Engine

Application	2.0L DOHC
Engine Type	Dual Overhead Cam L–4
Bore	86 mm (3.4 in.)
Stroke	86 mm (3.4 in.)
Total Displacement	1 998 cm^3 (121.9 in^3)
Compression Ratio	9.5±0.2:1
Maximum Power	96 kW (128.7 bhp) (at 5,400 rpm)
Maximum Torque	184 N•m (135.7 lb–ft) (at 4,400 rpm)

Ignition System

Application	2.0L DOHC
Ignition Type	Direct Ignition System
Ignition Timing	8° BTDC
Ignition Sequence	1–3–4–2
Spark Plug Gap	0.8 mm (0.031 in)
Spark Plug Maker	Bosch
Spark Plug Type	FR8LDC4

Clutch – Manual Transaxle

Application	2.0L DOHC
Type	Single Dry Plate
Outside Diameter	225 mm (9.0 in.)
Inside Diameter	150 mm (5.9 in.)
Thickness	3.4 mm (0.13 in.)
Fluid Capacity	Common Use; Brake Fluid

Manual Transaxle

Application	2.2L DOHC
Maker	DWMC
Type or Model	D–20
Gear Ratio:	–
1st	3.545:1
2nd	2.158:1
3rd	1.478:1
4th	1.129:1
5th	0.886:1
Reverse	3.333:1
Final Drive Ratio	3.550:1
Oil Capacity	1.8L (2 qt)

* Puerto Rico only.

Chassis and Body

Maintenance Item	Maintenance Interval																
	Miles (Kilometers) or time inmonths, whichever comes first																
x 1,000 miles	**6**	**12**	**18**	**24**	**30**	**36**	**42**	**48**	**54**	**60**	**66**	**72**	**78**	**84**	**90**	**96**	**102**
x 1,000 km	**9.6**	**19.2**	**28.8**	**38.4**	**48**	**57.6**	**67.2**	**76.8**	**86.46**	**96**	**105.6**	**115.2**	**124.8**	**134.4**	**144**	**153.6**	**163.2**
# Months	**6**	**12**	**18**	**24**	**30**	**36**	**42**	**48**	**54**	**60**	**66**	**72**	**78**	**84**	**90**	**96**	**102**
Air Filter (A/C) (2)	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Exhaust pipes & mountings		I*		I*		I*		I*		I*		I*		I*		I*	
Brake/Clutch fluid (3)(5)	I	I	R	I	I	R	I	I	R	I	I	R	I	I	R		I
Brake pads & discs(6)	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I		I
Parking brake		I		I		I		I		I		I		I			
Brake line & connections (Including booster)	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I		I
Rear hub bearing & clearance		I		I		I		I		I		I		I		I	
Manual Transaxle Oil (3)		I		I		I		I		I		I		I		I	
Clutch & brake pedal free play	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Automatic transaxle fluid* (3) (7)		I		I		I		I		R		I		I		I	
Chassis & underbody bolts & nuts, tighten/secure	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Tire condition & inflation pressure	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Wheel alignment (8)	Inspect when abnormal condition is noted.																
Tire rotation	Rotate tires every 6,000 miles																
Steering wheel & linkage	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Power steering fluid & lines*		I		I		I		I		I		I		I		I	
Drive shaft boots	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Seat belts, buckles & anchors	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Lubricate locks, hinges & hood latch		I		I		I		I		I		I		I		I	

Chart Symbols:
I – Inspect these items and their related parts. If necessary, correct, clean, replenish, adjust or replace.
R – Replace or change.
(2) More frequent maintenance is required if driving under dusty conditions.
(3) Refer to"Recommended Fluids And Lubricants."
(5) Change the brake/clutch fluid every 9,000 miles (14,400 kilometers) or 9months, whichever comes first, if the vehicle is operated under any of the following conditions :

– Driving in hilly or mountainous terrain.

(6) More frequent maintenance is required if the vehicle is operated under any of the following conditions:

– Short–distance driving.
– Extensive idling or slow–speed driving in stop–and–go traffic.
– Driving on dusty roads.

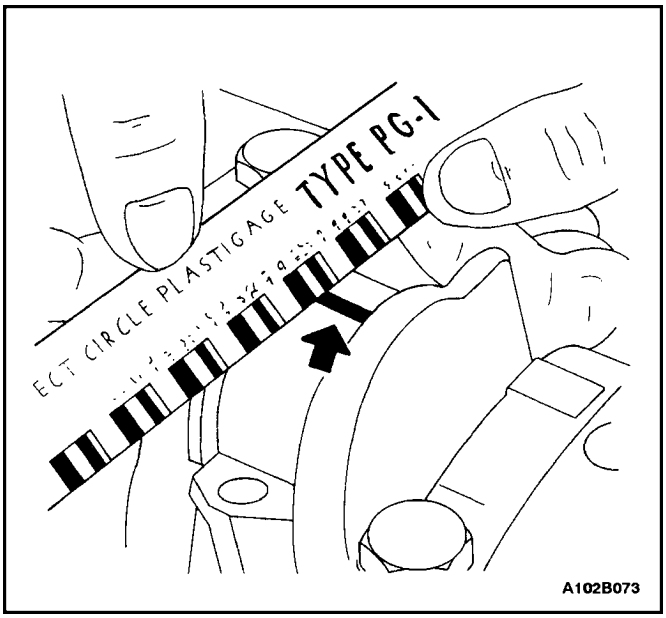
(7) Change the automatic transaxle fluid every 50,000miles (80,000 kilometers) if the vehicle is operated under any of the following conditions :

– Driving in hilly or mountainous terrain.
– Driving in heavy city traffic where the outside temperatures regularly reach 32˚C (90˚F) or higher.
– Driving a taxi, or police or delivery vehicles.

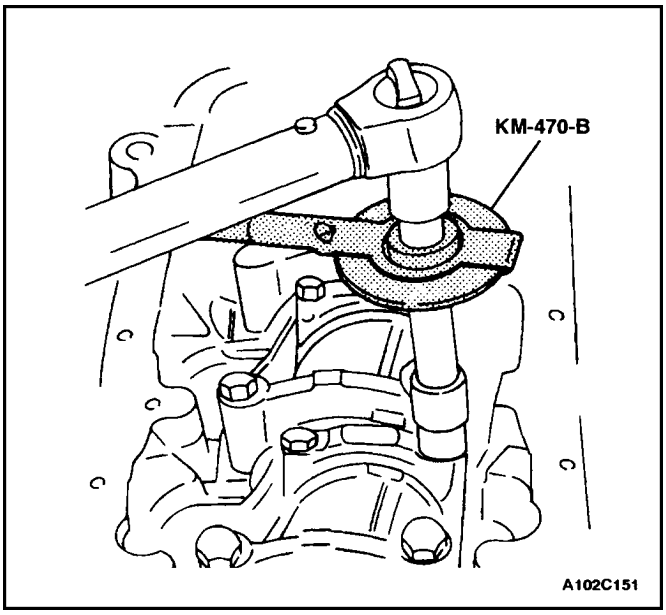
(8) If necessary, rotate and balance the wheels
Note : Check the engine oil and radiator coolant levels every week.

FASTENER TIGHTENING SPECIFICATIONS

Application	N•m	Lb–Ft	Lb–In
A/C Compressor Hose Assembly Bolt	33	24	–
Air Filter Housing Bolts	10	–	89
Automatic Tensioner Bolt	25	18	–
Auxiliary Catalytic Converter–to–Exhaust Manifold Nuts	40	30	–
Camshaft Bearing Cap Bolts, Intake and Exhaust	8	–	71
Camshaft Gear Bolt, Intake and Exhaust	50 + 60˚+ 15˚	37 + 60˚+ 15˚	–
Camshaft Position Sensor Bolts	12	–	106
Connecting Rod Cap Bolts	36 + 45˚+ 15˚	26 + 45˚+ 15˚	–
Coolant Bypass Housing and Mounting Bolts	15	11	–
Coolant Pump Retaining Bolts	25	18	–
Coolant Temperature Sensor	25	18	–
Crankshaft Bearing Cap Bolts	50 + 45˚ + 15˚	37 + 45˚ + 15˚	–
Crankshaft Position Sensor Retaining Bolt	8	–	71
Crankshaft Pulley Bolts	20	15	–
Crankshaft Timing Belt Drive Gear Bolt	135+ 30˚ +10˚	100+ 30˚ +10˚	–
Cylinder Head Bolts	25 + 90˚ +90˚ + 90˚	18 + 90˚ +90˚ + 90˚	–
EI System Ignition Coil and EGR Mounting Bracket Bolts	25	18	–
Engine Block Lower Support Bracket/Splash Shield Bolts	35	26	–
Engine Mount Bracket Retaining Bolts and Nuts	55	41	–
Engine Mount Bracket–to–Engine Mount Retaining Bolts	60	44	–
Engine Mount Retaining Bolts	60	44	–
Engine–to–Intake Manifold Support Bracket Bolts	20	15	–
Evaporative Emission Canister Purge Solenoid Bracket Bolt	5	–	44
Exhaust Gas Recirculation Valve Bolts	20	15	–
Exhaust Manifold Heat Shield Bolts	8	–	71
Exhaust Manifold Retaining Nuts	15	11	–
Exhaust Pipe Support Bracket Bolts	40	30	–
Flexible Plate Bolts	65	48	–
Flywheel Bolts	65 + 30˚ + 15˚	48 + 30˚ + 15˚	–
Front Muffler Pipe–to–Main Catalytic Converter Nuts	30	22	–
Fuel Rail Retaining Bolts	25	18	–
Front Timing Belt Cover Bolts, Upper and Lower	6	–	53
Generator–to–Intake Manifold and Cylinder Head Support Bracket Bolts	37	27	–
Generator–to–Intake Manifold Strap Bracket Bolt, Upper and Lower	22	16	–
Generator–to–Intake Manifold Support Bracket Bolts	35	26	–
Ignition Coil Mounting Bolts	10	–	89
Intake Manifold Retaining Nuts and Bolts	18	13	–
Intake Manifold Support Bracket Bolts	20	15	–



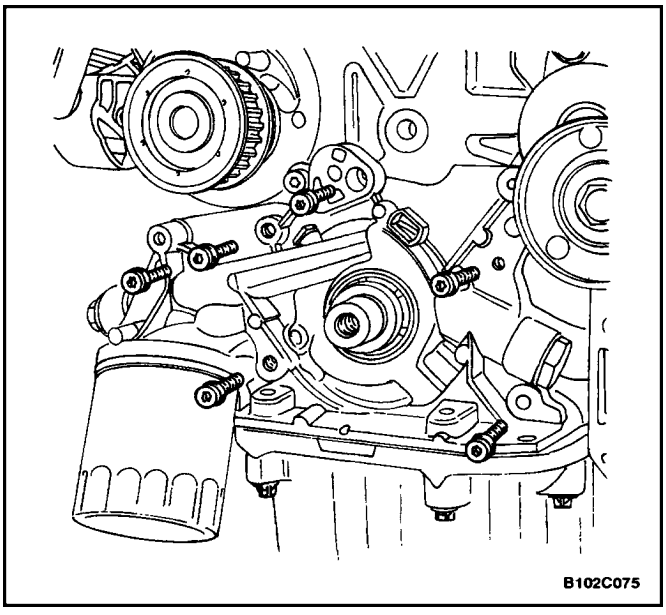
20. Remove the connecting rod bearing caps.
21. Measure the width of the flattened plastic thread of the plastic gauging using a ruler. (Plastic gauging is available for different tolerance ranges.)
22. Inspect the bearing clearance for permissible tolerance ranges. Refer to ”Engine Specifications”in this section.



23. Install the connecting rod bearing caps to the connecting rods.
24. Tighten the connecting rod bearing caps using new bolts.

Tighten

Tighten the connecting rod bearing cap bolts to 35 N•m (26 lb–ft). Use the angular torque gauge, KM–470–B, to tighten the connecting rod cap bolts to +45 degrees plus one turn of 15 degrees.

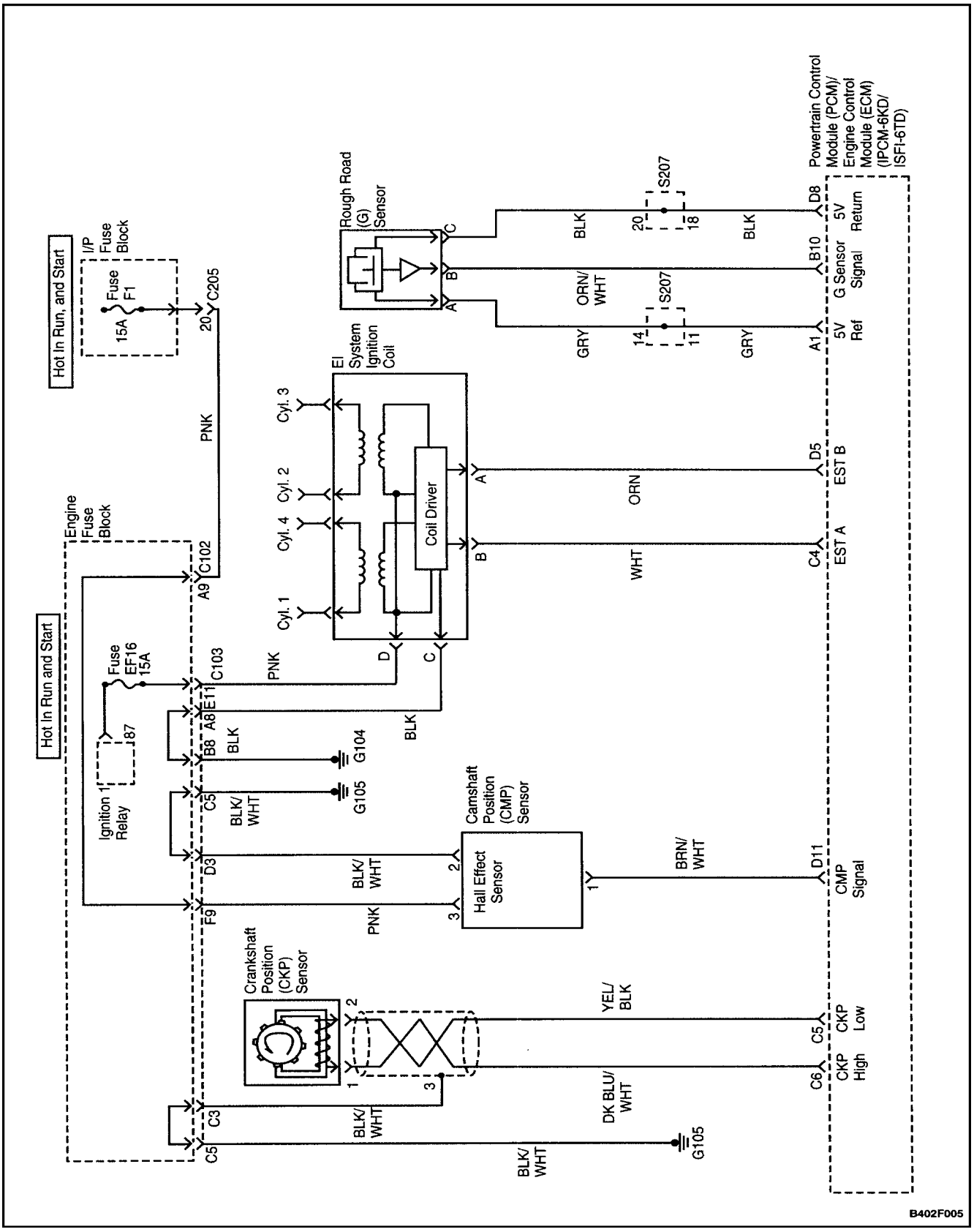


25. Install the oil pump.
26. Install the oil pump retaining bolts.

Tighten

Tighten the oil pump retaining bolts to 10 N•m (89 lb–in).

PCM/ECM WIRING DIAGRAM (5 OF 6)
(IPCM–6KD/ISFI–6TD)



COMMON OBD II TERMS

Diagnostic

When used as a noun, the word diagnostic refers to any on–board test run by the vehicle's Diagnostic Management System. A diagnostic is simply a test run on a system or component to determine if the system or component is operating according to specification. There are many diagnostics, shown in the following list:

- Misfire
- Oxygen Sensors (O2S)
- Heated Oxygen Sensor (HO2S)
- Exhaust Gas Recirculation (EGR)
- Catalyst monitoring

Enable Criteria

The term "enable criteria" is engineering language for the conditions necessary for a given diagnostic test to run. Each diagnostic has a specific list of conditions which must be met before the diagnostic will run.

"Enable criteria" is another way of saying "conditions required."

The enable criteria for each diagnostic is listed on the first page of the Diagnostic Trouble Code (DTC) description under the heading "Conditions for Setting the DTC." Enable criteria varies with each diagnostic and typically includes, but is not limited to, the following items:

- Engine speed.
- Vehicle speed
- Engine Coolant Temperature (ECT)
- Manifold Absolute Pressure (MAP)
- Barometric Pressure (BARO)
- Intake Air Temperature (IAT)
- Throttle Position (TP)
- High canister purge
- Fuel trim
- A/C on

Trip

Technically, a trip is a key–on run key–off cycle in which all the enable criteria for a given diagnostic are met, allowing the diagnostic to run. Unfortunately, this concept is not quite that simple. A trip is official when all the enable criteria for a given diagnostic are met. But because the enable criteria vary from one diagnostic to another, the definition of trip varies as well. Some diagnostics are run when the vehicle is at operating temperature, some when the vehicle first starts up; some require that the vehicle be cruising at a steady highway speed, some run only when the vehicle is at idle; some diagnostics function with the Torque Converter Clutch (TCC) disabled. Some run only immediately following a cold engine startup.

A trip then, is defined as a key–on run key–off cycle in which the vehicle was operated in such a way as to satisfy the enables criteria for a given diagnostic, and this diagnostic will consider this cycle to be one trip. However, another diagnostic with a different set of enable criteria (which were not met) during this driving event, would not consider it a trip. No trip will occur for that particular diagnostic until the vehicle is driven in such a way as to meet all the enable criteria

Diagnostic Information

The diagnostic charts and functional checks are designed to locate a faulty circuit or component through a process of logical decisions. The charts are prepared with the requirement that the vehicle functioned correctly at the time of assembly and that there are not multiple faults present.

There is a continuous self–diagnosis on certain control functions. This diagnostic capability is complimented by the diagnostic procedures contained in this manual. The language of communicating the source of the malfunction is a system of diagnostic trouble codes. When a malfunction is detected by the control module, a diagnostic trouble code is set and the Malfunction Indicator Lamp (MIL) is illuminated.

Malfunction Indicator Lamp (MIL)

The Malfunction Indicator Lamp (MIL) is required by On–Board Diagnostics (OBD II) that it illuminates under a strict set of guide lines.

Basically, the MIL is turned on when the powertrain control module (PCM)/engine control module (ECM) detects a DTC that will impact the vehicle emissions.

The MIL is under the control of the Diagnostic Executive. The MIL will be turned on if an emissions–related diagnostic test indicates a malfunction has occurred. It will stay on until the system or component passes the same test, for three consecutive trips, with no emissions related faults.

Extinguishing the MIL

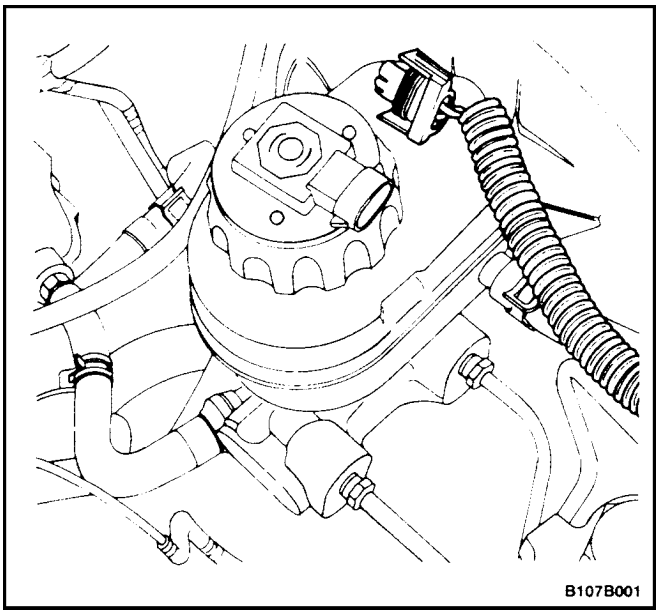
When the MIL is on, the Diagnostic Executive will turn off the MIL after three consecutive trips that a "test passed" has been reported for the diagnostic test that originally caused the MIL to illuminate. Although the MIL has been turned off, the DTC will remain in the PCM/ECM memory (both Freeze Frame and Failure Records) until forty (40) warm–up cycles after no faults have been completed.

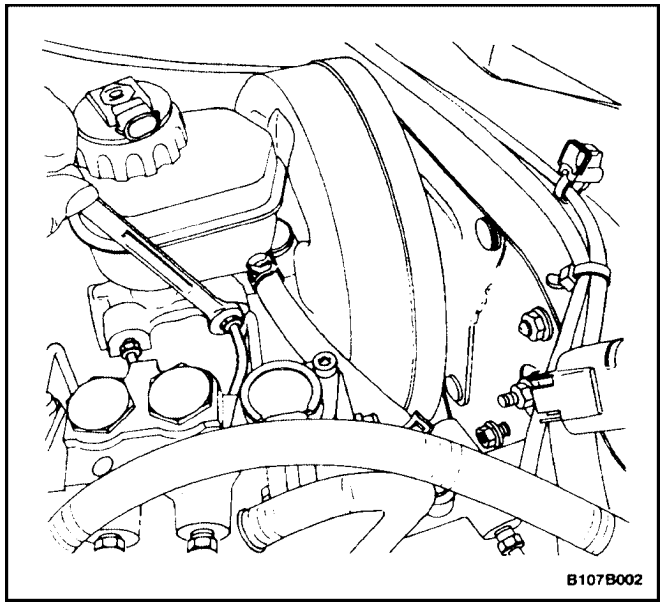
If the MIL was set by either a fuel trim or misfire–related DTC, additional requirements must be met. In addition to the requirements stated in the previous paragraph, these requirements are as follows:

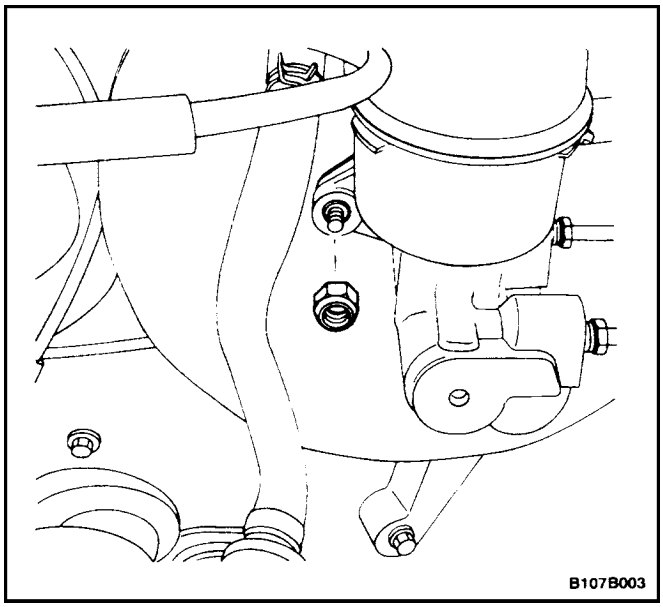
- The diagnostic tests that are passed must occur with 375 rpm of the rpm data stored at the time the last test failed.
- Plus or minus ten percent of the engine load that was stored at the time the last test failed. Similar engine temperature conditions (warmed up or warming up) as those stored at the time the last test failed.

Meeting these requirements ensures that the fault which turned on the MIL has been corrected.

The MIL is on the instrument panel and has the following functions:







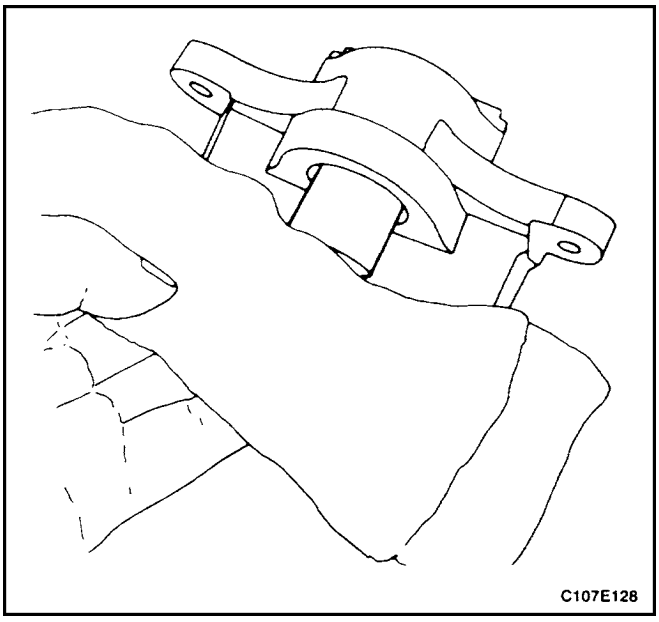
MAINTENANCE AND REPAIR

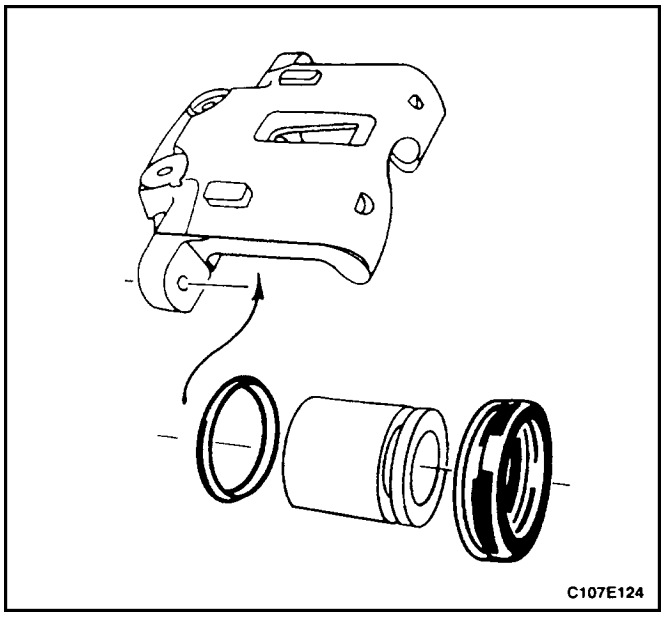
ON–VEHICLE SERVICE

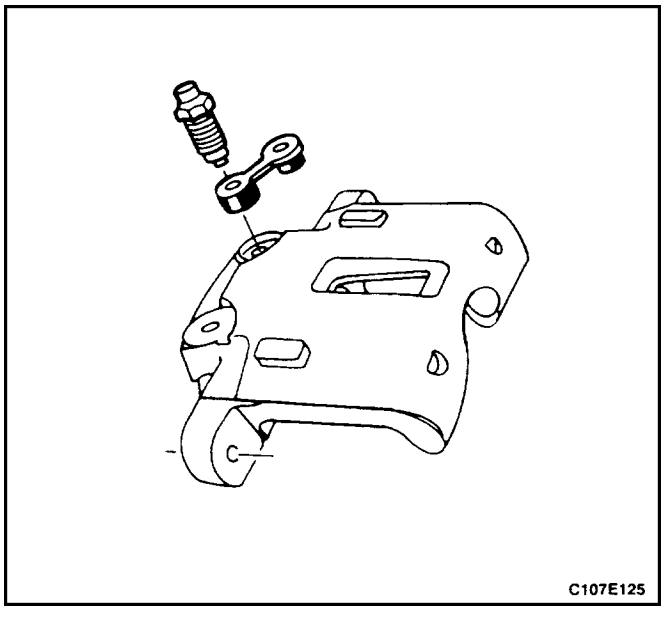
MASTER CYLINDER ASSEMBLY

Removal Procedure

1. Disconnect the electrical connector from the reservoir cap.
2. For vehicles with the ABS braking system, disconnect the brake lines from the master cylinder body.
3. For vehicles with the non–ABS braking system, disconnect the brake lines from the proportioning valves.
4. For vehicles with the manual transaxle, disconnect the clip to the clutch hose connection to the master cylinder and move the clip out of the way.
5. Remove the clutch hose from the master cylinder if equipped.
6. Plug the opening to the brake lines to prevent fluid loss and contamination.
7. Remove the attaching nuts from the power booster.
8. Remove the master cylinder assembly.
9. Drain the brake fluid.







UNIT REPAIR

CALIPER OVERHAUL

Disassembly Procedure

1. Remove the caliper. Refer to"Caliper"in this section.
2. To prevent damage to the piston when removing it, place a clean shop towel between the piston and the caliper.

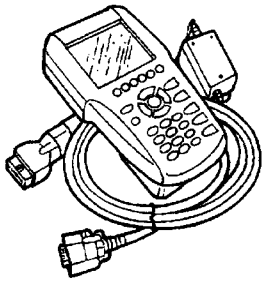
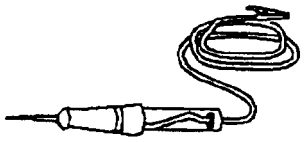
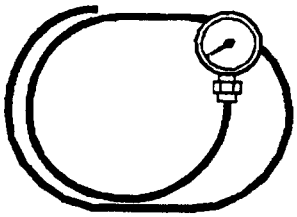
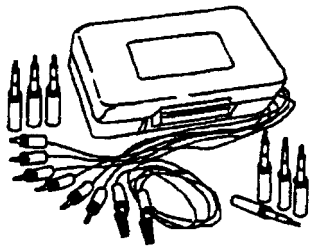
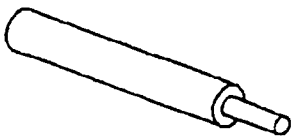
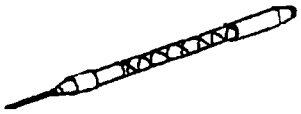
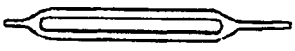
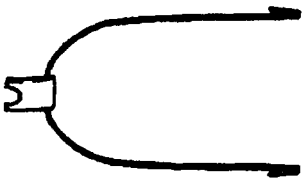
CAUTION : When applying air pressure at the caliper inlet port, do not place fingers in front of the piston. The piston will pop out of its bore with enough force to cause serious injury.

3. Apply unlubricated compressed air to the caliper inlet port, and progressively increase the air pressure until the piston is forced out of the bore.
4. Remove and discard the outer dust seal.
5. Remove the inner seal and discard it. Do not scratch the piston bore or the seal groove when removing the inner seal.

6. Remove the bleeder valve and the dust cover.

SPECIAL TOOLS

SPECIAL TOOLS TABLE

 A410B026	Scan Tool	 A103A266	J 34142–B Universal Test Lamp
 A103A263	J 21867 Universal Pressure Gauge Set	 A103A267	J 35616 Connector Test Adapter Kit
 A103A264	J 28742–A Weather Pack Terminal Remover	 A103A268	J 35689–A Metri–pack Terminal Remover
 A103A265	J 33095 Control Module Connector Terminal Remover	 A103A269	J 36169–A Fused Jumper Wire

Step	Action	Value(s)	Yes	No
7	1. Turn the ignition ON. 2. Turn the blower motor switch to 4. 3. Check the blower motor ground. Is ground OK?		Go to *Step 9*	Go to *Step 8*
8	Repair the blower motor ground. Is the repair complete?		System OK	
9	Check the motor connector with a 12–volt test light. Does the test light come on?		Go to *Step 10*	Go to *Step 11*
10	Repair the open in the feed wire from the resistor block to the blower motor. Is the repair complete?		System OK	
11	Use the 12–volt test light to check the power feed terminal on the blower speed switch. Does the light come on?		Go to *Step 12*	Go to *Step 13*
12	Replace the blower speed switch. Is the repair complete?		System OK	
13	Repair the open in the power wire from the blower speed switch to the fuse panel. Is the repair complete?		System OK	
14	Does the blower fail to operate at speed 4?		Go to *Step 15*	Go to *Step 21*
15	Check fuse EF2 in the engine fuse block. Is the fuse blown?		Go to *Step 16*	Go to *Step 17*
16	1. Turn the ignition ON. 2. Turn the blower motor switch to 4. 3. Use a short detector to locate the following possible shorts: • From the engine fuse panel to the blower HI relay. • From the blower HI relay to the blower motor. 4. Repair any short. 5. Replace the EF2. Is the repair complete?		System OK	
17	1. Turn the ignition ON. 2. Turn the blower motor switch to 4. 3. Check for 12 volts on the blower HI relay coil terminal from the blower speed switch terminal A2. Is this voltage present?		Go to *Step 18*	Go to *Step 19*
18	Replace the blower speed switch. Is the repair complete?		System OK	
19	1. Turn the ignition OFF. 2. Check for opens in the following locations: • Fuse EF2 to the blower HI relay. • Blower speed switch to the blower HI relay. • Blower HI relay to ground. • Blower HI relay to the blower motor. 3. Repair any opens. Is the repair complete?		System OK	Go to *Step 20*

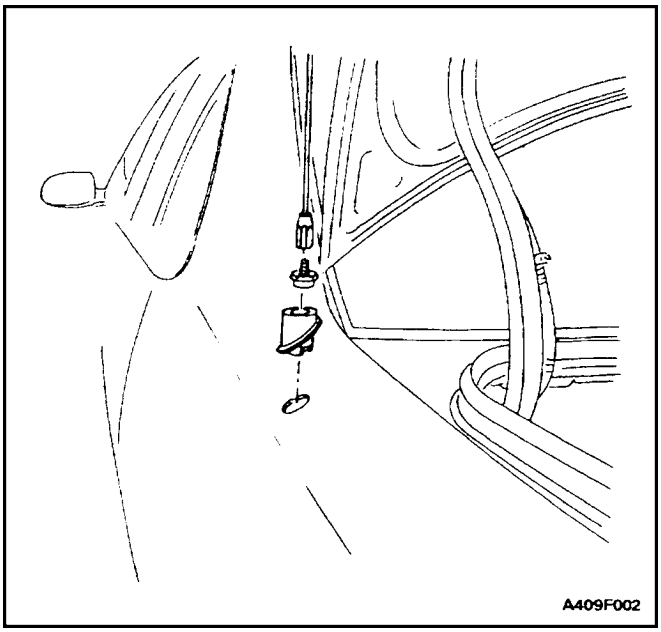
Step	Action	Value(s)	Yes	No
15	1. Record the high– and low–side pressures after the A/C system has been operating for 5 minutes or more with the engine cooling fan ON. 2. Locate the intersection of the high– and low–side pressures. Refer to "Low– and High–Side Pressure Relationship Chart" in this section. Do the low– and high–side pressures intersect in the white area of the chart?		System OK	Go to *Step 16*
16	Check the high– and low–side pressures. Do the high– and low–side pressures intersect in the gray area of the chart?		Go to *Step 17*	Go to *Step 20*
17	Feel the liquid pipe between the condenser and the expansion valve. Is the pipe cold?		Go to *Step 18*	Go to*Step 19*
18	1. Examine the condenser for any restriction of the airflow. 2. Check the cooling fans for proper operation. 3. Remove the restriction or repair the fans, as required. Is the pipe temperature normal?	At least 7˚C (12˚F) below ambient air temperature	Go to *Step 13*	
19	1. Recover, evacuate, and recharge the A/C system. 2. Check the A/C system for leaks. Is the system free from leaks?		Go to *Step 13*	
20	Observe the readings on the pressure gauges. Are the A/C compressor high– and low–side pressures within the specified value of each other?	207 kPa (30 psi)	Go to *Step 21*	Go to *Step 26*
21	1. Run the engine at 3,000 rpm. 2. Set the A/C controls to the following positions: • The A/C to ON. • The fresh air control switch to fresh air. • The blower motor to 4. • The temperature control knob to full cold. 3. Close all of the vehicle's windows and doors. 4. Turn the A/C ON and OFF every 20 seconds for 3 minutes. Are the A/C compressor high– and low–side pressures within the specified value of each other?	207 kPa (30 psi)	Go to *Step 22*	Go to *Step 13*
22	Observe the pressure rise on both gauges and the temperatures of both the compressor suction pipe and the discharge pipe. Is the pressure rise on both gauges slow and the suction pipe warm with the discharge pipe very hot?		Go to *Step 25*	Go to *Step 23*
23	1. Turn the ignition to LOCK. 2. Make sure the compressor clutch is disengaged. 3. Attempt to turn the clutch driver (not the pulley). Can you turn the clutch driver freely by hand?		Go to *Step 25*	Go to *Step 24*

REAR WINDOW WIPER (HATCHBACK AND WAGON)

Diagnostic Aid

If the front wiper is operating correctly, it is not necessary to check the fuse or the power supply circuit. Begin the diagnostic check at *Step 5* of the table below.

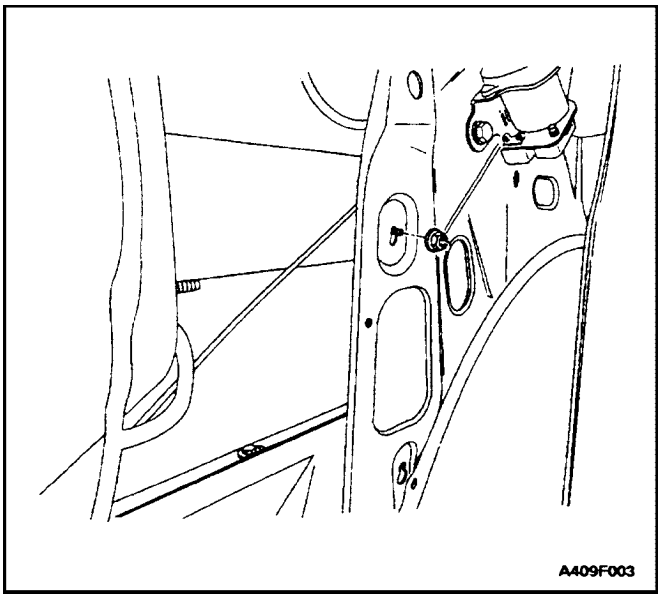
Step	Action	Value(s)	Yes	No
1	Check fuse F4. Is fuse F4 blown?		Go to *Step 2*	Go to *Step 3*
2	1. Check for a short circuit and repair it, if necessary. 2. Replace the fuse. Is the repair complete?		System OK	
3	1. Turn the ignition ON. 2. Check the voltage at fuse F4. Is the specified voltage available at fuse F4?	11 – 14 v	Go to *Step 5*	Go to *Step 4*
4	Repair the open power supply circuit for fuse F4. Is the repair complete?		System OK	
5	1. Disconnect the rear window wiper motor electrical connector. 2. Turn the ignition ON. 3. Check the voltage at rear wiper motor connector terminal 3. Does the voltage equal the specified value?	11 – 14 v	Go to *Step 7*	Go to *Step 6*
6	Repair the open circuit between fuse F4 and rear window wiper motor connector terminal 3. Is the repair complete?		System OK	
7	With the rear window wiper still disconnected, use an ohmmeter to check continuity between rear wiper motor connector terminal 2 and ground. Does the ohmmeter indicate the specified value?	$\approx$ 0 Ω	Go to *Step 9*	Go to *Step 8*
8	Repair the open ground circuit for the rear window wiper motor. Is the repair complete?		System OK	
9	1. Turn the ignition ON. 2. Turn the rear window wiper to ON. 3. Check the voltage at rear window wiper motor connector terminal 1. Does the voltmeter indicate the specified value?	11 – 14 v	Go to *Step 10*	Go to *Step 11*
10	Replace the rear window wiper motor. Is the repair complete?		System OK	
11	1. Disconnect the rear window wiper switch electrical connector. 2. Turn the ignition ON. 3. Check the voltage at wiper switch connector terminal A3 (PNK wire). Does the voltmeter indicate the specified value?	11 – 14 v	Go to *Step 13*	Go to *Step 12*
12	Repair the open circuit between fuse F4 and rear window wiper switch connector terminal A3. Is the repair complete?		System OK	



MAST ANTENNA

Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the luggage compartment rear quarter trim panel. Refer to*Section 9G, Interior Trim.*
3. Unscrew and remove the mast antenna.
4. Remove the antenna cap nut and the rubber grommet.



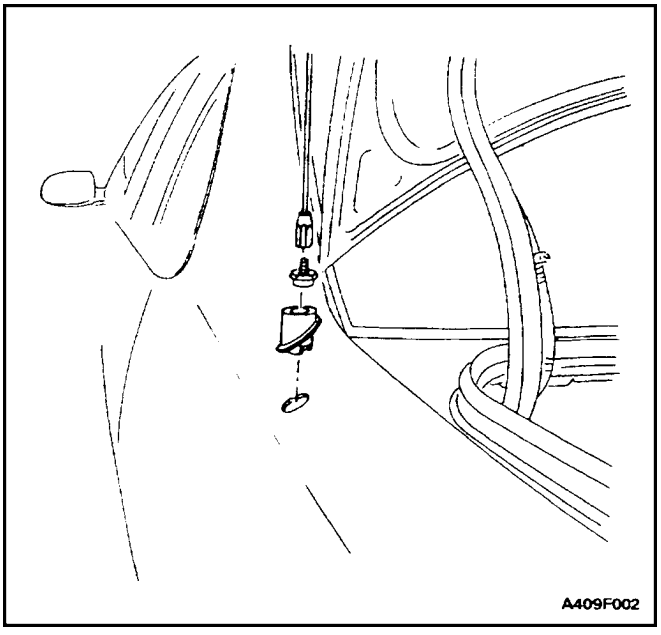
Installation Procedure

Notice : Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the mast antenna base with the nut.

   Tighten

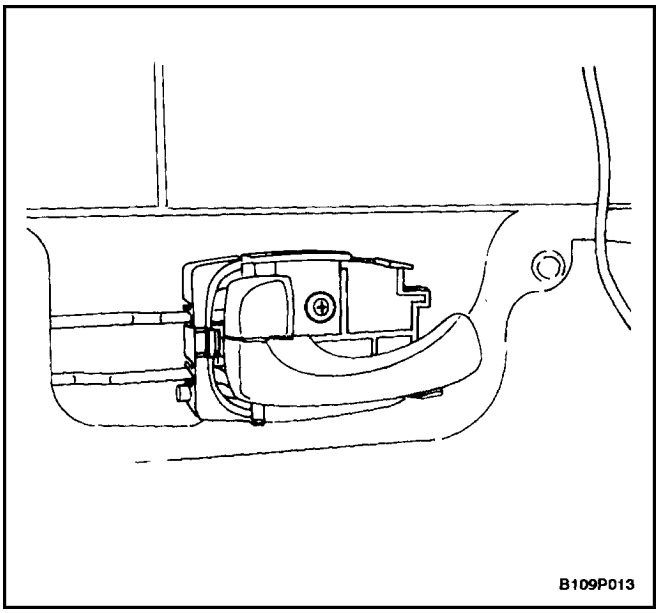
   Tighten the mast antenna base nut to 4 N•m (35 lbin).



2. Connect the antenna cable.
3. Install the rubber grommet and the antenna cap nut.

   Tighten

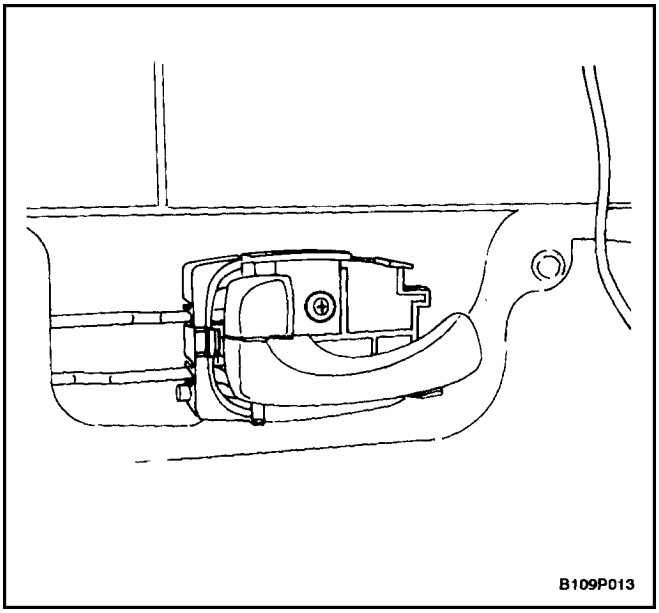
   Tighten the antenna cap nut to 7 N•m (62 lb–in).
4. Install the mast antenna.
5. Install the luggage compartment rear quarter trim panel. Refer to*Section 9G, Interior Trim.*
6. Connect the negative battery cable.



INSIDE DOOR HANDLE

Removal Procedure

1. Remove the door seal trim. Refer to"Door Seal Trim" in this section.
2. Remove the screw securing the door handle to the door.
3. Slide the door handle forward and remove it from the door.
4. Disconnect the inside door handle and the lock rods.



Installation Procedure

1. Connect the inside door handle and the lock rods.
2. Insert the inside door handle into the slots in the door.
3. Slide the door handle rearward.

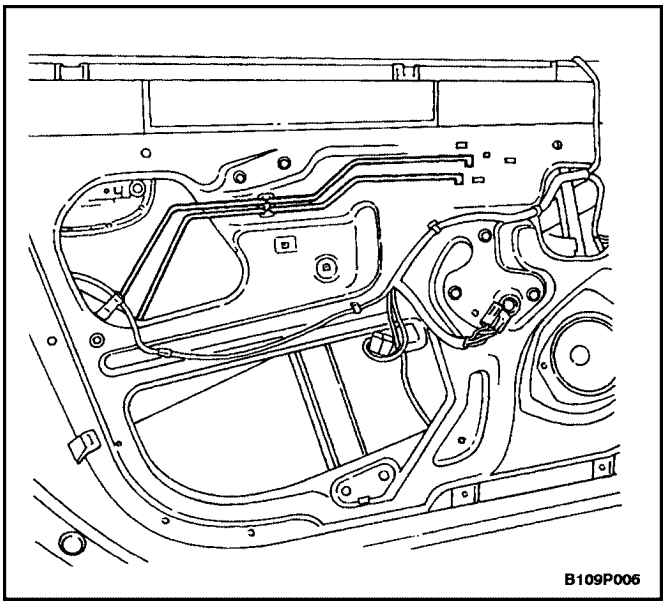
Notice : Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

4. Install the inside door handle screw.

   ### Tighten

   Tighten the inside door handle screw to 1.5 N•m (13 lb–in).

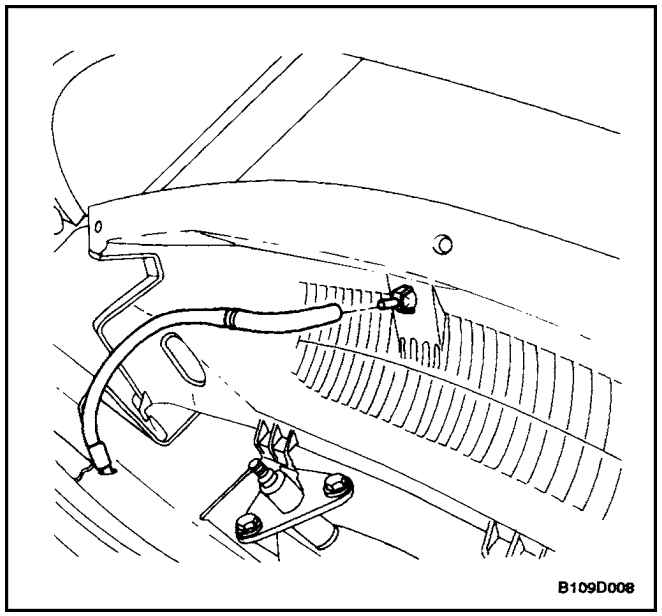
5. Install the door seal trim. Refer to"Door Seal Trim" in this section.



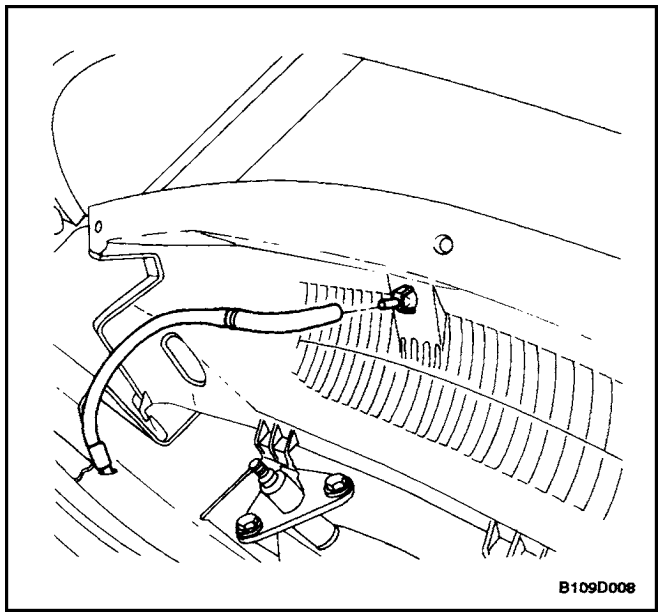
INSIDE LOCK ROD

Removal Procedure

1. Remove the door seal trim. Refer to"Door Seal Trim" in this section.
2. Disconnect the inside lock rods from the door handle and the lock.

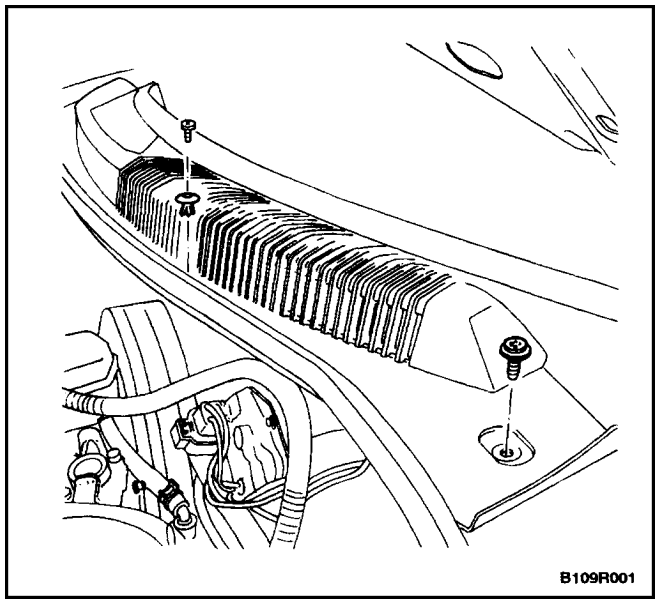


4. Disconnect the washer hoses.



Installation Procedure

1. Connect the washer hoses.



Notice : Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the two–piece grille and the cowl vent grille screws.

   Tighten

   Tighten the cowl vent grille screws to 4 N•m (35 lbin).

3. Install the wiper arms. Refer to *Section 9D, Wipers/ Washer Systems.*