P1224	Throttle control position error	<ul style="list-style-type: none"> • Throttle position adaptations not performed after battery disconnect • TP sensor disconnected • TP sensor to ECM sense circuits open circuit, high resistance • Throttle motor power relay failure • Throttle motor power relay to ECM circuit fault • Throttle motor power relay power supply open circuit • ECM ground circuit fault (relay coil drive) • Throttle motor to ECM drive circuits open circuit, short circuit, high resistance • Throttle motor failure • Throttle assembly failure 	<p>Carry out throttle adaptation procedure. For TP sensor circuit tests, Goto <<D>>, and Goto <<K>>. For throttle motor circuit tests, Goto <<S>>. For throttle body information, <<303-04>></p>
P1226	Mechanical guard sensor range/performance	<ul style="list-style-type: none"> • Mechanical guard sensor to ECM sense circuit open circuit, short circuit or high resistance • Sensor power supply fault • Sensor reference ground fault • Mechanical guard sensor failure • Mechanical guard actuator seized/spring broken 	<p>For mechanical guard circuit tests, Goto <<T>>. For sensor power supply circuit tests, Goto <<V>>. For sensor ground circuit tests, Goto <<W>>. For throttle body information, <<303-04>></p>
P1227	Mechanical guard sensor circuit low voltage	<ul style="list-style-type: none"> • Mechanical guard sensor to ECM sense circuit open circuit or high resistance • Sensor power supply fault • Mechanical guard sensor failure 	<p>For mechanical guard circuit tests, Goto <<T>>. For sensor power supply circuit tests, Goto <<V>>. For throttle body information, <<303-04>></p>
P1228	Mechanical guard sensor circuit high voltage	<ul style="list-style-type: none"> • Mechanical guard sensor to ECM sense circuit short circuit to high voltage • Mechanical guard sensor failure 	<p>For mechanical guard circuit tests, Goto <<T>>. For throttle body information, <<303-04>></p>

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P1229	Throttle motor control circuit malfunction	<ul style="list-style-type: none"> • Throttle motor disconnected • Throttle motor to ECM drive circuits short circuit or open circuit • Throttle motor failure 	For throttle motor circuit tests, Goto <<S>>
P1230	Fuel pump relay malfunction	<ul style="list-style-type: none"> • Fuel pump relay failure • Fuel pump to ECM circuit fault • Fuel pump relay coil power supply open circuit • ECM ground circuit fault (relay coil drive) 	For fuel pump relay circuit tests, Goto <<U>>
P1235	Vacuum switching valve (VSV) 1 circuit range/performance (mechanical guard position)	<ul style="list-style-type: none"> • Vacuum leak/blockage between the throttle elbow and the throttle vacuum actuator • Vacuum actuator failure • Mechanical guard actuator seized/spring broken 	Carry out mechanical checks for vacuum leak/blockage, failed vacuum actuator, and broken/seized actuator spring
P1236	Vacuum switching valve (VSV) 1 (vacuum) circuit failure	<ul style="list-style-type: none"> • VSV 1 disconnected • VSV 1 to ECM drive circuit high resistance, open circuit or short circuit • VSV 1 power supply open circuit • VSV 1 failure 	<<310-03>>
P1237	Vacuum switching valve (VSV) 2 (atmosphere) circuit failure	<ul style="list-style-type: none"> • VSV 2 disconnected • VSV 2 to ECM drive circuit high resistance, open circuit or short circuit • VSV 2 power supply open circuit • VSV 2 failure 	For VSV tests, <<310-03>>
P1238	Vacuum switching valve (VSV) 3 (release) circuit failure	<ul style="list-style-type: none"> • VSV 3 disconnected • VSV 3 to ECM drive circuit high resistance, open circuit or short circuit • VSV 3 power supply open circuit • VSV 3 failure 	For VSV tests, <<310-03>>

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P1240	Sensor reference voltage malfunction (TP sensor, APP and mechanical guard sensors. ECM pins EM10-21; EM11-8)	<ul style="list-style-type: none"> • ECM to sensors reference voltage short circuit to ground, short circuit to high voltage, open circuit, high resistance • TP sensor, APP and mechanical guard sensor(s) failure(s) 	For sensor reference voltage circuit tests, Goto <<V>> .
P1241	Sensor reference voltage low (TPS, APP and mechanical guard sensors. ECM pins EM10-21; EM11-8)	<ul style="list-style-type: none"> • ECM to sensors reference voltage short circuit to ground • TP sensor, APP and mechanical guard sensor(s) failure(s) 	For sensor reference voltage circuit tests, Goto <<V>> .
P1242	Sensor reference voltage high (TP sensor, APP and mechanical guard sensors. ECM pins EM10-21; EM11-8)	<ul style="list-style-type: none"> • ECM to sensors reference voltage circuit open circuit, high resistance, short circuit to high voltage 	For sensor reference voltage circuit tests, Goto <<V>> .
P1243	Sensor reference ground malfunction (throttle sensors, ECT sensor, IAT sensor. ECM pins EM10-20; EM11-12)	<ul style="list-style-type: none"> • ECM to sensors reference ground circuit open circuit, high resistance 	For sensor reference ground circuit tests, Goto <<W>> .
P1245	Engine crank signal low voltage	<ul style="list-style-type: none"> • Starter relay coil to ECM/BPM circuit open circuit 	For engine crank circuit tests, Goto <<X>> .
P1246	Engine crank signal high voltage	<ul style="list-style-type: none"> • Starter relay coil to ECM/BPM circuit short circuit to B+ voltage • BPM failure 	For engine crank circuit tests, Goto <<X>> .
P1250	Throttle valve spring failure	<ul style="list-style-type: none"> • Throttle valve spring failure 	Install a new throttle bod <<303-04>>
P1251	Throttle position malfunction (engine off)	<ul style="list-style-type: none"> • Throttle motor disconnected • Throttle motor to ECM drive circuits short circuit or open circuit • Throttle motor failure • Throttle assembly failure 	For throttle motor circuit tests, Goto <<S>> . For throttle body information, <<303-04>>
P1252	Mechanical guard position malfunction (cruise control) VSV stuck on	<ul style="list-style-type: none"> • Mechanical guard actuator siezed/spring broken • Throttle vacuum actuator fault 	See pinpoint tests for components listed.

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P1253	Mechanical guard position malfunction (engine off)	<ul style="list-style-type: none"> • VSV 1, 2, 3 vacuum and/or electrical circuit fault(s) • Mechanical guard sensor to ECM sense circuit • Mechanical guard sensor failure • Mechanical guard actuator siezed/spring broken • Throttle vacuum actuator fault 	See pinpoint tests for components listed.
P1260	Security input malfunction	<ul style="list-style-type: none"> • KTM to ECM circuit short circuit, high resistance or open circuit • KTM failure 	For KTM circuit tests, Goto <<Y>>
P1313	Misfire rate catalyst damage, Right-Hand. NOTE. This DTC will flag only when accompanied by a random or individual cylinder misfire DTC; P0300, P0301 to P0304	Refer to possible causes for P0300-P0308	Refer to actions for P0300-P0308
'	'	P1314	Misfire rate catalyst damage, Left-Hand. NO This DTC will flag only when accompanied by a random or individual cylinder misfire DTC; P0300 to P0308
'	'	P1316	Misfire excess emission. NOTE. This DTC will flag only when accompanied an individual cylinder mis DTC; P0300 to P0308
P1336	Crankshaft position (CKP) sensor / camshaft position (CMP) sensor synchronization malfunction	<ul style="list-style-type: none"> • Engine stall • Incorrect fitting of CMP sensor wheel • Valve timing • CKP sensor/CMP sensor gap incorrect/foreign matter on sensor face 	For CKP sensor circuit tests, Goto <<N>> . For CMP sensor circuit tests, Goto <<O>>

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P1367	Ignition monitor (ignition module 1)	<ul style="list-style-type: none"> • Ignition module 1 disconnected • Ignition module 1 to ECM circuits open circuit, short circuit to ground or short circuit to B+ voltage • Ignition module 1 ground circuit fault • Ignition coil relay failure • Ignition coil open/short circuit • Ignition module 1 failure 	For ignition circuit tests, <<303-07>>
P1368	Ignition monitor (ignition module 2)	<ul style="list-style-type: none"> • Ignition module 2 disconnected • Ignition module 2 to ECM circuits open circuit, short circuit to ground or short circuit to B+ voltage • Ignition module 2 ground circuit fault • Ignition coil relay failure • Ignition coil open/short circuit • Ignition module 2 failure 	For ignition circuit tests, <<303-07>>
P1392	Right-hand variable camshaft timing (VCT) oil control solenoid circuit open circuit	<ul style="list-style-type: none"> • ECM to VCT solenoid valve circuit open circuit, high resistance or short circuit to high voltage • VCT solenoid valve failure 	For Right-hand VCT circ tests, Goto <<Z>>
P1393	Right-hand variable camshaft timing (VCT) oil control solenoid circuit short circuit	<ul style="list-style-type: none"> • ECM to VCT solenoid valve short circuit to ground • VCT solenoid valve failure 	For Right-hand VCT circ tests, Goto <<Z>>

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P1396	Left-hand variable camshaft timing (VCT) oil control solenoid malfunction	<ul style="list-style-type: none"> • ECM to VCT solenoid valve circuit fault (refer to P1392, P1393) • VCT solenoid valve actuator sticking • VCT unit fault • Camshaft drive fault • CKP sensor/CMP sensor circuits fault(s) (refer to P0335, P0340) 	See pinpoint tests for components listed. Carry out mechanical checks on components listed.
P1397	Left-hand variable camshaft timing (VCT) oil control solenoid circuit open circuit	<ul style="list-style-type: none"> • ECM to VCT solenoid valve open circuit, high resistance, short circuit to high voltage • VCT solenoid valve failure 	For Left-hand VCT circuit tests, Goto <<AA>>
P1398	Left-hand variable camshaft timing (VCT) oil control solenoid circuit short circuit	<ul style="list-style-type: none"> • ECM to VCT solenoid valve short circuit to ground • VCT solenoid valve failure 	For Left-hand VCT circuit tests, Goto <<AA>>
P1475	Radiator fans slow (series) circuit malfunction	<ul style="list-style-type: none"> • Radiator fan control relay module to ECM 'series' drive circuit (relay pin 9) fault • Relay coil ignition power supply open circuit • ECM ground circuit fault (relay coil drive) • ECT sensor circuit malfunction (refer to P0116) 	For radiator fan series circuit tests, Goto <<AB>>
P1476	Radiator fans fast (parallel) circuit malfunction	<ul style="list-style-type: none"> • Radiator fan control relay module to ECM 'parallel' drive circuit (relay pin 7) fault • Relay coil ignition power supply open circuit • ECM ground circuit fault (relay coil drive) • ECT sensor circuit malfunction (refer to P0116) 	For radiator fan parallel circuit tests, Goto <<AC>>
P1517	Engine cranking PARK/NEUTRAL malfunction	<ul style="list-style-type: none"> • TR sensor to ECM circuit open circuit or high resistance • TR sensor failure 	For PARK/NEUTRAL circuit tests, Goto <<AD>>

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P1571	Brake switch malfunction	<ul style="list-style-type: none"> • Brake switch to ECM circuit open circuit, short circuit to ground, high resistance • Brake switch ignition switched ground circuit open circuit • Brake switch failure • Brake cancel switch to ECM circuit open circuit, short circuit to ground, high resistance • Brake cancel switch to cruise control switch circuit open circuit, short circuit to ground, high resistance • Brake cancel switch ignition switched power supply open circuit • Brake cancel switch failure • Cruise control switch failure 	For cruise control circuit tests, <<310-03>>
P1606	Engine management system (EMS) control relay malfunction	<ul style="list-style-type: none"> • ECM control relay failure 	For ECM relay circuit tests, Goto <<AE>>
P1609	ECM microprocessor-to-microprocessor communication failure	<ul style="list-style-type: none"> • ECM FCCP (programming) circuit (ECM pin EM11-3) short circuit to ground • ECM failure 	For programming circuit tests, Goto <<AF>>. Contact dealer technical support for advice on possible ECM failure.
P1611	Throttle angle malfunction	<ul style="list-style-type: none"> • TP sensor circuit fault (refer to P0121) • Pedal position sensor circuit fault (refer to P0121) • Throttle assembly failure • ECM failure 	See pinpoint tests for components listed. For throttle body information, <<303-04>> Contact dealer technical support for advice on possible ECM failure.
P1612	Throttle offset malfunction	<ul style="list-style-type: none"> • TP sensor circuit fault (refer to P0121) • Pedal position sensor circuit fault (refer to P0121) • Throttle assembly failure • ECM failure 	See pinpoint tests for components listed. For throttle body information, <<303-04>> Contact dealer technical support for advice on possible ECM failure.

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P1637	CAN ABS/TCCM token missing	<ul style="list-style-type: none">• CAN open circuit fault - ABS/TCCM to ECM• CAN short circuit fault• ABS/TCCM failure• ECM failure	<<418-00>>
P1638	CAN INST token missing	<ul style="list-style-type: none">• CAN open circuit fault - INST to ECM• CAN short circuit fault• INST failure• ECM failure	For network circuit tests, <<418-00>>
P1642	CAN circuit malfunction	<ul style="list-style-type: none">• CAN short circuit fault• Control module failure - check for additional logged DTCs to locate control module source	For network circuit tests, <<418-00>>
P1643	CAN TCM token missing	<ul style="list-style-type: none">• CAN open circuit fault - TCM to ECM• CAN short circuit fault• TCM failure• ECM failure	For network circuit tests, <<418-00>>

Pinpoint Tests

A : DTC P0101, P0102, P0103; MASS AIR FLOW (MAF) SENSOR RANGE/PERFORMANCE, HIGH/LOW VOLTAGE

NOTE:

Before commencing this test, check the air filter for blockage, the engine air intake and breather systems for leaks, and the TP sensor for additional DTCs.

A1 : CHECK THE MAF SENSOR SENSE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the ECM electrical connector, EM12.
3. Disconnect the MAF sensor electrical connector, PI35.
4. Measure the resistance between EM12, pin 13 (GY) and PI35, pin 02 (GY).

•Is the resistance greater than 5 ohms?

-> Yes

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> No

Goto <<A2>>

A2 : CHECK THE MAF SENSOR SENSE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.

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2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between the MAF sensor electrical connector, PI35, pin 02 (GY) and GROUND.

•Is the voltage greater than 3 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<A3>>

A3 : CHECK THE MAF SENSOR SENSE CIRCUIT FOR SHORT TO GROUND

NOTE:

The short to GROUND may be intermittent. Move the wiring to attempt to reproduce the conditions under which the DTC was logged, and visually inspect the harness for any signs of chafing, see 'visual inspection chart'.

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between PI35, pin 02 (GY) and GROUND.

•Is the resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation

-> **No**

Goto <<A4>>

A4 : CHECK THE MAF SENSOR SUPPLY CIRCUIT VOLTAGE

1. Reconnect the ECM electrical connector, EM12.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between the MAF sensor electrical connector, PI35, pin 01 (WU) and GROUND.

•Is the voltage greater than 10 volts?

-> **Yes**

Goto <<A5>>

-> **No**

REPAIR the circuit between the MAF sensor electrical connector, PI35, pin 01 (WU) and BATTERY. This circuit includes the EMS control relay, fuse 09 of the passenger side fuse board, and splices in the harness. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

A5 : CHECK THE MAF SENSOR SUPPLY CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the EMS fuse board electrical connector, EM20.
3. Measure the resistance between EM20, pin 10 (WU) and PI35, pin 01 (WU).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the circuit between EM20, pin 10 (WU) and PI35, pin 01 (WU). For additional information, refer

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to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new MAF sensor. CLEAR the DTC. TEST the system for normal operation.

B : DTC P0111, P0112, P0113; INTAKE AIR TEMPERATURE (IAT) SENSOR RANGE/PERFORMANCE, HIGH/LOW VOLTAGE

NOTE:

Before commencing this test, check the air filter for blockage and the engine air intake and breather systems for leaks.

B1 : CHECK THE IAT SENSOR SENSE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the ECM electrical connector, EM12.
3. Disconnect the MAF sensor electrical connector, PI35.
4. Measure the resistance between EM12, pin 12 (UP) and PI35, pin 03 (UP).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<B2>>

B2 : CHECK THE IAT SENSOR SENSE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between PI35, pin 03 (UP) and GROUND.

•Is the voltage greater than 3 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<B3>>

B3 : CHECK THE IAT SENSOR SENSE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between PI35, pin 03 (UP) and GROUND.

•Is the resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new MAF sensor. CLEAR the DTC. TEST the system for normal operation.

C : DTC P0116, P0117, P0118; ENGINE COOLANT TEMPERATURE (ECT) SENSOR RANGE/PERFORMANCE, HIGH/LOW VOLTAGE

NOTE:

Before commencing this test, check the coolant level and condition, check the operation of the thermostat, rectify as necessary.

C1 : CHECK THE ECT SENSOR SENSE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the ECM electrical connector, EM11.
3. Disconnect the ECT sensor electrical connector, PI04.
4. Measure the resistance between EM11. pin 09 (UY) and PI04, pin 02 (UY).

•Is the resistance greater than 5 ohms?

-> Yes

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> No

Goto <<C2>>

C2 : CHECK THE ECT SENSOR SENSE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between PI04, pin 02 (UY) and GROUND.

•Is the voltage greater than 3 volts?

-> Yes

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> No

Goto <<C3>>

C3 : CHECK THE ECT SENSOR SENSE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between PI04, pin 02 (UY) and GROUND.

•Is the resistance less than 10,000 ohms?

-> Yes

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> No

INSTALL a new ECT sensor. <<303-03>> CLEAR the DTC. TEST the system for normal operation.

D : DTC P0121, P0122, P0123; THROTTLE POSITION (TP) SENSOR RANGE/PERFORMANCE,

HIGH/LOW VOLTAGE

D1 : CHECK THE TP SENSOR SENSE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the ECM electrical connector, EM11.
3. Disconnect the TP sensor electrical connector, PI06.
4. Measure the resistance between EM11, pin 11 (U) and PI06, pin 03 (U).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<D2>>

D2 : CHECK THE TP SENSOR SENSE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between PI06, pin 03 (U) and GROUND.

•Is the voltage greater than 5 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<D3>>

D3 : CHECK THE TP SENSOR SENSE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between PI06, pin 03 (U) and GROUND.

•Is the resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new TP sensor. CLEAR the DTC. TEST the system for normal operation.

E : DTC P0131, P0132, P0133; RIGHT-HAND H02S LOW/HIGH VOLTAGE, SLOW RESPONSE

NOTE:

Before commencing this test, check the sensor connections and harness, check for exhaust leaks, engine misfire, etc. See 'visual inspection chart' and 'possible causes'.

E1 : CHECK THE H02S SENSE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.

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2. Disconnect the H02S electrical connector, EM21.
3. Disconnect the ECM electrical connector, EM12.
4. Measure the resistance between EM21, pin 03 (R) and EM12, pin 15 (R).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<E2>>

E2 : CHECK THE H02S SENSE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between EM12, pin 15 (R) and GROUND.

•Is the voltage greater than 5 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<E3>>

E3 : CHECK THE H02S SENSE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between EM12, pin 15 (R) and GROUND.

•Is the resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<E4>>

E4 : CHECK THE H02S GROUND CIRCUIT FOR OPEN CIRCUIT

1. Reconnect the ECM electrical connector, EM12.
2. Measure the resistance between EM21, pin 04 (BRD) and GROUND.

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the circuit. (This is a braided lead which would require different repair techniques to standard wiring). For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new H02S. CLEAR the DTC. TEST the system for normal operation.

F : DTC P0133, P0135; RIGHT-HAND H02S HEATER CIRCUIT MALFUNCTION

F1 : CHECK H02S HEATER POWER SUPPLY CIRCUIT

1. Disconnect the Right-Hand H02S electrical connector, EM21.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between EM21, pin 02 (WP) and GROUND.

•Is the voltage greater than 10 volts?

-> **Yes**

Goto <<F2>>

-> **No**

REPAIR the power supply circuit to the Right-hand H02S heater. This circuit includes the EMS control relay and fuse 14 of the EMS fuse board. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

F2 : CHECK H02S HEATER INPUT FROM ECM FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the ECM electrical connector, EM15.
3. Measure the resistance between EM15, pin 02 (PU) and EM21, pin 01 (PU).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<F3>>

F3 : CHECK H02S HEATER INPUT FROM ECM FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between EM21, pin 01 (PU) and GROUND.

•Is the voltage greater than 10 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<F4>>

F4 : CHECK H02S HEATER INPUT FROM ECM FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between EM21, pin 01 (PU) and GROUND.

•Is the resistance less than 10,000 ohms?

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-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new H02S. CLEAR the DTC. TEST the system for normal operation.

G : DTC P0137, P0138; RIGHT-HAND CATALYST MONITOR SENSOR LOW/HIGH VOLTAGE, NO ACTIVITY

G1 : CHECK THE CATALYST MONITOR SENSOR SENSE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the catalyst monitor sensor electrical connector, EM22.
3. Disconnect the ECM electrical connector, EM12.
4. Measure the resistance between EM22, pin 02 (U) and EM12, pin 17 (U).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<G2>>

G2 : CHECK THE CATALYST MONITOR SENSOR SENSE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between EM12, pin 17 (U) and GROUND.

•Is the voltage greater than 5 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<G3>>

G3 : CHECK THE CATALYST MONITOR SENSOR SENSE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between EM12, pin 17 (U) and GROUND.

•Is the resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<G4>>

G4 : CHECK THE O2S GROUND CIRCUIT FOR OPEN CIRCUIT

1. Reconnect the ECM electrical connector, EM12.
2. Measure the resistance between EM22, pin 01 (BRD) and GROUND.

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the circuit. (This is a braided lead which would require different repair techniques to standard wiring). For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new catalyst monitor sensor. CLEAR the DTC. TEST the system for normal operation.

H : DTC P0151, P0152, P0153; LEFT-HAND H02S LOW/HIGH VOLTAGE, SLOW RESPONSE

NOTE:

Before commencing this test, check the sensor connections and harness, check for exhaust leaks, engine misfire, etc. See 'visual inspection chart' and 'possible causes'.

H1 : CHECK THE H02S SENSE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the H02S electrical connector, EM23.
3. Disconnect the ECM electrical connector, EM12.
4. Measure the resistance between EM23, pin 03 (G) and EM12, pin 14 (G).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<E2>>

H2 : CHECK THE H02S SENSE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between EM12, pin 14 (G) and GROUND.

•Is the voltage greater than 5 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<E3>>

H3 : CHECK THE H02S SENSE CIRCUIT FOR SHORT TO GROUND

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1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between EM12, pin 14 (G) and GROUND.
 - Is the resistance less than 10,000 ohms?
 - > **Yes**
REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.
 - > **No**
Goto <<E4>>

H4 : CHECK THE H02S GROUND CIRCUIT FOR OPEN CIRCUIT

1. Reconnect the ECM electrical connector, EM12.
2. Measure the resistance between EM23, pin 04 (BRD) and GROUND.
 - Is the resistance greater than 5 ohms?
 - > **Yes**
REPAIR the circuit. (This is a braided lead which would require different repair techniques to standard wiring). For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.
 - > **No**
INSTALL a new H02S. CLEAR the DTC. TEST the system for normal operation.

I : DTC P0153, P0155; LEFT-HAND H02S HEATER CIRCUIT MALFUNCTION

I1 : CHECK H02S HEATER POWER SUPPLY CIRCUIT

1. Disconnect the Left-Hand H02S electrical connector, EM23.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between EM23, pin 02 (WP) and GROUND.
 - Is the voltage greater than 10 volts?
 - > **Yes**
Goto <<I2>>
 - > **No**
REPAIR the power supply circuit to the Left-hand H02S heater. This circuit includes the EMS control relay and fuse 14 of the EMS fuse board. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

I2 : CHECK H02S HEATER INPUT FROM ECM FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the ECM electrical connector, EM15.
3. Measure the resistance between EM15, pin 01 (PS) and EM23, pin 01 (PS).
 - Is the resistance greater than 5 ohms?
 - > **Yes**
REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**
Goto <<I3>>

I3 : CHECK H02S HEATER INPUT FROM ECM FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between EM23, pin 01 (PS) and GROUND.

•Is the voltage greater than 10 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<I4>>

I4 : CHECK H02S HEATER INPUT FROM ECM FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between EM23, pin 01 (PS) and GROUND.

•Is the resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new H02S. CLEAR the DTC. TEST the system for normal operation.

J : DTC P0157, P0158; LEFT-HAND CATALYST MONITOR SENSOR LOW/HIGH VOLTAGE, NO ACTIVITY

J1 : CHECK THE CATALYST MONITOR SENSOR SENSE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the catalyst monitor sensor electrical connector, EM24.
3. Disconnect the ECM electrical connector, EM12.
4. Measure the resistance between EM24, pin 02 (N) and EM12, pin 16 (N).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<J2>>

J2 : CHECK THE CATALYST MONITOR SENSOR SENSE CIRCUIT FOR SHORT TO HIGH VOLTAGE

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1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between EM12, pin 16 (N) and GROUND.

•Is the voltage greater than 5 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<J3>>

J3 : CHECK THE CATALYST MONITOR SENSOR SENSE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between EM12, pin 16 (N) and GROUND.

•Is the resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<J4>>

J4 : CHECK THE CATALYST MONITOR SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT

1. Reconnect the ECM electrical connector, EM12.
2. Measure the resistance between EM24, pin 01 (BRD) and GROUND.

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the circuit. (This is a braided lead which would require different repair techniques to standard wiring). For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new catalyst monitor sensor. CLEAR the DTC. TEST the system for normal operation.

K : DTC P0222, P0223; THROTTLE POSITION (TP) SENSOR CIRCUIT #2 LOW VOLTAGE

K1 : CHECK TP SENSOR #2 SENSE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the TP sensor electrical connector, PI06.
3. Disconnect the ECM electrical connector, EM11.
4. Measure the resistance between PI06, pin 02 (G) and EM11, pin 10 (G).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

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-> **No**
Goto <<K2>>

K2 : CHECK TP SENSOR #2 SENSE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between PI06, pin 02 (G) and GROUND.

•Is the voltage greater than 5 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new TP sensor. CLEAR the DTC. TEST the system for normal operation.

L : DTC P0327, P0328; RIGHT-HAND KNOCK SENSOR (KS) CIRCUIT OUT OF RANGE (LOW VOLTAGE)

NOTE:

Before commencing this test, make sure that the sensor is making a good electrical contact with the cylinder block. See 'possible causes'.

L1 : CHECK KS SENSE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the KS electrical connector, PI26.
3. Disconnect the ECM electrical connector, EM13.
4. Measure the resistance between PI26, pin 01 (S) and EM13, pin 18 (S).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<L2>>

L2 : CHECK KS SENSE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Turn the ignition switch to the **ON** position.
2. Reconnect the battery negative terminal.
3. Measure the voltage between PI26, pin 01 (S) and GROUND.

•Is the voltage greater than 5 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<L3>>

L3 : CHECK KS SENSE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between PI26, pin 01 (S) and GROUND.

•Is the resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new KS. CLEAR the DTC. TEST the system for normal operation.

M : DTC P0332, P0333; LEFT-HAND KNOCK SENSOR (KS) CIRCUIT OUT OF RANGE (LOW VOLTAGE)

NOTE:

Before commencing this test, make sure that the sensor is making a good electrical contact with the cylinder block. See 'possible causes'.

M1 : CHECK KS SENSE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the KS electrical connector, PI27.
3. Disconnect the ECM electrical connector, EM13.
4. Measure the resistance between PI27, pin 01 (N) and EM13, pin 17 (N).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<M2>>

M2 : CHECK KS SENSE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Turn the ignition switch to the **ON** position.
2. Reconnect the battery negative terminal.
3. Measure the voltage between PI27, pin 01 (N) and GROUND.

•Is the voltage greater than 5 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<M3>>

M3 : CHECK KS SENSE CIRCUIT FOR SHORT TO GROUND

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1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between PI27, pin 01 (N) and GROUND.
 - **Is the resistance less than 10,000 ohms?**
 - > **Yes**
REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.
 - > **No**
INSTALL a new KS. CLEAR the DTC. TEST the system for normal operation.

N : DTC P0335; CRANKSHAFT POSITION (CKP) SENSOR CIRCUIT MALFUNCTION

N1 : CHECK THE CKP SENSOR FOR CORRECT INSTALLATION

1. Turn the ignition switch to the **OFF** position.
2. Check the CKP sensor for correct installation.
 - **Is the CKP sensor correctly installed?**
 - > **Yes**
Goto <<N2>>
 - > **No**
INSTALL the CKP sensor correctly. Reconnect the sensor. CLEAR the DTCs. TEST the system for normal operation.

N2 : CHECK THE CKP SENSOR FOR DEBRIS

1. Remove the CKP sensor and inspect for debris.
 - **Is the CKP sensor free of debris?**
 - > **Yes**
Goto <<N3>>
 - > **No**
CLEAN the sensor and wheel. INSTALL the sensor. Reconnect the sensor. CLEAR the DTCs. TEST the system for normal operation.

N3 : CHECK THE CKP SENSOR SENSE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the ECM electrical connector, EM13.
3. Measure the resistance between EM13, pin 19 (Y) and PI17, pin 01 (Y).
4. Measure the resistance between EM13, pin 28 (P) and PI17, pin 02 (P).
 - **Is either resistance greater than 5 ohms?**
 - > **Yes**
REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.
 - > **No**
Goto <<N4>>

N4 : CHECK THE CKP SENSOR SENSE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between PI17, pin 19 (Y) and GROUND.
4. Measure the voltage between PI17, pin 28 (P) and GROUND.

•Are both voltages greater than 3 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<N5>>

N5 : CHECK THE CKP SENSOR SENSE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between EM13, pin 19 (Y) and GROUND.
3. Measure the resistance between EM13, pin 28 (P) and GROUND.

•Is either resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new CKP sensor. CLEAR the DTC. TEST the system for normal operation.

O : DTC P0340; CAMSHAFT POSITION (CMP) SENSOR CIRCUIT MALFUNCTION

O1 : CHECK THE CMP SENSOR FOR CORRECT INSTALLATION

1. Turn the ignition switch to the **OFF** position.
2. Check the CMP sensor for correct installation.

•Is the CMP sensor correctly installed?

-> **Yes**

Goto <<O2>>

-> **No**

INSTALL the CMP sensor correctly. CLEAR the DTCs. TEST the system for normal operation.

O2 : CHECK THE CMP SENSOR FOR FOREIGN DEBRIS

1. Remove the CMP sensor and inspect for foreign debris.

•Is the CMP sensor free of foreign debris?

-> **Yes**

Goto <<N3>>

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-> **No**

CLEAN the sensor and wheel. INSTALL the sensor. CLEAR the DTCs. TEST the system for normal operation.

O3 : CHECK THE CMP SENSOR SENSE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the ECM electrical connector, EM13.
3. Measure the resistance between EM13, pin 20 (B) and P115, pin 01 (B).

• **Is the resistance greater than 5 ohms?**

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<O3>>

O4 : CHECK THE CMP SENSOR SENSE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between EM13, pin 20 (B) and GROUND.

• **Is the voltage greater than 5 volts?**

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<O5>>

O5 : CHECK THE CMP SENSOR SENSE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between P115, pin 01 (B) and GROUND.

• **Is the resistance less than 10,000 ohms?**

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new CMP sensor. CLEAR the DTC. TEST the system for normal operation.

P : DTC P0560; VEHICLE VOLTAGE MALFUNCTION

NOTE:

When checking the EMS switched supplies to the ECM in test P3, the EMS relay must be energised when testing EM10, pin 01 and EM14, pin 03.

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P1 : CHECK THE BATTERY POWER SUPPLY TO THE ECM

1. Disconnect the ECM electrical connector, EM10.
2. Measure the voltage between EM10, pin 09 (NO) and GROUND.

•Is the voltage greater than 10 volts?

-> **Yes**

Goto <<P2>>

-> **No**

REPAIR the battery power supply circuit. This circuit includes fuse 4 of the EMS fuse board. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

P2 : CHECK THE IGNITION SWITCHED POWER SUPPLY TO THE ECM

1. Turn the ignition switch to the **ON** position.
2. Measure the voltage between EM10, pin 05 (WK) and GROUND.

•Is the voltage greater than 10 volts?

-> **Yes**

Goto <<P3>>

-> **No**

REPAIR the ignition switched power supply circuit. This circuit includes fuse 9 of the Right-hand heelboard fuse box. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

P3 : CHECK THE EMS SWITCHED POWER SUPPLIES TO THE ECM

1. Disconnect the ECM electrical connector, EM14.
2. Make sure the EMS relay is energised.
3. Measure the voltage between EM10, pin 01 (WR) and GROUND.
4. Measure the voltage between EM14, pin 03 (WR) and GROUND.

•Are both voltages greater than 10 volts?

-> **Yes**

Contact dealer technical support for advice on possible ECM failure.

-> **No**

REPAIR the EMS switched power supply circuits. The supply circuit to EM10, pin 01 includes fuse 18 of the Right-hand heelboard fuse box, the supply circuit to EM14, pin 03 includes fuse 01 of the trunk fuse box. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

Q : DTC P1121, P1122, P1123; ACCELERATOR PEDAL POSITION (APP) SENSOR CIRCUIT 'A' RANGE/PERFORMANCE, HIGH/LOW VOLTAGE

Q1 : CHECK THE APP SENSOR SENSE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the ECM electrical connector, EM11.

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3. Disconnect the APP sensor electrical connector, PI42.
4. Measure the resistance between EM11, pin 16 (K) and PI42, pin 05 (K).

•Is the resistance greater than 5 ohms?

-> Yes

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> No

Goto <<Q2>>

Q2 : CHECK THE APP SENSOR SENSE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between PI42, pin 05 (K) and GROUND.

•Is the voltage greater than 5 volts?

-> Yes

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> No

Goto <<Q3>>

Q3 : CHECK THE APP SENSOR SENSE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between PI42, pin 05 (K) and GROUND.

•Is the resistance less than 10,000 ohms?

-> Yes

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> No

Goto <<Q4>>

Q4 : CHECK THE APP SENSOR COMMON REFERENCE VOLTAGE AT THE SENSOR

1. Reconnect the ECM electrical connector, EM11.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between PI42, pin 04 (UW) and GROUND.

•Is the voltage less than 4 volts?

-> Yes

Goto <<Q5>>

-> No

Goto <<Q6>>

Q5 : CHECK THE APP SENSOR COMMON REFERENCE VOLTAGE CIRCUIT

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1. Turn the ignition switch to the **OFF** position.
2. Disconnect the ECM electrical connector, EM11.
3. Measure the resistance between EM11, pin 08 (UW) and PI42, pin 04 (UW).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Check the ECM power supplies.

Q6 : CHECK THE APP SENSOR COMMON REFERENCE GROUND

1. Measure the resistance between PI42, pin 02 (BG) and GROUND.

•Is the resistance greater than 5 ohms?

-> **Yes**

Goto <<Q7>>

-> **No**

INSTALL a new APP sensor. CLEAR the DTC. TEST the system for normal operation.

Q7 : CHECK THE APP SENSOR COMMON REFERENCE GROUND CIRCUIT

1. Disconnect the ECM electrical connectors, EM10 and EM11.
2. Measure the resistance between EM10, pin 20 (BG) and PI42, pin 02 (BG).
3. Measure the resistance between EM11, pin 12 (BG) and PI42, pin 02 (BG).

•Is either resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Check the ECM GROUND circuits. If the GROUND circuits are sound, contact dealer technical support for advice on possible ECM failure.

R : DTC P1221, P1222, P1223; ACCELERATOR PEDAL POSITION (APP) SENSOR CIRCUIT 'B' RANGE/PERFORMANCE, HIGH/LOW VOLTAGE

R1 : CHECK THE APP SENSOR SENSE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the ECM electrical connector, EM11.
3. Disconnect the APP sensor electrical connector, PI42.
4. Measure the resistance between EM11, pin 15 (R) and PI42, pin 03 (R).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

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-> **No**
Goto <<R2>>

R2 : CHECK THE APP SENSOR SENSE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between PI42, pin 03 (R) and GROUND.

•Is the voltage greater than 5 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<R3>>

R3 : CHECK THE APP SENSOR SENSE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between PI42, pin 03 (R) and GROUND.

•Is the resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<R4>>

R4 : CHECK THE APP SENSOR COMMON REFERENCE VOLTAGE AT THE SENSOR

1. Reconnect the ECM electrical connector, EM11.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between PI42, pin 04 (UW) and GROUND.

•Is the voltage less than 4 volts?

-> **Yes**

Goto <<R5>>

-> **No**

Goto <<R6>>

R5 : CHECK THE APP SENSOR COMMON REFERENCE VOLTAGE CIRCUIT

1. Turn the ignition switch to the **OFF** position.
2. Disconnect the ECM electrical connector, EM11.
3. Measure the resistance between EM11, pin 08 (UW) and PI42, pin 04 (UW).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the

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DTC. TEST the system for normal operation.

-> **No**

Check the ECM power supplies.

R6 : CHECK THE APP SENSOR COMMON REFERENCE GROUND

1. Measure the resistance between PI42, pin 02 (BG) and GROUND.

•Is the resistance greater than 5 ohms?

-> **Yes**

Goto <<R7>>

-> **No**

INSTALL a new APP sensor. CLEAR the DTC. TEST the system for normal operation.

R7 : CHECK THE PP SENSOR COMMON REFERENCE GROUND CIRCUIT

1. Disconnect the ECM electrical connectors, EM10 and EM11.

2. Measure the resistance between EM10, pin 20 (BG) and PI42, pin 02 (BG).

3. Measure the resistance between EM11, pin 12 (BG) and PI42, pin 02 (BG).

•Is either resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Check the ECM GROUND circuits. If the GROUND circuits are sound, contact dealer technical support for advice on possible ECM failure.

S : DTC P1224, P1229; THROTTLE CONTROL POSITION (TP) SENSOR ERROR/THROTTLE MOTOR CONTROL CIRCUIT MALFUNCTION

NOTE:

Before commencing this test, check the TP sensor connections, perform the throttle adaptations procedure.

S1 : CHECK THE TP SENSOR TO ECM SENSE CIRCUIT #1 FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.

2. Disconnect the TP sensor electrical connector, PI06.

3. Disconnect the ECM electrical connector, EM11.

4. Measure the resistance between PI06, pin 02 (G) and EM11, pin 10 (G).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<S2>>

S2 : CHECK THROTTLE MOTOR RELAY CONSTANT SUPPLY

1. Reconnect the battery negative terminal.
2. Remove the throttle motor relay.
3. Measure the voltage between the throttle motor relay base, pin 3 and GROUND.

•Is the voltage greater than 10 volts?

-> **Yes**

Goto <<S3>>

-> **No**

REPAIR the circuit between the throttle motor relay base, pin 3 and the battery. This circuit includes the EMS fuse box, fuse 09. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

S3 : CHECK THROTTLE MOTOR RELAY EMS SWITCHED SUPPLY

1. Turn the ignition switch to the **ON** position.
2. Measure the voltage between the throttle motor relay base, pin 1 and GROUND.

•Is the voltage greater than 10 volts?

-> **Yes**

Goto <<S4>>

-> **No**

REPAIR the circuit between the throttle motor relay base, pin 1 and the battery. This circuit includes the EMS fuse box, fuse 14, and the EMS control relay. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

S4 : CHECK THROTTLE MOTOR RELAY TO ECM CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the ECM electrical connector, EM13.
3. Measure the resistance between EM13, pin 14 (GR) and throttle motor relay base, pin 2.

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<S5>>

S5 : CHECK THROTTLE MOTOR RELAY OUTPUT TO ECM

1. Reconnect the ECM electrical connector, EM13.
2. Disconnect the ECM electrical connector, EM14.
3. INSTALL the throttle motor relay.
4. Reconnect the battery negative terminal.
5. Turn the ignition switch to the **ON** position.

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6. Measure the voltage between EM14, pins 01 and 02, (GY) and GROUND.

•Is the voltage greater than 10 volts?

-> Yes

Goto <<S6>>

-> No

INSTALL a new throttle motor relay. For additional information, refer to the electrical guide. CLEAR the DTC. TEST the system for normal operation.

S6 : CHECK THROTTLE MOTOR TO ECM DRIVE SUPPLY CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the throttle motor electrical connector, PI33.

2. Measure the resistance between PI33, pin 01 (R) and EM14, pins 05 and 06 (R).

•Is either resistance greater than 5 ohms?

-> Yes

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> No

Goto <<S7>>

S7 : CHECK THROTTLE MOTOR TO ECM DRIVE GROUND CIRCUIT FOR HIGH RESISTANCE

1. Measure the resistance between PI33, pin 02 (G) and EM14, pins 11 and 12 (G).

•Is either resistance greater than 5 ohms?

-> Yes

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> No

Goto <<S8>>

S8 : CHECK THROTTLE MOTOR TO ECM DRIVE SUPPLY CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the ECM electrical connector, EM14.

2. Turn the ignition switch to the **ON** position.

3. Measure the voltage between PI33, pin 01 (R) and GROUND.

•Is the voltage greater than 10 volts?

-> Yes

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> No

Goto <<S9>>

S9 : CHECK THROTTLE MOTOR TO ECM DRIVE SUPPLY CIRCUIT FOR SHORT TO GROUND

1. Disconnect the ECM electrical connector, EM14.

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2. Turn the ignition switch to the **OFF** position.
3. Measure the resistance between PI33, pin 01 (R) and GROUND.

•Is the resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new throttle motor. <<303-04>> CLEAR the DTC. TEST the system for normal operation.

T : DTC P1226; MECHANICAL GUARD SENSOR RANGE/PERFORMANCE, HIGH /LOW VOLTAGE

T1 : CHECK THE MECHANICAL GUARD SENSE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the mechanical guard sensor electrical connector, PI42.
3. Disconnect the ECM electrical connector, EM11.
4. Measure the resistance between PI42, pin 01 (BY) and EM11, pin 13 (BY).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<T2>>

T2 : CHECK THE MECHANICAL GUARD SENSE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between PI42, pin 01 (BY) and GROUND.

•Is the voltage greater than 10 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<T3>>

T3 : CHECK THE MECHANICAL GUARD SENSE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between PI42, pin 01 (BY) and GROUND.

•Is the resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<T4>>

T4 : CHECK THE MECHANICAL GUARD SENSOR POWER SUPPLY CIRCUIT

1. Reconnect the ECM electrical connector, EM11.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between PI42, pin 04 (UW) and GROUND.

•Is the voltage less than 5 volts?

-> **Yes**

REPAIR the power supply circuit. This circuit includes the ECM. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new mechanical guard sensor. CLEAR the DTC. TEST the system for normal operation.

U : DTC P1230; FUEL PUMP RELAY MALFUNCTION

U1 : CHECK THE FUEL PUMP RELAY TO ECM CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Remove the fuel pump relay.
3. Disconnect the ECM electrical connector, EM13.
4. Measure the resistance between EM13, pin 01 (KN) and the relay base, pin 02.

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<U2>>

U2 : CHECK THE FUEL PUMP RELAY TO ECM CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between EM13, pin 01 (KN) and GROUND.

•Is the voltage greater than 10 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<U3>>

U3 : CHECK THE FUEL PUMP RELAY TO ECM CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between EM13, pin 01 (KN) and GROUND.

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•Is the resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<U4>>

U4 : CHECK THE FUEL PUMP RELAY CONSTANT POWER SUPPLY

1. Reconnect the ECM electrical connector, EM13.
2. Measure the voltage between the relay base, pin 03 and GROUND.

•Is the voltage less than 10 volts?

-> **Yes**

REPAIR the circuit between the relay base, pin 03 and the battery power bus. This circuit includes the trunk fuse box and the high power protection module. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<U5>>

U5 : CHECK THE FUEL PUMP RELAY IGNITION SWITCHED POWER SUPPLY

1. Turn the ignition switch to the **ON** position.
2. Measure the voltage between the relay base, pin 01 and GROUND.

•Is the voltage less than 10 volts?

-> **Yes**

REPAIR the circuit between the relay base, pin 01 and battery. This circuit includes the trunk fuse box, fuse 16 of the Left-hand fuse box, the ignition positive relay and the high power protection module. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<U6>>

U6 : CHECK THE FUEL PUMP RELAY ECM SWITCHED GROUND SUPPLY

1. Turn the ignition switch to the **ON** position.
2. Make sure the ignition positive relay is engaged.
3. Check the resistance between the fuel pump relay base, pin 02 and GROUND.

•Is the resistance greater than 5 ohm?

-> **Yes**

Contact dealer technical support for advice on possible ECM failure.

-> **No**

INSTALL a new fuel pump relay. For additional information, refer to the electrical guide. CLEAR the DTC. TEST the system for normal operation.

V : DTC P1240, P1241, P1242; SENSOR REFERENCE VOLTAGE MALFUNCTION, HIGH/LOW VOLTAGE (TP SENSOR, APP SENSOR, MECHANICAL GUARD SENSOR)

V1 : CHECK THE REFERENCE VOLTAGE AT THE APP SENSOR/MECHANICAL GUARD SENSOR

1. Disconnect the pedal position sensor electrical connector, PI42.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between PI42, pin 04 (UW) and GROUND.

•Is the voltage less than 5 volts?

-> **Yes**

Goto <<V2>>

-> **No**

Goto <<V3>>

V2 : CHECK THE APP SENSOR/MECHANICAL GUARD SENSOR REFERENCE VOLTAGE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the ECM electrical connectors, EM10 and EM11.
2. Measure the resistance between PI42, pin 04 (UW) and EM10, pin 21 (UW).
3. Measure the resistance between PI42, pin 04 (UW) and EM11, pin 08 (UW).

•Is either resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<V3>>

V3 : CHECK THE APP SENSOR/MECHANICAL GUARD SENSOR REFERENCE VOLTAGE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Turn the ignition switch to the **ON** position.
2. Measure the voltage between PI42, pin 04 (UW) and GROUND.

•Is the voltage greater than 6 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<V4>>

V4 : CHECK THE APP SENSOR/MECHANICAL GUARD SENSOR REFERENCE VOLTAGE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between PI42, pin 04 (UW) and GROUND.

•Is the resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

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-> **No**
Goto <<V5>>

V5 : CHECK THE REFERENCE VOLTAGE AT THE THROTTLE POSITION SENSOR

1. Disconnect the throttle position sensor electrical connector, PI06.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between PI06, pin 04 (UW) and GROUND.

•Is the voltage less than 5 volts?

-> **Yes**
Goto <<V6>>

-> **No**
Goto <<V7>>

V6 : CHECK THE THROTTLE POSITION SENSOR REFERENCE VOLTAGE CIRCUIT FOR HIGH RESISTANCE

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between PI06, pin 04 (UW) and EM10, pin 21 (UW).
3. Measure the resistance between PI06, pin 04 (UW) and EM11, pin 08 (UW).

•Is either resistance greater than 5 ohms?

-> **Yes**
REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**
Goto <<V7>>

V7 : CHECK THE THROTTLE POSITION SENSOR REFERENCE VOLTAGE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Turn the ignition switch to the **ON** position.
2. Measure the voltage between PI06, pin 04 (UW) and GROUND.

•Is the voltage greater than 6 volts?

-> **Yes**
REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**
Goto <<V8>>

V8 : CHECK THE THROTTLE POSITION SENSOR REFERENCE VOLTAGE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between PI06, pin 04 (UW) and GROUND.

•Is the resistance less than 10,000 ohms?

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-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new throttle body. CLEAR the DTC. TEST the system for normal operation. If the DTC is repeated, contact dealer technical support for advice on possible ECM failure.

W : DTC P1243; SENSOR REFERENCE GROUND MALFUNCTION (THROTTLE SENSORS, ECT SENSOR, IAT SENSOR, IAT SENSOR 2)

W1 : CHECK THE SENSOR REFERENCE GROUND AT THE THROTTLE SENSORS

1. Disconnect the throttle sensor electrical connector, PI06.
2. Measure the resistance between PI06, pin 01 (BG) and GROUND.

• **Is the resistance greater than 5 ohms?**

-> **Yes**

Goto <<W2>>

-> **No**

Goto <<W3>>

W2 : CHECK THE THROTTLE SENSOR REFERENCE GROUND CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the ECM electrical connectors, EM10 and EM11.
2. Measure the resistance between PI06, pin 01 (BG) and EM10, pin 20 (BG).
3. Measure the resistance between PI06, pin 01 (BG) and EM11, pin 12 (BG).

• **Is either resistance greater than 5 ohms?**

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<W3>>

W3 : CHECK THE SENSOR REFERENCE GROUND AT THE APP SENSOR/MECHANICAL GUARD SENSOR

1. Disconnect the APP sensor/mechanical guard sensor electrical connector, PI42.
2. Reconnect the ECM electrical connectors, EM10 and EM11.
3. Measure the resistance between PI42, pin 02 (BG) and GROUND.

• **Is the resistance greater than 5 ohms?**

-> **Yes**

Goto <<W4>>

-> **No**

Goto <<W5>>

W4 : CHECK THE APP SENSOR/MECHANICAL GUARD SENSOR REFERENCE GROUND

CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the ECM electrical connectors, EM10 and EM11.
2. Measure the resistance between PI42, pin 02 (BG) and EM10, pin 20 (BG).
3. Measure the resistance between PI42, pin 02 (BG) and EM11, pin 12 (BG).

•Is either resistance greater than 5 ohms?

-> Yes

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> No

Goto <<W5>>

W5 : CHECK THE SENSOR REFERENCE GROUND AT THE ECT SENSOR

1. Reconnect the ECM electrical connectors, EM10 and EM11.
2. Disconnect the ECT sensor electrical connector, PI04.
3. Measure the resistance between PI04, pin 01 (BG) and GROUND.

•Is the resistance greater than 5 ohms?

-> Yes

Goto <<W6>>

-> No

Goto <<W7>>

W6 : CHECK THE ECT SENSOR REFERENCE GROUND CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the ECM electrical connectors, EM10 and EM11.
2. Measure the resistance between PI04, pin 01 (BG) and EM10, pin 20 (BG).
3. Measure the resistance between PI04, pin 01 (BG) and EM11, pin 12 (BG).

•Is either resistance greater than 5 ohms?

-> Yes

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> No

Goto <<W7>>

W7 : CHECK THE SENSOR REFERENCE GROUND AT THE IAT SENSOR (MAF)

1. Reconnect the ECM electrical connectors, EM10 and EM11.
2. Disconnect the IAT sensor (MAF) electrical connector, PI35.
3. Measure the resistance between PI35, pin 04 (BG) and GROUND.

•Is the resistance greater than 5 ohms?

-> Yes

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> No

Goto <<W8>>

W8 : CHECK THE IAT SENSOR REFERENCE GROUND CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the ECM electrical connectors, EM10 and EM11.
2. Measure the resistance between PI35, pin 04 (BG) and EM10, pin 20 (BG).
3. Measure the resistance between PI35, pin 04 (BG) and EM11, pin 12 (BG).

•Is either resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

CHECK for DTCs associated with TP sensor, APP/mechanical guard sensor, ECT sensor, or IAT sensor. INSTALL a new sensor as indicated by the DTC. CLEAR the DTC. TEST the system for normal operation.

X : DTC P1245, P1246; ENGINE CRANK SIGNAL LOW/HIGH VOLTAGE

X1 : CHECK THE STARTER RELAY SIGNAL CIRCUIT FROM ECM AND BPM FOR SHORT TO B+

1. Measure the voltage between the relay base, pin 02 and GROUND.

•Is the voltage greater than 3 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<X2>>

X2 : CHECK THE STARTER RELAY SIGNAL CIRCUIT FROM ECM AND BPM FOR HIGH RESISTANCE

1. Remove the starter relay.
2. Disconnect the ECM electrical connector, EM11.
3. Disconnect the BPM electrical connector, FC15.
4. Measure the resistance between EM11, pin 06 (GO) and the starter relay base, pin 02.
5. Measure the resistance between FC15, pin 73 (GO) and the starter relay base, pin 02.

•Is either resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new BPM. CLEAR the DTC. TEST the system for normal operation.

Y : DTC P1260; SECURITY INPUT MALFUNCTION

Y1 : CHECK THE KTM TO ECM CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the ECM electrical connector, EM10.
2. Disconnect the KTM electrical connector, FC22.
3. Measure the resistance between EM10, pin 06 (O) and FC22, pin 16 (O).

•Is either resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new KTM. CLEAR the DTC. TEST the system for normal operation.

Z : DTC P1392, P1393; RIGHT-HAND VARIABLE CAMSHAFT TIMING (VCT) OIL CONTROL SOLENOID CIRCUIT OPEN/SHORT CIRCUIT

Z1 : CHECK ECM TO VCT SOLENOID VALVE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the VCT electrical connector, PI31.
3. Disconnect the ECM electrical connector, EM15.
4. Measure the resistance between PI31, pin 01 (RY) and EM15, pin 09 (RY).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<Z2>>

Z2 : CHECK ECM TO VCT SOLENOID VALVE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between PI31, pin 01 (RY) and GROUND.

•Is the voltage greater than 10volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<Z2>>

Z3 : CHECK ECM TO VCT SOLENOID VALVE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between PI31, pin 01 (RY) and GROUND.

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•Is the resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new VCT solenoid valve. <<303-01>> CLEAR the DTC. TEST the system for normal operation.

AA : DTC P1397, P1398; LEFT-HAND VCT SOLENOID CIRCUIT OPEN/SHORT CIRCUIT

AA1 : CHECK ECM TO VCT SOLENOID VALVE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the VCT electrical connector, PI32.
3. Disconnect the ECM electrical connector, EM15.
4. Measure the resistance between PI32, pin 01 (RG) and EM15, pin 08 (RG).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<AA2>>

AA2 : CHECK ECM TO VCT SOLENOID VALVE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between PI32, pin 01 (RG) and GROUND.

•Is the voltage greater than 10volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<AA3>>

AA3 : CHECK ECM TO VCT SOLENOID VALVE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between PI32, pin 01 (RG) and GROUND.

•Is the resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

INSTALL a new VCT solenoid valve. <<303-01>> CLEAR the DTC. TEST the system for normal operation.

AB : DTC P1475; RADIATOR FANS SLOW (SERIES) CIRCUIT MALFUNCTION

AB1 : CHECK THE RADIATOR FAN MODULE TO ECM 'SERIES' DRIVE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the ECM electrical connector, EM13.
3. Disconnect the fan module electrical connector, LS31.
4. Measure the resistance between EM13, pin 15 (W) and LS31, pin 09 (W).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<AB2>>

AB2 : CHECK THE RADIATOR FAN MODULE TO ECM 'SERIES' DRIVE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between EM13, pin 15 (W) and GROUND.

•Is the voltage greater than 3 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<AB3>>

AB3 : CHECK THE RADIATOR FAN MODULE TO ECM 'SERIES' DRIVE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between EM13, pin 15 (W) and GROUND.

•Is the resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<AB4>>

AB4 : CHECK THE RADIATOR FAN MODULE IGNITION SUPPLY

1. Reconnect the ECM electrical connector, EM13.

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2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between LS31, pin 08 (WP) and GROUND.

•Is the voltage greater than 10 volts?

-> **Yes**

INSTALL a new radiator fan module. <<303-03>> CLEAR the DTC. TEST the system for normal operation.

-> **No**

REPAIR the circuit between LS31, pin 08 (WP) and battery. This circuit includes the EMS fuse box, (fuse 14), the EMS relay, etc. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

AC : DTC P1476; RADIATOR FANS FAST (PARALLEL) CIRCUIT MALFUNCTION

AC1 : CHECK THE RADIATOR FAN MODULE TO ECM 'PARALLEL' DRIVE CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the ECM electrical connector, EM13.
3. Disconnect the fan module electrical connector, LS31.
4. Measure the resistance between EM13, pin 16 (WU) and LS31, pin 07 (WU).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<AB2>>

AC2 : CHECK THE RADIATOR FAN MODULE TO ECM 'PARALLEL' DRIVE CIRCUIT FOR SHORT TO HIGH VOLTAGE

1. Reconnect the battery negative terminal.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between EM13, pin 16 (WU) and GROUND.

•Is the voltage greater than 3 volts?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<AC3>>

AC3 : CHECK THE RADIATOR FAN MODULE TO ECM 'PARALLEL' DRIVE CIRCUIT FOR SHORT TO GROUND

1. Turn the ignition switch to the **OFF** position.
2. Measure the resistance between EM13, pin 16 (WU) and GROUND.

•Is the resistance less than 10,000 ohms?

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-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<AB4>>

AC4 : CHECK THE RADIATOR FAN MODULE IGNITION SUPPLY

1. Reconnect the ECM electrical connector, EM13.
2. Turn the ignition switch to the **ON** position.
3. Measure the voltage between LS31, pin 08 (WP) and GROUND.

•Is the voltage greater than 10 volts?

-> **Yes**

INSTALL a new radiator fan module. <<303-03>> CLEAR the DTC. TEST the system for normal operation.

-> **No**

REPAIR the circuit between LS31, pin 08 (WP) and battery. This circuit includes the EMS fuse box, (fuse 14), the EMS relay, etc. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

AD : DTC P1516, P1517; GEAR CHANGE PARK/NEUTRAL DRIVING MALFUNCTION

AD1 : CHECK THE TRANSMISSION RANGE (TR) SENSOR TO ECM CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the TR sensor electrical connector, EM47.
3. Disconnect the ECM electrical connector, EM10.
4. Measure the resistance between EM47, pin K (RU) and EM10, pin 15 (RU).

•Is the resistance greater than 5 ohms?

-> **Yes**

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Goto <<AD2>>

AD2 : CHECK THE TRANSMISSION RANGE (TR) SENSOR PARK/NEUTRAL SWITCHING ACTION

1. Measure the resistance between pins J and K of the rotary switch.
2. Move the selector lever from **PARK** to **NEUTRAL** and back.

•Does the resistance switch between open circuit and continuity as the lever moves?

-> **Yes**

Goto <<AD3>>

-> **No**

INSTALL a new TR sensor. CLEAR the DTC. TEST the system for normal operation.

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AD3 : CHECK THE D-4 SWITCH TO TCM CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the D-4 switch electrical connector, CC07.
2. Disconnect the TCM electrical connector, EM07.
3. Measure the resistance between CC07, pin 01 (US) and EM07, pin 13 (US).

•Is the resistance greater than 5 ohms?

-> Yes

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> No

INSTALL a new TR sensor. CLEAR the DTC. TEST the system for normal operation.

AE : DTC P1606; EMS CONTROL RELAY MALFUNCTION

AE1 : CHECK THE EMS RELAY PERMANENT B+SUPPLY

1. Remove the EMS relay.
2. Measure the voltage between the relay base, pins 02 and 03.

•Are both voltages greater than 10 volts?

-> Yes

Goto <<AE2>>

-> No

REPAIR the circuit between the relay base and battery. This circuit includes the high power protection module. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

AE2 : CHECK THE EMS RELAY TO ECM CIRCUIT FOR HIGH RESISTANCE

1. Disconnect the battery negative terminal.
2. Disconnect the ECM electrical connector, EM10.
3. Measure the resistance between the relay base, pin 01 and EM10, pin 16 (PK).

•Is the resistance greater than 5 ohms?

-> Yes

REPAIR the high resistance circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> No

INSTALL a new EMS relay. CLEAR the DTC. TEST the system for normal operation.

AF : DTC P1609; ECM MICROPROCESSOR TO MICROPROCESSOR COMMUNICATION FAILURE

AF1 : CHECK THE ECM PROGRAMMING CIRCUIT FOR SHORT TO GROUND

1. Disconnect the ECM electrical connector, EM11.
2. Measure the resistance between EM11, pin 03 (P) and GROUND.

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•Is the resistance less than 10,000 ohms?

-> **Yes**

REPAIR the short circuit. For additional information, refer to the wiring diagrams. CLEAR the DTC. TEST the system for normal operation.

-> **No**

Contact dealer technical support for advice on possible ECM failure.

AG : CHECK ROCHESTER VALVE FUNCTION

AG1 : CHECK VACUUM INTEGRITY OF ROCHESTER VALVE

1. Disconnect hoses from rochester valve.
2. Blank off outlet side of valve.
3. Connect a hand-held vacuum pump to the vacuum inlet of the valve.
4. Apply a vacuum to the valve and monitor the reading for 2 minutes.

•Does the valve hold vacuum?

-> **Yes**

Inspect the pipes at either side of the valve for leaks/damage. Rectify as necessary.

-> **No**

INSTALL a new rochester valve. TEST the system for normal operation.



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