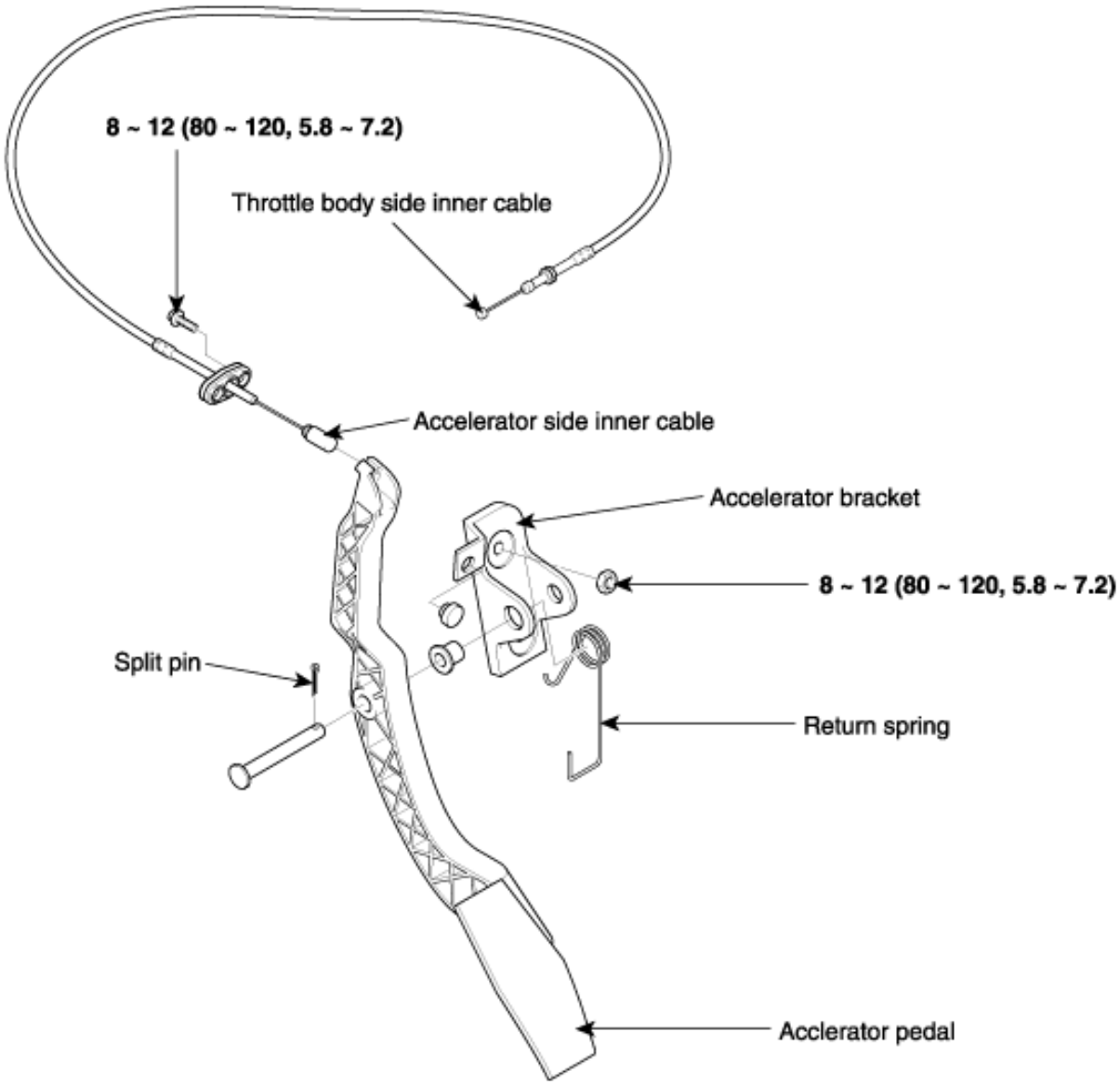
HYUNDAI

Elantra

Workshop Manual
2001 - 2006

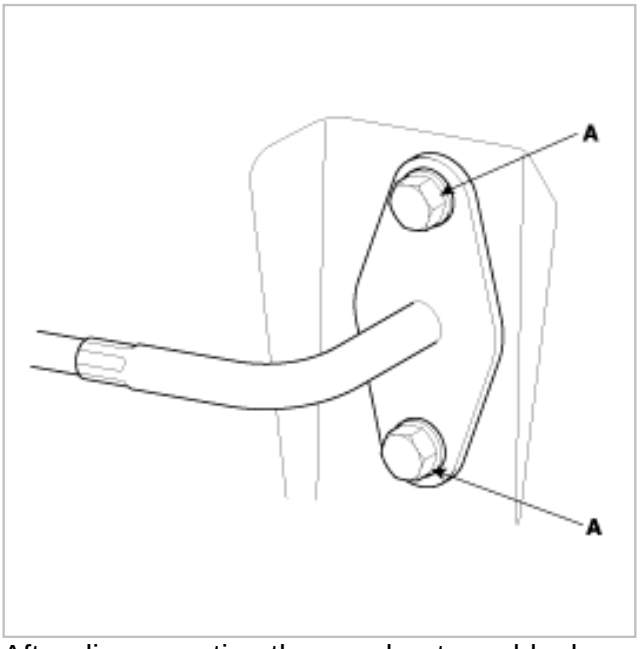
COMPONENTS



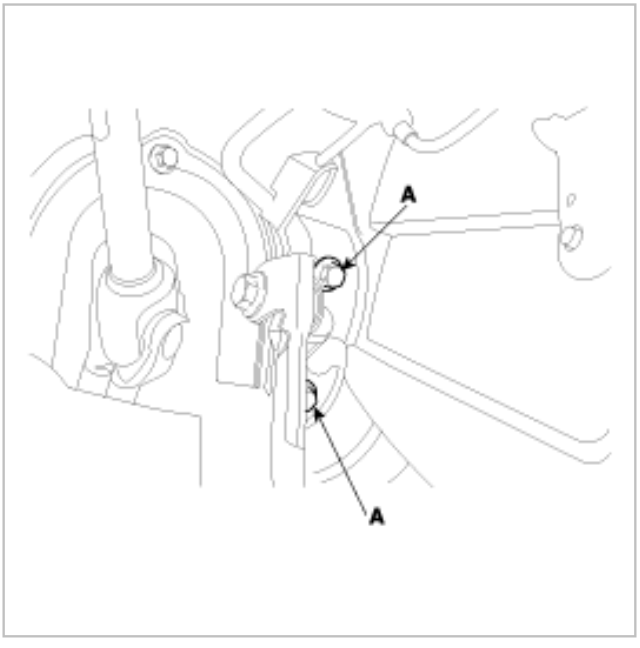
TORQUE : Nm (kg·cm, lb·ft)

REMOVAL

1. Disconnect the accelerator cable from the accelerator pedal by removing the 2 bolts(A).

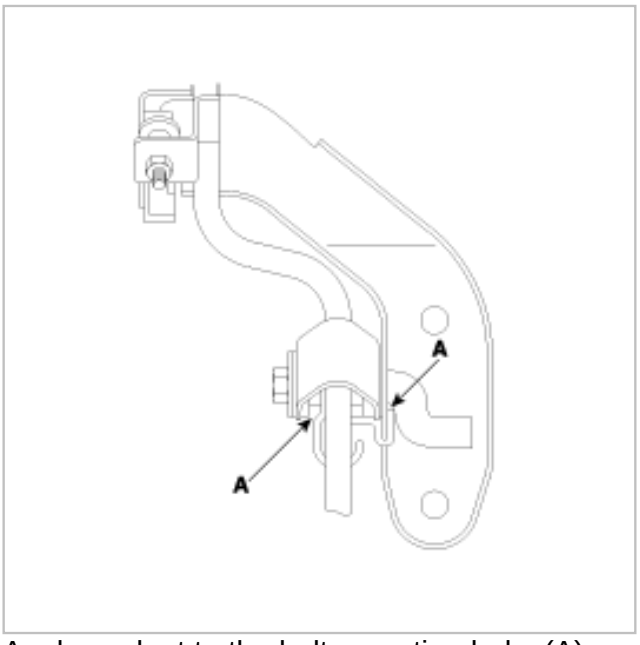


2. After disconnecting the accelerator cable, loosen the bolts(A) of the accelerator arm bracket and remove.



INSTALLATION

1. When installing the return spring and accelerator pedal, apply multi-purpose grease around each moving point (A) of the accelerator pedal.

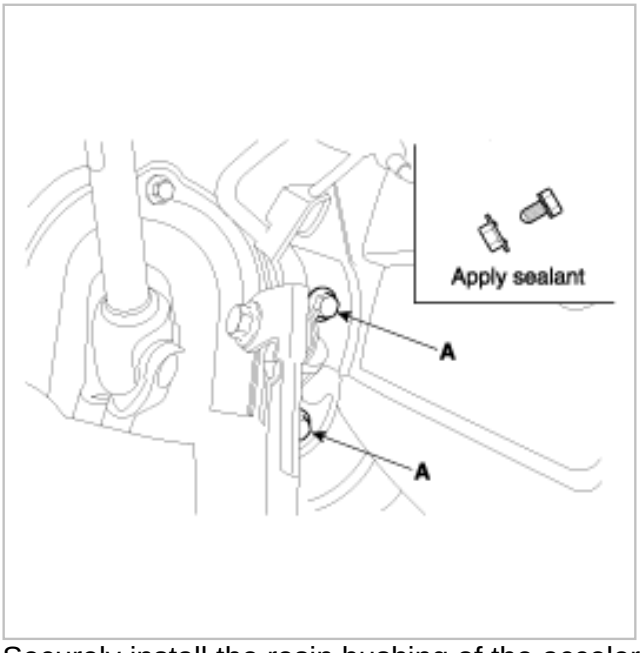


2. Apply sealant to the bolt mounting holes(A), and tighten the accelerator pedal bracket.

Tightening torque

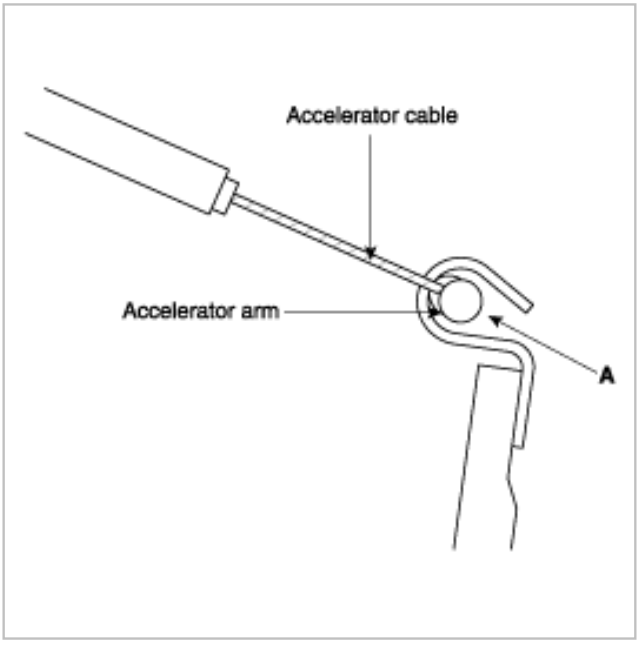
Accelerator pedal bracket bolts :

8 ~ 12Nm (80 ~ 120 kg·cm, 5.8 ~ 7.2 lb·ft)



3. Securely install the resin bushing of the accelerator cable on the end of the accelerator pedal.

4. Apply multipurpose grease around the cable end (A).



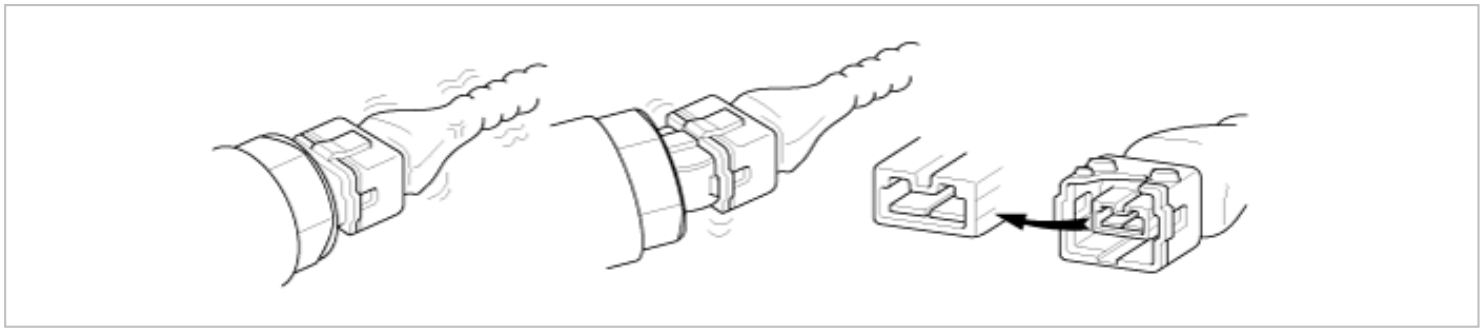
INSPECTION

1. Check the inner and outer cable for damage.
2. Check the cable for smooth movement.
3. Check the accelerator pedal for deformation.
4. Check the return spring for deterioration.
5. Check the connection of the bushing to end metal fitting.

p

INTERMITTENT PROBLEM PROCEDURE

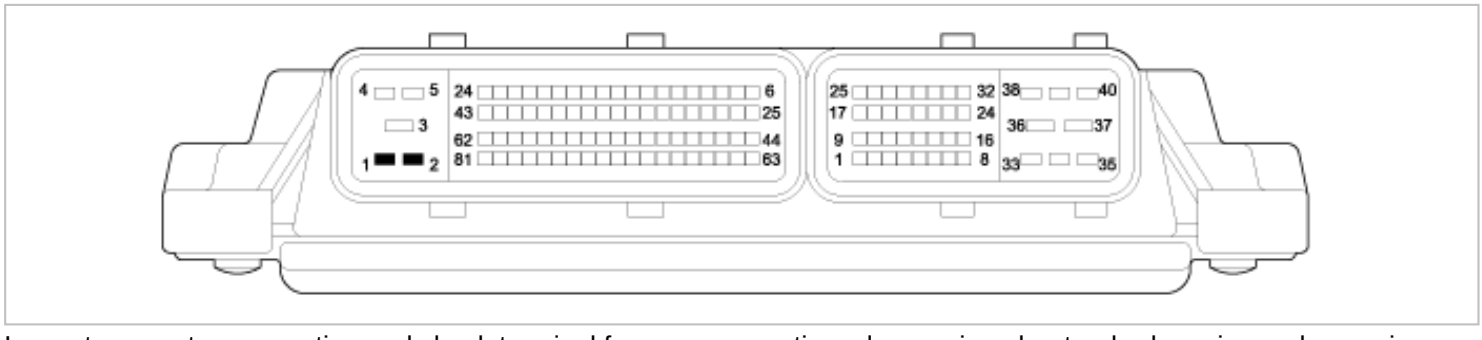
1. Clear diagnostic trouble code(DTC).
2. Inspect connector connection and check terminal for poor connections, loose wires, bent or broken pins and corrosions. Make sure that the connectors are always securely fastened.



3. Perform a simulation test.(See next page)
4. Repair or replace the componect that has a problem.
5. Verify that the problem has disappeared with the road test.

ECM PROBLEM PROCEDURE

1. Turn ignition switch to OFF.
2. Disconnect ECM connector, measure the resistance between ground terminal on the ECM side (terminal 1, 2) and chassis ground.



3. Inspect connector connection and check terminal for poor connections, loose wires, bent or broken pins and corrosion.
4. If it is abnormal, repair it. If it is normal, the ECM could be faulty.
5. Temporarily install a good ECM and check for proper operation. If problem disappeared, replace ECM.

SIMULATION TEST

1. Vibration
   A. Slightly shake the connector and wiring harness up and down and right and left.
   B. Slightly Vibrate sensors or actuators.
2. Heat
   A. Heat components that likely caused the malfunction with a hair dryer or others.
   B. Do not heat the components to the point where they may be damaged and do not heat the ECM directly.
3. Water sprinkling
   A. Sprinkle water onto vehicle to simulate a rainy day or a high humidity condition.
   B. In this test, do not sprinkle water directly onto the engine compartment or electronic components.

4. Electrical loads
   A. Turn on all electrical systems to simulate excessive electrical loads.

MFI SYSTEM INSPECTION

1. Engine is hard to start or does not start at all.
2. Unstable idle.
3. Poor driveability.

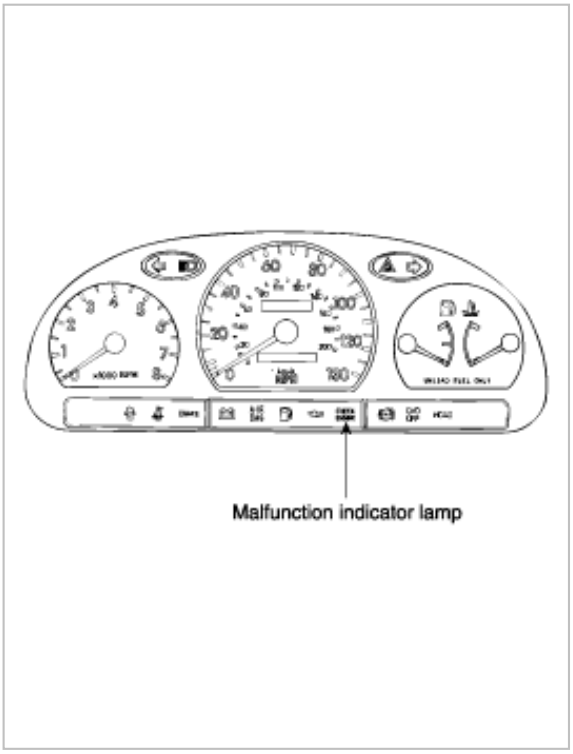
NOTE

- Before removing or installing any parts, read the diagnostic trouble codes and then disconnect the battery negative (-) terminal.
- Before disconnecting the cable from the battery terminal, turn the ignition switch to the OFF position. Removal or connection of the battery cable during engine operation or while the ignition switch is ON could cause damage to the ECM.
- The control harnesses between the ECM and heated oxygen sensor are shielded with the shielded ground wires to the body in order to prevent the influence of ignition noises and radio signals. When the shielded wire is faulty, the control harness must be replaced.
- When checking the generator for charging ability, do not disconnect the battery '+' terminal to prevent the ECM from being damaged.
- When charging the battery with the external charger, disconnect the battery terminals from the vehicle to prevent damage to the ECM.

MALFUNCTION INDICATOR LAMP (MIL)

- Catalyst
- Fuel system
- Mass Air Flow (MAF) Sensor
- Intake Air Temperature Sensor (Built in MAF Sensor)
- Engine Coolant Temperature Sensor
- Throttle Position Sensor
- Upstream Oxygen Sensor
- Downstream Oxygen Sensor Heater
- Downstream Oxygen Sensor
- Upstream Oxygen Sensor Heater
- Injector
- Misfire
- Crankshaft Position Sensor
- Camshaft Position Sensor
- Evaporative Emission Control System
- Vehicle Speed Sensor
- Idle Control Valve
- Power Supply
- ECM
- MT/AT Encoding
- MIL-on Request Signal
- Power Stage
- Differential Pressure Sensor

- Canister Close Valve
- Continuously Variable Valve Timing System



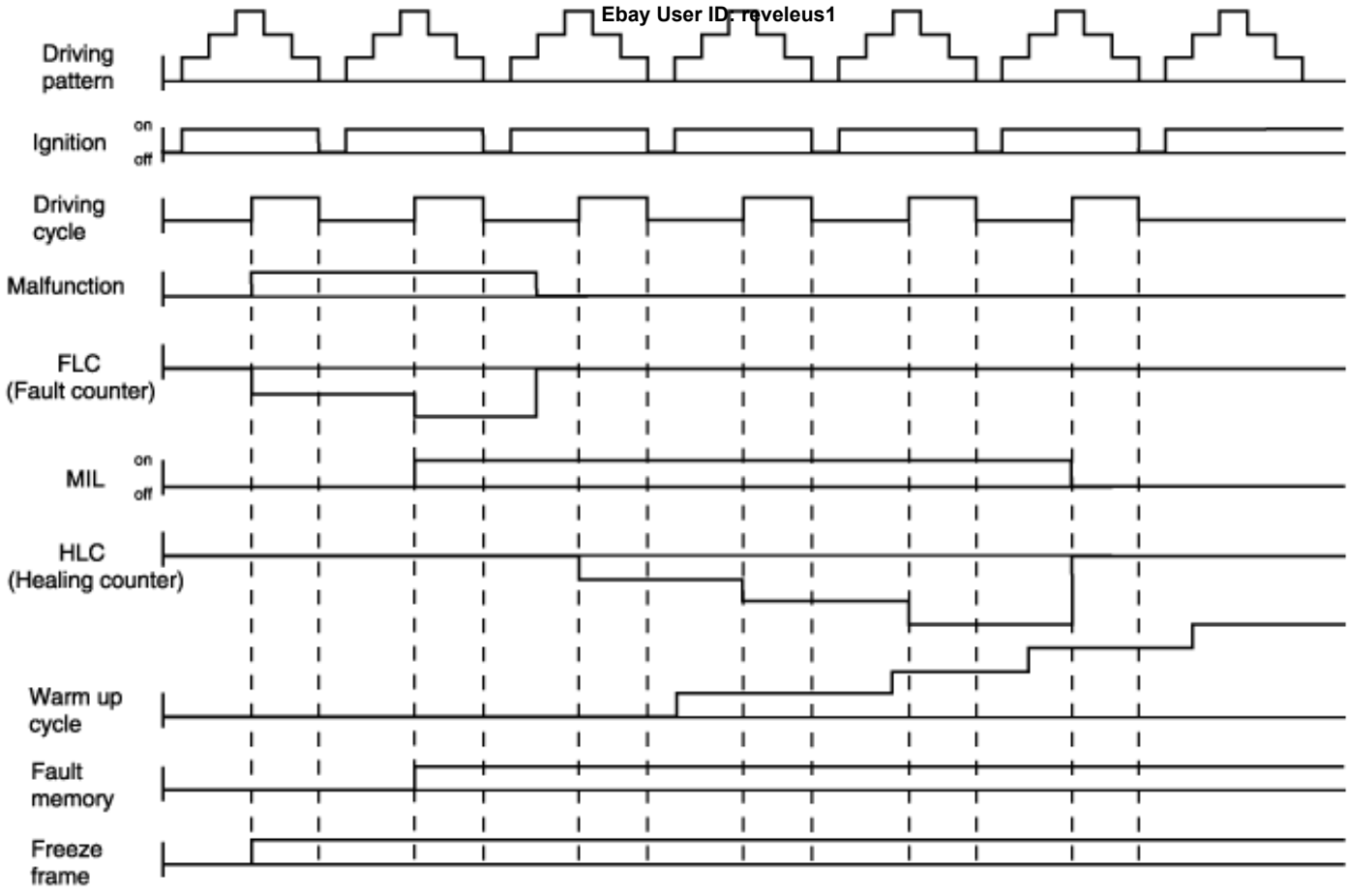
[INSPECTION]

1. After turning ON the ignition key, ensure that the light illuminates before engine starts and then goes out.
2. If the light does not illuminate, check for an open circuit in the harness, a blown fuse or a blown bulb.

NOTE

If a sensor connector is disconnected with the ignition switch turned on, the diagnostic trouble code (DTC) is recorded. In this case, disconnect the battery negative terminal (-) for 15 seconds or more, and the diagnosis memory will be erased.

THE RELATION BETWEEN DTC AND DRIVING PATTERN IN EOBD SYSTEM



1. When the same malfunction is detected and maintained during two sequential driving cycles, the MIL will automatically illuminate.
2. The MIL will go off automatically if no fault is detected after 3 sequential driving cycles.
3. A Diagnostic Trouble Code (DTC) is recorded in ECM memory when a malfunction is detected after two sequential driving cycles.
4. The MIL will illuminate whenthe malfunction is detected on the second driving cycle.
   If a misfire is detected, a DTC will be recorded and the MIL will illuminate immediately after a fault is first detected.
5. A Diagnostic Trouble Code(DTC) will automatically be erased from the ECM memory if the same malfunction is not detected for 40 driving cycles.

NOTE

- A "warm-up cycle" means sufficient vehicle operation such that the coolant temperature has risen by at least 40 degrees Fahrenheit from engine starting and reaches a minimum temperature of 160 degress Fahrenheit.
- A "driving cycle" consists of engine startup, vehicle operation beyond the beginning of closed loop operation.

INSPECTION CHART FOR DIAGNOSTIC TROUBLE CODES (DTC)

DTC NO	DESCRIPTION	CAL	FED	SEE PAGE
P0010	"A" Camshaft Position Actuator Circuit (Bank 1)	○	○	FL-43
P0030	HO2S Heater Control Circuit (Bank 1 / Sensor 1)	○	○	FL-44
P0031	HO2S Heater Circuit low (Bank 1 / Sensor 1)	O	O	FL-49
P0032	HO2S Heater Circuit high (Bank 1 / Sensor 1)	○	○	FL-52

P0036	HO2S Heater Control Circuit (Bank 1 / Sensor 2)	○	○	FL-55
P0037	HO2S Heater Circuit low (Bank 1 / Sensor 2)	○	○	FL-59
P0038	HO2S Heater Circuit high (Bank 1 / Sensor 2)	○	○	FL-62
P0076	Intake Valve Control Solenoid Circuit Low (Bank1)	○	○	FL-65
P0077	Intake Valve Control Solenoid Circuit High (Bank1)	○	○	FL-69
P0101	Mass Air Flow Circuit Range/Performance	○	○	FL-72
P0102	Mass Air Flow Circuit Low Input	○	○	FL-77
P0103	Mass Air Flow Circuit high Input	○	○	FL-80
P0112	Intake Air Temperature Sensor Circuit Low Input	○	○	FL-82
P0113	Intake Air Temperature Sensor Circuit High Input	○	○	FL-86
P0116	Engine Coolant Temperature Circuit Range/ Performance	○	○	FL-89
P0117	Engine Coolant Temperature Circuit Low Input	○	○	FL-92
P0118	Engine Coolant Temperature Circuit High Input	○	○	FL-95
P0121	Throttle Position Sensor Circuit Range/Performance	○	○	FL-101
P0122	Throttle Position Sensor Circuit Low Input	○	○	FL-105
P0123	Throttle Position Sensor Circuit High Input	○	○	FL-108
P0125	Insufficient Coolant Temperature for Closed Loop Fuel Control	○	○	FL-111
P0128	Coolant Thermostat (Coolant Temp. below Thermostat Regulating Temp.)	○	○	FL-113
P0131	O2 Sensor Circuit Low Voltage(Bank 1 / Sensor 1)	○	○	FL-115
P0132	O2 Sensor Circuit High Voltage(Bank 1 / Sensor 1)	○	○	FL-118
P0133	O2-Sensor Circuit Slow Response (Bank 1 / Sensor 1)	○	○	FL-120
P0136	O2 Sensor Circuit (Bank 1 / Sensor 2)	○	○	FL-122
P0137	O2 Sensor Circuit Low Voltage (Bank 1 / Sensor 2)	○	○	FL-125
P0138	O2 Sensor Circuit High Voltage (Bank 1 / Sensor 2)	○	○	FL-127
P0139	O2 Sensor Circuit Slow Response	○	○	FL-129
P0140	O2 Sensor Circuit No Activity Detected (Bank 1 / Sensor 2)	○	○	FL-131
P0171	System Too Lean (Bank 1)	○	○	FL-134
P0172	System Too Rich (Bank 1)	○	○	FL-138
P0196	Engine Oil Temp. Sensor Range / Performance	○	○	FL-141
P0197	Engine Oil Temp. Sensor Low Input	○	○	FL-144
P0198	Engine Oil Temp. Sensor High Input	○	○	FL-147

P0261	Cylinder 1 - Injector Circuit Low **Ebay User ID: reveleus1**	○	○	FL-154
P0262	Cylinder 1 - Injector Circuit High	○	○	FL-158
P0264	Cylinder 2 - Injector Circuit Low	○	○	FL-161
P0265	Cylinder 2 - Injector Circuit High	○	○	FL-164
P0267	Cylinder 3 - Injector Circuit Low	○	○	FL-167
P0268	Cylinder 3 - Injector Circuit High	○	○	FL-170
P0270	Cylinder 4 - Injector Circuit Low	○	○	FL-173
P0271	Cylinder 4 - Injector Circuit High	○	○	FL-176
P0300	Random/Multiple Cylinder Misfire Detected	○	○	FL-179
P0301	Cylinder 1 - Misfire detected	○	○	FL-183
P0302	Cylinder 2 - Misfire detected	○	○	FL-187
P0303	Cylinder 3 - Misfire detected	○	○	FL-194
P0304	Cylinder 4 - Misfire detected	○	○	FL-198
P0325	Knock Sensor Circuit	Δ	Δ	FL-202
P0335	Crankshaft Position Sensor Circuit	○	○	FL-206
P0340	Camshaft Position Sensor Circuit Malfunction(Single Sensor)	○	○	FL-211
P0341	Camshaft Position Sensor Circuit Range/Performance (Single Sensor)	○	○	FL-216
P0420	Catalyst System Efficiency below Threshold (Bank 1)	○	○	FL-217
P0441	Evap. Emission System Incorrect Purge Flow	○	○	FL-220
P0442	Evap. Emission System - Leak detedted (small leak)	○	○	FL-222
P0444	Evap. Emission System - Purge Ctrl. Valve Circuit Open	○	○	FL-226
P0445	Evap. Emission System - Purge Ctrl. Valve Circuit Shorted	○	○	FL-230
P0447	Evap. Emission System - Vent Control Circuit Open	○	○	FL-233
P0448	Evap. Emission System - Vent Control Circuit Shorted	○	○	FL-236
P0449	Evap. Emission System - Vent valve / Solenoid circuit	○	○	FL-239
P0451	Evap. Emission System - Pressure Sensor Range / Performance	○	○	FL-241
P0452	Evap. Emission System - Pressure Sensor Low Input	○	○	FL-244
P0453	Evap. Emission System - Pressure Sensor High Input	○	○	FL-246
P0454	Evap. Emission System - Pressure Sensor Intermittent	○	○	FL-249
P0455	Evap. Emission System - Leak detected (large leak)	○	○	FL-252

Email: suzlever@gmail.com

P0456	Evap. Emission System - Leak detected (very small leak)	○	○	FL-255
P0501	Vehicle Speed Sensor Range/Performance	○	○	FL-258
P0506	Idle Air Control System - RPM lower than expected	○	○	FL-261
P0507	Idle Air Control System - RPM higher than expected	○	○	FL-266
P0560	System Voltage	Δ	Δ	FL-270
P0562	System Voltage Low	○	○	FL-273
P0600	CAN Communication BUS	○	○	FL-275
P0605	Internal Control Module Read Only Memory(ROM) Error	○	○	FL-276
P0606	ECM/PCM Processor (ECU-SELF TEST Failed)	○	○	FL-277
P0650	Malfunction Indicator Lamp(MIL) Control Circuit	Δ	Δ	FL-278
P1166	O2 Sensor System - Lambda Controller at the Limit	○	○	FL-281
P1372	Misfire Detection - Segment Time Acquisition Incorrect	Δ	Δ	FL-284
P1505	Idle Speed Actuator Signal Low of Coil #1	○	○	FL-289
P1506	Idle Speed Actuator Signal High of Coil #1	○	○	FL-293
P1507	Idle Speed Actuator Signal Low of Coil #2	○	○	FL-296
P1508	Idle Speed Actuator Signal High of Coil #2	○	○	FL-299
P1529	TCU Request for MIL On	○	○	FL-302
P1602	CAN Communication BUS with TCU (Timeout)	○	○	FL-303
P1690	Immobilizer Smartra Error		Δ	FL-306
P1691	Immobilizer Antena Error		Δ	FL-306
P1693	Immobilizer Transponder Error		Δ	FL-306
P1694	Immobilizer ECU Siganl Error		Δ	FL-306
P1695	Immobilizer EEPROM Error		Δ	FL-306
P1696	Immobilizer Mismatch/Overtrial Error		Δ	FL-306
P2096	Post Catalyst Fuel Trim System Too Lean Bank 1	○	○	FL-310
P2097	Post Catalyst Fuel Trim System Too Rich Bank 1	○	○	FL-310
P2195	O2 Sensor Signal Stuck Lean -Bank 1 Sensor 1	○		FL-312
P2196	O2 Sensor Signal Stuck Rich -Bank 1 Sensor 1	○		FL-312
P2231	O2 Sensor Signal Circuit Shorted to Heater Circuit (Bank 1 Sensor 1)	○		FL-314
P2237	O2 Sensor Pumping Current Circuit/Open - Bank 1 Sensor 1	○		FL-316

P2243	O2 Sensor Reference Voltage Circuit/Open - Bank 1 Sensor 1	○	FL-316
P2251	O2 Sensor Reference Ground Circuit/Open - Bank 1 Sensor 1	○	FL-316
P2270	O2 Sensor Signal Stuck Lean - Bank 1 Sensor 2	○	FL-318
P2271	O2 Sensor Signal Stuck Rich - Bank 1 Sensor 2	○	FL-318
P2414	O2 Sensor Exhaust Sample Error - Bank 1 Sensor 1	○	FL-320
P2626	O2 Sensor Pumping Current Trim Circuit/Open - Bank 1 Sensor 1	○	FL-316

NOTE

○ : MIL ON & FAULT CODE MEMORY
Δ : MIL OFF & FAULT CODE MEMORY

SUSPECT AREA RELATED TO DTC

NOTE

Suspect areas for each diagnostic item do not list all probable causes.

DTC No.	Diagnostic items	Suspect area
P0030	O2 Sensor Heater - Heater Control Circuit (Bank 1 / Sensor 1)	•Contaminated, deteriorated or aged HO2S •Heater Resistance out of Reasonable Range •Misplaced, bent, loose or corroded connector terminals •Faulty HO2S
P0031	O2 Sensor Heater Circuit low (Bank 1 / Sensor 1)	•Blown or missing HO2S fuse •Open or short to GND between HO2S and ECM •Faulty HO2S
P0032	O2 Sensor Heater Circuit high (Bank 1 / Sensor 1)	•Short to battery between HO2S and ECM •Faulty HO2S
P0136	O2 Sensor Circuit Malfunction(Bank 1 / Sensor 2)	•Short between rear HO2S and ECM •Faulty rear HO2S
P0137	O2 Sensor Circuit Low Input (Bank 1 / Sensor 2)	•Short to GND between HO2S and ECM •Faulty front HO2S
P0138	O2 Sensor Circuit High Input (Bank 1 / Sensor 2)	•Open or short to battery between HO2S and ECM •Faulty front HO2S

P0139	O2 Sensor Circuit Slow Response (Bank 1 / Sensor 2)	•Front and rear HO2S connections reversed •Faulty fuel delivery system •Leak in intake system •Leak in exhaust system •Faulty MAPS ground circuit •Faulty HO2S **NOTE** If any misfire, purge solenoid valve, MAPS or HO2S heater codes are present, do all repairs associated with those codes before proceeding with this trouble area.
P0140	O2 Sensor Circuit No Activity Detected (Bank 1 / Sensor 2)	•Contaminated, deteriorated or aged HO2S •Misplaced, bent, loose or corroded connector terminals •Faulty HO2S **NOTE** If any misfire, purge solenoid valve or HO2S heater codes are present, do all repairs associated with those codes before proceeding with this trouble area.
P0037	O2 Sensor Heater Circuit low (Bank 1 / Sensor 2)	•Blown or missing HO2S fuse •Open or short to GND between HO2S and ECM •Faulty HO2S
P0038	O2 Sensor Heater Circuit high (Bank 1 / Sensor 2)	•Short to battery between HO2S and ECM •Faulty HO2S
P0036	O2 Sensor Heater - Heater Control Circuit (Bank 1 / Sensor 2)	•Contaminated, deteriorated or aged HO2S •Heater resistance out of reasonable range •Misplaced, bent, loose or corroded connector terminals •Faulty HO2S
P0106	MAP Sensor-Rationality	•Dirty air cleaner •Oil cap or dipstick missing or not installed correctly •Air leak in intake system •Contaminated, deteriorated or damaged manifold absolute pressure sensor •Faulty manifold absolute pressure sensor or throttle position sensor •Poor connections between ECM and MAP or TPS

		NOTE If any codes relating to MAP are present, do all repairs associated with them before proceeding with this troubleshooting area.
P0107	MAP Sensor-Range Check Low	•Short to ground between MAP and ECM •Signal line open between MAP and ECM •Faulty MAP
P0108	MAP Sensor-Range Check High	•Short to Battery between MAP and ECM •Ground open between MAP and main relay •Ground open or Poor connections between open or short to battery between MAP and ECM •Faulty MAP
P0112	Intake Air Temperature Circuit Low Input	•Short to ground between IAT sensor and ECM •Short between IAT sensor wires •Faulty IAT sensor
P0113	Intake Air Temperature Circuit High Input	•Open or short to battery between IAT sensor and ECM •Faulty IAT sensor
P0116	Engine Coolant Temperature Circuit Range / Performance	•After engine start-up, the measured coolant temperature shows no variation after detecting the calculated coolant temperature variation (engine coolant temperature sensor input is stuck.) •Poor connections between ECT sensor and ECM •Misplaced, loose or corroded terminals •Foreign materials fouled ECTS •Faulty ECTS NOTE If any codes relating to ECTS are present, do all repairs associated with them before proceeding with this troubleshooting area.
P0117	Engine Coolant Temperature Circuit Low Input	•Short to ground between ECTS and ECM •Short between ECTS wires •Faulty ECTS
P0118	Engine Coolant Temperature Circuit High Input	•Open or short to battery between ECTS and ECM •Faulty ECTS

P0121	Throttle / Pedal Position Circuit Range/ Performance Problem	•Poor connections between TPS and ECM •Misplaced, loose or corroded terminals •Contaminated deteriorated TPS •Open or short between TPS 5V reference and ECM •Open or short between TPS signal and ECM •Short between TPS wires •Faulty TPS
P0122	Throttle / Pedal Position Circuit Low Input	•Short to GND between TPS and ECM •Open / Short to GND between TPS and ECM •Short to GND between ECM and fuel tank pressure sensor (FTPS) •Faulty TPS or FTPS
P0123	Throttle / Pedal Position Circuit High Input	•Open or short to battery between TPS and ECM •Open between and ECM •Faulty TPS
P0125	Insufficient Coolant Temperature for Closed Loop Fuel Control	•After engine start-up, the elapsed time before feedback operation is initializes too long (engine coolant temperature sensor input is insufficient for closed loop operation) •Poor connections between ECT sensor and ECM •Faulty ECTS •Thermostat
P0128	Coolant Thermostat (Coolant Temp. below Thermostat Regulating Temp.)	•Thermostat stuck opened
P0131	O2 Sensor Circuit Low Input(Bank 1 / Sensor 1)	•Short to GND between HO2S and ECM •Faulty front HO2S
P0132	O2 Sensor Circuit High Input(Bank 1 / Sensor 1)	•Short to battery between HO2S and ECM •Faulty front HO2S
P0133	O2-Sensor Circuit Slow Response (Bank 1 / Sensor 1)	•Front and rear HO2S connections reversed •Faulty fuel delivery system •Leak in intake system •Leak in exhaust system •Faulty MAPS ground circuit •Faulty HO2S NOTE If any misfire, purge solenoid valve, MAPS or HO2S heater codes are present, do all repairs associated with those codes before proceeding with this trouble area.

P0134	O2 Sensor Circuit No Activity Detected (Bank 1 / Sensor 1)	•Contaminated, deteriorated or aged HO2S •Misplaced, bent, loose or corroded connector terminals •Faulty HO2S **NOTE** If any misfire, purge solenoid valve or HO2S heater codes are present, do all repairs associated with those codes before proceeding this trouble area.
P0171	Fuel Trim Malfunction - System Too Lean (Bank 1)	•Faulty ignition system (Ignition coil/spark plug/ Ignition cable) •Faulty fuel delivery system (Fuel tank/Pressure regulator/Canister purge valve) •Clogged fuel injectors •Faulty fuel injectors •Leak in intake system •Leak in exhaust system •Faulty MAPS **NOTE** If any codes relating to injectors, HO2S, ECTS or MAPS are stored, do all repairs associated with those codes before proceeding with this trouble area.
P0172	Fuel Trim Malfunction - System Too Rich (Bank 1)	•Faulty fuel delivery system (Fuel tank/Pressure regulator/Canister purge valve) •Faulty fuel injectors •Faulty MAPS **NOTE** If any codes relating to injectors, HO2S, ECTS or MAPS are stored, do all repairs associated with those codes before proceeding with this trouble area.
P0230	Fuel Pump Circuit Malfunction	•Blown or missing fuse/relay •Short to battery between fuel pump relay and ECM •Open between fuel pump relay and ECM •Faulty fuel pump relay
P0261	Cylinder 1 - Injector Circuit Low	•Short to GND between injector and ECM •Faulty fuel injector
P0264	Cylinder 2 - Injector Circuit Low	
P0267	Cylinder 3 - Injector Circuit Low	
P0270	Cylinder 4 - Injector Circuit Low	
P0262	Cylinder 1 - Injector Circuit High	•Open between injector fuse and injector •Open or short to battery between injector and ECM

P0265	Cylinder 2 - Injector Circuit High	•Faulty fuel injector
P0268	Cylinder 3 - Injector Circuit High	
P0271	Cylinder 4 - Injector Circuit High	
P0300	Multiple Cylinder Misfire Detected	•Vacuum leak in air intake system •CKP sensor circuit malfunction •Faulty CKP sensor •Ignition circuit malfunction •Faulty ignition coil or plug wire •Spark plug malfunction •Low compression due to blown head gasket, leaking valve or piston ring •Low/high fuel pressure due to faulty pressure regulator, restricted fuel lines, plugged fuel filter or faulty fuel pump •Fuel injector circuit malfunction •Faulty fuel injector NOTE If any fuel injector codes (or pending codes) are present, do all repairs associated with those codes before proceeding with this trouble area.
P0301	Cylinder 1 - Misfire detected	
P0302	Cylinder 2 - Misfire detected	
P0303	Cylinder 3 - Misfire detected	
P0304	Cylinder 4 - Misfire detected	
P0325	Knock Sensor 1 Circuit Malfunction	•Open or short to GND between knock sensor and ECM •Source of high resistance between knock sensor and ECM •Faulty knock sensor
P0335	Crankshaft Position Sensor Circuit Malfunction	•Short to GND between CKP sensor and ECM •Open or short to battery between CKP and ECM •Short between CKP sensor wires •Poor connection between CKP connector harness connector •Out of spec air gap •Faulty target wheel tolerance •Faulty CKP sensor
P0340	Camshaft Position Sensor Circuit Malfunction(Bank1 or Single Sensor)	•Short to GND between CMP sensor and ECM •Open or short to battery between CMP and ECM •Short between CMP sensor wires •Poor connection between CMP connector harness connector •Faulty CMP sensor

P0420	Catalyst System Efficiency below Threshold (Bank 1)	•Catalytic converter deteriorated NOTE If any codes relating to HO2S sensor. MAPS, injectors, a P0170 or a P0173 are present, do all repairs associated with them before proceeding with this trouble area.
P0441	Evap. Emission Ctrl. System Incorrect Purge Flow	•Stuck in valve open position
P0442	Evap. Emission Ctrl. System - Small Leak detected (1.0 mm)	•Fuel filler cap loose or missing •Fuel filler cap o-ring missing or damaged •Faulty or damaged fuel filler pipe •Leaking, disconnected or plugged fuel vapor lines •Fuel in lines due to faulty rollover valve, on-board refueling vapor recovery valve or CCV stuck closed •Canister close valve clogged, stuck open or closed •Improperly installed purge solenoid valve •PCSV stuck open or closed •Faulty fuel tank pressure sensor •Leaking canister or catch tank NOTE If any codes relating to FTPS, CCV or PCSV circuits are present, do all repairs associated with those codes before proceeding with this trouble area.
P0444	Evap. Emission Ctrl. System - Purge Ctrl. Valve Circuit Open	•Faulty PCSV •Open between PCSV and ECM
P0445	Evap. Emission Ctrl. System - Purge Ctrl. Valve Circuit Shorted	•Faulty PCSV •Short to GND or battery between PCSV and ECM
P0447	Evap. Emission Ctrl. System - Vent Circuit Open (SOV)	•Open or short to battery between CCV and ECM •Faulty CCV
P0448	Evap. Emission Ctrl. System - Vent Circuit Shorted (SOV)	•Short to GND between CCV and ECM •Faulty CCV
P0451	Evap. Emission Ctrl. System - Pressure Sensor Range / Performance(DTP_CON)	•Canister close valve stuck closed •Blocked vapor hose between canister and CCV •Open or short to battery between FTPS and ECM •Faulty FTPS
P0452	Evap. Emission Ctrl. System - Pressure Sensor Low Input	•Short to GND between FTPS and ECM •Faulty FTPS

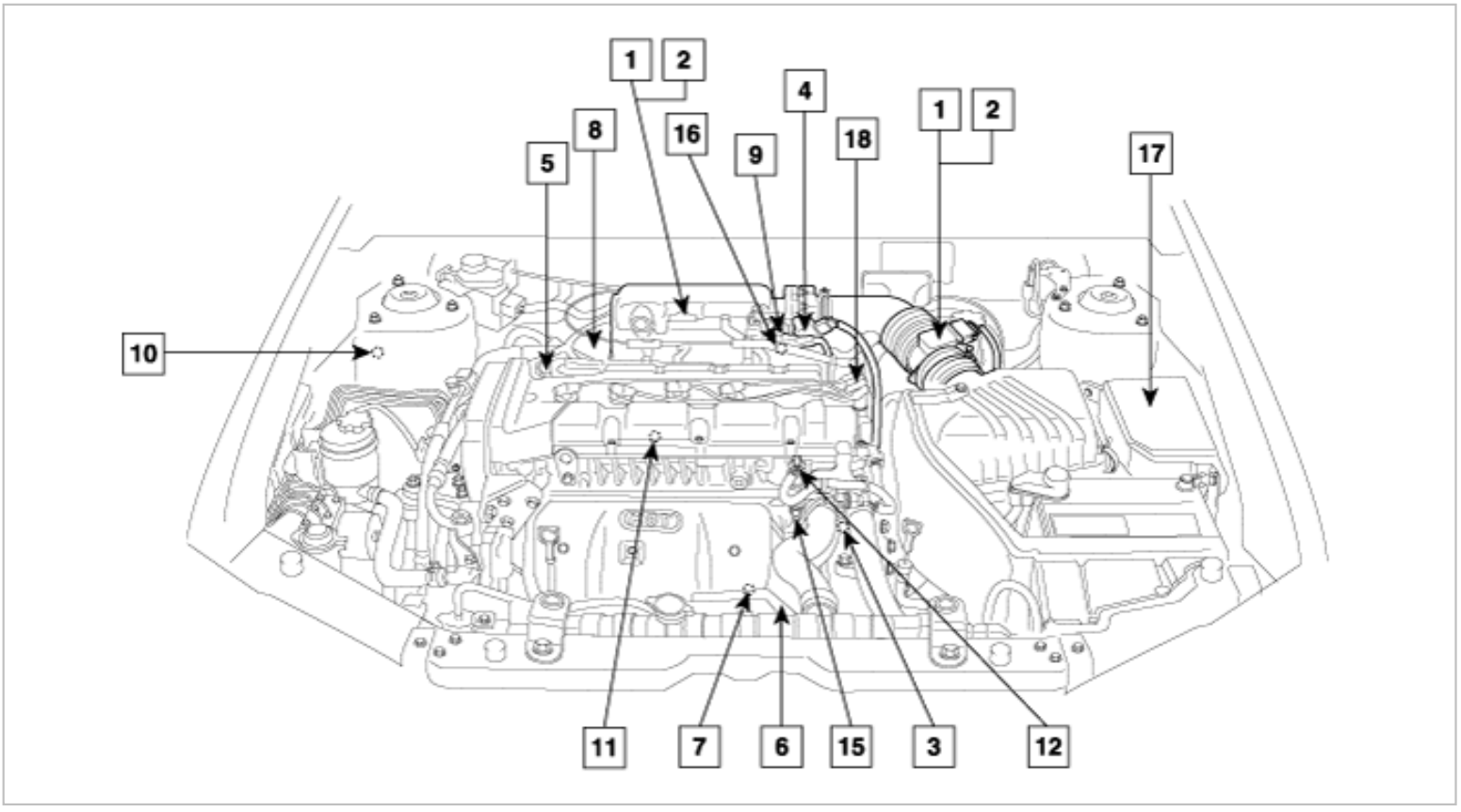
P0453	Evap. Emission Ctrl. System - Pressure Sensor High Input	•Open or short to battery between fuel tank pressure sensor and ECM •Short to battery in ECM •Open in ECM •Faulty FTPS
P0454	Evap.Emission Ctrl. System - Pressure Sensor Intermittent(DTP_NOISE)	•Poor connections between FTPS and ECM •Misplaced, loose or corroded terminals •Foreign materials fouled FTPS •Faulty FTPS
P0455	Evap. Emission Ctrl. System - Large Leak detected(or tank cap loose/off)	•Fuel filler cap loose or missing •Fuel filler cap o-ring missing or damaged •Faulty or damaged fuel filler pipe •Leaking, disconnected or plugged fuel vapor lines •Fuel in lines due to faulty rollover valve, on-board refueling vapor recovery valve or CCV stuck closed •Canister close valve clogged, stuck open or closed •Improperly installed purge solenoid valve •PCSV stuck open or closed •Faulty fuel tank pressure sensor •Leaking canister or catch tank
P0456	Evap. Emission Ctrl. System- Small Leak detected (0.5 mm)	NOTE -If any codes relating to FTPS, CCV or PCSV circuits are present, do all repairs associated with those codes before proceeding with this trouble area. -If DTC P0455 is stored and MIL is illuminated, before proceeding to evaporative system test and repair, verify whether the customer was running the engine uring refueling. -If an obvious cause for DTC P0455 is an engine running during refueling, erasethe DTC P0455 using the Hi-Scan and do not repair the evaporative system. However, the vehicle should be monitored in case of reoccurrence of the concern which may come from actual evaporative system.
P0501	Vehicle Speed Sensor Range / Performance	•Open between fuse and wheel speed sensor (WSS) •Open between WSS and GND •Open between WSS and ECM •Short to battery or GND between WSS and ECM •Faulty WSS

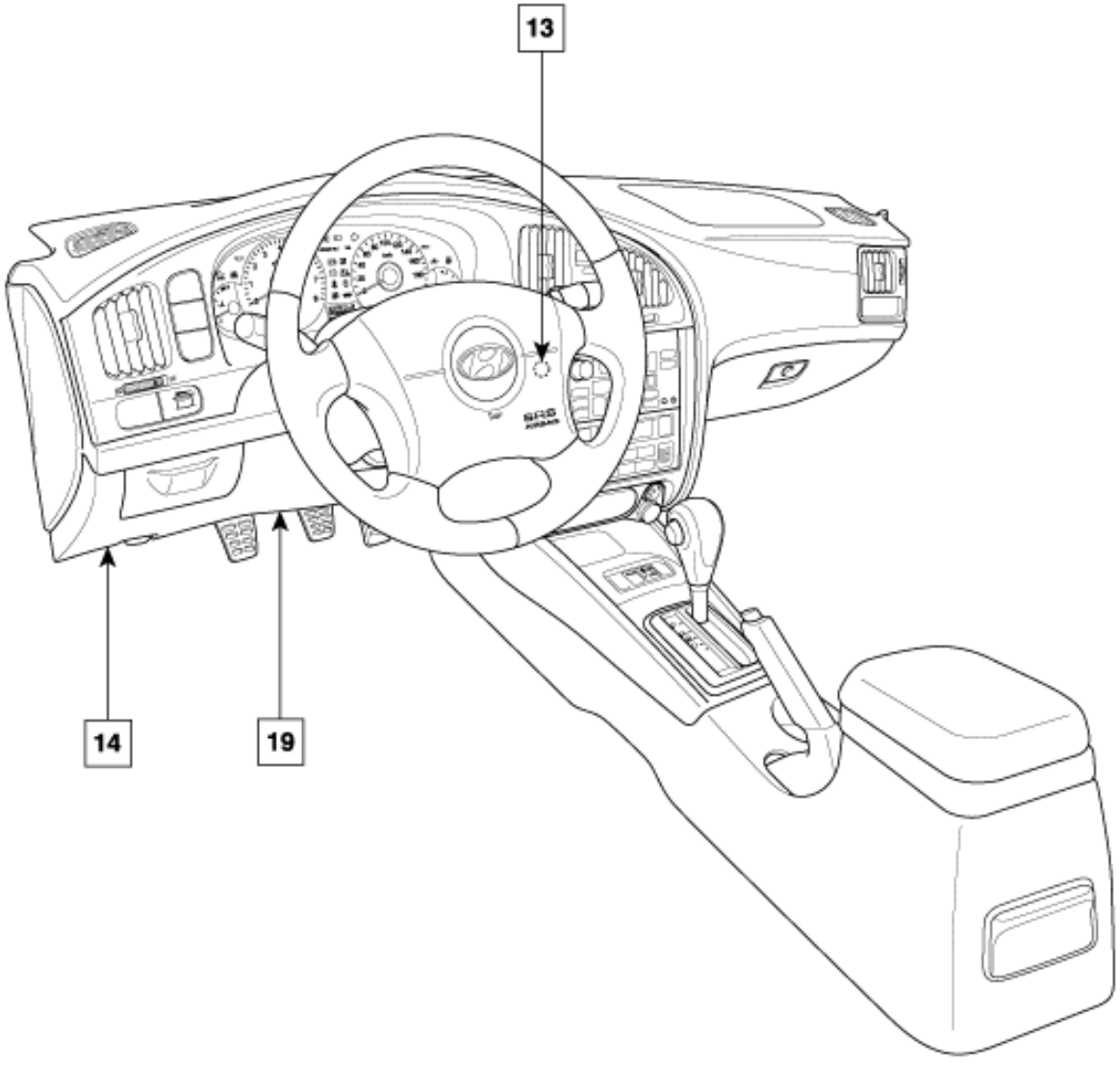
P0506	Idle Control System - RPM lower than expected	•High resistance between injector fuse and IAC valve •High resistance between ISC and ECM •Faulty ISC valve •Carbon fouled throttle plate NOTE If any TPS, MAPS, fuel injector or ISC valve circuit codes (or pending codes) are present, do all repairs associated with them before proceeding with this trouble area.
P0507	Idle Control System - RPM higher than expected	•Improperly adjusted accelerator cable •Air leak in intake system between head and throttle plate •Faulty PCV valve or PCSV •Poor connections in TPS circuit or faulty TPS •High resistance between IAC valve and ECM •Faulty IAC valve NOTE If any codes relating to TPS, MAPS, fuel injector or ISC valve are present, do all repairs associated with them before proceeding with this troubleshooting area.
P0560	System Voltage Malfunction	•Short between main relay and ECM •Open between main relay and ECM •Poor connection •Faulty main relay
P0562	System Voltage Low	•Reverse battery cable connection (+/- reverse) •Faulty generator
P0563	System Voltage High	
P0650	Malfunction Indicator Lamp(MIL) Control Circuit Malfunction	•Open or short between lamp and ECM •Faulty lamp
P1134	O2 Sensor Circuit - Transition Switch Time Malfunction / Slope(Bank 1 / Sensor1)	•HO2S Deteriorated •Foreign Material Deposit

P1166	O2 Sensor System - Lambda Controller at the Limit (Bank 1)	•P1166 is case for HO2S (Bank 1, Sensor 1) Signal line open •Fuel system (Fuel tank/Pressure regulator/Fuel pump/PCSV) Failure •Poor connection to fuel line hose/Sealing/Cut •Sealing between purge valve and fuel tank •Air leakage in exhaust system •Ignition system (Ignition coil, spark plug, cable) failure •Surge tank and intake port failure
P1372	Segment Time Acquisition Incorrect	•Improperly installed target wheel •Faulty wires between ECM and wheel speed sensor •Bad signal of wheel speed sensor •Poor connection •Faulty CKP sensor
P1505	Idle Charge Actuator Signal Low of Coil #1	•Open or short to GND between ISC and ECM •Faulty ISC
P1506	Idle Charge Actuator Signal High of Coil #1	•Short to battery between ISC and ECM •Faulty ISC
P1507	Idle Charge Actuator Signal Low of Coil #2	•Open or short to GND between ISC and ECM •Faulty ISC
P1508	Idle Charge Actuator Signal High of Coil #2	•Short to battery between ISC and ECM •Faulty ISC
P1529	TCM Request for MIL On / Freeze Frame to ECM via CAN	•This is only a request from TCM to turn the MIL ON. The fault code is stored in the TCM. The freeze frame data is stored in the ECM under the P1529 request code. Be sure to retrieve freeze frame data before clearing code P1529 from ECM.

LOCATION OF MFI COMPONENTS

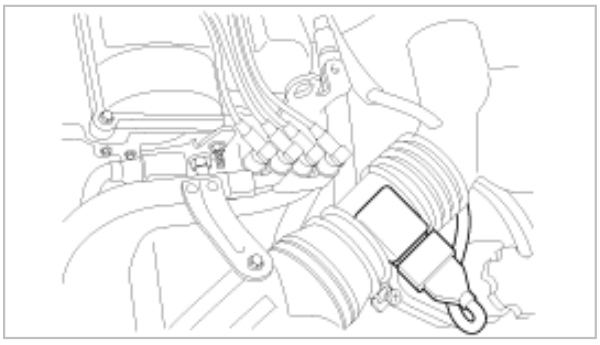
[BETA-ENGINE]

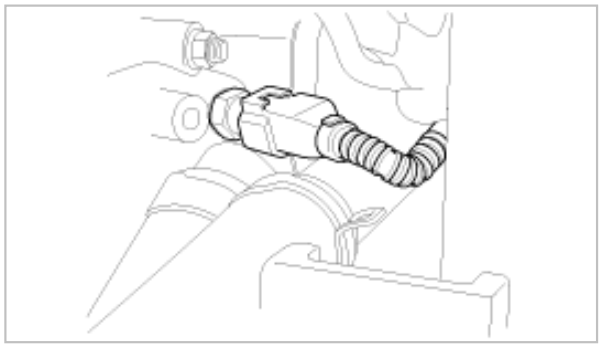




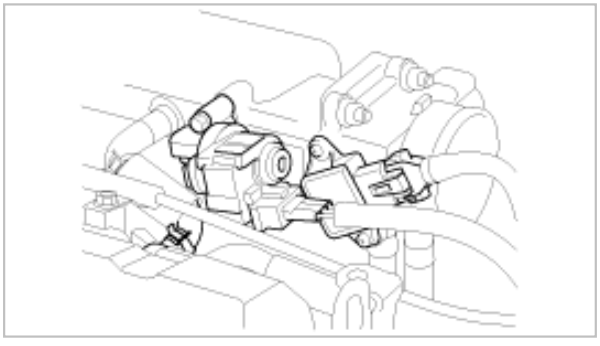
1	Mass Air Flow (MAF) Sensor - for CVVT
2	Intake Air Temp. (IAT) Sensor
3	Engine Coolant Temp. (ECT) Sensor
4	Throttle Position Sensor (TPS)
5	Camshaft Position (CMP) Sensor
6	Crankshaft Position (CKP) Sensor
7	Heated Oxygen Sensor
8	Injector
9	Idle Speed Actuator (ISA)
10	Wheel Speed Sensor (WSS)
11	Knock Sensor
12	Oil Control Valve (OCV) - for CVVT
13	Ignition Switch
14	ECM
15	Oil Temp. Sensor (OTS) - for CVVT
16	Purge Control Solenoid Valve (PCSV)
17	Control Relay
18	Ignition Coil
19	Data Link Connector (DLC)
20	Inhibitor Switch

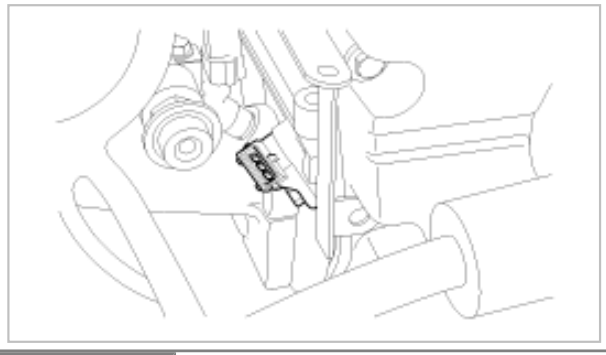
1 2 3



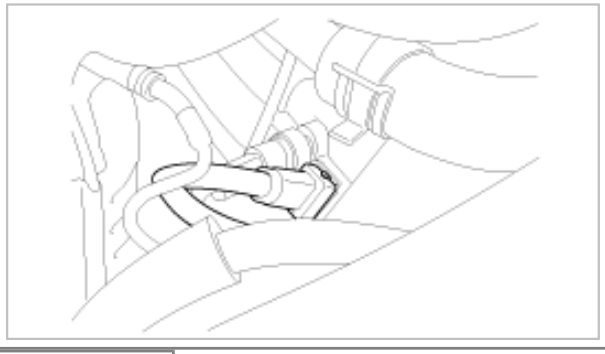


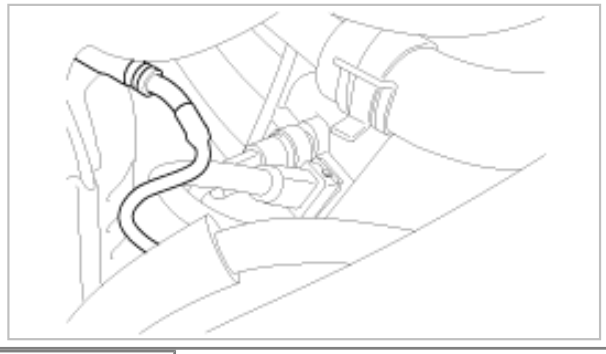
4 9 5



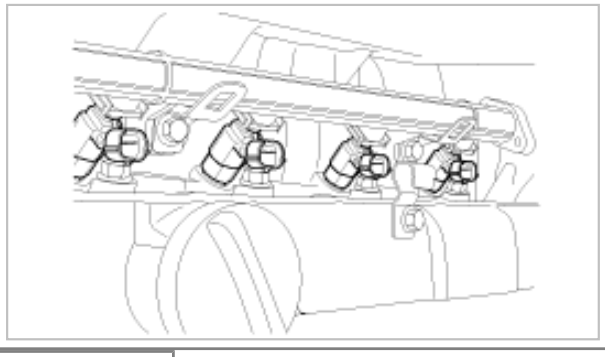


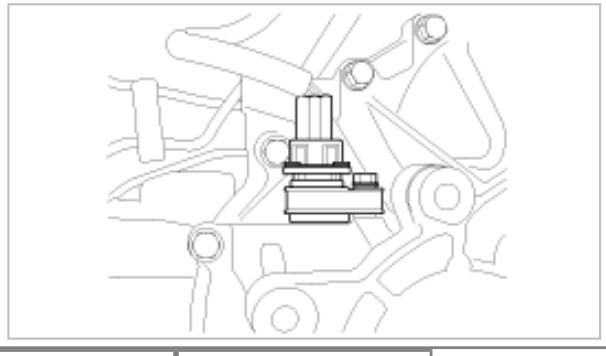
6 7



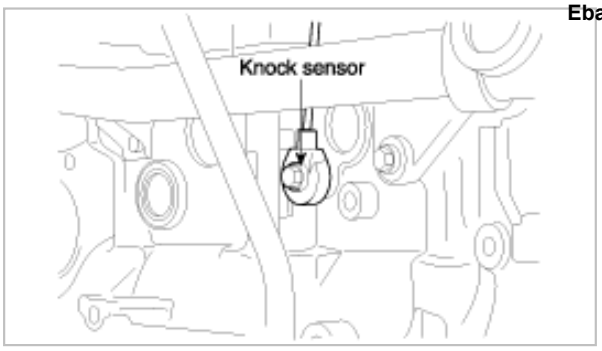


8 10

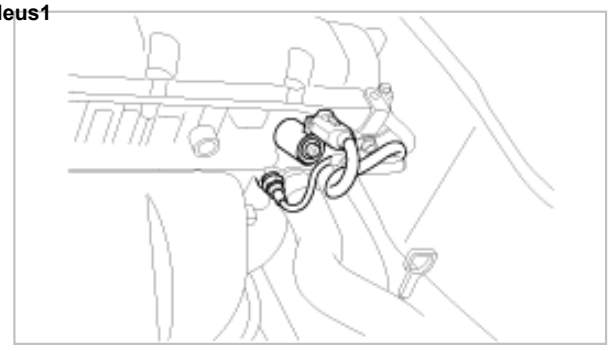




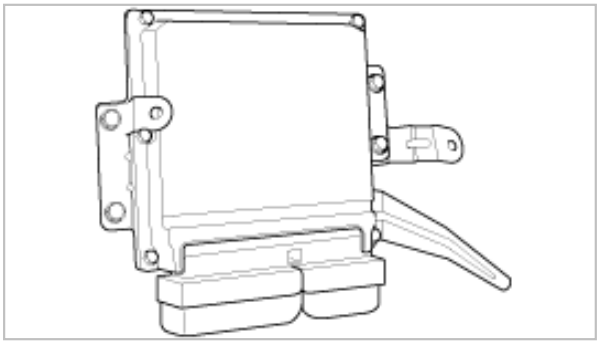
11 12 15



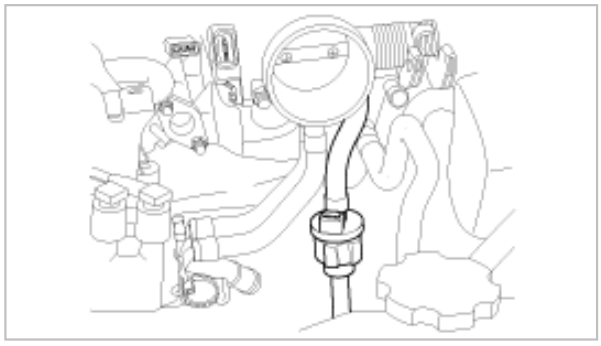
14



16

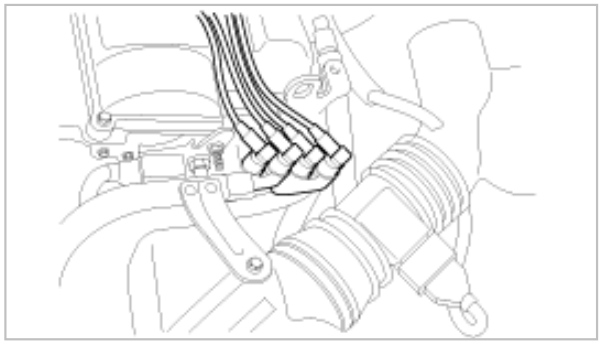


17

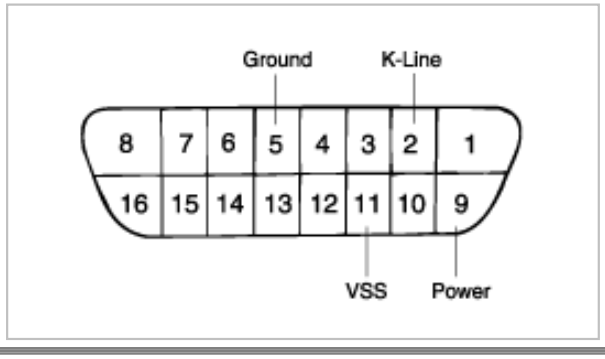


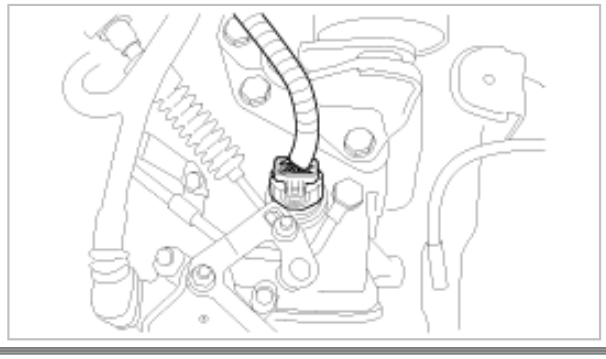
18

19



20





DIAGNOSTIC ITEM

DTC	Diagnostic item
P0106	MAP Sensor-Rationality
P0107	MAP Sensor-Range Check Low
P0108	MAP Sensor-Range Check High

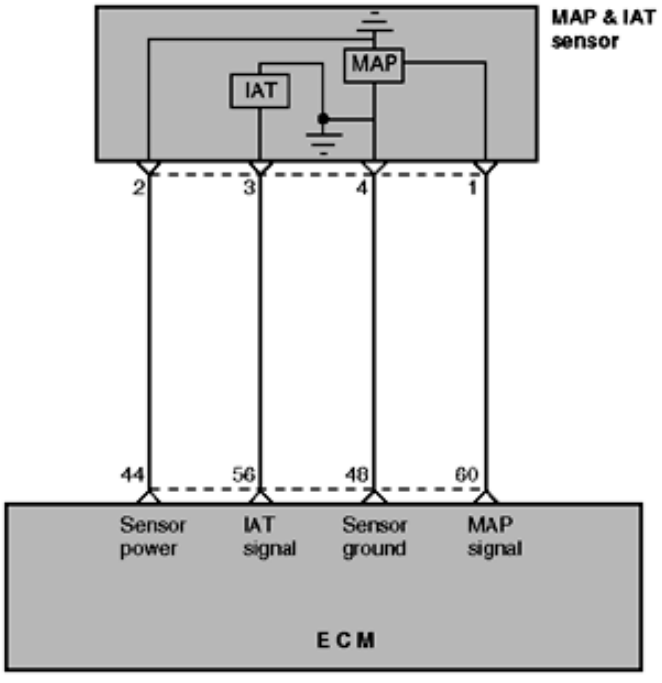
DESCRIPTION

The Manifold Absolute Pressure(MAP) sensor is essentially a strain gauge used to measure the pressure in the surge tank. Inside the sensor is a metal diaphragm with a small wire attached. The diaphragm flexes according to changes in pressure. When the diaphragm flexes, the wire attached to it stretches, changing the resistance of the wire. The Engine Control Module (ECM) applies five volts to the MAP sensor and measures the voltage drop across the sensor. Sensor output is in volts and as pressure decreases, the voltage drop across the sensor increases. Since the MAP sensor is used as an air flow sensor, the sensor signal is an important input. The ECM uses the information to determinefuel amount and ignition timing.

FAILURE CONDITIONS

The MAP sensor outputs a voltage which corresponds to the pressure in the surge tank. The ECM checks whether this voltage is within a specified range. The ECM will set P0107 or P0108 and the Malfunction Indicator Lamp (MIL) will turn on if the MAP sensor output voltage has continued to be 4.5V or higher - corresponding to a surge tank pressure of 114kPa (17psi) or higher - for 4 sec. or to be 1.95V or lower - corresponding to a surge tank pressureof 50kPa (7.4psi) or lower - for 4 sec.

CIRCUIT DIAGRAM



Note : Refer to the appropriate Electrical Troubleshooting Manual for full wiring details.

TEST PROCEDURE

- Turn ignition switch on.
- Connect scan tool to data link connector.
- Verify DTC P0106, P0107 and/or P0108 is set.

Is DTC P0112 or P0113 also set?

NO

- MAP sensor disconnected.
- Measure resistance between MAP & IAT sensor connector terminals 1 and 4.

Resistance should read approximately 30 kilo ohms, does it?

YES

- Turn ignition off.
- Disconnect MAP & IAT sensor.
- Turn ignition on.
- Measure voltage between ground and MAP & IAT sensor harness connector terminal 2.

5 volts should be present, is it?

YES

- MAP & IAT sensor disconnected.
- Turn ignition off.
- Disconnect ECM connector.
- Measure resistance between ground and MAP & IAT harness connector terminal 3.

Resistance should indicate open circuit, does it?

YES

- Turn ignition on, engine off.
- Measure voltage between ground and MAP & IAT sensor terminal 1 (backprobe).

Voltage measured should be 0.2 to 4.5 volts, is it?

YES

Verify ECM connector is secure. If OK, replace MAP & IAT with known good component. If problem persists, replace ECM. Clear code and verify MAP sensor signal voltage is within normal parameters.

NO

Repair short to ground in the wire between MAP & IAT sensor harness connector terminal 3 and ECM. Clear code and verify MAP sensor signal voltage is within normal parameters.

NO

Repair open circuit in wire between MAP & IAT sensor harness connector terminal 2 and ECM. Clear code and verify MAP sensor signal voltage is within normal parameters.

NO

Replace MAP & IAT sensor. Clear code and verify MAP sensor signal voltage is within normal parameters.

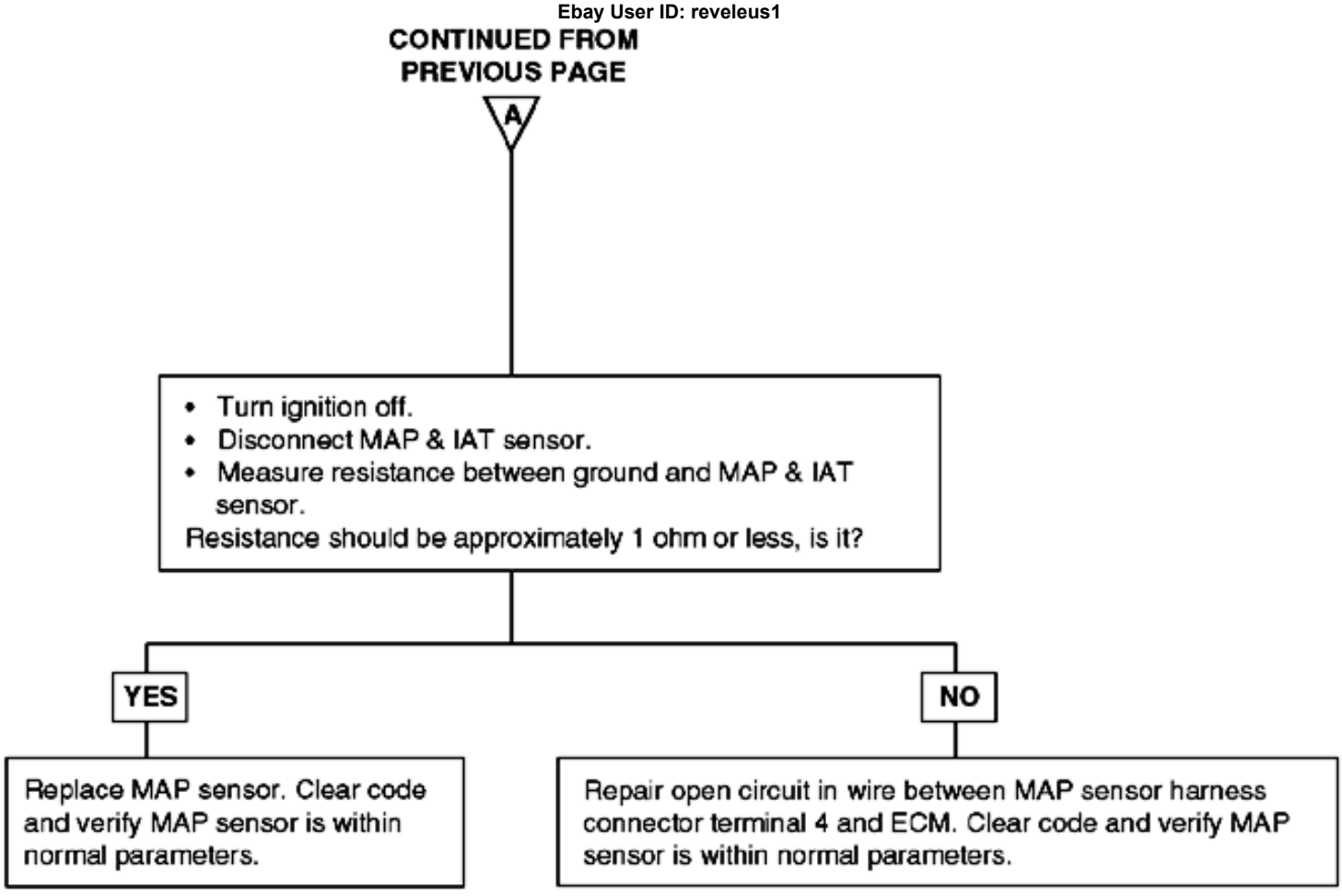
YES

A

CONTINUED ON NEXT PAGE

NO

Replace MAP & IAT sensor. Clear code and verify output signal voltage is within normal parameters.


CONTINUED FROM PREVIOUS PAGE
A
• Turn ignition off.
• Disconnect MAP & IAT sensor.
• Measure resistance between ground and MAP & IAT sensor.
Resistance should be approximately 1 ohm or less, is it?
YES
NO
Replace MAP sensor. Clear code and verify MAP sensor is within normal parameters.
Repair open circuit in wire between MAP sensor harness connector terminal 4 and ECM. Clear code and verify MAP sensor is within normal parameters.

DTC	Diagnostic item
P0112	Intake Air Temperature Circuit Low Input
P0113	Intake Air Temperature Circuit High Input

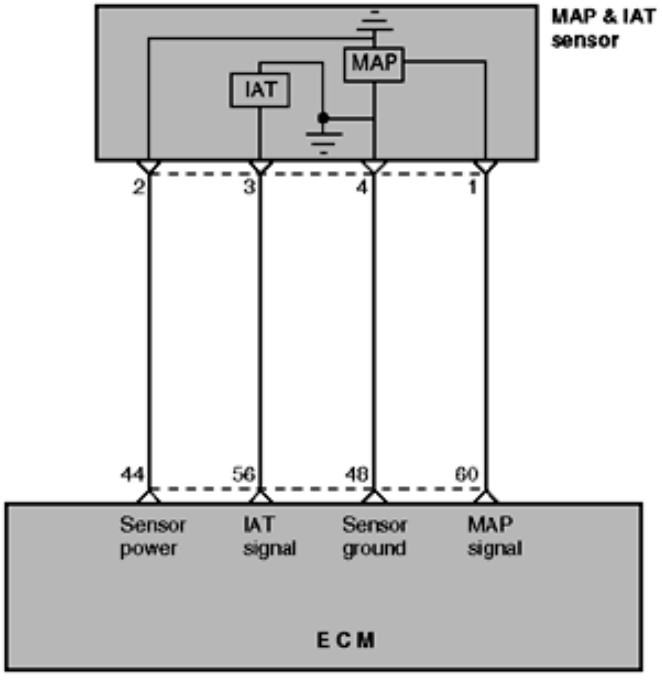
DESCRIPTION

The Intake Air Temperature (IAT) sensor is built in to the MAP sensor. The IAT sensor is a variable resistor whose resistance changes as the temperature of the air flowing through the air intake changes. The Engine Control Module (ECM) uses the IAT sensor input to adjust fuel injector pulse width. When the temperature sensed is cold, the ECM enriches fuel mixture by increasing injector pulse width; as the air warms, the injector pulse width time is shortened.

FAILURE CONDITIONS

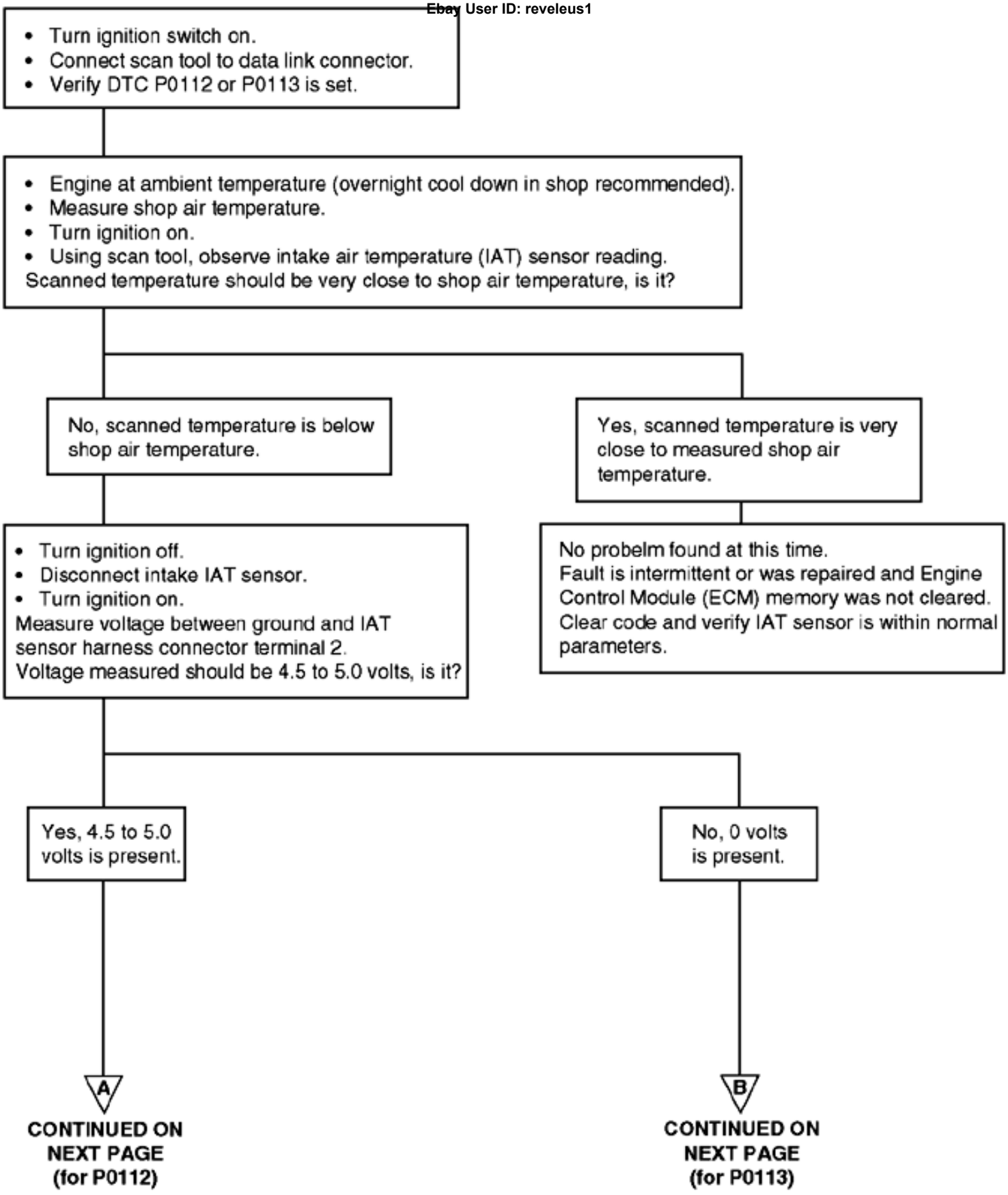
The ECM will set P0112 and the Malfunction Indicator Lamp (MIL) will turn on if the IAT sensor indicates a temperature lower than -49°F (-45°C) for 0.2 seconds during two driving cycles. This check is made after the engine has run for 4 minutes and 10 seconds and then idles for 30 seconds (with no fuel cut-off during a coast-down). This code indicates a lower than expected temperature is being read by the IAT sensor or ECM after the engine has beenwarmed up.

CIRCUIT DIAGRAM



Note : Refer to the appropriate Electrical Troubleshooting Manual for full wiring details.

TEST PROCEDURE



(for P0112) CONTINUED FROM PREVIOUS PAGE

A

- IAT sensor disconnected.
- ECM disconnected.
- Measure resistance between IAT sensor harness connector terminal 3 and ECM harness connector terminal C56.

Resistance should be approximately 1 ohm or less, is it?

YES

Verify ECM connector is secure.
If OK, replace IAT sensor with known good component. Clear code and verify IAT sensor is within normal parameters. If problem persists, replace ECM.

NO

Repair open circuit in wire between IAT sensor harness connector terminal 3 and ECM. Clear code and verify IAT sensor is within normal parameters.

(for P0113) CONTINUED FROM PREVIOUS PAGE

B

- IAT sensor disconnected.
- Turn Ignition off.
- Disconnect ECM connector.
- Measure resistance between IAT sensor harness connector terminal 2 and ECM harness connector terminal C44.

Resistance should be approximately 1 ohm or less, is it?

YES

NO

Repair open in wire between IAT sensor harness connector terminal 4 and ECM. Clear code and verify IAT sensor is within normal parameters.

DTC	Ebay User ID: reveleus1 Diagnostic item
P0116	Engine Coolant Temperature Circuit Range / Performance
P0117	Engine Coolant Temperature Circuit Low Input
P0118	Engine Coolant Temperature Circuit High Input

DESCRIPTION

The Engine Coolant Temperature (ECT) sensor is located in the coolant passage of the cylinder head. The ECT sensor is a variable resistor whose resistance changes as the temperature of the engine coolant flowing past the sensor changes. When coolant temperature is low, sensor resistance is high;when coolant temperature is high, sensor resistance is low. The Engine Control Module (ECM) checks ECT sensor voltage and uses the information to adjust fuel injector pulse width and ignition timing. When the temperature sensed is very cold, the ECM enriches the fuel mixture and advances ignition timing. As coolant temperature rises, the ECM reduces theamount of enrichment and timing advance.

FAILURE CONDITIONS

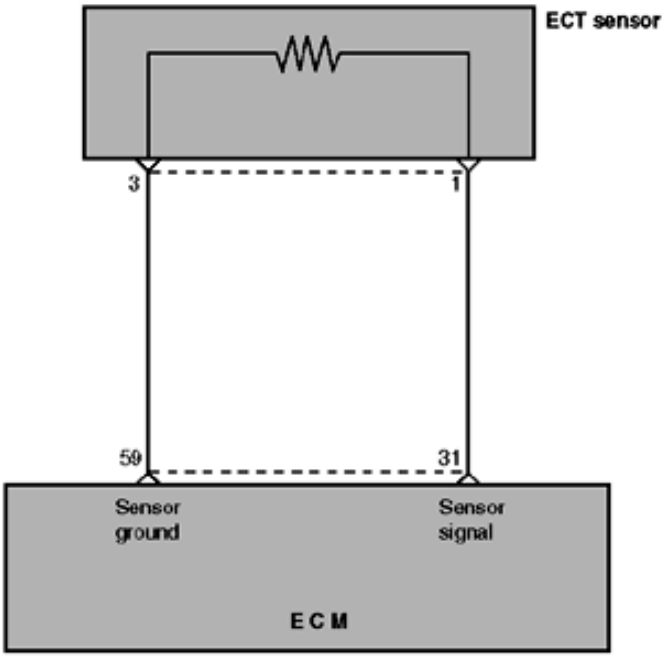
The ECM will set P0116 and the Malfunction Indicator Lamp (MIL) will turn on if the ECT sensor's actual performance curve falls more than 68°F (20°C) below the ECM's model curve (based on fuel delivery, ambient air temperature and engine running time) for 0.2 seconds during two driving cycles. This code indicates uncharacteristic engine temperature performance beingread by the ECT sensor or ECM.

NOTE

The ECT sensor resistance varies with temperature as follows:

- 5.18 ~ 6.60 kΩ@ 32°F (0°C).
- 2.27 ~ 2.73 kΩ @ 68°F (20°C).
- 0.30 ~ 0.32 kΩ @ 176°F (80°C).

CIRCUIT DIAGRAM



Note : Refer to the appropriate Electrical Troubleshooting Manual for full wiring details.

TEST PROCEDURE

- Turn Ignition Switch on.
- Connect scan tool to Data Link Connector.
- Verify DTC P0116 is set.

Is DTC P0117 or P0118 also set?

NO

Verify ECM connector is secure. If OK, replace ECT sensor with known good component. Clear code and verify ECT sensor is within normal parameters. If problem persists, replace ECM.

YES

Refer to sections P0117 and/or P0118 and follow test procedures.

- Turn ignition switch on.
- Connect scan tool to data link connector.
- Verify DTC P0117 is set.

- Engine idling at normal operating temperature.
- Using scan tool, observe Engine Coolant Temperature (ECT) sensor reading.

Scanned temperature should be between 180˚F and 203˚F (82˚C and 95˚C), is it?

No, scanned temperature is below 170˚F (77˚C).

Yes, scanned temperature is within normal parameters.

- Turn ignition off.
- Disconnect ECT sensor.
- Turn ignition on.
- Measure voltage across ECT sensor harness connector terminals 1 and 3.

Voltage measured should be 4.5 to 5.0 volts, is it?

No probelm found at this time.
Fault is intermittent or was repaired and Engine Control Module (ECM) memory was not cleared. Clear code and verify ECT sensor is within normal parameters.

Yes, 4.5 to 5.0 volts is present.

Replace ECT sensor. Clear code and verify ECT sensor is within normal parameters.

No, less than 4.5 volts is present.

A

CONTINUED ON NEXT PAGE

CONTINUED FROM PREVIOUS PAGE

A

- Turn ignition off.
- ECT sensor disconnected.
- Disconnect ECM connector.
- Ground ECT sensor harness connector terminal 3.
- Measure resistance between ground and ECM harness connector terminal 59.

Resistance should be approximately 1 ohm or less, is it?

YES

- ECT sensor disconnected.
- ECM disconnected.
- Ground ECT sensor harness connector terminal 3.
- Measure resistance between ground and ECM harness connector terminal 59.

Resistance should be approximately 1 ohm or less, is it?

NO

Repair open in wire between ECT sensor harness connector terminal and ECM harness connector terminal. Clear code and verify ECT sensor is within normal parameters.

YES

Verify ECM connector is secure. If OK, replace ECT with known good component. Clear code and verify ECT sensor is within normal parameters. If problem persists, replace ECM.

NO

Repair open in wire between ECT sensor harness connector terminal and ECM harness connector terminal. Clear code and verify ECT sensor is within normal parameters.

- Turn ignition switch on.
- Connect scan tool to data link connector.
- Verify DTC P0118 is set.

- Engine idling at normal operating temperature.
- Using scan tool, observe Engine Coolant Termperature (ECT) sensor reading.

Scanned temperature should be between 180˚F and 203˚F (82˚C and 95˚C), is it?

No, scanned temperature is above 203˚F (95˚C).

Yes, scanned temperature is within normal parameters.

- Turn ignition off.
- Disconnect ECT sensor.
- Turn ignition on.
- Observe ECT sensor reading on scan tool.

Scanned temperature should now be -40˚F (-40˚C), is it?

No problem found at this time. Fault is intermittent or was repaired and Engine Control Module (ECM) memory was not cleared.
Clear code and verify ECT sensor is within normal parameters.

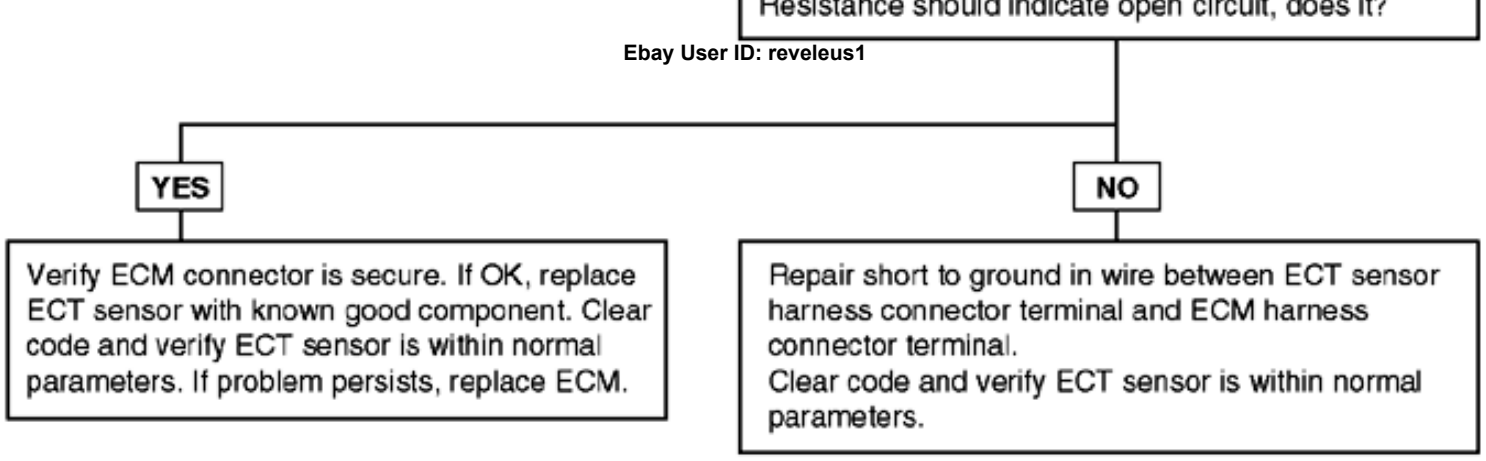
YES

Replace ECT sensor.

NO

- ECT sensor disconnected.
- Turn ignition off.
- Disconnect ECM connector.
- Measure resistance between ground and ECT sensor harness connector terminal 3.

Resistance should indicate open circuit, does it?



DTC	Diagnostic item
P0121 P0122 P0123	Throttle / Pedal Position Circuit Range/Performance Problem Throttle / Pedal Position Circuit Low Input Throttle / Pedal Position Circuit High Input

DESCRIPTION

The Throttle Position Sensor (TPS) mounts on the side of the throttle body and is connected to the throttle valve shaft. The TPS is a variable resistor (potentiometer) whose resistance changes according to throttle valve shaft position. During acceleration, the TPS resistance decreases; duringdeceleration, the TPS resistance increases.

The Engine Control Module (ECM) applies a reference voltage to the TPS and then measures the voltage that is present on the TPS signal circuit. The ECM uses the TPS signal to adjust timing and injector pulse width. The TPS signal along with the MAP sensor signal is used by the ECM to calculate engineload.

FAILURE CONDITIONS

The ECM will set P0121 and the Malfunction Indicator Lamp (MIL) will turn on if the engine load indicated by the Throttle Position (TP) sensor and the Manifold Absolute Pressure (MAP) sensor are different. This code indicates that the throttle position and air flow readings by the TP and MAP sensor,or ECM, do not result in the expected engine load value.

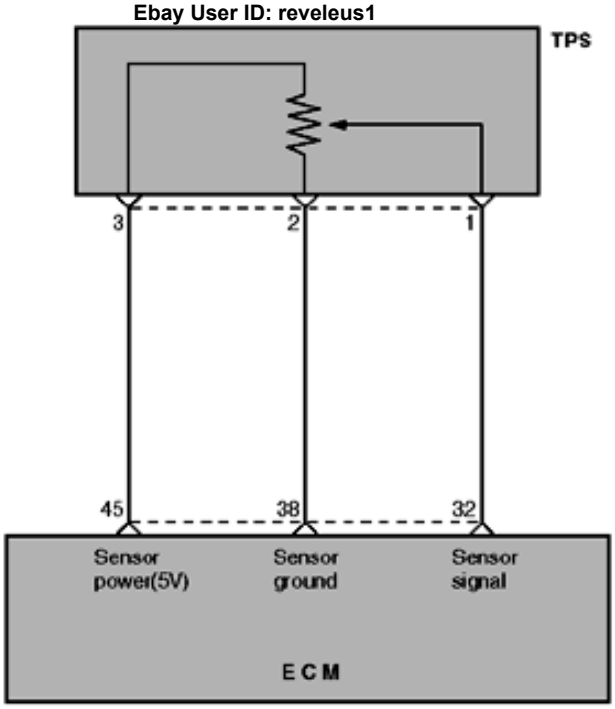
The ECM will set P0122 and the Malfunction Indicator Lamp (MIL) will turn on if the throttle angle is reported as less than 2.1 degrees for more than 0.2 seconds during 2-driving cycles. This code indicates an unusuallylow throttle position angle being read by the TP sensor or ECM.

The ECM will set P0123 and the Malfunction Indicator Lamp (MIL) will turn on if the throttle angle is reported as greater than 105.4 degrees for 0.2 seconds during 2-driving cycles. This code indicates an unusually highthrottle position angle being read by the TP sensor or ECM.

NOTE

The standard resistance value between terminals 2 and 3 of the throttle position sensor is 1600-2500 ohms.

CIRCUIT DIAGRAM



Note : Refer to the appropriate Electrical Troubleshooting Manual for full wiring details.

TEST PROCEDURE

CONTINUED FROM PREVIOUS PAGE

A

NO

- Turn Ignition off.
- Disconnect TP sensor.
- Turn ignition on.
- Using voltmeter, measure voltage between ground and TP sensor connector terminal 3.

5 volts should be present, is it?

YES

- Ignition on, engine on.
- Quickly push throttle to wide open position, then release.
- Using scan tool, record TP sensor reading.

Reading should reach as high as about 4.75V, does it?

YES

Fault repaired. Problem was misadjusted TP sensor. Clear code and verify TP sensor is within normal parameters.

NO

Replace TP sensor. Clear code and verify TP sensor is within normal parameters.

YES

- Ignition on, engine off.
- TP sensor disconnected.

NO

Repair open wire between TP sensor harness connector terminal and ECM harness connecter

- TP sensor disconnected.
- Measure resistance between ground and TP sensor harness connector terminal 2.

Resistance should be approximately 1 ohm or less, is it?

Repair open wire between TP sensor harness connector terminal and ECM harness connecter terminal. Clear code and verify TP sensor is within normal parameters.

YES

- Ignition on, engine off.
- TP sensor disconnected.
- Connect fused jumper between TP harness connector terminals 2 and 3.
- Using scan tool, observe TP sensor's output reading.

Reading should be above 4.5V, is it?

NO

Repair poor ground connection or open circuit in wire between TP sensor harness connector terminal 2 and ECM harness connector terminal 38.
Clear code and verify TP sensor is within normal parameters.

B

CONTINUED ON NEXT PAGE

CONTINUED FROM PREVIOUS PAGE

B

NO

- Ignition on, engine off.
- TP sensor disconnected.
- Fused jumper in place.
- With ECM connected, measure voltage (backprobe) between ground and ECM connector terminal 45.

5 volts should be present, is it?

YES

Replace TP sensor.
Clear code and verify TP sensor is within normal parameters.

YES

Verify ECM connector is secure. If OK, replace ECM. Clear code and verify TP sensor is within

NO

Repair open circuit or short to ground wire between TP sensor harness connector

Verify ECM connector is secure. If OK, replace ECM. Clear code and verify TP sensor is within normal parameters.

Repair open circuit or short to ground wire between TP sensor harness connector terminal 1 and ECM harness connector terminal 32.
Clear code and verify TP sensor is within normal parameters.

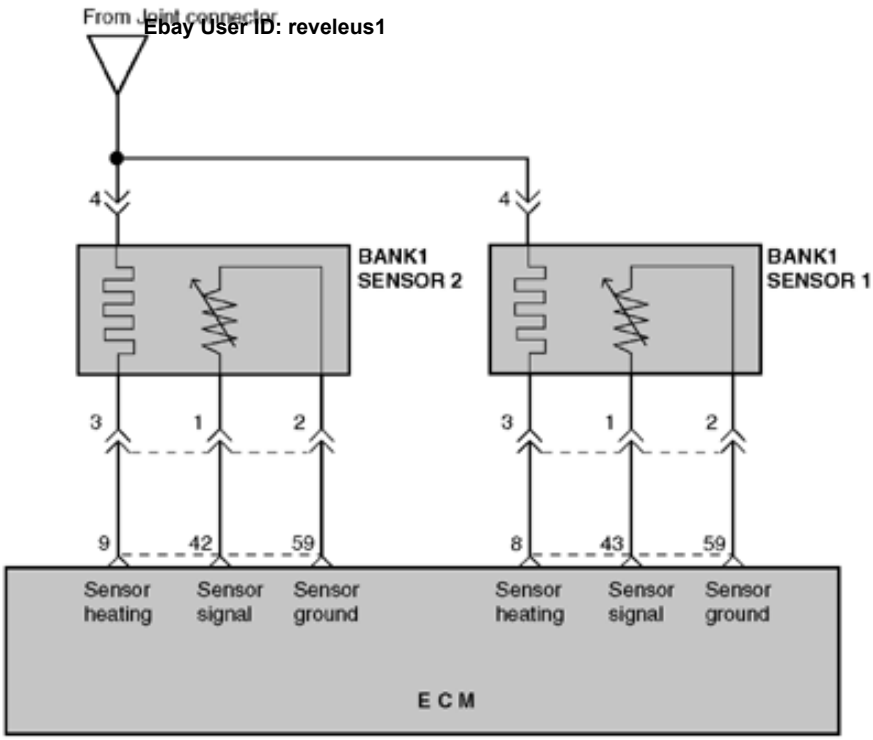
DTC	Diagnostic item
P0130 P0136	O2 Sensor Circuit(Bank 1/ Sensor 1) O2 Sensor Circuit Malfunction(Bank 1 / Sensor 2)

DESCRIPTION

The Engine Control Module (ECM) uses oxygen sensor signals to maintain the air fuel mixture at the ratio resulting in optimum fuel economy and reduced emissions. The amount of oxygen in the exhaust gases indicates, to the front oxygen sensor, whether the air fuel mixture being supplied to the engine cylinders is rich or lean. The readings of the rear oxygen sensor are used to indicate the efficiency of the catalytic converter. The ECM calculates catalytic converter efficiency by comparing the rear oxygen sensor signal to the front oxygensensor signal.
A normal oxygen sensor signal will constantly fluctuate above and below 500 mV, with the front oxygen sensor signal frequency of at least 5Hz at 2500 RPM. Due to the effect of the catalytic converter, the rear oxygen sensor signal frequency will be lower than the front oxygen sensor signal frequency. If the rear oxygen sensor signal coincides with the front oxygen sensor signal a large percentage of the time, this indicates a loss in efficiency of thecatalytic converter or a malfunction within the fuel system.

FAILURE CONDITIONS

CIRCUIT DIAGRAM



Note : Refer to the appropriate Electrical Troubleshooting Manual for full wiring details.

TEST PROCEDURE

- Turn Ignition Switch on.
- Connect scan tool to Data Link Connector.
- Verify DTC P0130 or P0136 is set.

Are other DTCs also set?

NO

- Start engine and warm it to normal operating temperature .
- Vary engine speed and, using scan tool, monitor oxygen sensor voltage.

Voltage should vary between 0 and 900 mV, does it?

YES

Repair conditions that caused other DTCs to set. Refer to DTC test procedures.

No, voltage is constant and the reading is approximately 450 mV.

No, voltage is constant and approximately 5 or 12 volts.

Repair short to voltage in wiring harness. Clear code and verify oxygen sensor is within normal parameters

No, 0 volts present.

No, voltage varies but stays below 500 mV (lean). → B

No, voltage varies but stays above 500 mV (rich). → C

Yes, voltage varies between 0 and 900 mV. → D

CONTINUED ON NEXT PAGE

- While running the engine,
- Disconnect oxygen

- While running the engine, measure voltage (backprobe) between oxygen sensor connector terminals 1 and 2.

Does voltage vary above and below 500 mV?

- Disconnect oxygen sensor connector.

Does voltage now read approximately 450 mV on scan tool?

NO

YES

For P0130 : Repair short to ground in wire between oxygen sensor harness connector terminal and ECM connector terminal.
For P0136 : Repair short to ground in wire between oxygen sensor harness connector terminal and ECM connector terminal.
Clear code and verify oxygen sensor is within normal parameters.

Replace oxygen sensor. Clear code and verify oxygen sensor is within normal parameters.

A

CONTINUED ON NEXT PAGE

CONTINUED FROM PREVIOUS PAGE

A

YES

NO

- Ignition off.
- Disconnect front oxygen senosr [for P0130] or rear oxygen sensor [for P0136].
- Disconnect ECM connector.
- Ground oxygen sensor harness terminal 2.
- Measure resistance between ground and ECM connector terminal 59.

Resistance measured should be approximately 1 ohm or less, is it?

Replace oxygen sensor. Clear code and verify oxygen sensor is within normal parameters.

YES

NO

Verify ECM connector is secure. If OK, replace oxygen sensor with a known good component. Clear code and verify oxygen sensor is within normal parameters. If problem persists, replace ECM.

Repair open wire or cause of high resistance. Clear code and verify oxygen sensor is within normal parameters.

CONTINUED FROM PREVIOUS PAGE

B

Voltage varies but stays below 500 mV (lean).

CONTINUED FROM PREVIOUS PAGE

C

Voltage varies but stays above 500 mV (rich).

- Inspect air inlet downstream of MAP sensor for leaks or damage.
- Inspect exhaust manifold for cracks.

Are any leaks or damage found?

YES

Repair leaks or replace exhaust manifold.
Clear code and verify oxygen sensor is within normal parameters.

NO

- Perform fuel pressure test as outlined in shop manual (section FL).

Is fuel pressure within specification and no pressure leak down observed?

E

CONTINUED ON NEXT PAGE

CONTINUED FROM PREVIOUS PAGE

D

Voltage varies between 0 and 900 mV.

YES

- Ignition off.
- Disconnect ignition coil connector.
- Measure voltage drop across negative battery cable by connecting voltmeter between negative battery post and cable attachment point on engine while cranking the engine

Voltage drop measured should be less than 0.5 volts, is it?

YES

- Disconnect negative battery terminal.
- Measure resistance between generator case and engine ground point.

Resistance measured should be approximately 1 ohm or less, is it?

YES

- If malfunction Indicator Lamp (MIL) is turning on intermittently

CONTINUED FROM PREVIOUS PAGE

E

YES

Follow diagnostic procedures outlined in shop manual.
Clear code and verify oxygen sensor is within normal parametes.

NO

Replace negative battery cable.
Clear code and verify oxygen sensor is within normal parameters.

NO

Clean mating surfaces of generator

- If malfunction Indicator Lamp (MIL) is turning on intermittently and DTC P0130 or P0136 is set, problem is most likely a poor ground circuit. Clean negative battery terminal and engine ground. Also clean mating surfaces of generator housing and engine block.
- If Malfunction Indicator Lamp (MIL) was on and DTC P0130 or P0136 is set, replace oxygen sensor.
- Clear code and verify oxygen sensor is within normal parameters.

Clean mating surfaces of generator housing and engine block.
Clear code and verify oxygen sensor is within normal parameters.

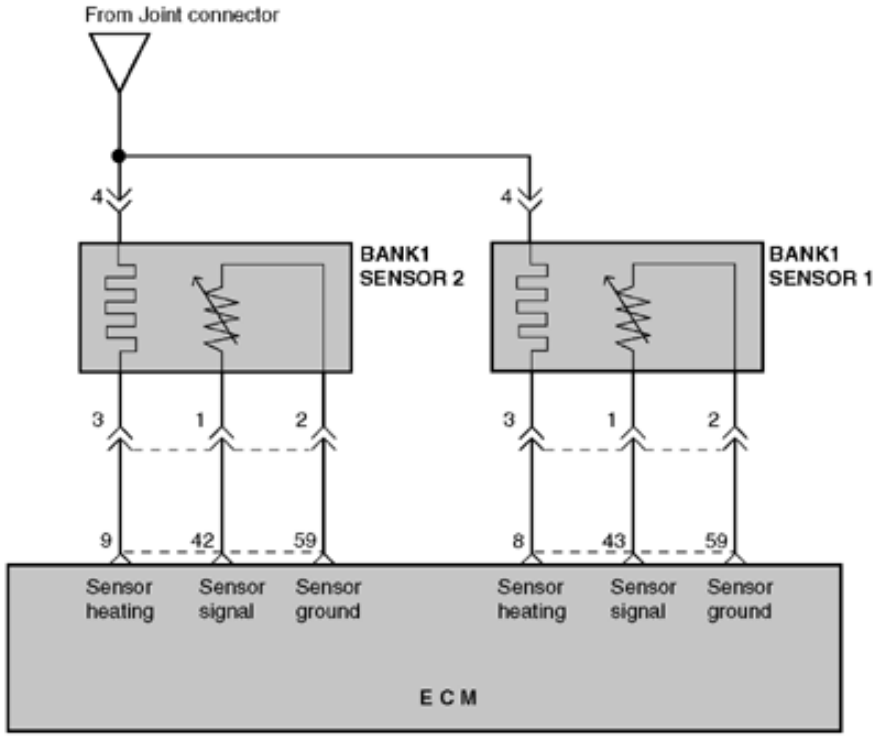
DTC	Diagnostic item
P0131	O2 Sensor Circuit Low Input(Bank 1 / Sensor 1)
P0137	O2 Sensor Circuit Low Input (Bank 1 / Sensor 2)

DESCRIPTION

Refer to DTC P0130 & P0136.

FAILURE CONDITIONS

CIRCUIT DIAGRAM

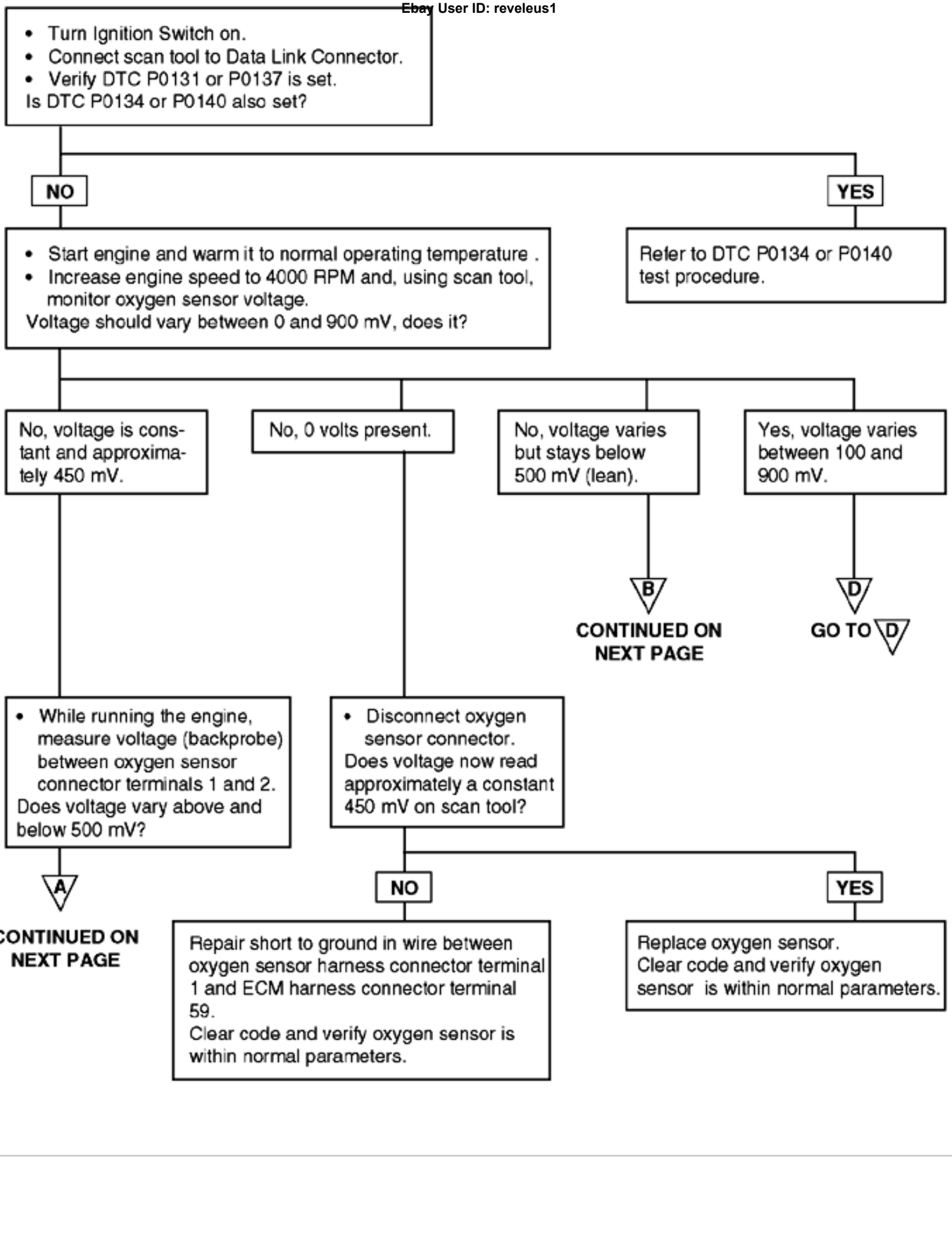


Note : Refer to the appropriate Electrical Troubleshooting Manual for full wiring details.

TEST PROCEDURE

Purchased
from Ebay seller
Reveleus1

Thank-you for purchasing from me, it is much appreciated.
To contact me please email
suzlever@gmail.com



CONTINUED FROM PREVIOUS PAGE

A

YES

- Ignition off.
- Disconnect ECM connector.
- Disconnect oxygen sensor.
- Ground oxygen sensor harness terminal 2.
- Measure resistance between ground and ECM harness connector terminal 59.

Resistance measured should be approximately 1 ohm or less, is it?

NO

Replace oxygen sensor. Clear code and verify oxygen sensor is within normal parameters.

YES

Verify ECM connector is secure. If OK, replace ECM. Clear code and verify oxygen sensor is within normal parameters.

NO

Repair open wire or cause of high resistance. Clear code and verify oxygen sensor is within normal parameters.

CONTINUED FROM PREVIOUS PAGE

B

Voltage varies but stays below 500 mV (lean).

- Inspect air inlet downstream of MAP sensor for leaks or damage.
- Inspect exhaust manifold for cracks.

Are any leaks or damage found?

YES

Repair leaks or replace exhaust manifold. Clear code and verify oxygen sensor is within normal parameters.

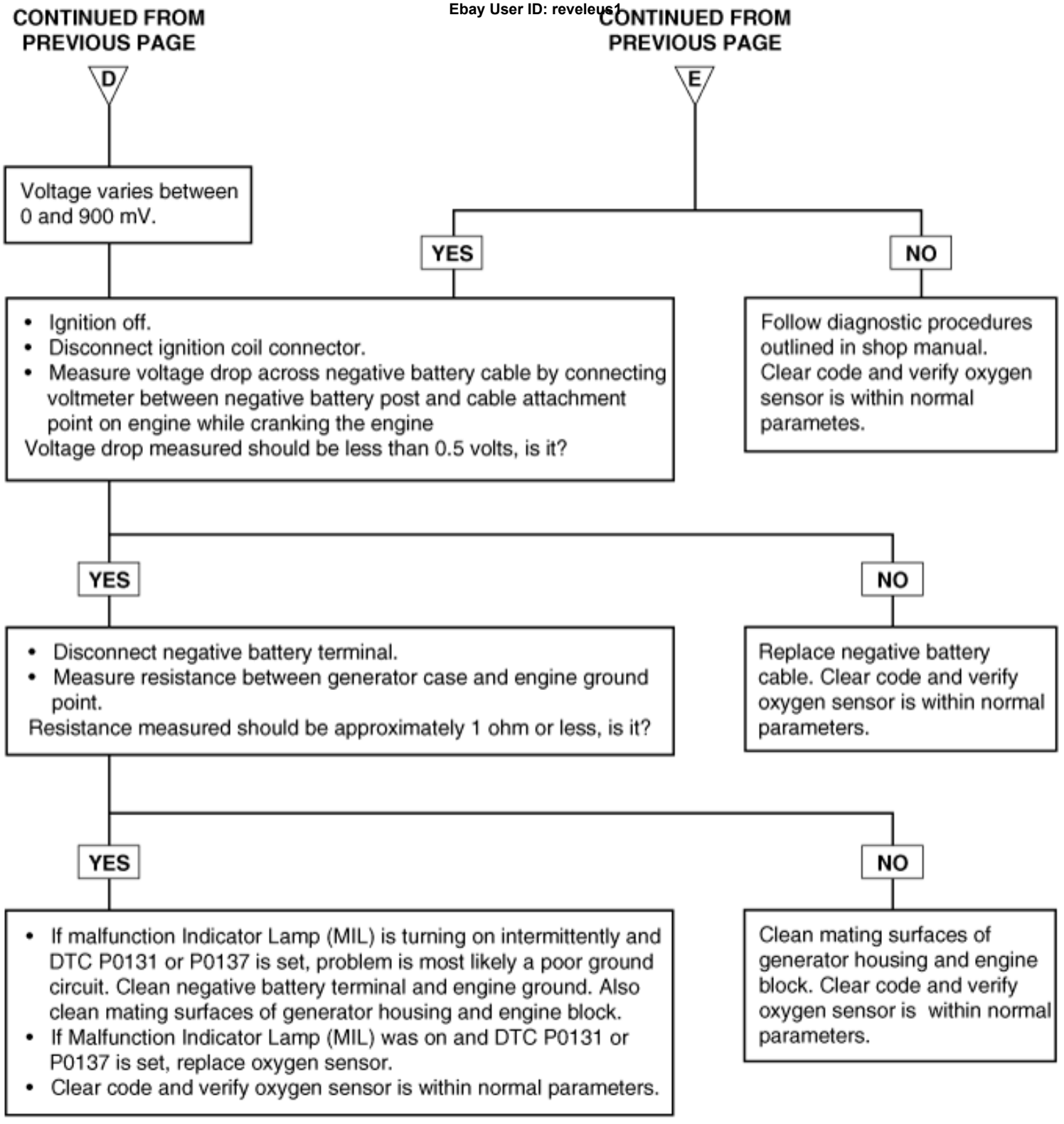
NO

- Perform fuel pressure test as outlined in shop manual.

Is fuel pressure within specification and no pressure leak down observed?

E

CONTINUED ON NEXT PAGE



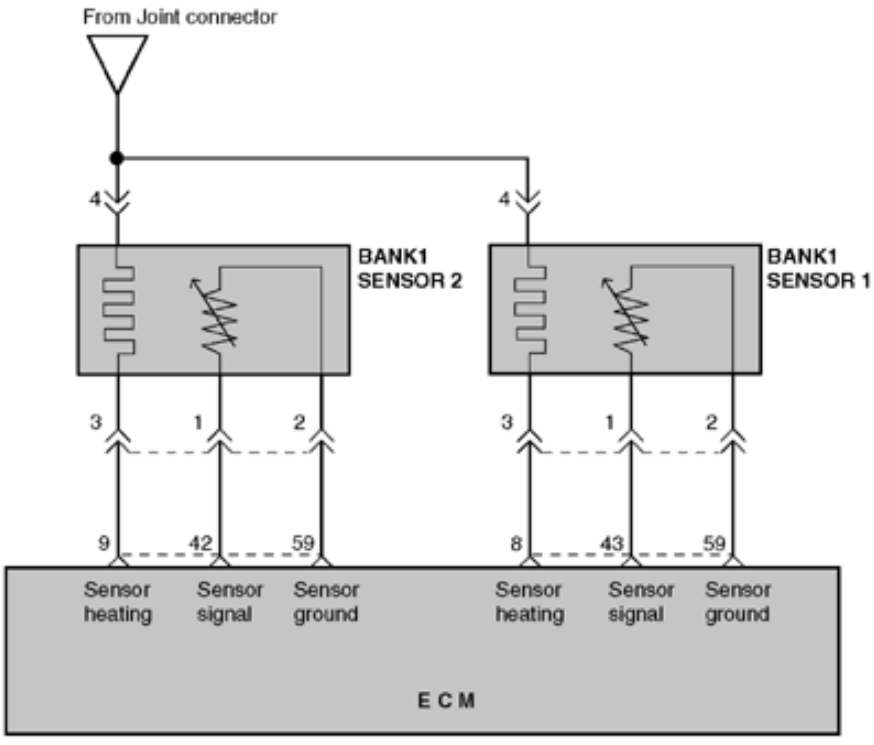
DTC	Diagnostic item
P0132	O2 Sensor Circuit High Input(Bank 1 / Sensor 1)
P0138	O2 Sensor Circuit High Input (Bank 1 / Sensor 2)

DESCRIPTION

Refer to DTC P0130 & P0136.

FAILURE CONDITIONS

CIRCUIT DIAGRAM



Note : Refer to the appropriate Electrical Troubleshooting Manual for full wiring details.

TEST PROCEDURE

- Turn Ignition Switch on.
- Connect scan tool to Data Link Connector.
- Verify DTC P0132 or P0138 is set.

Is DTC P0134 or P0140 also set?

NO

- Start engine and warm it to normal operating temperature .
- Increase engine speed to 4000 RPM and, using scan tool, monitor oxygen sensor voltage.

Voltage should vary between 0 and 900 mV, does it?

YES

Refer to DTC P0134 or P0140 test procedure.

No, voltage is constant and approximately 450 mV.

- While running the engine, measure voltage (backprobe) between oxygen sensor connector terminals 1 and 2.

Does voltage vary above and below 500 mV?

YES

- Ignition off.
- Disconnect ECM connector.
- Disconnect oxygen sensor.
- Ground oxygen sensor harness terminal 2.
- Measure resistance between ground and ECM harness connector terminal 59.

Resistance measured should be approximately 1 ohm or less, is it?

YES

Verify ECM connector is secure. If OK, replace Oxygen Sensor. Clear code and verify oxygen sensor is within normal parameters. If problem persists, replace ECM.

NO

Repair open wire or cause of high resistance. Clear code and verify oxygen sensor is within normal parameters.

NO

Replace oxygen sensor. Clear code and verify oxygen sensor is within noraml parameters.

No, voltage is constant and approximately 5 or 12 volts.

Repair short to voltage in wiring harness. Clear code and verify oxygen sensor is within normal parameters.

No, voltage varies but stays above 500 mV (rich).

B

CONTINUED ON NEXT PAGE

Yes, voltage varies between 100 and 900 mV.

D

CONTINUED ON NEXT PAGE

CONTINUED FROM PREVIOUS PAGE

D

Voltage varies between 0 and 900 mV.

CONTINUED FROM PREVIOUS PAGE

B

Voltage varies but stays above 500 mV (rich).

- Perform fuel pressure test as outlined in shop manual.

Is fuel pressure within specification and no pressure leak down observed?

YES

- Ignition off.
- Disconnect ignition coil connector.
- Measure voltage drop across negative battery cable by connecting voltmeter between negative battery post and cable attachment point on engine while cranking the engine

Voltage drop measured should be less than 0.5 volts, is it?

YES

- Disconnect negative battery terminal.
- Measure resistance between generator case and engine ground point.

Resistance measured should be approximately 1 ohm or less, is it?

YES

- If malfunction Indicator Lamp (MIL) is turning on intermittently and DTC P0132 or P0138 is set, problem is most likely a poor ground circuit. Clean negative battery terminal and engine ground. Also clean mating surfaces of generator housing and engine block.
- If Malfunction Indicator Lamp (MIL) was on and DTC P0132 or P0138 is set, replace oxygen sensor.
- Clear code and verify oxygen sensor is within normal parameters.

NO

Clean mating surfaces of generator housing and engine block. Clear code and verify oxygen sensor is within normal parameters.

NO

Replace negative battery cable. Clear code and verify oxygen sensor is within normal parameters.

NO

Follow diagnostic procedures outlined in shop manual. Clear code and verify oxygen sensor is within normal parametes.

DTC	Ebay User ID: reveleus1 Diagnostic item
P0133	O2-Sensor Circuit Slow Response (Bank 1 / Sensor 1)
P0134	O2 Sensor Circuit No Activity Detected (Bank 1 / Sensor 1)

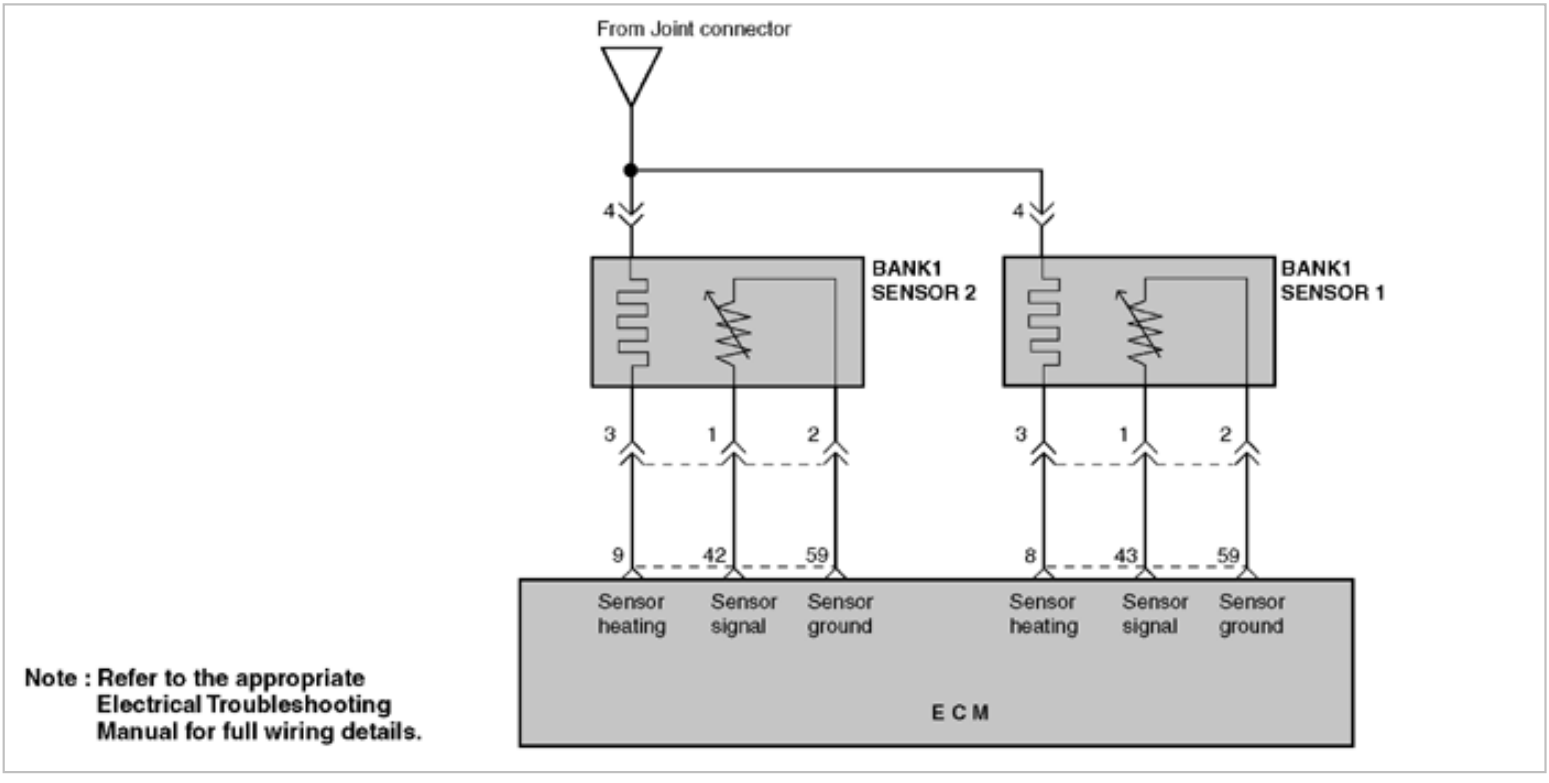
DESCRIPTION

Refer to DTC P0130 & P0136.

FAILURE CONDITIONS

1. Over a period of 2 minutes, the ECM must sense a fuel compensation factor greater 85% or less than 95%:
2. The ECM must make some correction in the air/fuel ratio when:
   - Engine RPM is between 1600 and 3200 RPM.
   - Engine load range is between 1.35 and 3.4 milliseconds.
   - Catalyst temperature is above 372°C (702°F).
   - System is in closed loop.

CIRCUIT DIAGRAM



TEST PROCEDURE

- Turn Ignition Switch on.
- Connect scan tool to Data Link Connector.
- Verify DTC P0133 or P0134 is set.

Is DTC P0134 also set?

NO

- Start engine and warm it to normal operating temperature .
- Increase engine speed to 4000 RPM and, using scan tool, monitor oxygen sensor voltage.

Voltage should vary between 100 and 900 mV, does it?

YES

Refer to DTC P0134 test procedure.

No, voltage is constant and approximately 450 mV.

- While running the engine, measure voltage (backprobe) between oxygen sensor connector terminals 1 and 2.

Does voltage vary above and below 500 mV?

A

CONTINUED ON NEXT PAGE

No, voltage is constant and approximately 5 or 12 volts.

Repair short to voltage in wiring harness. Clear code and verify oxygen sensor is within normal parameters

No, 0 volts present.

- Disconnect oxygen sensor connector.

[for P0133]
Does voltage now read approximately 450 mV on scan tool?
[for P0134]
Does voltage now read approximately 50 mV on scan tool?

NO

Repair short to ground in wire between oxygen sensor harness connector terminal 1 and ECM harness connector terminal 59.
Clear code and verify oxygen sensor is within normal parameters.

YES

Replace oxygen sensor. Clear code and verify oxygen sensor is within normal parameters.

No, voltage varies but stays below 500 mV (lean).

B

No, voltage varies but stays above 500 mV (rich).

C

CONTINUED ON NEXT PAGE

Yes, voltage varies between 100 and 900 mV.

D

CONTINUED FROM PREVIOUS PAGE

A

YES

- Ignition off.
- Disconnect ECM connector.
- Disconnect front oxygen sensor.
- Ground front oxygen sensor harness terminal 2.
- Measure resistance between ground and ECM harness connector terminal 59.

Resistance measured should be approximately 1 ohm or less, is it?

NO

Replace oxygen sensor. Clear code and verify oxygen sensor is within normal parameters.

YES

Verify ECM connector is secure. If OK, replace front oxygen sensor with known good component. Clear code and verify oxygen sensor is within normal parameters. If problem persists, replace ECM.

NO

Repair open circuit in wire or cause of high resistance. Clear code and verify oxygen sensor is within normal parameters.

CONTINUED FROM PREVIOUS PAGE

B

Voltage varies but stays below 500 mV (lean).

CONTINUED FROM PREVIOUS PAGE

C

Voltage varies but stays above 500 mV (rich).

- Inspect air inlet downstream of MAP sensor for leaks or damage.
- Inspect exhaust manifold for cracks.

Are any leaks or damage found?

YES

Repair leaks or replace exhaust manifold. Clear code and verify oxygen sensor is within normal parameters.

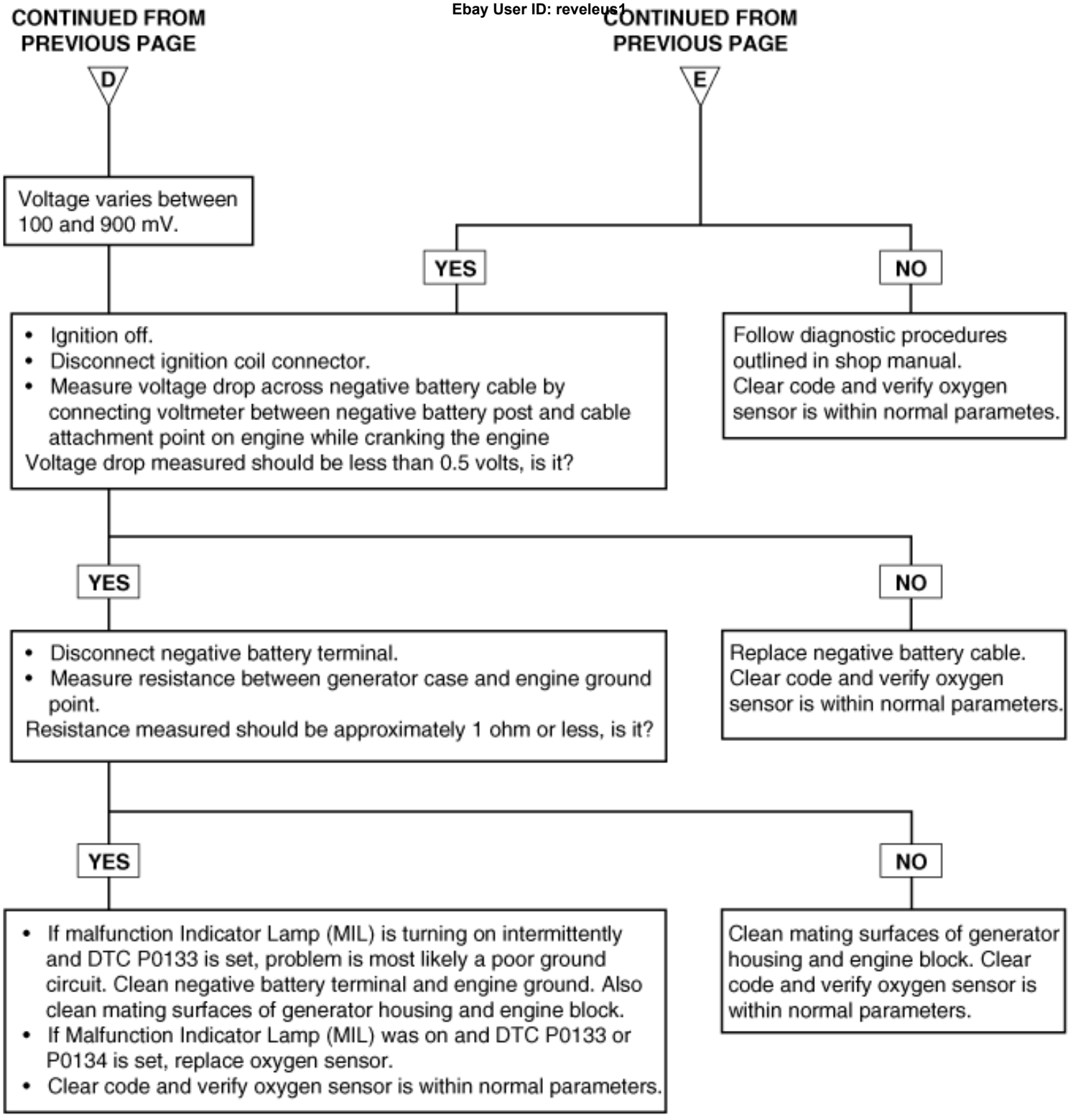
NO

- Perform fuel pressure test as outlined in shop manual.

Is fuel pressure within specification and no pressure leak down observed?

E

CONTINUED ON NEXT PAGE



DTC	Diagnostic item

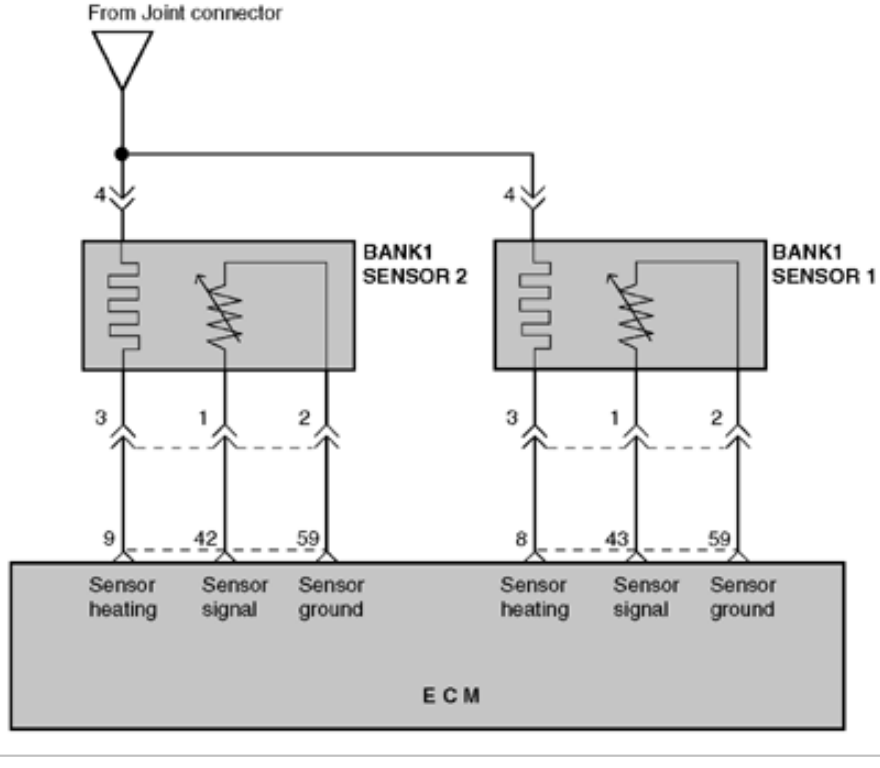
P0030	O2 Sensor Heater - Heater Control Circuit (Bank 1 / Sensor 1)
P0036	O2 Sensor Heater - Heater Control Circuit (Bank 1 / Sensor 2)
P0031	O2 Sensor Heater Circuit low (Bank 1 / Sensor 1)
P0032	O2 Sensor Heater Circuit high (Bank 1 / Sensor 1)
P0037	O2 Sensor Heater Circuit low (Bank 1 / Sensor 2)
P0038	O2 Sensor Heater Circuit high (Bank 1 / Sensor 2)

DESCRIPTION

Refer to DTC P0130 & P0136.

FAILURE CONDITIONS

CIRCUIT DIAGRAM



Note : Refer to the appropriate Electrical Troubleshooting Manual for full wiring details.

TEST PROCEDURE

- Turn ignition switch on.
- Connect scan tool to data link connector.
- Verify DTC P0031, P0032, P0037, P0038 or P0030, P0036 is set.

- Disconnect front [for P0030, P0031, P0032] or rear [for P0036, P0037, P0038] oxygen sensor.
- Start engine.
- Measure voltage between oxygen sensor harness connector terminal 3 or terminal 1.

Voltage should between 12 and 16 volts, is it?

YES

- Turn ignition switch off.
- Disconnect front [for P0030, P0031, P0032] or rear [for P0036, P0037, P0038] oxygen sensor.
- ECM disconnected.
- Ground front [for P0030, P0031, P0032] or rear [for P0036, P0037, P0038] oxygen sensor harness terminal.
- Measure resistance between ground and ECM harness terminal 59.

Resistance should be approximately 1 ohm or less, is it?

YES

- Ignition switch off.
- Disconnect front [for P0030, P0031, P0032] or rear [for P0036, P0037, P0038] oxygen sensor.
- Measure resistance between ground and oxygen sensor harness connector terminal.

Resistance should indicate an open circuit, does it?

A

CONTINUED ON NEXT PAGE

NO

Repair open or shourt to ground in wire between engine compartment and oxygen sensor harness connector terminal.
Clear code and verify oxygen sensor is within normal parameters.

NO

Repair open in wire between oxygen sensor harness connector termial and ECM harness connector terminal 59.
Clear code and verify oxygen sensor is within normal parameters.

CONTINUED FROM PREVIOUS PAGE

A

YES

- Ignition switch off.
- Disconnect front [for P0030, P0031, P0032] or rear [for P0036, P0037, P0038] oxygen sensor.
- Measure resistance between terminals 3 and 4 of oxygen sensor connector.

Is resistance within normal parameters (3-5 ohms)?

NO

Repair short to ground or another circuit in wire between oxygen sensor harness connector terminal 3 and ECM harness connector terminal 59.
Clear code and verify oxygen sensor is within normal parameters.

YES

Verify ECM connector is secure. If OK, replace Front [for P0030, P0031, P0032] or rear [for P0036, P0037, P0038] oxygen sensor with a known good component.
Clear code and verify oxygen sensor is within normal parameters.
If problem persists, replace ECM.

NO

Replace oxygen sensor. Clear code and verify oxygen sensor is within normal parameters.

DTC	Ebay User ID: reveleus1 Diagnostic item
P0261	Cylinder 1 - Injector Circuit Low
P0262	Cylinder 1 - Injector Circuit High
P0264	Cylinder 2 - Injector Circuit Low
P0265	Cylinder 2 - Injector Circuit High
P0267	Cylinder 3 - Injector Circuit Low
P0268	Cylinder 3 - Injector Circuit High
P0270	Cylinder 4 - Injector Circuit Low
P0271	Cylinder 4 - Injector Circuit High

DESCRIPTION

The fuel injectors are solenoid operated valves. When a fuel injector solenoid is energized (pulsed) the injector needle valve opens, allowing pressurizedfuel to pass through the injector and mix with air entering the engine.

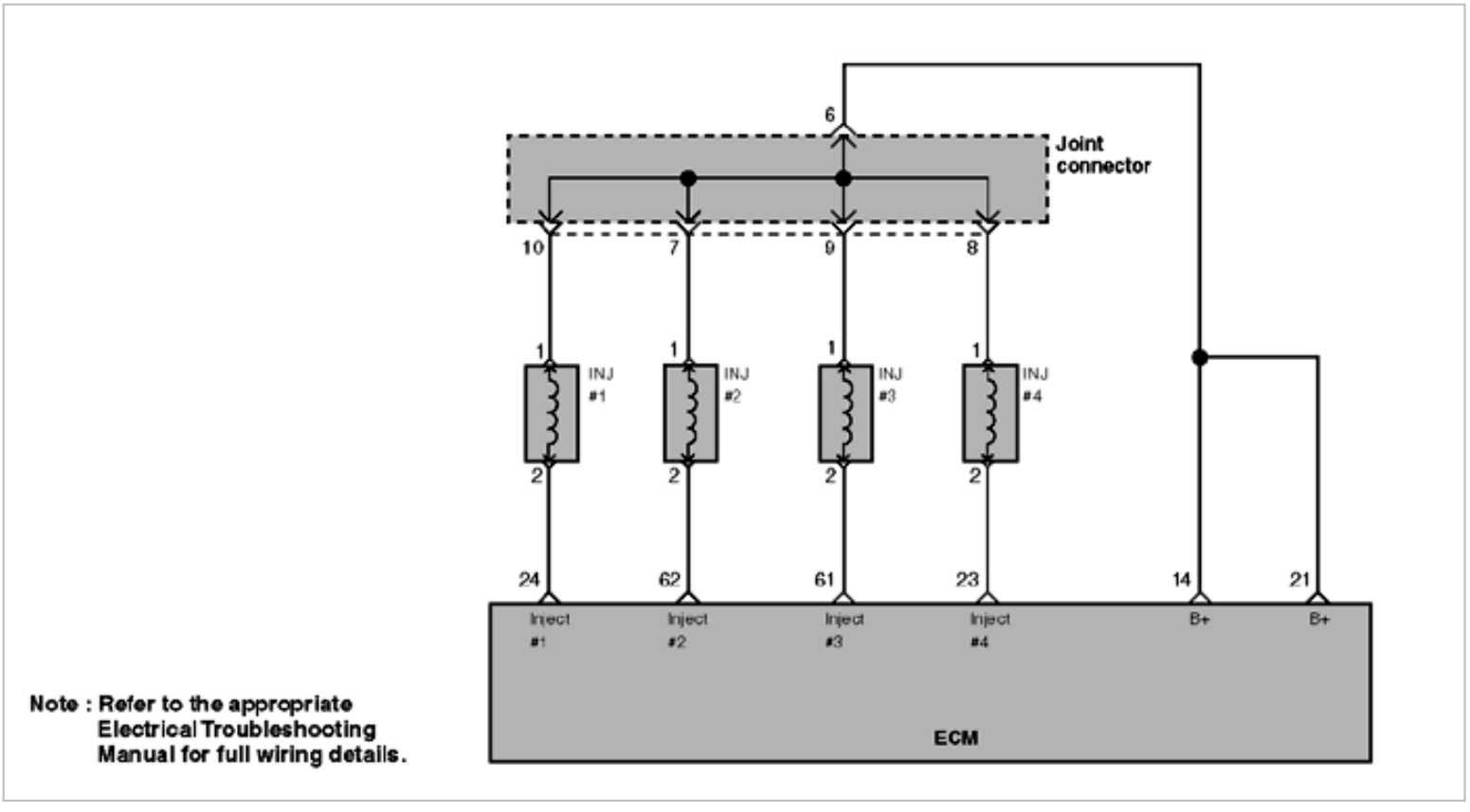
The Engine Control Module (ECM) controls injector timing and pulse width. The ECM pulses the fuel injectors based on information provided by its network of engine sensors. The ECM uses the crankshaft position sensor to determine when to pulse the injectors. Engine coolant temperature, intake air temperature, air flow, and throttle position data are all used by the ECM to calculateinjector pulse width.

The ECM also uses its network of sensors to determine whether all injectors should be pulsed at the same time (simultaneous injection) or each injector should be pulsed individually (sequential injection). Sequential injection is almost always used during normal engine operation. Simultaneous injectionmay be used when the engine is being cranked.

FAILURE CONDITIONS

The ECM will set a code and the MIL will turn on if an open circuit or short to ground is detected in the fuel injector circuit during two drivingcycles.

CIRCUIT DIAGRAM



TEST PROCEDURE

- Turn ignition switch on.
- Connect scan tool to data link connector.
- Verify DTC P0261, P0262, P0264, P0265, P0267 P0268, P0270 or P0271 is set.

- Engine idling at normal operating temperature.
- Disconnect the fuel injectors, one at a time, and note the drop in engine speed for each one.

Engine speed should drop the same amount for each fuel injector, does it?

NO

- Turn ignition off.
- Disconnect fuel injector connector related to DTC.
- Turn ignition on.
- Measure voltage between ground and fuel injector harness connector terminal 1.

Battery voltage should be present, is it?

YES

- Disconnect fuel injector related to DTC.
- Turn ignition off.
- Disconnect ECM connector.
- Ground fuel injector harness connector terminal 2. Measure resistance between ground and ECM connector harness terminal 24 [for P0261, P0262], terminal 62 [for P0264, P0265], terminal 61 [for P0267, P0268] or terminal 23 [for P0270, P271].

Resistance measured should be approximately 1 ohm or less, is it?

YES

- Ignition off.
- Disconnect fuel injector related to DTC.
- Disconnect ECM connector.
- Measure resistance between ground and fuel injector harness connector terminal 2.

Resistance should indicate open circuit, does it?

A

CONTINUED ON NEXT PAGE

YES

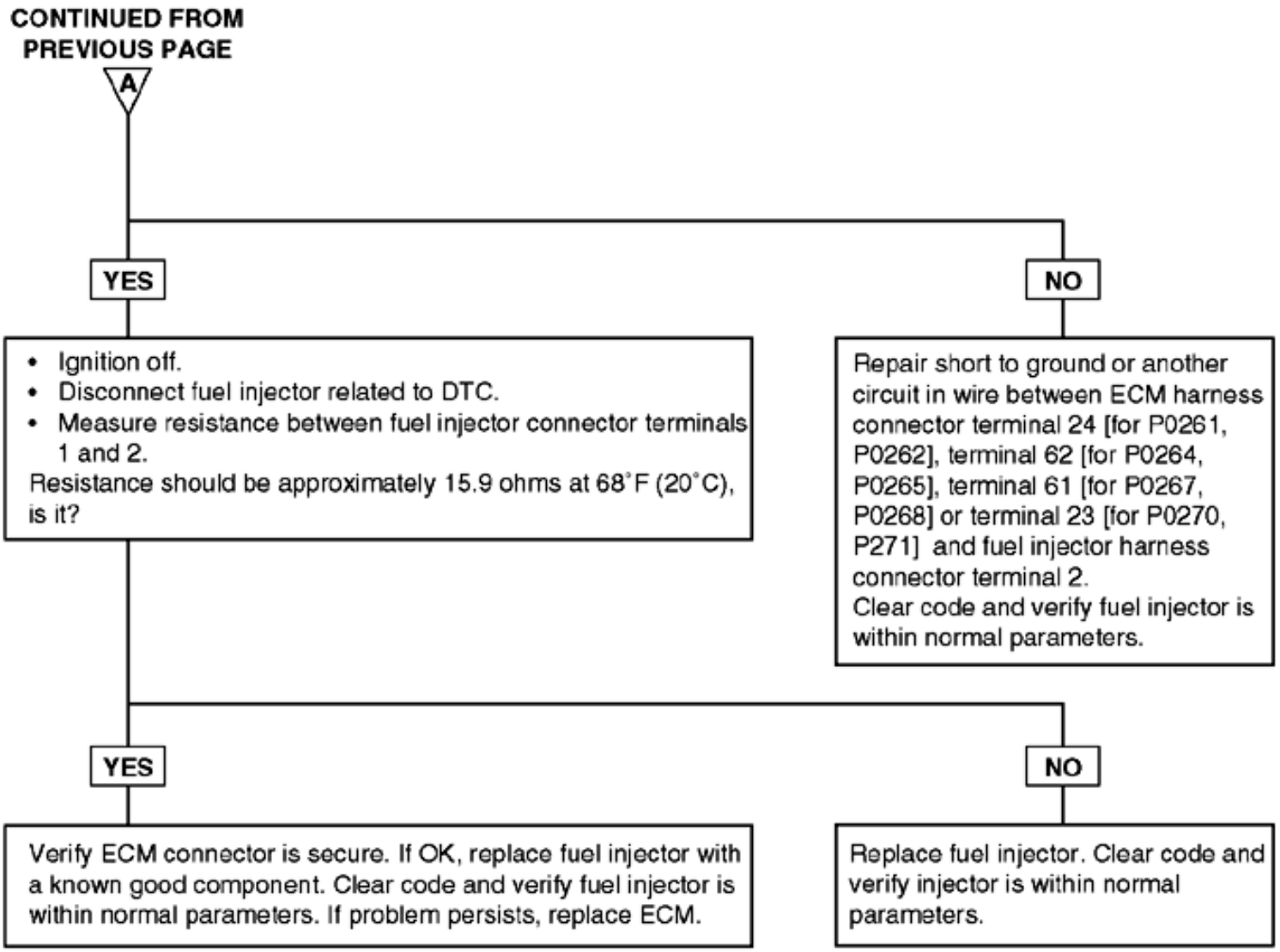
Problem is intermittent or was repaired and Engine Control Module (ECM) memory was not cleared. Clear code and verify fuel injector is within normal parameters.

NO

Repair open in wire between ECM control relay harness connector terminal 1 and fuel injector harness connector terminal 1. Clear code and verify fuel injector is within normal parameters.

NO

Repair open circuit in wire between ECM harness connector terminal 24 [for P0261, P0262], terminal 62 [for P0264, P0265], terminal 61 [for P0267, P0268] or terminal 23 [for P0270, P271] and fuel injector harness connector terminal 2. Clear code and verify fuel injector is within normal parameters.


CONTINUED FROM PREVIOUS PAGE
A
YES
NO
• Ignition off.
• Disconnect fuel injector related to DTC.
• Measure resistance between fuel injector connector terminals 1 and 2.
Resistance should be approximately 15.9 ohms at 68˚F (20˚C), is it?
Repair short to ground or another circuit in wire between ECM harness connector terminal 24 [for P0261, P0262], terminal 62 [for P0264, P0265], terminal 61 [for P0267, P0268] or terminal 23 [for P0270, P271] and fuel injector harness connector terminal 2.
Clear code and verify fuel injector is within normal parameters.
YES
NO
Verify ECM connector is secure. If OK, replace fuel injector with a known good component. Clear code and verify fuel injector is within normal parameters. If problem persists, replace ECM.
Replace fuel injector. Clear code and verify injector is within normal parameters.

DTC	Ebay User ID: reveleus1	Diagnostic item
P0300		Multiple Cylinder Misfire Detected

DESCRIPTION

With the ignition switch at ON or START, voltage is applied to the ignition coil. The ignition coil consists of two coils. High tension leads go to each cylinder from the ignition coil. The ignition coil fires two spark plugs on every power stroke (the cylinder under compression and the cylinder on the exhaust stroke). Coil number one fires cylinders 1 and 4. Coil number twofires cylinders 2 and 3.

The Engine Control Module (ECM) provides a switching circuit to ground for energizing the primary ignition coils. The ECM uses the crankshaft position sensor signal to time the energizing of the coil. When a primary ignition coil is energized and de-energized, the secondary coil produces a high voltagespike across the attached spark plugs.

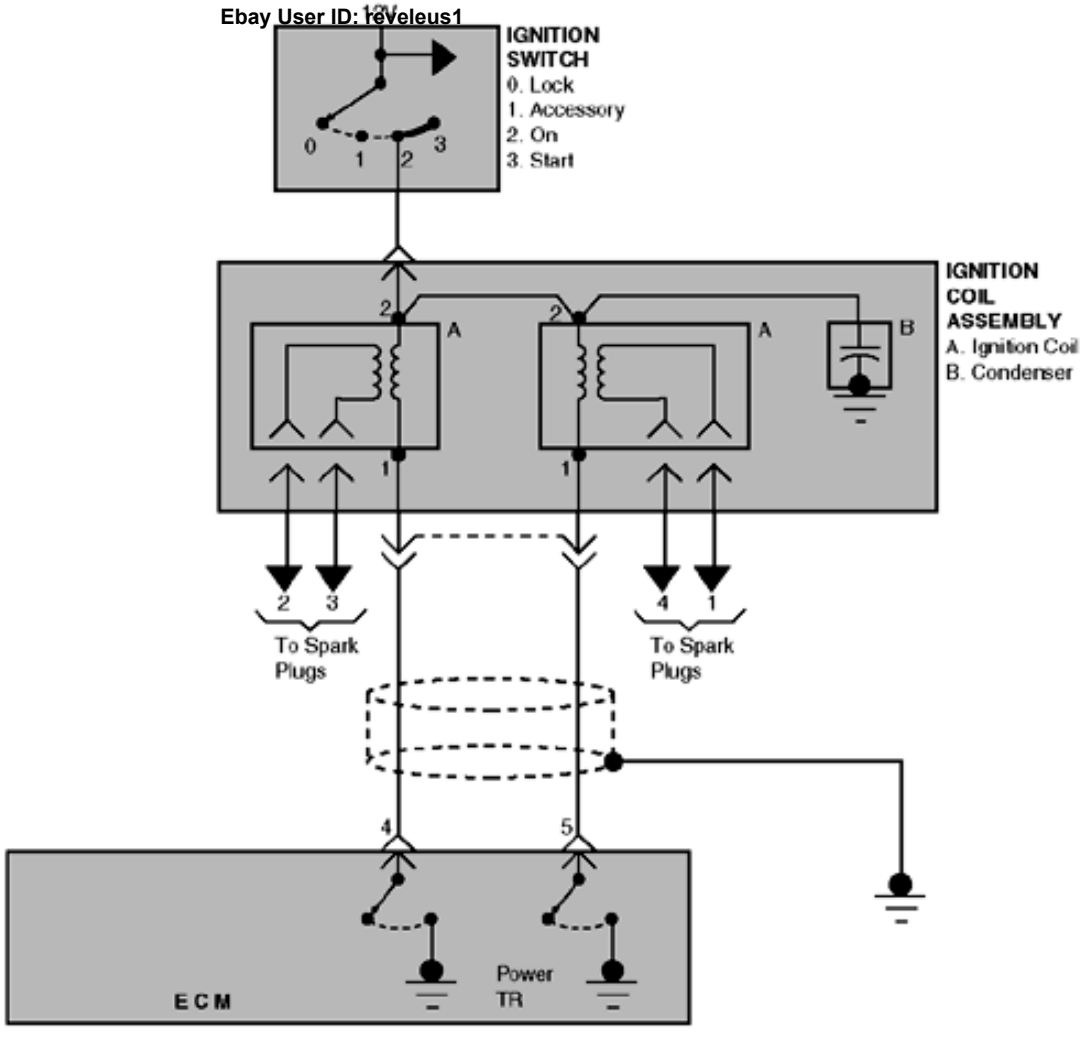
FAILURE CONDITIONS

The ECM will set P0300 and the MIL will turn on if 2 misfires per 100 revolutions are detected during two driving cycles. The misfire rate is measuredevery 200 revolutions when the following conditions are met:

- •Speed change is less than 1000 rpm per second.
- •Engine speed is between 600 and 4000 RPM.
- •Engine load is greater than 2 milliseconds.
- •No fuel cut-off.
- •Starter is not engaged.
- •Vehicle on smooth road (acceleration sensor reports less than 0.3 g acceleration).

If the misfire rate increases to between 5%-25% per 200 revolutions, there is danger of catalyst damage and the MIL will flash off and on. The catalyst temperature could exceed 3542°F (1950°C) if the misfire rate increases enough. This code indicates a problem with cylinder ignition beingread by the ECM.

CIRCUIT DIAGRAM



Note : Refer to the appropriate Electrical Troubleshooting Manual for full wiring details.

TEST PROCEDURE

- Turn Ignition Switch on.
- Connect scan tool to Data Link Connector.
- Verify DTC P0300 is set.

Is DTC P0300 the only code set?

YES

Is vehicle fueled with appropriate octane fuel (at least 87 octane)?

YES

- Ignition on.
- Disconnect ignition coil connector.
- Measure voltage between ground and ignition coil harness connector terminal 1.

Battery voltage should be present, is it?

YES

- Turn ignition off.
- Ignition coil assembly connector disconnected.
- Disconnect ECM connector.
- Ground ignition coil assembly connector terminal 1 and 2. Measure resistance between ground and ECM harness connector terminal 4 [for Ignition coil #1] or terminal 5 [for Ignition coil #2] .

Resistance measured should be approximately 1 ohm or less, is it?

YES

A

CONTINUED ON NEXT PAGE

NO

Repair open circuit in wire between ignition coil connector terminal 1 and ECM harness connector terminal 4 (for Ignition coil #1)or between ignition coil connector terminal 1 and ECM harness connect or terminal 5 (for Ignition coil #2).
Clear code and verify code does not reappear.

NO

Repair open in wire between ignition switch and ignition coil connector terminal 1.
Clear code and verify code does not reappear.

NO

Refuel vehicle with proper octane or higher fuel.
Clear code and verify code does not reappear.

NO

Refer to the appropriate section and follow test procedures for other set codes.
Clear codes and verify DTC P0300 is no longer set.

CONTINUED FROM PREVIOUS PAGE

A

- Ignition coil connector disconnected.
- Reconnect ECM connector.
- Ignition in start.
- Measure voltage between ground and ignition coil harness connector terminal 1. Note voltage.
- Measure voltage between ground and ignition coil harness connector terminal 2. Note voltage.

Voltage should vary between 0.02 and 0.2 volts, does it?

YES

- Ignition off.
- Disconnect ignition coil connector.
- Disconnect spark plug wires from ignition coil.
- Measure resistance between ignition coil connector terminals 1 and 2. Note primary coil resistance.
- Measure resistance between ignition coil spark plug connector terminals 1 and 4 and between spark plug connector terminals 2 and 3. Note secondary coil resistance.

Primary coil resistance should be approximately 1.0 ohm. Secondary coil resistance should be between 10.3 kilo ohms and 13.9 kilo ohms. Are resistances within specifiecation?

NO

Verify ECM connector is secure. If OK, replace ECM. Clear codes and verify code does not reappear.

YES

Inspect the following components/systems.

- Spark plugs and spark plug wires needing replacement.
- Fuel injectors for clogging or wiring damage.
- Obstructions to the air flow meter.
- Acceleration sensor wiring, connection.
- Canister purge valve for normal operation.
- Vacuum hoses for leaks.

Are all components undamaged and within specification?

NO

Replace ignition coil (s). Clear code and verify code does not reappear.

YES

- Verify fuel pressure according to procedure outlined in shop manual.
- Check engine oil for improper level or contamination (fuel in oil).

Is fuel pressure and oil level/contamination within specifications?

NO

Repair or replace damaged or out of specification components. Clear codes and verify code does not reappear.

YES

Verify ECM connector is secure. If OK, replace ECM. Clear code and verify code does not reappear.

NO

Repair out of specification components. Clear codes and verify code does not reappear.

DTC	Diagnostic item
P0301	Cylinder 1 - Misfire detected
P0302	Cylinder 2 - Misfire detected
P0303	Cylinder 3 - Misfire detected
P0304	Cylinder 4 - Misfire detected

DESCRIPTION

Refer to DTC P0300.

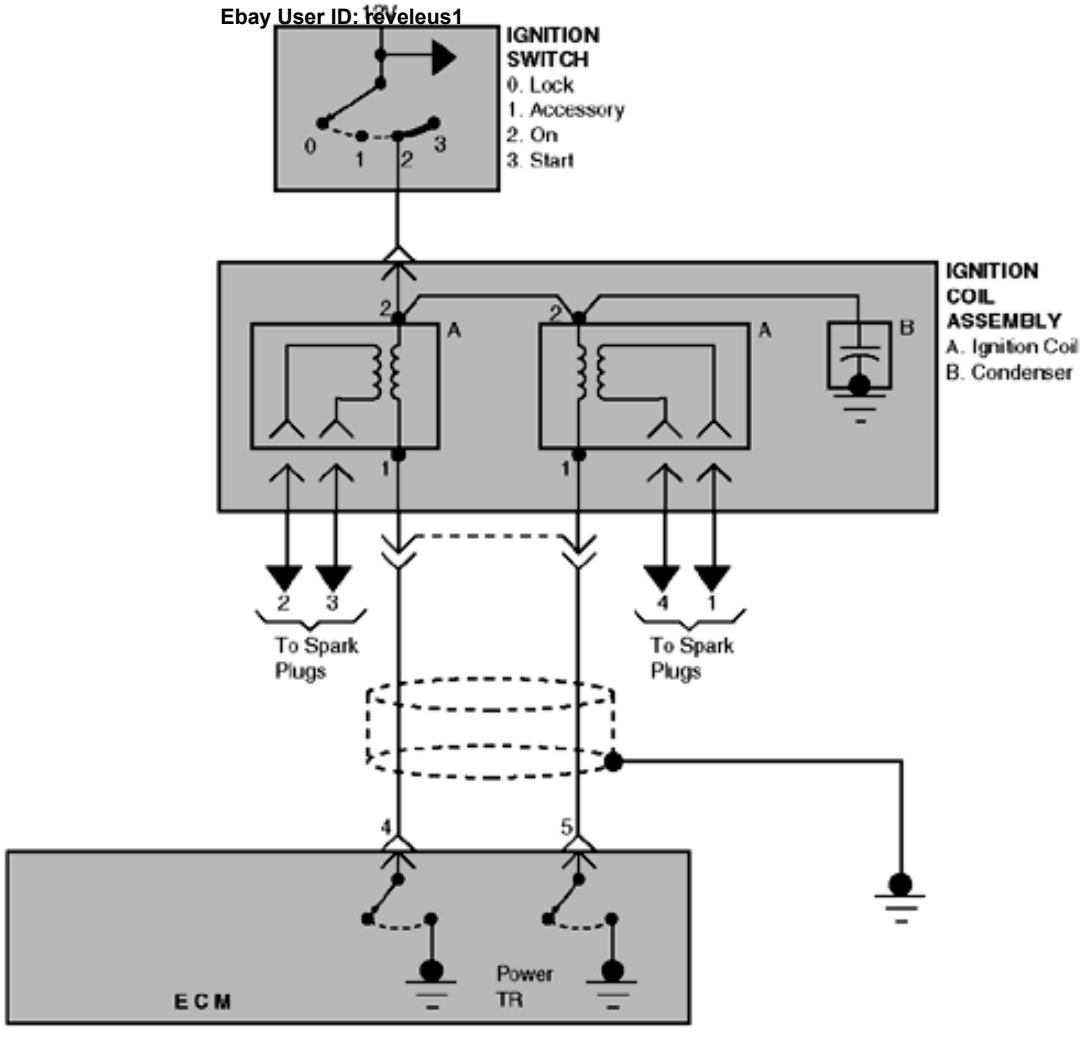
FAILURE CONDITIONS

The ECM will set P0301, P0302, P0303 or P0304 and the MIL will turn on if 2 misfires per 100 revolutions are detected during two driving cycles. The misfire rate is measured every 200 revolutions when the following conditionsare met:

- •Speed change is less than 1000 rpm per second.
- •Engine speed is between 600 and 4000 RPM.
- •Engine load is greater than 2 milliseconds.
- •No fuel cut-off.
- •Starter is not engaged.
- •Vehicle on smooth road (acceleration sensor reports less than 0.3 g acceleration).

If the misfire rate increases to between 5%-25% per 200 revolutions, there is danger of catalyst damage and the MIL will flash off and on. The catalyst temperature could exceed 3542°F (1950°C) if the misfire rate increases enough. This code indicates a problem with cylinder ignition beingread by the ECM.

CIRCUIT DIAGRAM



Note : Refer to the appropriate Electrical Troubleshooting Manual for full wiring details.

TEST PROCEDURE

- Turn Ignition Switch on.
- Connect scan tool to Data Link Connector.
- Verify DTC P0301, P0302, P0303 or P0304 is set.

Is DTC for Injector #1 or P0300 also set?
Is DTC for Injector #2 or P0300 also set?
Is DTC for Injector #3 or P0300 also set?
Is DTC for Injector #4 or P0300 also set?

NO

Is vehicle fueled with appropriate octane fuel (at least 87 octane)?

YES

Perform DTC for Injector #1 and/or DTC P0300 test procedures.
Perform DTC for Injector #2 and/or DTC P0300 test procedures.
Perform DTC for Injector #3 and/or DTC P0300 test procedures.
Perform DTC for Injector #4 and/or DTC P0300 test procedures.

YES

- Ignition off.
- Disconnect ignition coil connector (s).
- Disconnect spark plug wires from ignition coil.
- Measure resistance between ignition coil connector terminals 1 and 2. Note primary coil resistance.
- Measure resistance between ignition coil spark plug connector terminals 1 and 4 and between spark plug connector terminal 2 and 3. Note secondary coil resistance.

Primary coil resistance should be approximately 1.0 ohm. Secondary coil resistance should be between 10.3 kilo ohms and 13.9 kilo ohms. Are resistances within specification?

NO

Refuel vehicle with 87 octane or higher fuel. Clear code and verify code does not reappear.

YES

- Ignition off.
- Inspect spark plugs, cables and connections.
- Inspect acceleration sensor wiring and connection.

Are spark plugs, cables, acceleration sensor and connections undamaged or within specifications?

NO

Replace ignition coil. Clear code and verify code does not reappear.

YES

- Ignition off.
- Check fuel injector for clogging.
- Inspect acceleration sensor wiring and connection.

Is fuel injector OK?

NO

Repair or replace parts. Clear code and verify code does not reappear.

YES

Verify ECM connector is secure. If OK, replace ECM. Clear code and verify code does not reappear.

NO

Clean or replace fuel injector. Clear code and verify code does not reappear.

DTC	Ebay User ID: reveleus1	Diagnostic item
P0325		Knock Sensor 1 Circuit Malfunction

DESCRIPTION

The knock sensor is attached to the cylinder block and senses engine knocking. A knocking vibration from the cylinder block is applied as pressure to the sensor's piezoelectric element. This vibration pressure is then converted into a voltage signal. The Engine Control Module (ECM) uses this signal tosuppress knocking by retarding ignition timing.

FAILURE CONDITIONS

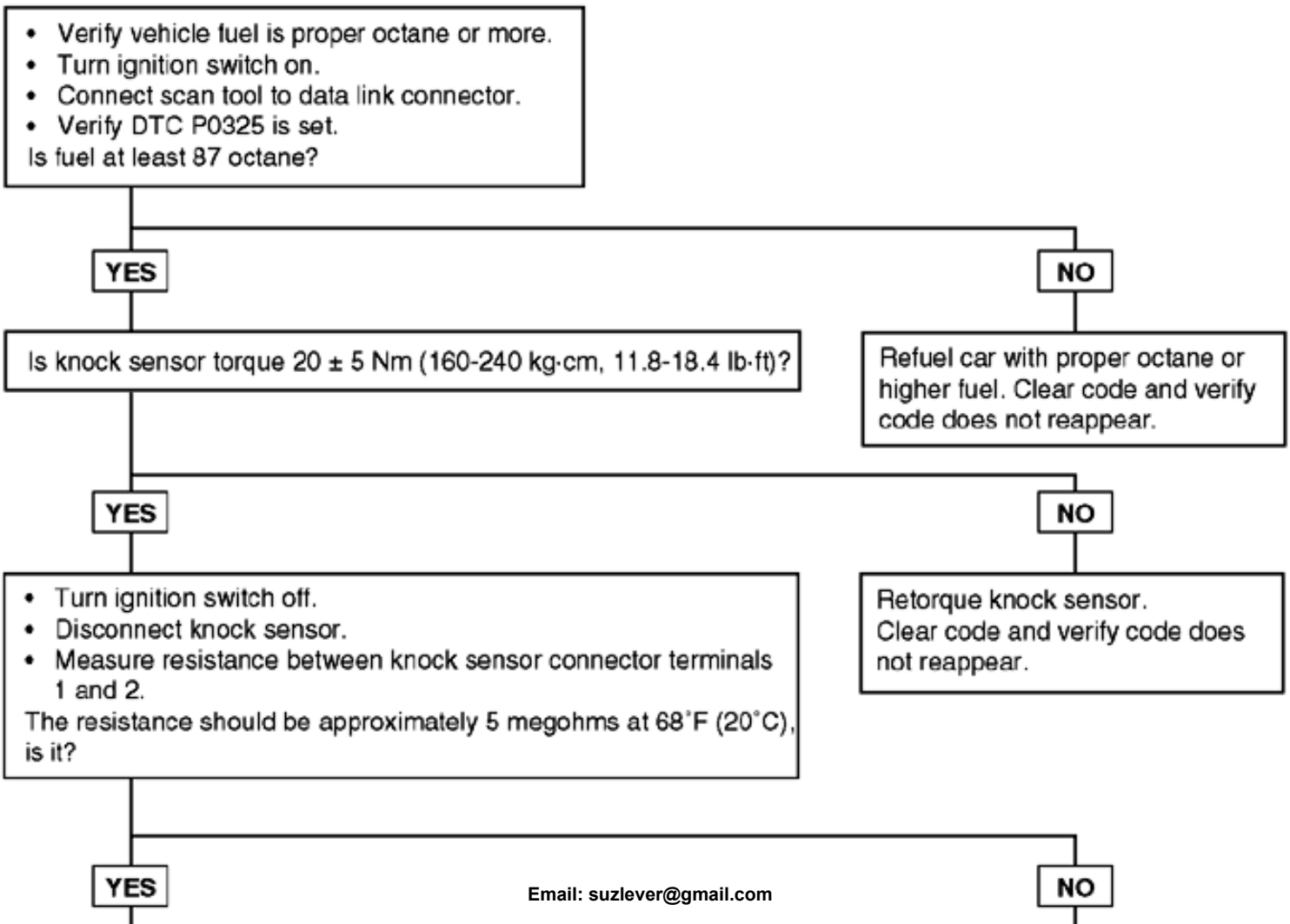
The ECM will set a code (Malfunction Indicator Lamp will Not turn on) if during two driving cycles the knock sensor's output voltage falls below 650 millivolts during a 4 second check when the following conditions are met:

- •Starter is not engaged.
- •Engine speed is above 3000 RPM.
- •Engine coolant temperature is above 104°F (40°C).
- •Engine load is greater than 2.5 milliseconds.

This code indicates an unexpected vibration is being read by the knock sensor or ECM under normal engine operation.

CIRCUIT DIAGRAM

TEST PROCEDURE



YES

- Ignition off.
- Knock sensor disconnected.
- ECM connector disconnected.
- Ground knock sensor harness terminals 1 and 2.
- Measure resistance between ground and ECM harness connector terminals 30 and 10.

Resistance measured should be approximately 1 ohm or less, is it?

NO

Replace knock sensor if the resistance measurement indicates an open or a short circuit. Clear code and verify code does not reappear.

YES

A

CONTINUED ON NEXT PAGE

NO

Repair open circuit in wire between knock sensor harness connector terminal 1 and ECM harness connector terminal 10 or between knock sensor harness connector terminal 2 and ECM harness connector terminal 30. Clear code and verify code does not reappear.

CONTINUED FROM PREVIOUS PAGE

A

- Ignition off.
- Knock sensor disconnected.
- Disconnect ECM connector.
- Measure resistance between ground and knock sensor harness connector terminal 1.

Resistance should indicate an open circuit, does it?

YES

Verify ECM connector is secure. If OK, replace knock sensor with a known good component. Clear code and verify code does not reappear. If problem persists, replace ECM.

NO

Repair short to ground in wire between knock sensor harness connector terminal 1 and ECM harness connector terminal 10.
Clear code and verify code does not reappear.

DTC	Diagnostic item
P0335	Crankshaft Position Sensor Circuit Malfunction

DESCRIPTION

The Crankshaft Position (CKP) sensor consists of a magnet and coil located next to the flywheel. The sensing wheel teeth are used by the CKP sensor to generate a signal. The voltage signal from CKP sensor allows the Engine ControlModule (ECM) to determine engine RPM and crankshaft position.

FAILURE CONDITIONS

The ECM will set P0335 and the MIL will turn on if the CKP signal voltage remains at 0.0 volts with the starter engaged for 4 seconds or 8 revolutions and the Camshaft Position (CMP) sensor signal indicating engine rotation This check is made every time the engine starts. This code indicates no crankshaft signal is being read by the CKP sensor or the ECM while a CMP sensor signalverifies engine rotation.

CIRCUIT DIAGRAM

TEST PROCEDURE

- Turn ignition switch on.
- Connect scan tool to data link connector.
- Verify DTC P0335 is set.

- Turn ignition switch off.
- Disconnect Crankshaft Position (CKP) sensor.
- Measure resistance between CKP sensor connector terminals 2 and 1.

The resistance should be between 486 and 594 ohms at 68˚F (20˚C), is it?

YES

- Ignition off.
- CKP sensor disconnected.
- ECM connector disconnected.
- Measure resistance between ground and both CKP sensor harness connector terminals 2 and 1.

The resistance between both terminals and ground should indicate an open circuit, does it?

YES

- Ignition off.
- CKP sensor disconnected.
- ECM connector disconnected.
- Ground CKP sensor harness connector terminals 1 and 2. Measure resistance between ground and ECM harness connector terminals 27 and 29. Note resistance value.

Resistance measured should be approximately 1 ohm or less, is it?

YES

Verify ECM connector is secure. If OK, replace CKP sensor with known good component. Clear code and verify code does not reappear.
If problem persists, replace ECM.

NO

Repair open circuit in wire between CKP sensor harness terminal 1 and ECM harness connector terminal 29 or between CKP terminal 2 and ECM terminal 27. Clear code and verify code does not reappear.

NO

Repair short to ground in wire between CKP sensor harness terminal 1 and ECM harness connector terminal 29 or between CKP terminal 2 and ECM terminal 27.
Clear code and verify code does not reappear.

NO

Replace CKP sensor.
Clear code and verify CKP sensor is within normal parameters.

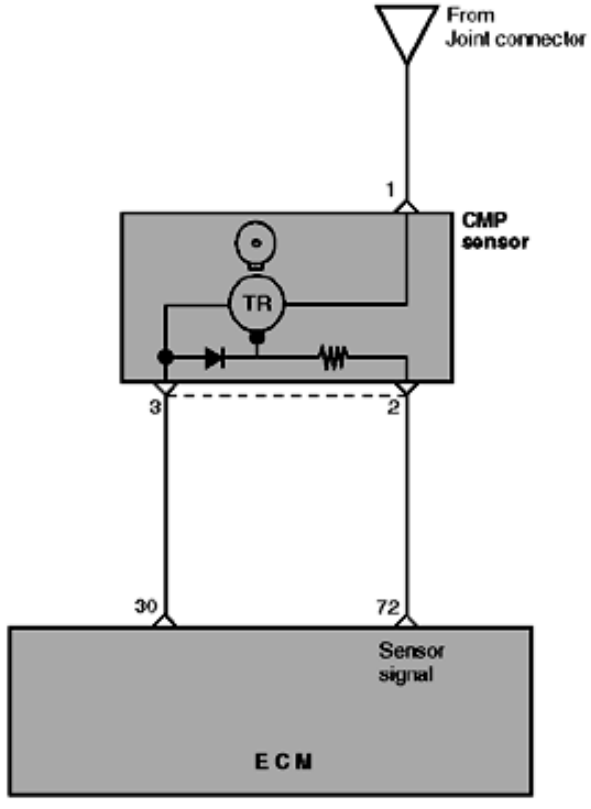
DTC	Ebay User ID: reveleus1	Diagnostic item
P0340		Camshaft Position Sensor Circuit Malfunction(Bank1 or Single Sensor)

DESCRIPTION

The Camshaft Position (CMP) sensor senses the Top Dead Center (TDC) point of the #1 cylinder in the compression stroke. The CMP sensor signal allows the Engine Control Module (ECM) to determine the fuel injector sequencestarting point.

FAILURE CONDITIONS

CIRCUIT DIAGRAM



Note : Refer to the appropriate Electrical Troubleshooting Manual for full wiring details.

TEST PROCEDURE

- Turn ignition switch on.
- Connect scan tool to Data Link Connector.
- Verify DTC P0340 is set.

- Camshaft Position (CMP) sensor connected.
- Ignition on.
- Measure voltage between ground and CMP sensor harness connector terminal 1.

Battery voltage should be measured, is it?

YES

- CMP sensor connected.
- Ignition on and engine running.
- Measure voltage between CMP sensor harness connector terminals 2 and 3 with the engine running between 700 to 3000 RPM.

The voltage should vary between 0 and 5 volts, does it?

YES

- Ignition off.
- Disconnect CMP sensor.
- Ground CMP sensor harness connector terminal 2.
- Measure resistance between ground and ECM harness connector terminal 72.

Resistance measured should be approximately 1 ohm or less, is it?

YES

- Ignition off.
- CMP sensor disconnected.
- Disconnect ECM connector.
- Measure resistance between ground and CMP sensor harness connector terminal 2.

Resistance should indicate an open circuit, does it?

A

CONTINUED ON NEXT PAGE

NO

Repair open circuit in wire between CMP sensor harness connector terminal 1 and Engine compartment junction block.
Clear code and verify CMP sensor signal is within normal parameters.

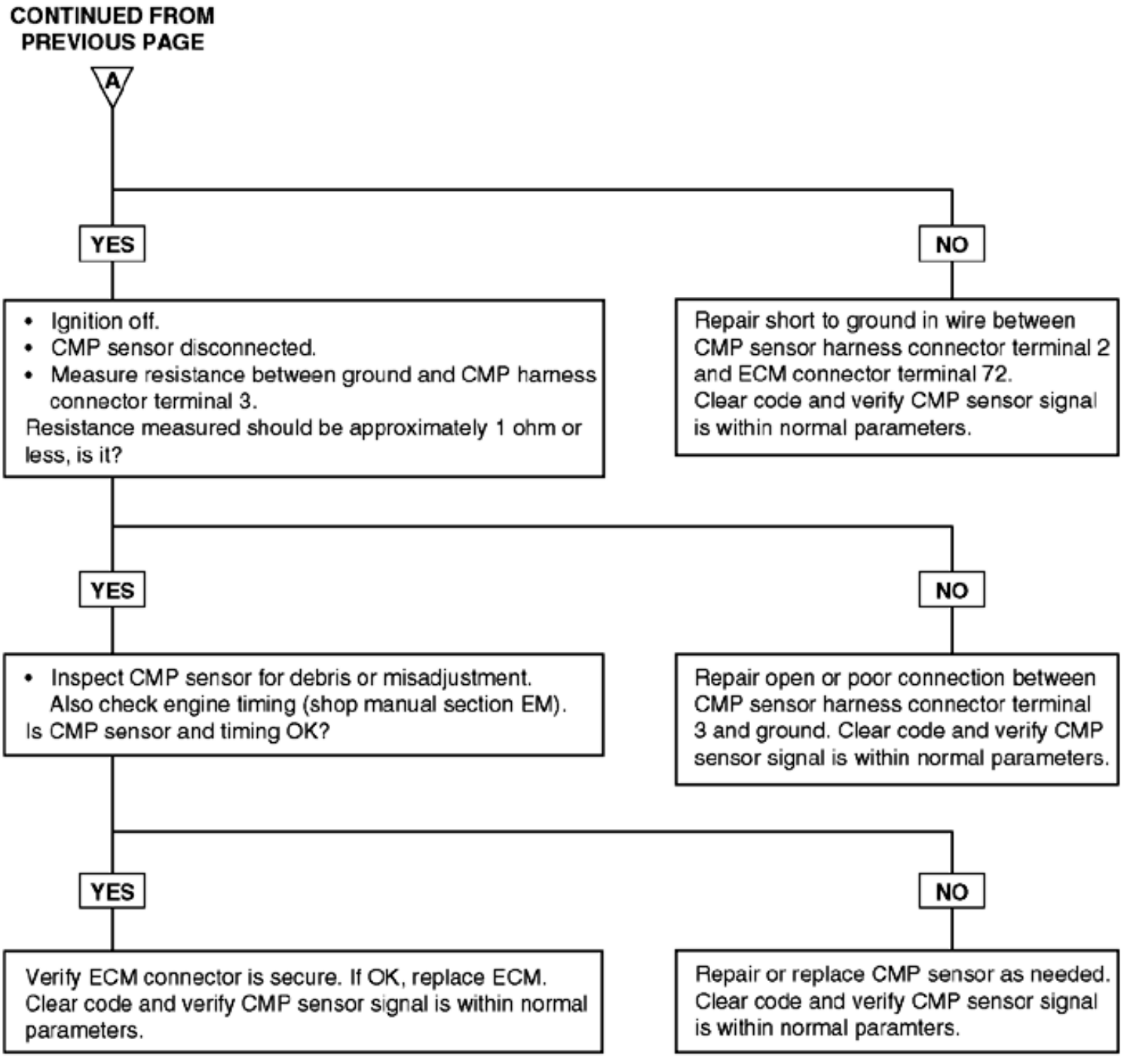
NO

Replace CMP sensor.
Clear code and verify CMP sensor signal is within normal parameters.

NO

Repair open circuit in wire between CMP sensor harness connector terminal 2 and ECM connector terminal 72.
Clear code and verify CMP sensor signal is within normal parameters.

CONTINUED FROM PREVIOUS PAGE



DTC	Ebay User ID: reveleus1 Diagnostic item
P0420	Catalyst System Efficiency below Threshold (Bank 1)

DESCRIPTION

The catalyst's efficiency is demonstrated in its ability to oxidize CO and HC emissions. The Engine Control Module (ECM) compares the output signals of the front and rear oxygen sensors to determine whether the output of the rear sensor is beginning to match the output of the front oxygen sensor. As the catalyst wears, the rear oxygen sensor's signal trace begins to match the front oxygen sensor's signal trace. That is because the catalyst becomes saturated with oxygen and cannot use the oxygen to convert HC and CO into H2O and CO2 with the same efficiency as when it was new. A completely worncatalyst shows a 100% match between front and rear sensor outputs.

FAILURE CONDITIONS

The efficiency of the catalytic converter is measured by comparing the activity of the front and rear oxygen sensors. The ECM will set a code and the Malfunction Indicator Lamp (MIL) will turn on if the front and rear oxygen sensor signals match more than 60% of the time in two of four 170 second monitoring periods during two driving cycles. The measurements are taken when the followingconditions are met:

1. The ECM is operating in closed loop.
2. The engine speed is between 1800 and 3200 PRM.
3. The catalyst temperature is above 702°F (372°C).
4. The canister purge function is greater than 0.9.
5. The vehicle is not shifting gears.
6. The engine load is between 1.4 milliseconds and 4.5 milliseconds.

TEST PROCEDURE

- Turn Ignition Switch on.
- Connect scan tool to Data Link Connector.
- Verify DTC P0420 is set.

Is DTC P0130 or P0136 and/or P0140 also set?

NO

- Ignition on, engine running.
- Inspect for leakage before and after catalyst.
- Inspect for leakage around the front and rear oxygen sensors.

Is exhaust system around the catalyst and oxygen sensors OK?

YES

- Check rear oxygen sensor by following DTC P0136 test procedure.

Is rear oxygen sensor OK?

YES

- Ignition off.
- Replace the catalyst.
- Erase DTC P0420 from memory.
- Road test the vehicle and verify DTC P0420 does not reset.

Does DTC P0420 reset?

YES

Verify ECM connector is secure. If OK, replace ECM. Clear code and verify oxygen sensor signals are within normal paramters.

NO

Problem has been corrected.
No additional testing required.

NO

Repair or replace the rear oxygen sensor. Clear code and verify oxygen sensor signals are within normal parameters.

NO

- Fix leaks.
- Clear code and verify oxygen sensor signals are within normal parameters.

YES

- Check DTC P0130, P0136 and/or P0140 first by following the code test procedures.

DTC	Ebay User ID: reveleus1 Diagnostic item
P0444	Evap. Emission Ctrl. System - Purge Ctrl. Valve Circuit Open
P0445	Evap. Emission Ctrl. System - Purge Ctrl. Valve Circuit Shorted

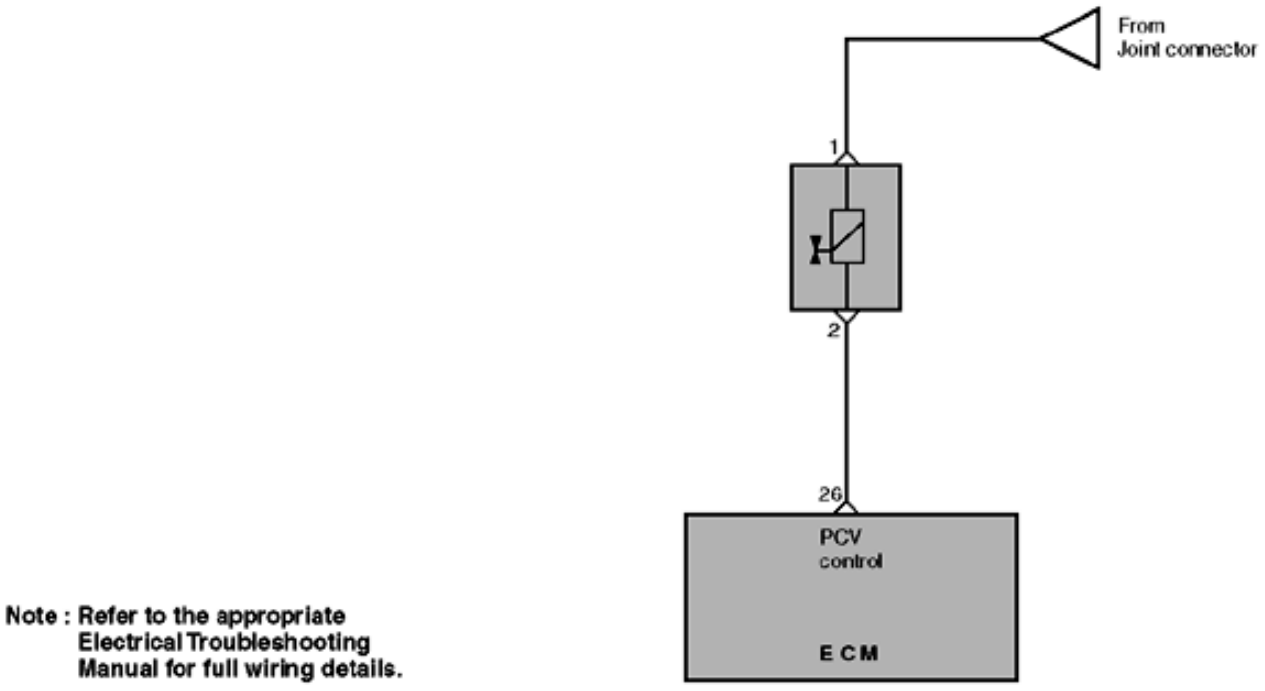
DESCRIPTION

The Purge Control Solenoid Valve is part of the Evaporative Emission Control System. The solenoid controls purge air from the evaporative emissioncanister.

FAILURE CONDITIONS

The ECM will set P0444 and the MIL will turn on if an open circuit is detected in the driver stage of the purge control solenoid circuit duringtwo driving cycles.
The ECM will set P0445 and the MIL will turn on if a short circuit is detected in the driver stage of the purge control solenoid circuit duringtwo driving cycles.

CIRCUIT DIAGRAM



Note : Refer to the appropriate Electrical Troubleshooting Manual for full wiring details.

TEST PROCEDURE

- Turn ignition switch on.
- Connect scan tool to data link connector.
- Verify DTC P0444 or P0445 is set.

- Turn ignition off.
- Disconnect the purge control solenoid valve connector.
- Turn ignition on.
- Measure voltage between ground and the purge control solenoid valve harness connector terminal 1.

Battery voltage should be present, is it?

YES

- Purge control solenoid valve disconnected.
- Disconnect ECM connector.
- Turn ignition off.
- Ground purge control solenoid valve harness connector terminal 2.
- Measure resistance between ground and ECM harness connector terminal 26.

Resistance measured should be approximatley 1 ohm or less, is it?

YES

- Ignition off.
- Purge control solenoid valve disconnected.
- Disconnect ECM connector.
- Measure resistance between ground and purge control solenoid valve harness connector terminal 2.

Resistance should indicate an open circuit, does it?

YES

- Ignition off.
- Purge control solenoid valve disconnected.
- Measure resistance between the purge control solenoid valve connector terminals 1 and 2.

Resistance should be approximately 26 ohms, is it?

YES

Verify ECM connector is secure. If OK, replace purge control solenoid valve with a known good component. Clear code and verify purge control solenoid valve is within normal parameters. If problem persists, replace ECM.

NO

Repair open or short to ground in wire between Engine compartment junction block and purge control solenoid valve connector terminal 1. Clear code and verify code does not reappear.

NO

Repair open in wire between ECM connector terminal 26 and purge control solenoid valve connector terminal 2. Clear code and verify code does not reappear.

NO

Repair short to ground or another circuit in the between ECM connector terminal 26 and purge control solenoid valve connector terminal 2. Clear code and verify code does not reappear.

NO

Replace purge control solenoid valve. Clear code and verify purge control solenoid valve is within normal parameters.

DTC	Diagnostic item
P0501	Vehicle Speed Sensor Range / Performance

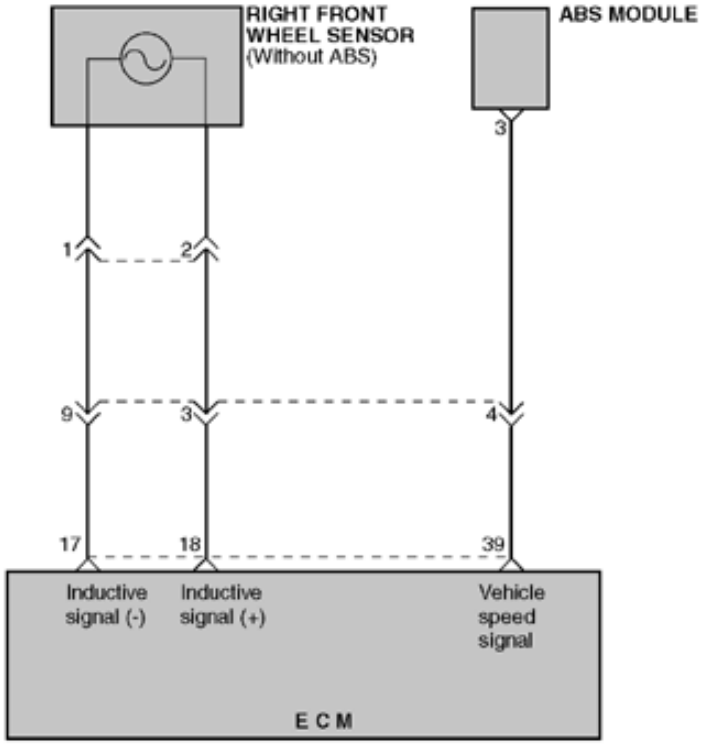
DESCRIPTION

The Vehicle Speed Sensor is a wheel speed sensor that is built near the wheel disc. The sensor converts the transaxle gear revolutions of thedisc into a pulse signal which is sent to the ECM.

FAILURE CONDITIONS

The ECM will set a code and the Malfunction Indicator Lamp (MIL) will turn on if there is no vehicle speed sensor output signal for 20 seconds duringtwo driving cycles when the following conditions are met:

CIRCUIT DIAGRAM



Note : Refer to the appropriate Electrical Troubleshooting Manual for full wiring details.

TEST PROCEDURE

- Turn ignition switch on.
- Connect scan tool to Data Link Connector.
- Verify DTC P0501 is set.

- Drive vehicle.

Does the speedometer operate OK?

YES

- Ignition on.
- Observe instrument cluster indicators.

All instrument cluster indicators should be operational, are they?

YES

- Turn ignition off.
- Disconnect instrument cluster connectors.
  Measure resistance between ground and instrument cluster harness connector terminal 9 and terminal 7.

Resistance should be greater than 50 ohms, is it?

YES

A

CONTINUED ON NEXT PAGE

NO

Repair short to ground or another circuit in the wire between VSS signal terminal and ECM.
Clear code and verify VSS signal is within normal parameters.

NO

Repair open wire between instrument cluster and ground. Clear code and verify VSS signal is within normal parameters.

NO

Check the connector of wheel sensor is securely connected or inspect the air gap between the wheel sensor and wheel disc is within normal parameter.

CONTINUED FROM PREVIOUS PAGE

A

- Turn ignition off.
- Instrument cluster connectors disconnected.
- Ground ECM harness connector terminal 39.
- Disconnect instrument cluster connectors. Measure resistance between ground and instrument cluster harness connector terminal 13 and terminal 5.

Resistance measured should be approximately 1 ohm or less, is it?

YES

- Instrument cluster connectors still disconnected.
- Rotate speedometer cable.
- Disconnect instrument cluster connectors. Measure resistance between instrument cluster connector terminal 9 and both connector terminal 13 and terminal 5.

Resistance measurement should switch from short to open circuit 4 times per revolution of the shaft, does it?

YES

Verify ECM connector is secure. If OK, replace VSS with known good component. Clear code and verify VSS signal is within normal parameters. If problem persists, replace ECM.

NO

Replace VSS. Clear code and verify VSS signal is within normal parameters.

NO

Repair open in wire between instrument cluster VSS signal terminal and ECM.
Clear code and verify VSS signal is within normal parameters.

DTC	Ebay User ID: reveleus1 Diagnostic item
P0506	Idle Control System - RPM lower than expected
P0507	Idle Control System - RPM higher than expected

DESCRIPTION

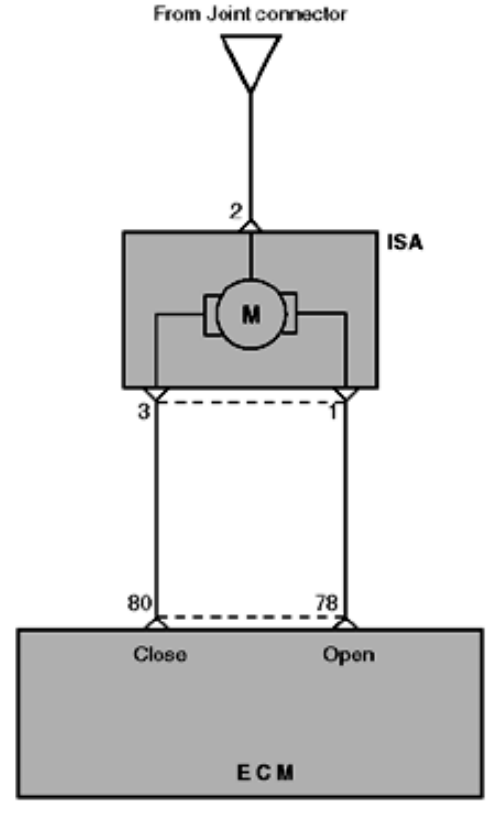
The Idle Speed Control (ISC) actuator has two coils that are driven by separate ECM driver stages. Depending on the pulse duty factor, the equilibrium of the magnetic forces of the two coils will result in different directions for the magnetic forces of the two coils which will result in different positions for the actuator. In parallel to the throttle valve, a bypass hose line isarranged where the ISC actuator is inserted.

FAILURE CONDITIONS

The ECM will set P0506 or P0507 and the MIL will turn on if for 15 seconds the ISC actuator driver circuit values and engine idle speed are not in agreement with values stored in the ECM during two driving cycles when the followingconditions are met:

1. The ISC actuator passes idle air at a rate above 4.1 g/s. [for P0506] or 1.7 g/s [for P0507].
2. Engine speed deviation is below 200 RPM.
3. Vehicle speed is zero.
4. Engine coolant temperature is above 167°F (75°C).

CIRCUIT DIAGRAM



Note : Refer to the appropriate Electrical Troubleshooting Manual for full wiring details.

TEST PROCEDURE

- Turn ignition switch on.
- Connector scan tool to data link connector.
- Verify DTC P0506 or P0507 is set.

Is DTC P0121, P0122 or P0123 also set?

NO

- Disconnect Idle Speed Control (ISC) actuator connector.
- Ignition on.
- Measure voltage between ISC actuator harness connector terminals 2 and ground.

Battery voltage should be present, is it?

YES

- Turn ignition off.
- ISC actuator connector disconnected.
- Ground ISC actuator harness connector terminals 1 and 3.
- Measure resistance between ground and ECM harness connector terminal 78 and 80.

Resistance measured should be approximately 1 ohm or less, is it?

YES

- Ignition off.
- ISC actuator connector disconnected.
- Measure resistance between ground and both ISC actuator harness connector terminals 1 and 3.

Resistance should indicate an open circuit for each measurement, does it?

YES

CONTINUED ON NEXT PAGE

YES

Perform DTC P0121, P0122 and/or P0123 test procedure.

NO

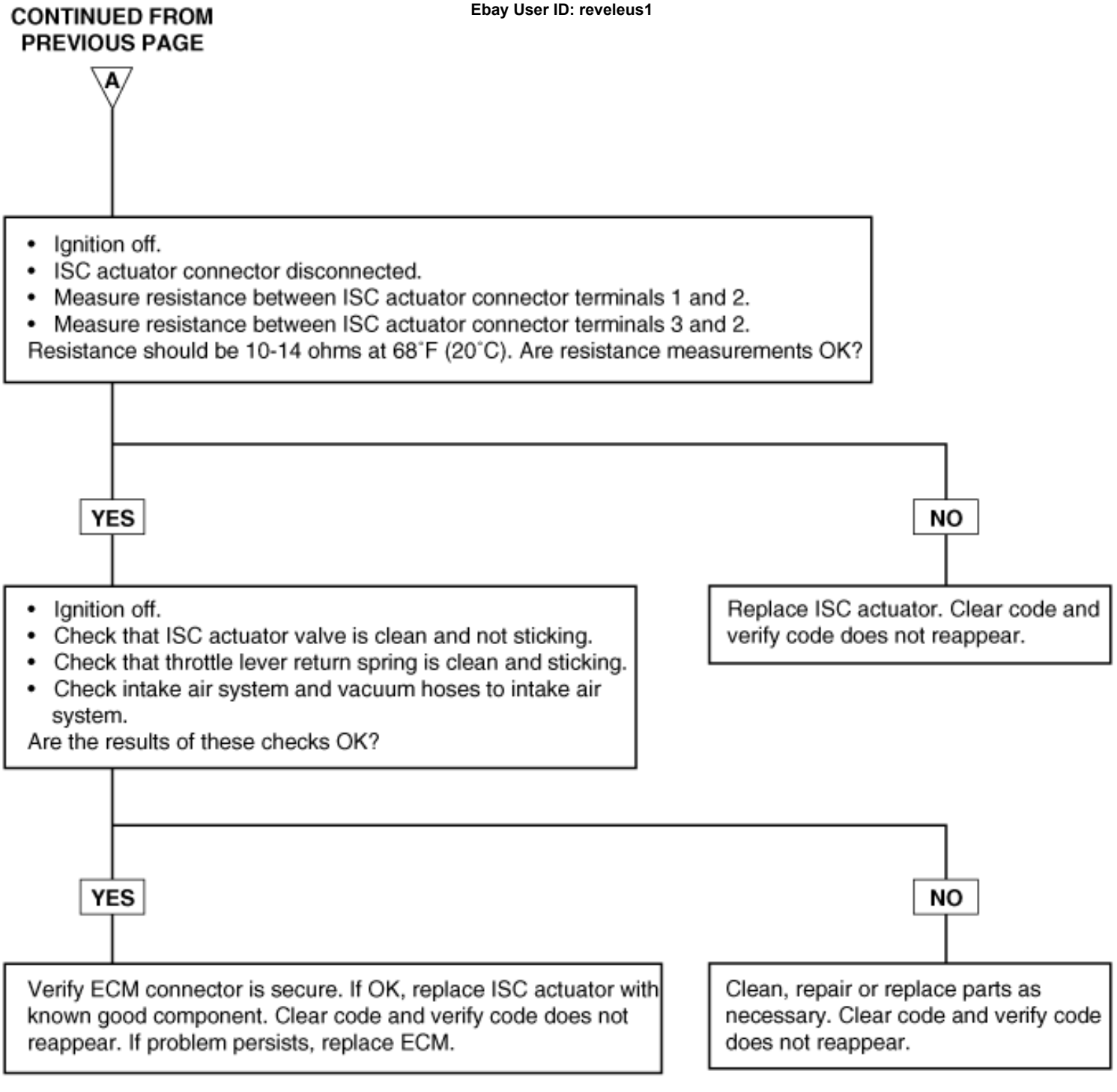
Repair open circuit wire between Engine compartment junction block and ISC actuator terminal 2. Clear code and verify code does not reappear.

NO

Repair open in wire between ECM harness connector terminal 78 and ISC actuator connector terminal 1 or between ECM terminal 80 and ISC terminal 3. Clear code and verify code does not reappear.

NO

Repair short to ground or other circuit in wire between ECM harness connector terminal 78 and ISC actuator connector terminal 1 or between ECM terminal 80 and ISC terminal 3. Clear code and verify code does not reappear.



DTC	Diagnostic item
P1505	Idle Charge Actuator Signal Low of Coil #1
P1506	Idle Charge Actuator Signal High of Coil #1
P1507	Idle Charge Actuator Signal Low of Coil #2
P1508	Idle Charge Actuator Signal High of Coil #2

DESCRIPTION

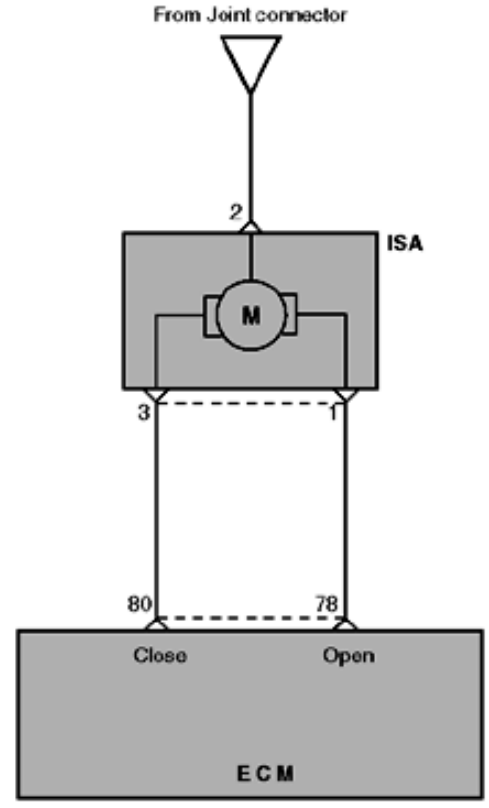
The Idle Speed Control (ISC) actuator has two coils that are driven by separate ECM driver stages. Depending on the pulse duty factor, the equilibrium of the magnetic forces of the two coils will result in different directions for the magnetic

forces of the two coils which will result in different positions for the actuator. In parallel to the throttle valve, a bypass hose line isarranged where the ISC actuator is inserted.

FAILURE CONDITIONS

The ECM will set a code and the MIL will turn on if ISC actuator's opening coil driver stage [for P1505, P1506] or closing coil driver stage [for P1507,P1508] is shorted to battery voltage during two driving cycles.

CIRCUIT DIAGRAM



Note : Refer to the appropriate Electrical Troubleshooting Manual for full wiring details.

TEST PROCEDURE

- Turn ignition switch on.
- Connector scan tool to data link connector.
- Verify DTC P1505, P1506, P1507 or P1508 is set.

- Disconnect Idle Speed Control (ISC) actuator connector.
- Ignition on.
- Measure voltage between ISC actuator harness connector terminals 2 and ground.

Battery voltage should be present, is it?

YES

- Ignition on.
- ISC actuator connector disconnected.
- Measure voltage between ground and ISC actuator harness connector terminal 1.
- Measure voltage between ground and ISC actuator harness connector terminal 3.

Both voltage measurements should be less than 0.5 volts, are they?

YES

- Ignition off.
- ISC actuator connector disconnected.
- Measure resistance between ISC actuator connector terminals 1 and 2.
- Measure resistance between ISC actuator connector terminals 2 and 3.

Resistance should be 10-14 ohms at 68°F (20°C).
Are resistance measurements OK?

YES

Verify ECM connector is secure.
If OK, replace ISC actuator with known good component.
Clear code and verify code does not reappear.
If problem persists, replace ECM.

NO

Replace ISC actuator. Clear code and verify code does not reappear.

NO

Repair open circuit in wire between ECM harness connector terminal 80 and ISC actuator connector terminal 3 or between ECM terminal 78 and ISC terminal 1.
Clear code and verify code does not reappear.

NO

Repair open wire between Engine compartment junction block and ISC actuator harness connector terminal 2.
Clear code and verify code does not reappear.

FUEL PUMP OPERATION CHECK

1. Turn the ignition switch OFF.
2. Using the Hi-scan(Pro)'s actuator test mode for fuel pump, check that pump operation.

NOTE

The fuel pump is an in-tank type and its operation is hard to hear without removing the fuel tank cap.

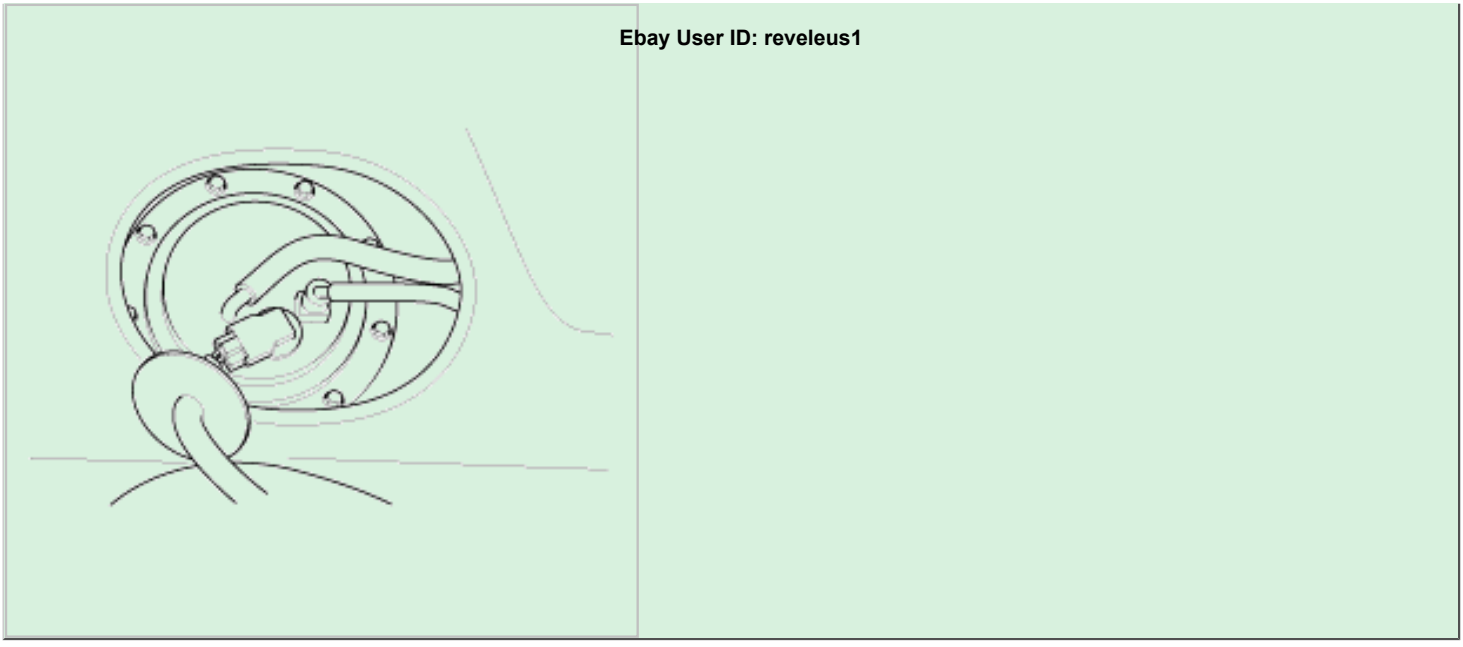
3. Pinch the hose to check that fuel pressure is felt.

FUEL PRESSURE TEST

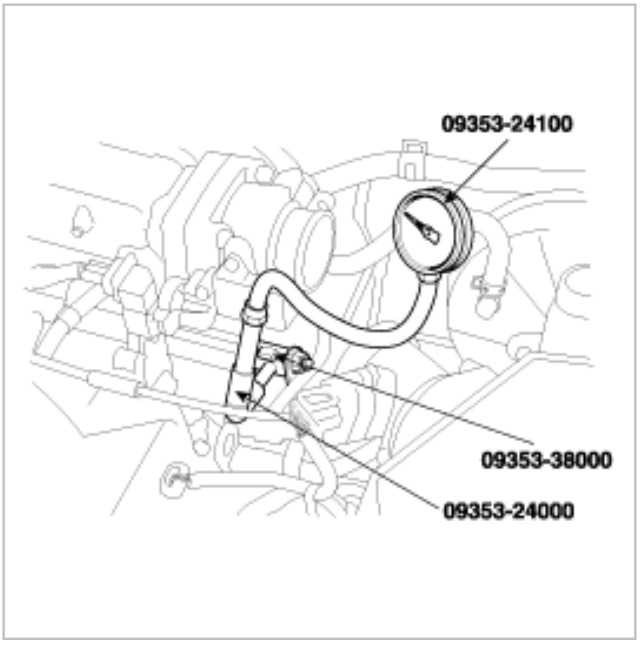
1. Press the two tabs under the rear seat and raise the seat, then detach the inspection panel of the fuel pump.
2. To reduce the internal pressure of the fuel lines and hoses, first start the engine with the fuel pump disconnected and wait until it stops by itself.

NOTE

Be sure to reduce the fuel pressure before disconnecting the fuel main pipe and hose, otherwise fuel will spill out.



3. Disconnect the battery negative (-) terminal and then connect the fuel pump harness connector.
4. Using the fuel pressure gauge, adaptor and connector, install the fuel-pressure gauge to the fuel delivery pipe. Tighten the bolt to the specified torque.



Tightening Torque

Fuel pressure gauge to fuel delivery pipe:
25 - 35Nm (250 - 350 kg.cm, 18 - 26 lb.ft)

---

5. Connect the battery's negative (-) terminal.
6. Apply battery voltage to the terminal for the pump drive and activate the fuel pump. Then, with fuel pressure applied, check that there is no fuel leak from the pressure gauge or connections.
7. Start the engine and let it idle.

8. Measure the fuel pressure.

Standard value : 350 kPa (3.5 kg/cm², 49.8 psi)

9. If the result of the measurements made in steps (7) and (8) are not within the standard value, use the table below to determine the probable cause, and perform the necessary repairs.

Condition	Probable cause	Remedy
Fuel pressure too low	1) Clogged fuel filter. 2) Fuel leak on the fuel-pressure regulator that is assembled on fuel pump, caused by poor seating of the fuel-pressure regulator.	1) Replace fuel filter. 2) Repair the leak or replace the fuel pump.
Fuel pressure too high	1) Sticking fuel-pressure regulator.	1) Repair the leak or replace the fuel pump.

10. Stop the engine and check for a change in the fuel pressure gauge reading, which should hold for approximately 5 minutes. If the gauge indication drops, observe the rate of drop. Determine and correct the causes according to the following table.

Condition	Probable cause	Remedy
Fuel pressure drops slowly after engine is stopped	1) Injector leak	1) Replace injector
Fuel pressure drops immediately after engine is stopped	1) The check valve within the fuel pump is open	1) Replace fuel pump

11. Release the pressure in the fuel line.
12. Disconnect the hose and the gauge.

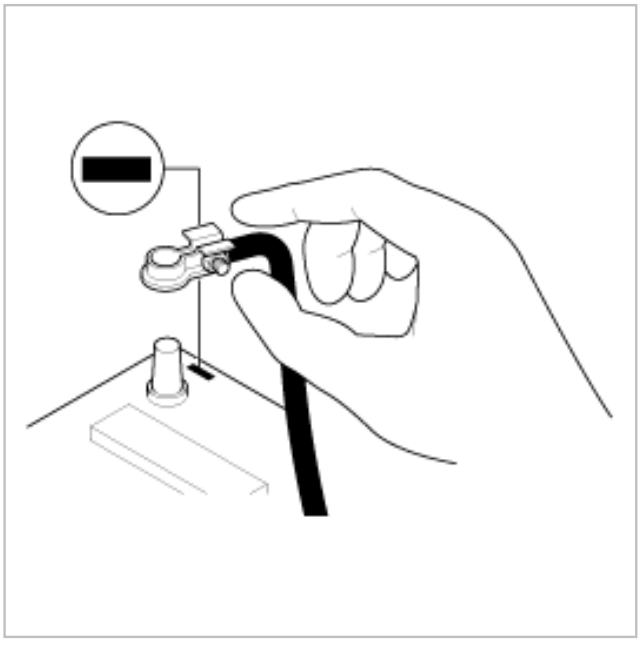
CAUTION

Cover the hose connection with a shop towel to prevent splashing of fuel caused by residual fuel pressure in the fuel line.

13. Replace the O-ring at the end of the hose.
14. Connect the fuel hose to the delivery pipe and tighten to the specified torque.
15. Check for fuel leaks.

FUEL FILTER REPLACEMENT

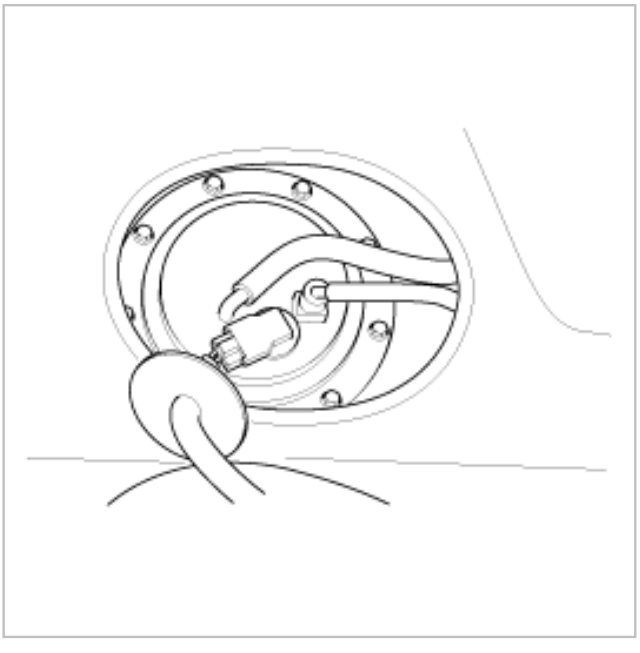
1. Reduce the internal pressure of the fuel lines and hoses by completing the following operations.
   A. After removing the rear seat cushion, disconnect the fuel pump harness.
   B. Start the engine. Allow it to stop by itself, then turn the ignition switch OFF.
   C. Disconnect the battery negative (-) terminal.
   D. Connect the fuel pump harness connector.



2. Remove the eye bolts while holding the fuel filter nuts securely.

> CAUTION
>
> Cover the fuel filter with a shop towel to avoid residual gasoline from splashing.

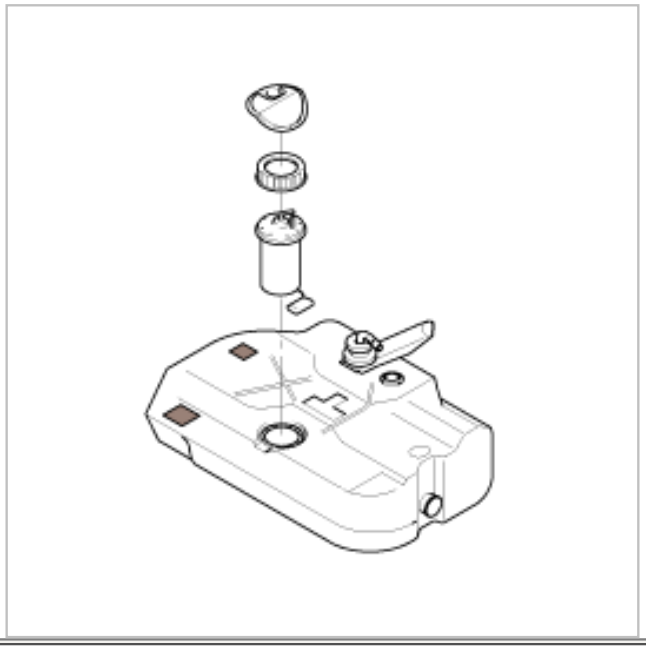
3. Remove the fuel filter mounting bolts, then remove the fuel filter from the fuel filter clamp.
4. After replacing the fuel filter, check for fuel leaks.



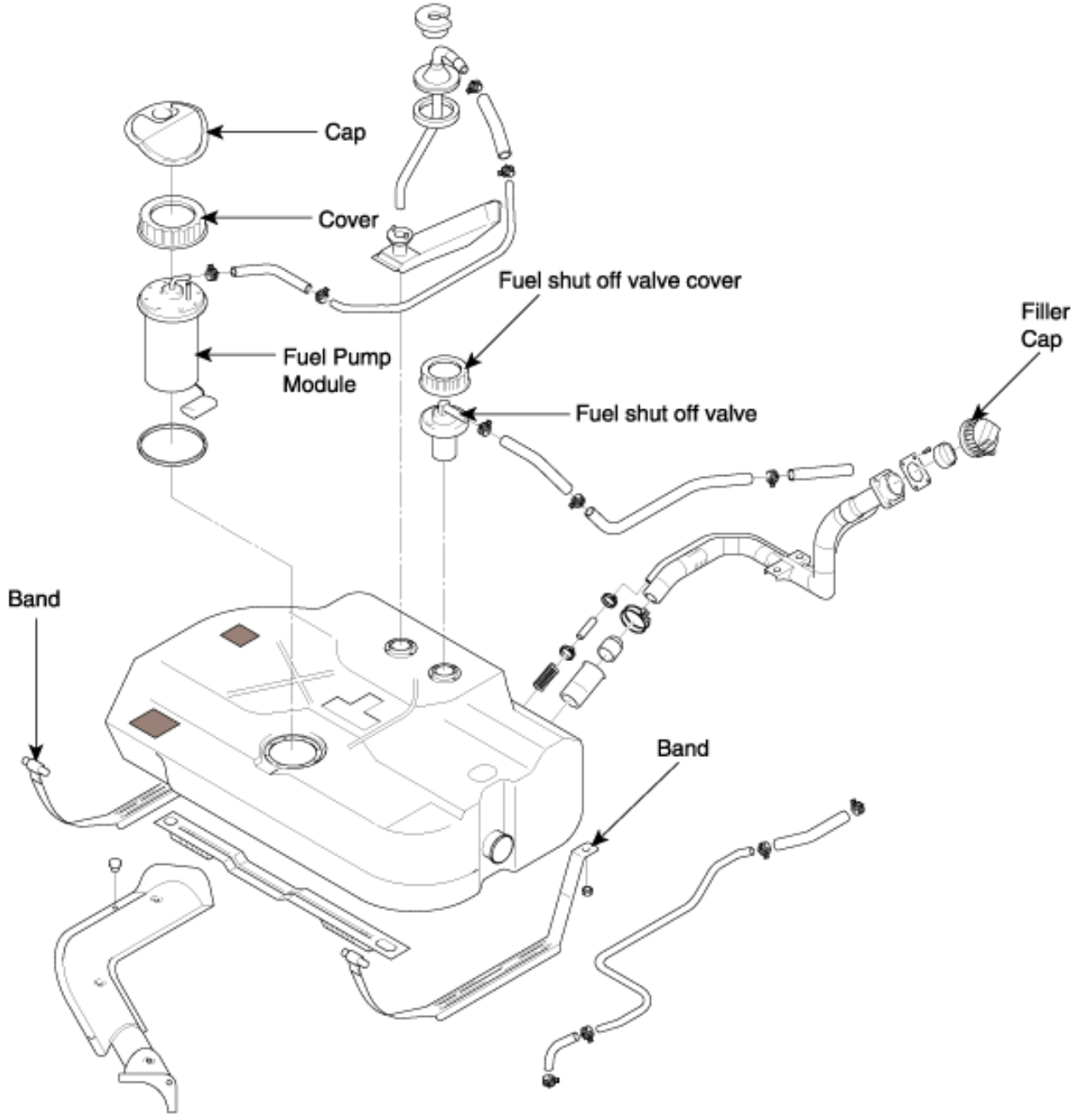
FUEL SENDER REPLACEMENT

1. Remove the fuel tank cap to lower the fuel tank's internal pressure.

2. Remove the fuel sender mounting screws, then remove the fuel sender from the fuel tank.



COMPONENTS

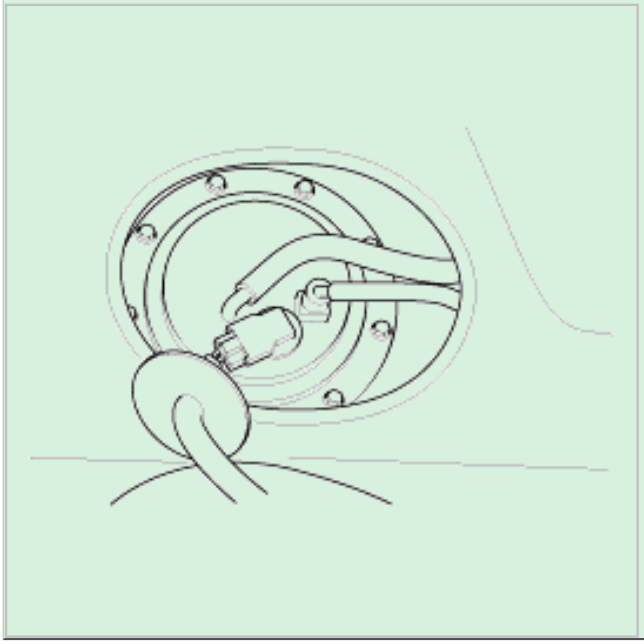

Cap
Cover
Fuel shut off valve cover
Filler Cap
Fuel Pump Module
Fuel shut off valve
Band
Band

REMOVAL

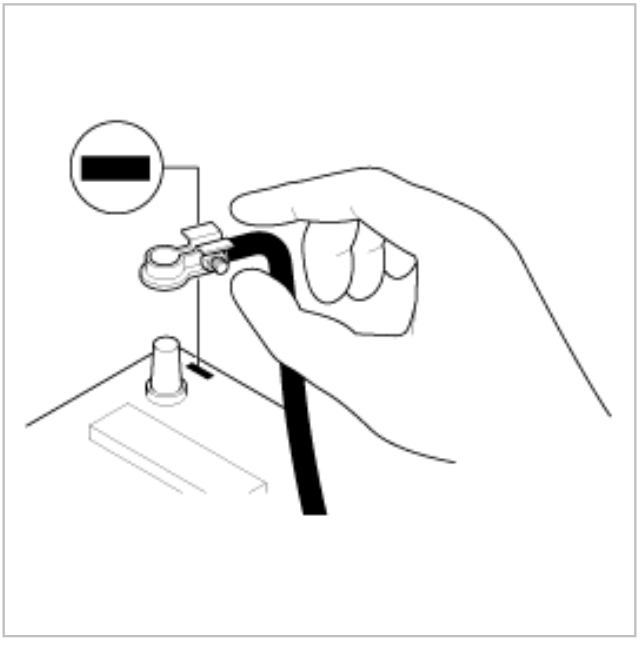
1. Press the two tabs under the rear seat and raise the seat, then remove the inspection panel of the fuel pump.
2. To reduce the internal pressure of the fuel lines and hoses, first start the engine with the fuel pump disconnected and wait until it stops by itself.

NOTE

Be sure to reduce the fuel pressure before disconnecting the fuel main pipe and hose. Otherwise fuel will spill out.



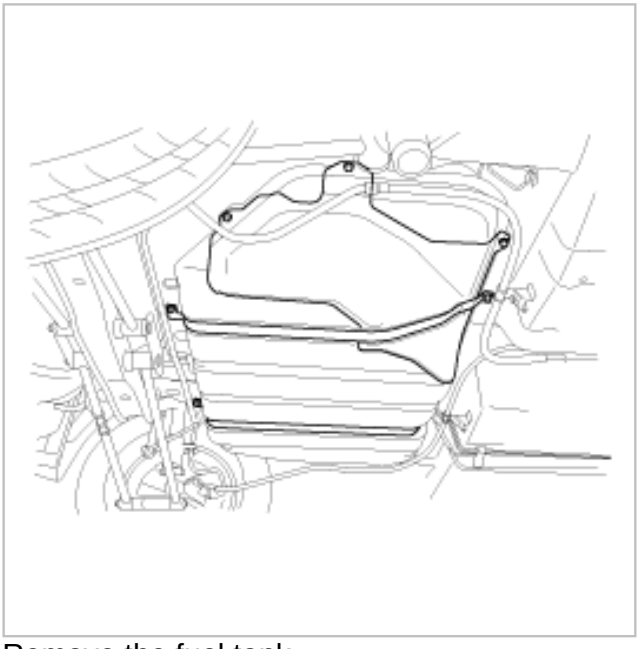
3. Disconnect the battery cable from the negative (-) terminal of the battery.



4. Disconnect the high pressure hose from the fuel filter output side, and disconnect the tab for static electricity.

> **CAUTION**
>
> Cover the hose connection with a shop towel to prevent splashing of fuel that could be caused by residual pressure in the fuel line.

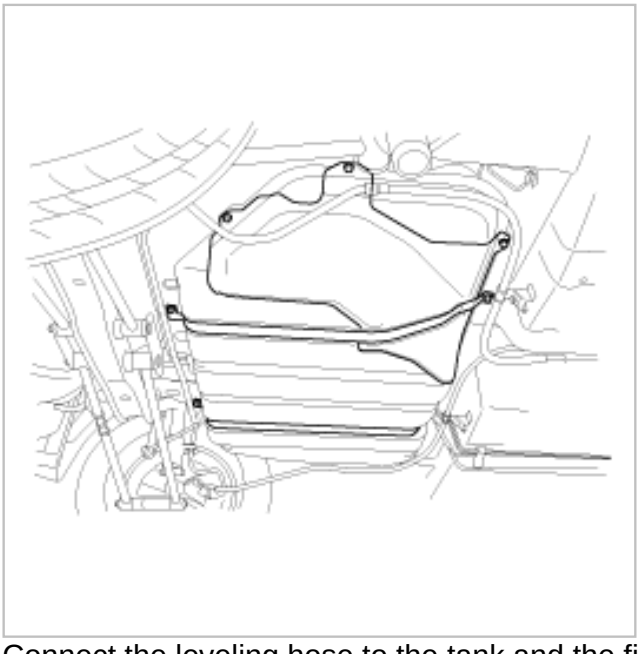
5. Lift up the vehicle.
6. Detach the fuel filler hose and leveling hose.
7. Support the fuel tank with a jack.
8. Remove the fuel tank bands.



9. Remove the fuel tank.

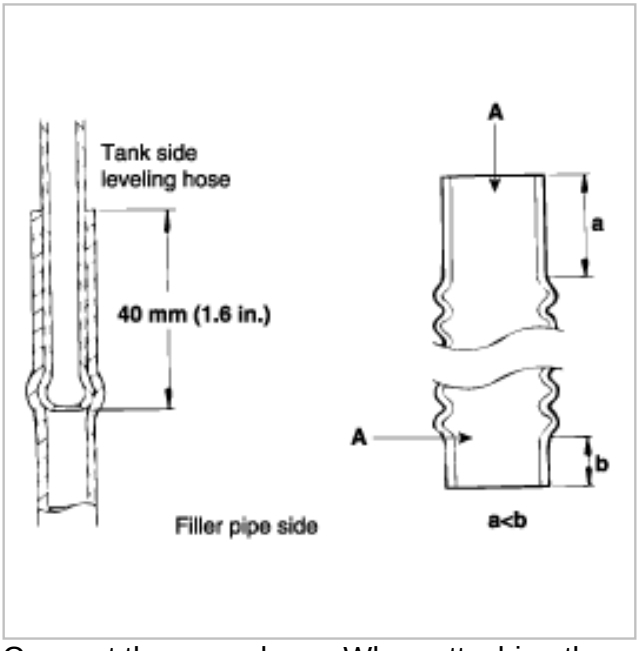
INSTALLATION

1. Confirm that the pad is fully bonded to the fuel tank, and install the fuel tank by tightening the self-locking nuts.

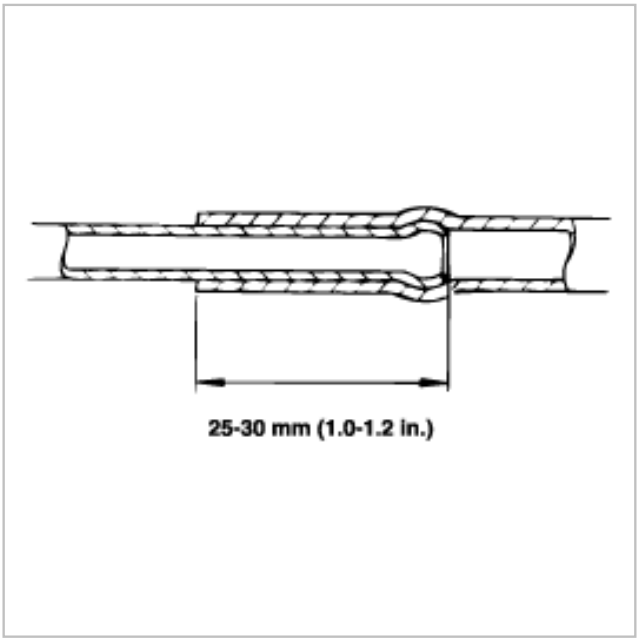


2. Connect the leveling hose to the tank and the filler neck. Insert approximately 40mm (1.6 in.).

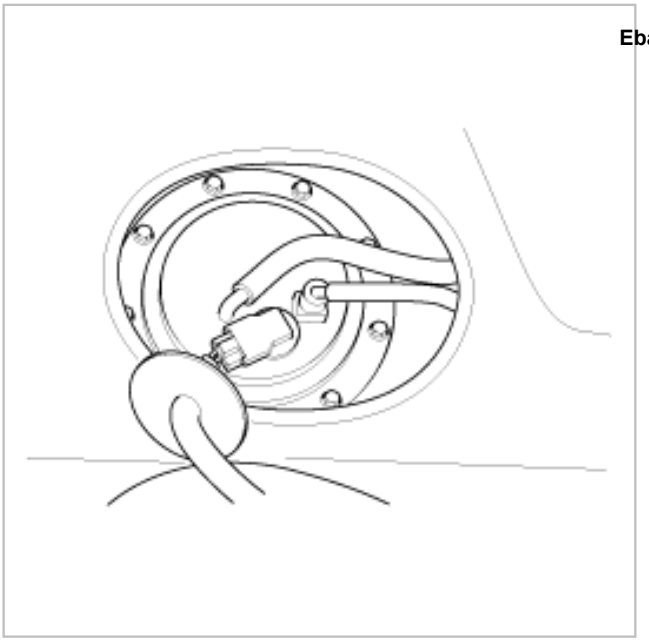
3. When connecting the filler hose(A), the end with the shorter straight pipe should be connected to the tank side.



4. Connect the vapor hose. When attaching the vapor hose to the line, be sure that the hose is attached as shown in the illustration.

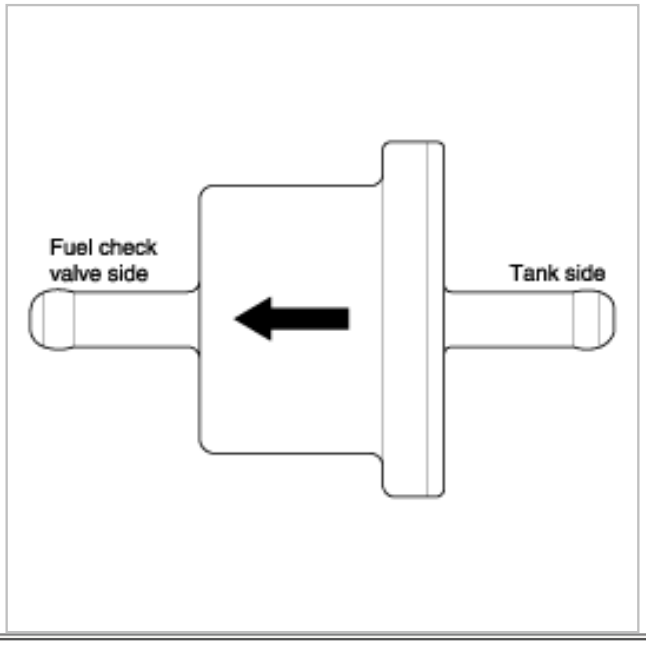


5. Connect the high pressure hose to the fuel pump. Make sure that the fuel hose does not twist.
6. Connect the electrical fuel pump connector.



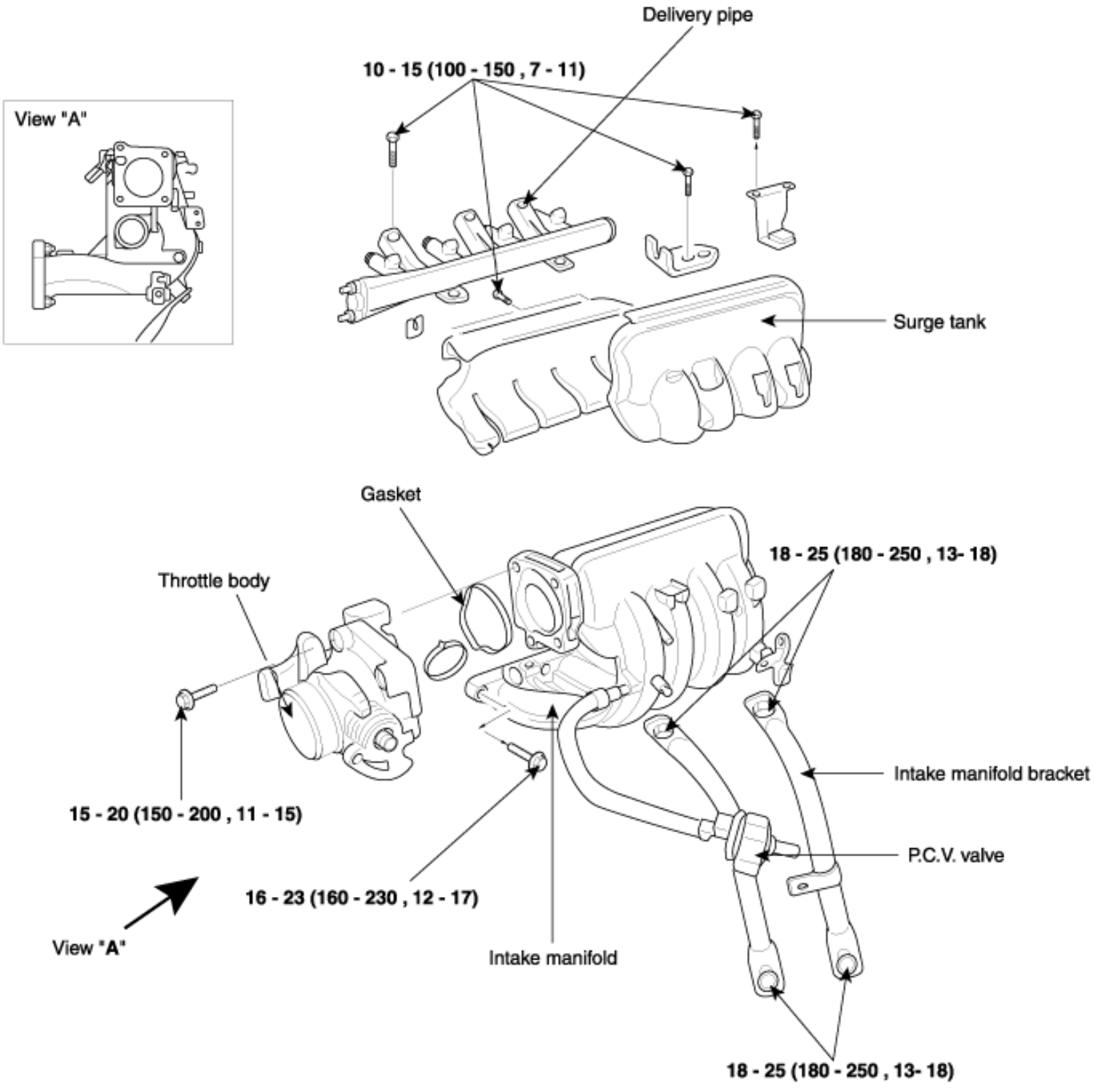
INSPECTION

1. Check the hoses and the pipes for cracks or damage.
2. Check the fuel tank cap for proper operation.
3. Check the fuel tank for deformation, corrosion or cracking.
4. Check the inside of the fuel tank for dirt or foreign material.
5. Check the in-tank fuel filter for damage or restriction.
6. Test the two-way valve for proper operation.
7. To check the two-way valve, lightly blow into the inlet and outlet. If air passes through after slight resistance, then the valve is good.



COMPONENTS

[1.8/2.0 I4]



TORQUE : Nm (kg·cm, lb·ft)

REMOVAL

1. Release residual pressure from the fuel line to prevent fuel from spilling.

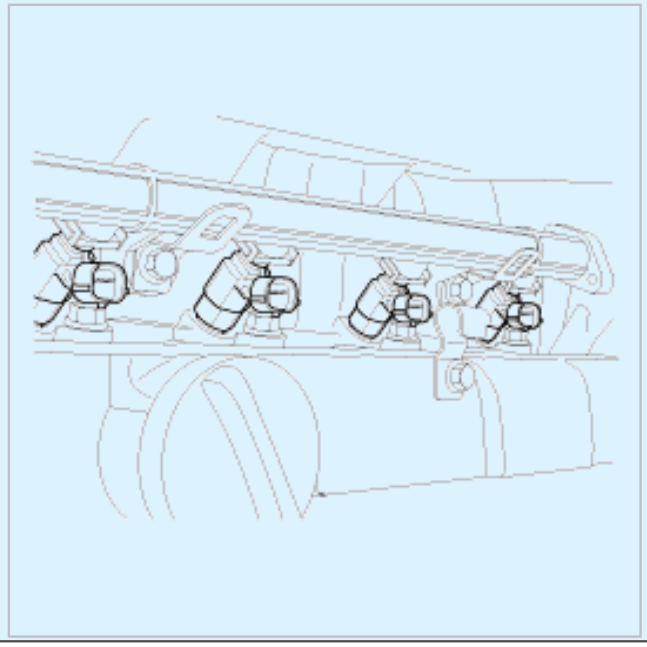
CAUTION

Cover the hose connection with rags to prevent splashing of fuel that may be caused by residual pressure in the fuel line.

2. Remove the delivery pipe with the fuel injectors.

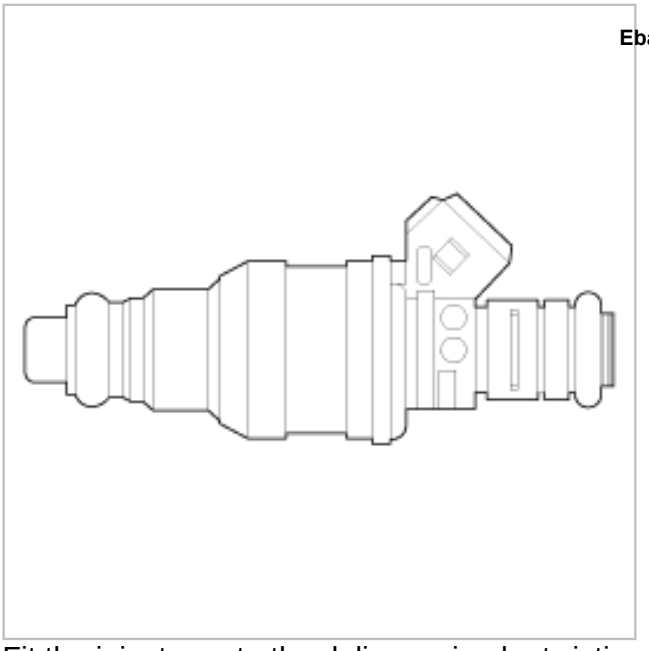
CAUTION

1. Be careful not to drop any injectors when removing the delivery pipe.
2. Be aware that fuel may flow out when removing the injector.



INSTALLATION

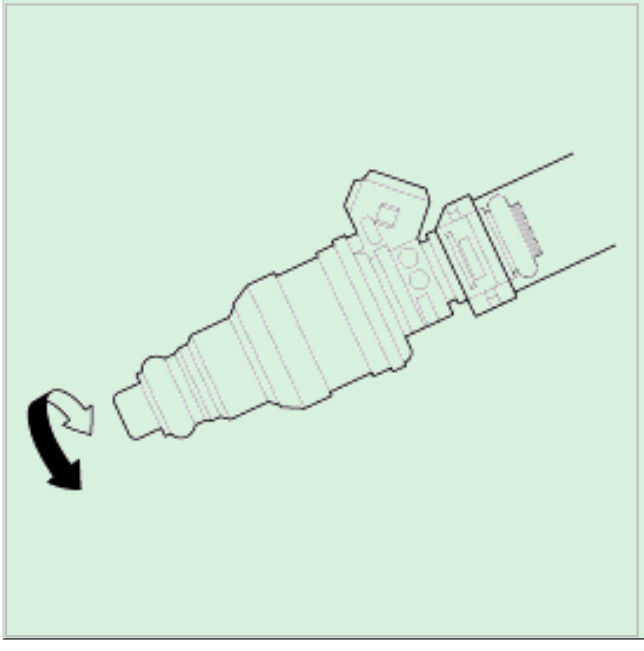
1. Install a new grommet and O-ring on the injector.
2. Apply a coating of oil or gasoline to the O-ring of the injector.



3. Fit the injector onto the delivery pipe by twisting it to the left and right.
4. Be sure the injector turns smoothly.

NOTE

If it does not turn smoothly, the O-ring may be jammed: Remove the injector and re-insert it into the delivery pipe and recheck.
If the O-ring is damaged, replace it.

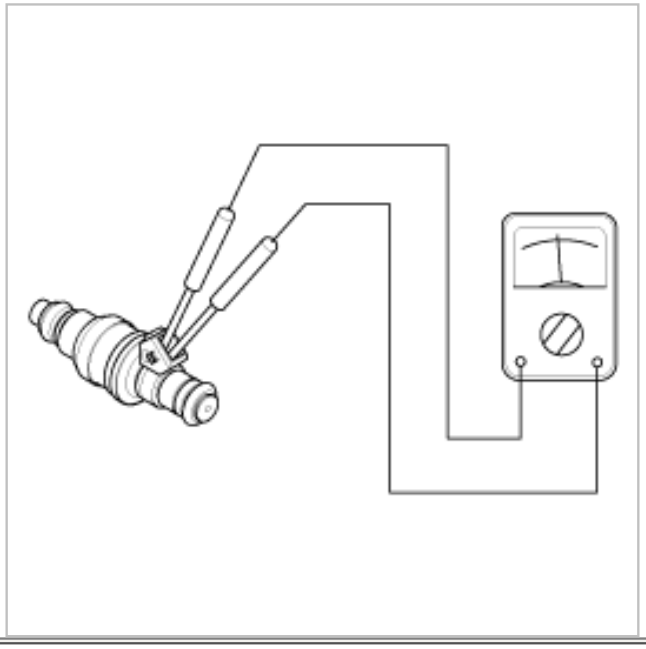


INSPECTION

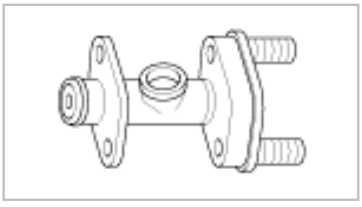
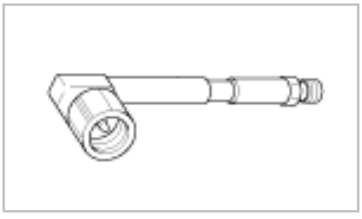
1. Measure the resistance of the injectors between the terminals using an ohmmeter.

Resistance : 15.9 ± 0.35Ω [at 20°C (68°F)]

2. If the resistance is not within specifications, replace the injector.



SPECIAL TOOLS

Tool (Number and name)	Illustration	Application
09353-24100 Fuel pressure gauge		Connection of fuel pressure gauge to delivery pipe for measurement of fuel pressure.
09353-38000 Fuel pressure gauge adaptor		
09353-24000 Fuel pressure gauge connector		

SPECIFICATIONS

Items	Specifications
Engine Management System (ECM)	Siemens
Fuel tank Capacity Return system Fuel filter F/Pressure regulator Regulator pressure Fuel pump	55 lit. (14.5 U.S. gal., 12.1 lmp.gal.) Returnless High pressure type (built in F/Pump Assembly) Built in F/Pump Assembly 350 kpa (3.5 kg/cm², 49.8 psi) Electrical, in-tank type
INPUT SENSORS Mass Air Flow (MAF) sensor Output voltage Throttle body Throttle Position Sensor (TPS) Resistance Output voltage at curb idle Knock sensor Intake Air Temperature sensor (IAT Sensor) Resistance Engine Coolant Temperature sensor (ECT Sensor) Resistance Heated Oxygen Sensor (HO2S) Output voltage (V) Heated Oxygen Sensor (HO2S) for SULEV Vehicle Speed Sensor Camshaft Position Sensor (CMP Sensor) Output voltage (V) Crankshaft Position Sensor (CKP Sensor) Output voltage (V) Differential Pressure Sensor (DPS)	Hot film type 0 ~ 5V Variable resister type 0.7 ~ 3.0 kΩ 0.1 ~ 0.875V Piezoelectric type Thermistor type (built in MAF sensor) 2.0 ~ 3.0 kΩ at 20°C (68°F) Thermistor type 2.27 ~ 2.73kΩ at 20°C (68°F) 0.30 ~ 0.32kΩ at 80°C (176°F) Zirconia sensor (Heated) 0 ~ 1V Linear Oxygen Sensor Wheel speed sensor (Inductive) Hall effect sensor 0 ~ 5V Hall effect sensor 0 ~ 5V Piezo-Resistivity type

OUTPUT ACTUATORS	Electromagnetic type
Injector type	4
Number	14.5 ± 0.7Ω
Coil resistance (Ω)	Duty type
EVAP Canister Purge solenoid valve	26Ω
Resistance	Double coil type
Idle Speed Control actuator (ISC Actuator)	100Hz
Control frequency (Hz)	ON/OFF type
Canister Close Valve (CCV)	

SERVICE STANDARDS

Items	2.0L
Basic idle rpm	700 ± 100 (N,A/C OFF)
Ignition timing (°) - BTDC	8° ± 5°

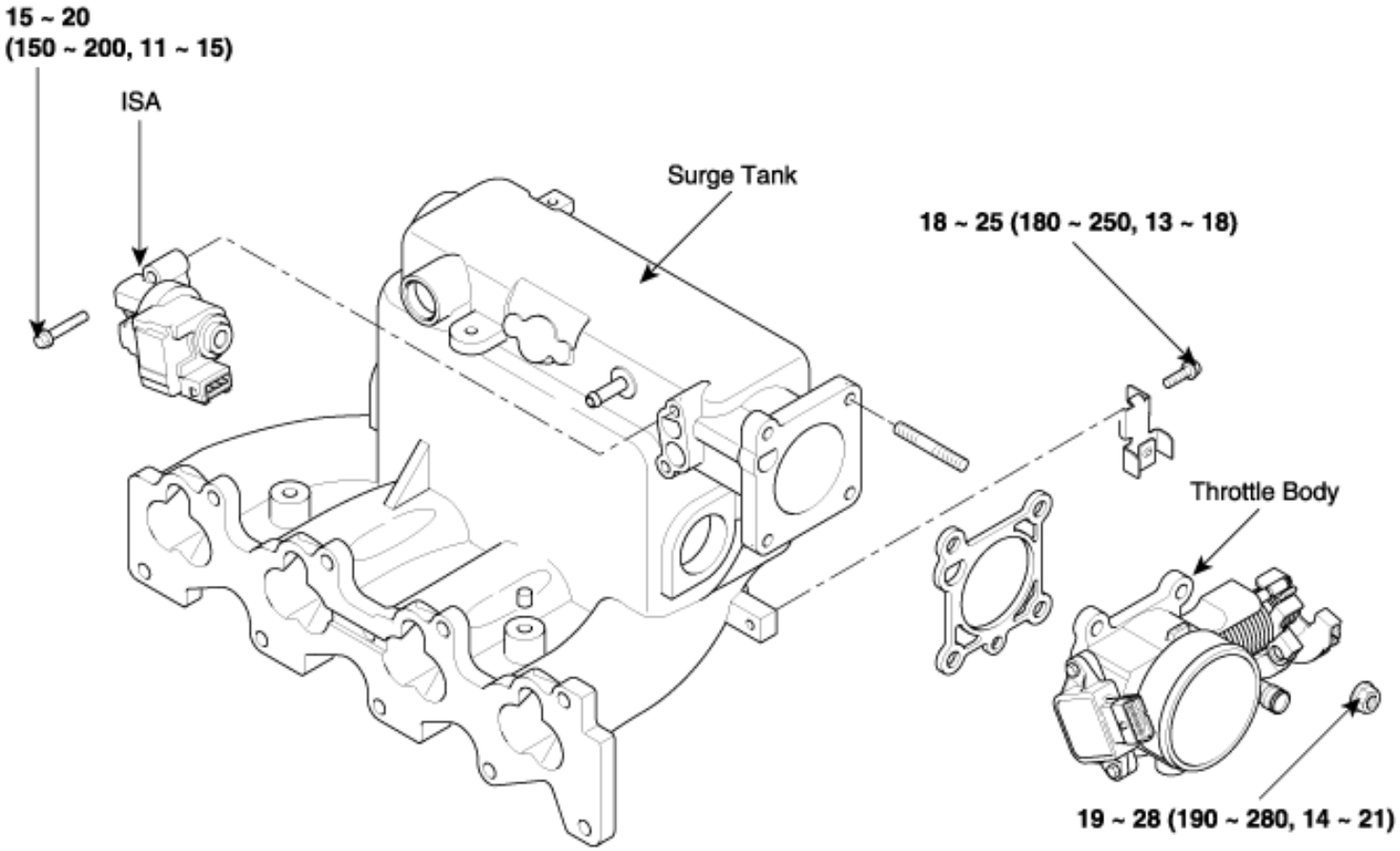
SEALANTS

Engine coolant temperature sensor assembly	LOCTITE 962T or equivalent

TIGHTENING TORQUES

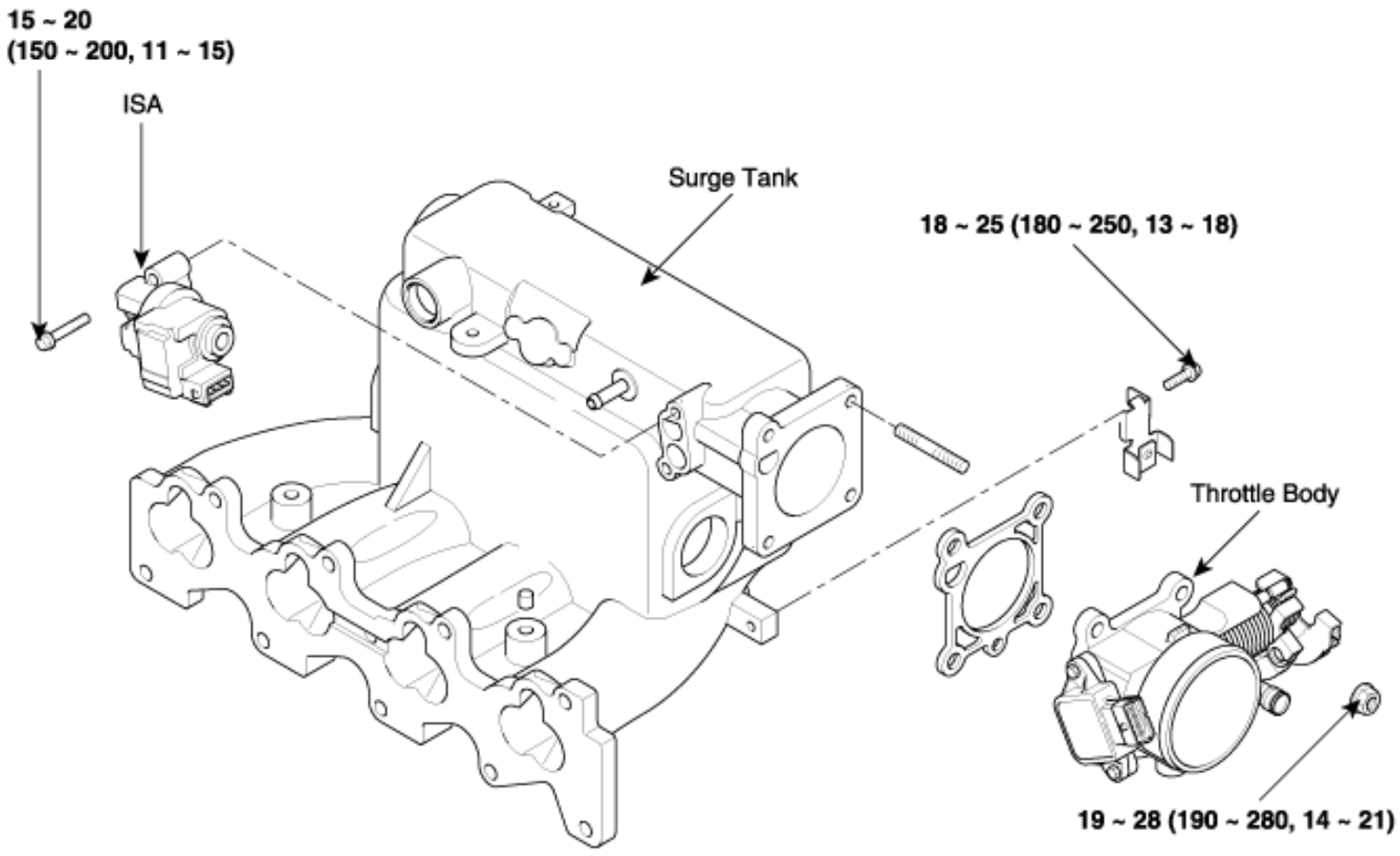
Items	Nm	Kg·cm	lb·ft
Delivery pipe installation	19 ~ 28	190 ~ 280	14 ~ 20.7
bolts	50 ~ 60	500 ~ 600	37 ~ 44
Heated oxygen sensor	4 ~ 6	40 ~ 60	3 ~ 4.4
Crankshaft position	17 ~ 27	170 ~ 270	12.5 ~ 20
sensor installation bolts	15 ~ 20	150 ~ 200	11 ~ 15
Knock sensor installation	1.5 ~ 2.5	15 ~ 25	1.1 ~ 1.8
bolt	19 ~ 28	180 ~ 280	14 ~ 20.7
Engine coolant temperature sensor			
Throttle position sensor installation bolts			
Throttle body to surge tank bolts			

COMPONENTS



TORQUE : Nm (kg·cm, lb·ft)

COMPONENTS



TORQUE : Nm (kg·cm, lb·ft)

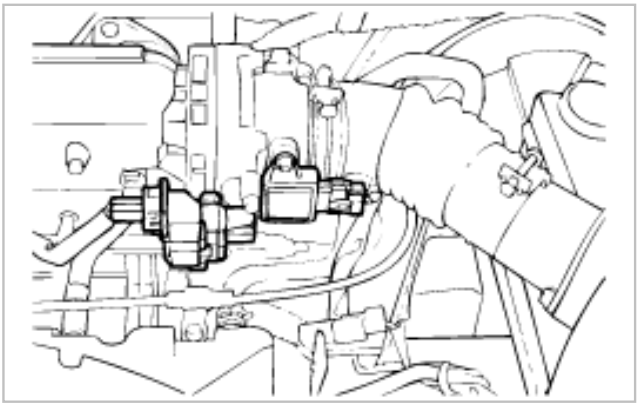
REMOVAL

CAUTION

The throttle valve must not be removed.

NOTE

Except when necessary for replacement, the throttle position sensor must not be removed.



REMOVAL

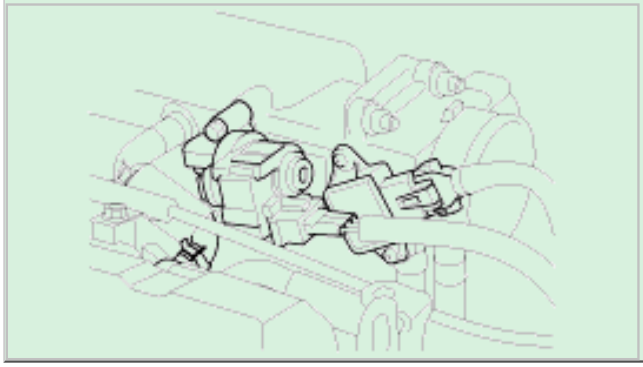
CAUTION

The throttle valve must not be removed.

Remove the throttle position sensor.

NOTE

Except when necessary for replacement, the throttle position sensor must not be removed.



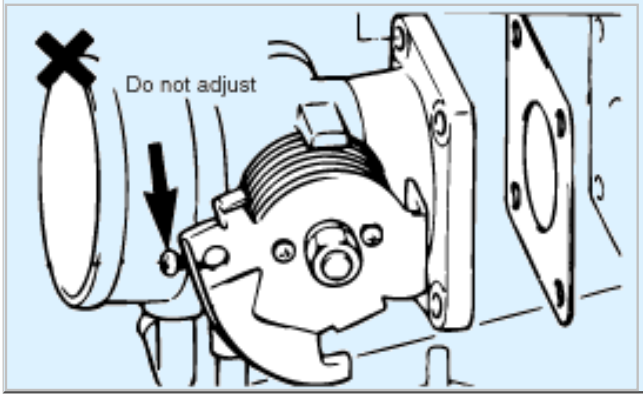
INSPECTION

1. Check the throttle body for cracks.
2. Check for restriction in the vacuum port or passage.

3. Check for interference when moving the accelerator cable.

CAUTION

- Throttle valve set screw was adjusted in the production line with the air volume (0.516 ± 5% g/sec) during idling. So please DO NOT ADJUSTIT voluntarily.
- When the idle rpm is out of specification, check the relevant sensors and their input or output value first.
- The throttle body does not need to be cleaned because carbon in throttle body does not affect the system's operation at all.



INSPECTION

1. Check the throttle body for cracks.
2. Check for restriction in the vacuum port or passage.
3. Check for interference when moving the accelerator cable.

CAUTION

- Throttle valve set screw is set by the factory. Please do not adjust this screw.
- When the idle rpm is out of specification, check the relevant sensors and their input or output value first.

Purchased
from Ebay seller
Reveleus1

Thank-you for purchasing from me, it is much appreciated.
To contact me please email
suzlever@gmail.com

BASIC TROUBLESHOOTING

1. Power supply
   - Battery
   - Fusible link
   - Fuse
2. Body ground
3. Fuel supply
   - Fuel line
   - Fuel filter
   - Fuel pump
4. Ignition system
   - Spark plugs
   - High-tension cables
   - Ignition coils
5. Emission control system
   - PCV system
   - Vacuum leak
6. Others
   - Ignition timing
   - Idle speed

TROUBLESHOOTING GUIDE CHART

Main Symptoms / Sub-Symptoms / Check points	STARTING							Poor Idling					Poor Driving	
	Unable to start			Difficult to start										
	Engine does not turn over	Starter runs but engine does not turn over	Incomplete combustion	Engine turns over	Always	When the engine is cold	When the engine is hot	Incorrect fast idle	High idle speed	Low idle speed	Rough idling	Engine hesitates or accelerates poorly	Surging	Knocking
Starter relay	1													
Starter	2	2		1										
Park/Neutral SW [A/T] or Clutch start SW [M/T]	3													
Flywheel [M/T] or Drive plate [A/T]		4												
Mass air flow sensor circuit			3							3	10	7		
Idle speed control actuator			4		3	3	3	3	3	2	7			2
Fuel pressure regulator			5		5	5	5				4	11	1	
ECT sensor circuit			6		4	1	1	2	2	1	2	8	6	
Compression			7		8						8	5		
Piston rings			8		9						9			
Ignition timing					10						11	14		
Timing mark			9								12			
Injectors			10		13	8	8		7	4	13	15	4	
PCM			11		14	9	9	4	8	5	14	16	5	
A/C circuit				2					6					
Connecting rod bearing				3										
Crankshaft bearing				4										
Fuel quality					1	2	2				1	3	3	
Spark plugs					2						3	4	2	
Fuel pump					6	6	6				5	12		
Fuel lines					7	7	7				6	13		
Ignition circuit			2		11									3
Intake air temp. sensor circuit					12	4	4		4			9		1
Accelerator pedal link								1	1					
TP Sensor circuit									5			6		
Cylinder head											15			
Clutch [M/T]												1		
Brakes not releasing properly												2		
Oxygen sensor circuit												10		
Crankshaft position sensor		3												
Battery voltage		1	1											

Main Symptoms / Sub-Symptoms / Check points	Engine Stalls				Others			Refueling
	Soon after starting	After accelerator pedal is depressed	After accelerator pedal is released	During A/C ON	Excessive fuel consumption	Engine overheats	Engine too cool	Hard to refuel Overflowing spit-Back
Fuel quality	1							
Fuel pressure regulator	2	4			2			
Fuel pump	3							
Fuel lines	4	5						
ISC actuator	5		1	2				
MAF sensor circuit	6	1	2		13			
ECT sensor circuit	7				11			
Injectors	8	6			10			
ECM	9	7	3	3	17			
TP Sensor circuit		2			12			
Spark plug		3			6	8		
A/C circuit				1	14			
Fuel leakage					1			
Accelerator pedal link					3			
Clutch [M/T]					4			
Brakes drag when pedal released					5			
Compression					7			
Piston ring					8			
Ignition timing					9			
Oxygen sensor circuit					15			
Intake air temp. sensor circuit					16			
Coolant leakage						1		
Cooling fan						2	1	
Thermo switch						3		
Radiator and radiator cap						4	2	
Thermostat						5		
Timing belt						6		
Engine coolant pump						7		
Oil pump						9		
Cylinder head						10		
Cylinder block						11		
ECT sender						12	3	
Crankshaft position sensor	11	8	4	4				
Fill vent valve hose-clogging								1
Canister fillter-Contamination								2
Fuel shut off valve-operation								3

NOTE

Ebay User ID: reveleus1

The number herein means the check order.