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This file was not scanned to deprive Mazda of any money – it was scanned due to the rareness of the original manuals and the overwhelming need of the RX-7 owner to have this information so that they can accurately troubleshoot problems. Perhaps if Mazda's dealerships could support the Rotary Engine it wouldn't be so necessary for the owners to do so.

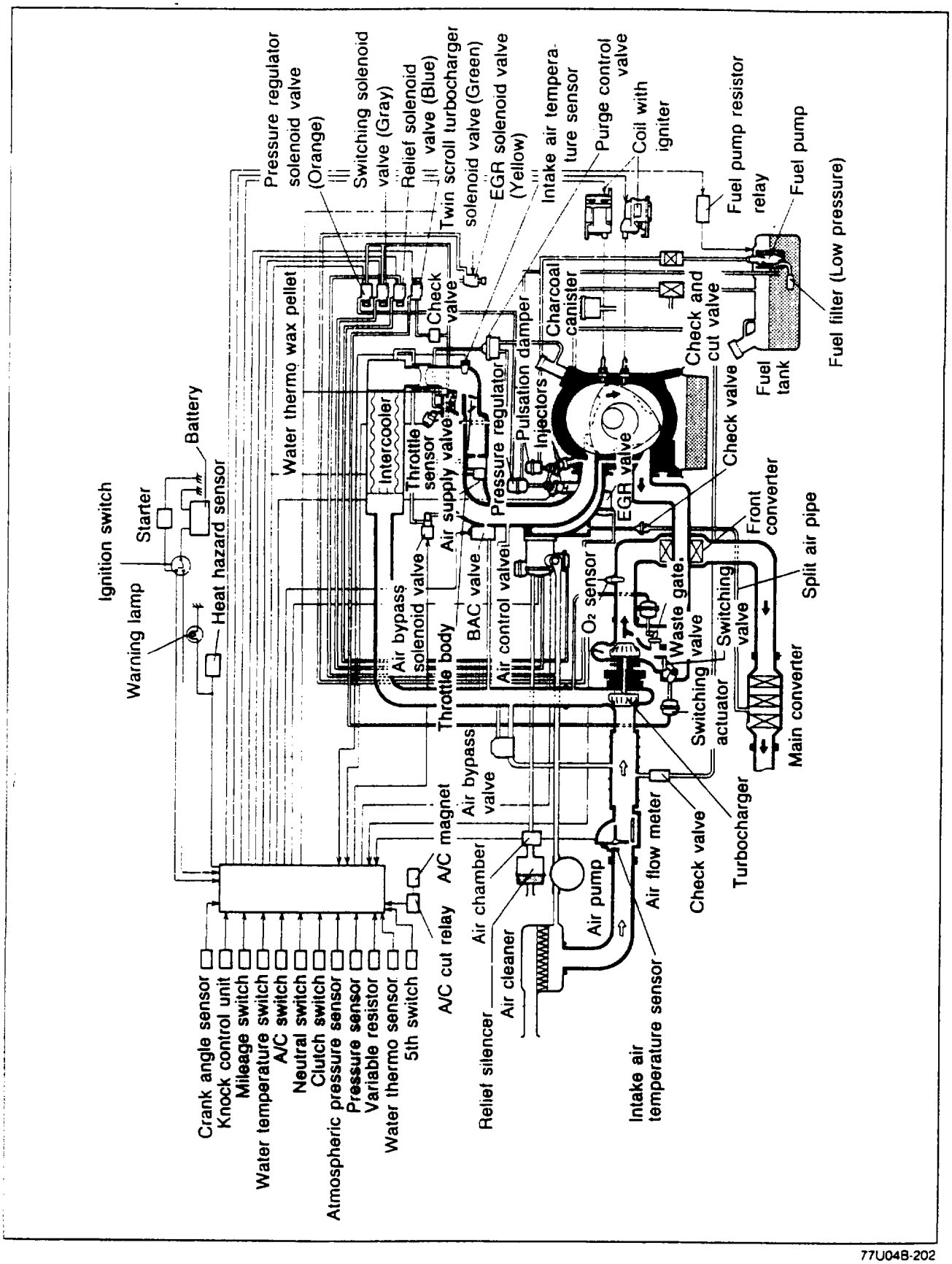
Many thanks to Anh Diep for scanning this file.

FUEL AND EMISSION CONTROL SYSTEMS (EGI TURBO)

87U04B-001

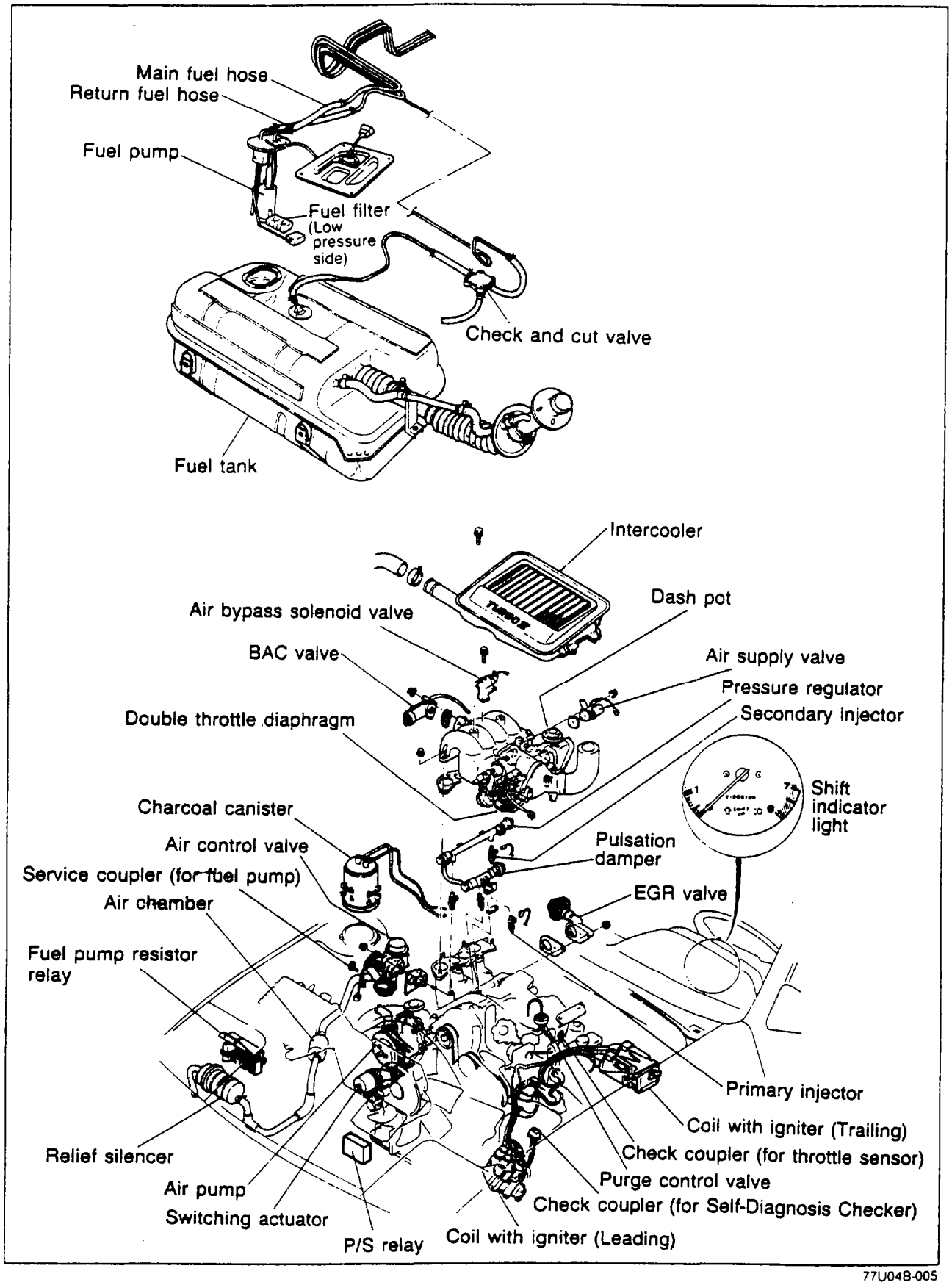
OUTLINE

SYSTEM DIAGRAM



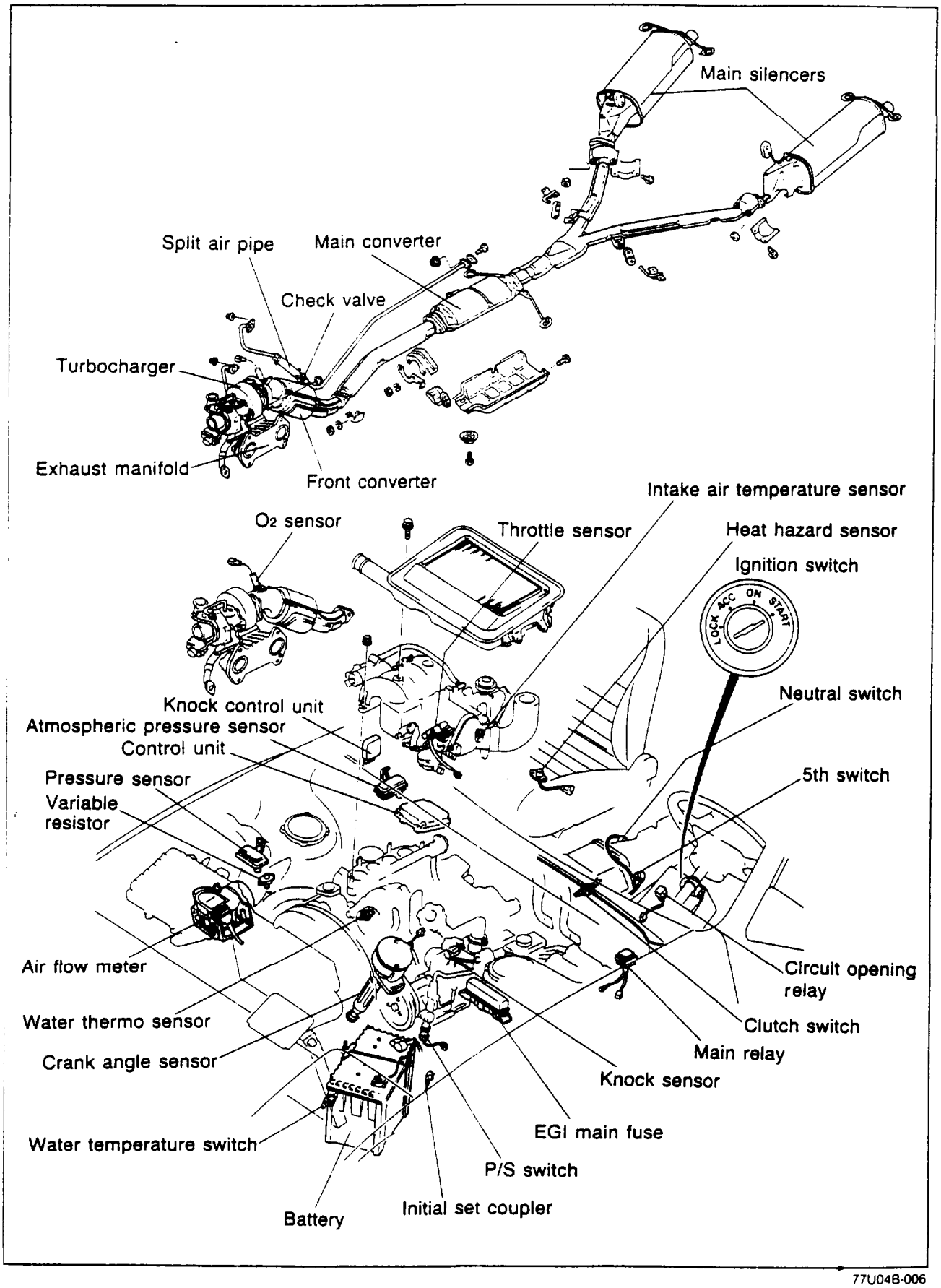
77U04B-202

EMISSION COMPONENTS LOCATION
Fuel and Output Devices



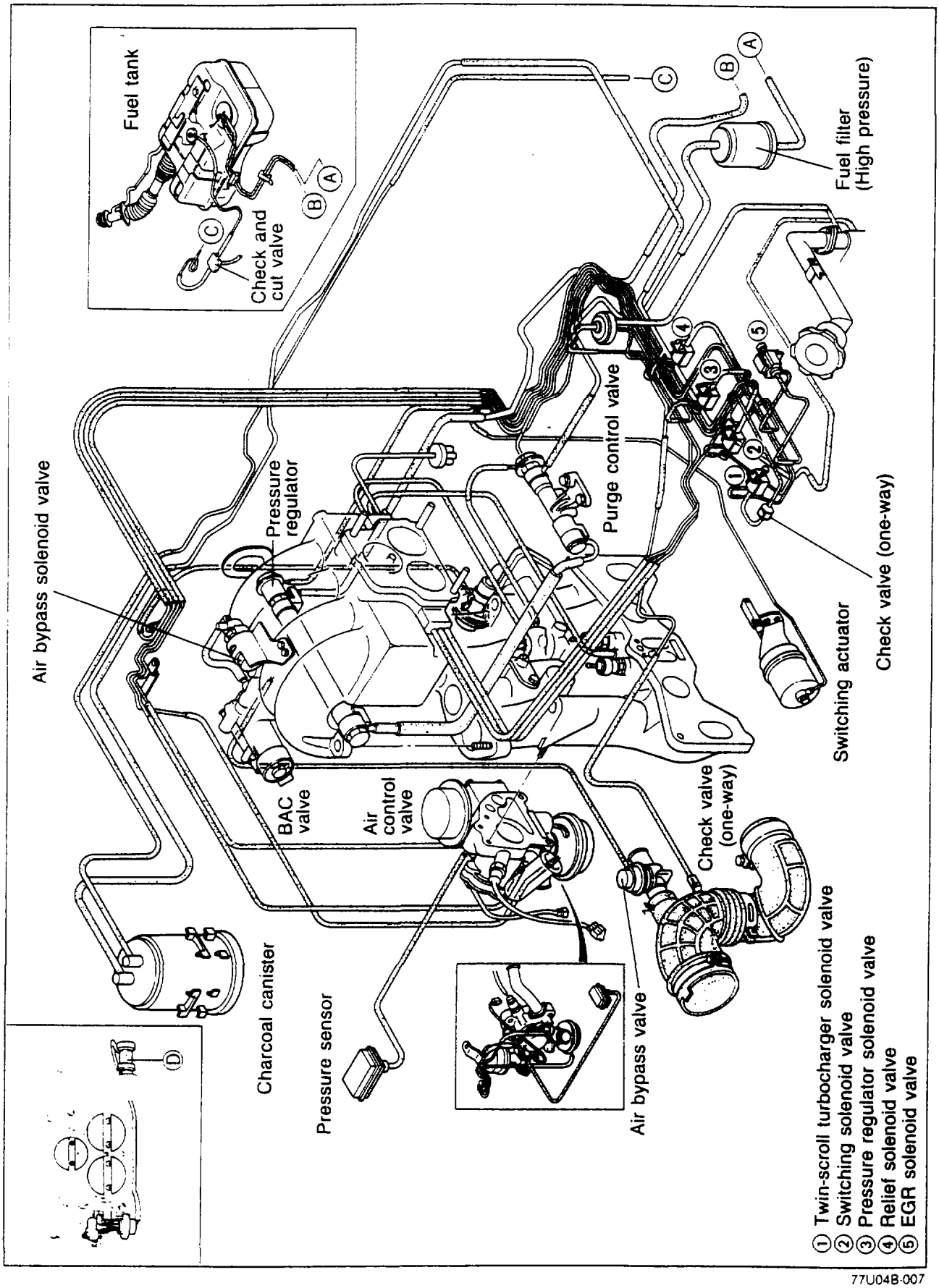
77U04B-005

Exhaust and Input Devices



77U048-006

VACUUM HOSE ROUTING DIAGRAM



77U04B-007

COMPONENT DESCRIPTION

Component	Function	Remarks
Anti-afterburn Valve	Supplies fresh air into rear port during deceleration	Included in air control valve
Air Bleed Socket	Supplies fresh air into primary injector hole	
Air Bypass Solenoid Valve	Supplies bypass air into primary intake manifold	Assist of BAC valve during cold condition
Air Bypass Valve	Reduces sound of intake air from turbocharger relived through air flow meter during deceleration.	
Air cleaner	Filters air into throttle chamber	
Air Control Valve	Directs air to one of three locations; exhaust port, main converter or relief air silencer	Consists of 3 valves; Relief valve Switching valve Anti-afterburn valve
Air Flow Meter	Detects amount of intake air; sends signal to control unit	
Atmospheric Pressure Sensor	Detects atmospheric pressure; sends signal to control unit	
Air Pump	Supplies secondary air to air control valve	
Air Supply Valve	Supplies bypass air into dynamic chamber	During P/S operation During hot starting
Bypass Air Control (BAC) Valve	Supplies bypass air into dynamic chamber	Controlled by duty signal from control unit
Pressure Sensor	Detects intake manifold vacuum; sends signal to control unit	E.G.I. Engine; Boost sensor
Catalytic Converter	Reduces HC, CO and NOx	
Check Valve	Supplies the blowby gas and evaporative emission gas into the turbocharger when the intake manifold vacuum becomes positive pressure	For evaporative emission control system
Charcoal Canister	Stores gas tank fumes when engine stops	Vented to atmosphere through charcoal and filter
Check and cut valve	Controls pressure in fuel tank	
Control Unit	Detects the following: 1.Engine speed 2.Amount of intake air 3.Engine coolant temperature 4.Throttle opening 5.Intake manifold vacuum 6.O_2 concentration 7.Radiator coolant temperature 8.Idle mixture 9.In-gear condition 10.Intake air temperature 11.Floor temperature 12.A/C operation 13.Cranking signal 14.Atmospheric pressure 15.Knocking signal 16.Initial set signal 17.Position of transmission gear Controls operation of the following: 1.Fuel injection system 2.Ignition control system 3.BAC system 4.Pressure regulator control system 5.Secondary air injection control system 6.Shift indicator light system 7.EGR system 8.Fuel pump control system 9.Twin scroll turbocharger	 Crank angle sensor Air flow meter Water thermo sensor Throttle sensor Pressure sensor Oxygen (O_2) sensor Water temperature switch Variable resistor Neutral switch and clutch switch Intake air temperature sensor Heat hazard sensor A/C switch Starter switch Atmospheric pressure sensor Knock sensor and knock control unit Initial set coupler 5th switch

77U04B-212

Component	Function	Remarks
Coil with Igniter	Generates high voltage	Leading; ignite simultaneously Trailing; ignite individually
Crank Angle Sensor	Detects eccentric shaft angle at 30° intervals and front rotor position; sends signal to control unit	
Dashpot	Gradually closes throttle valve during deceleration	
Double Throttle System	Gradually opens the No. 2 secondary throttle valve when No. 1 secondary throttle valve suddenly opens	
Dynamic Chamber	Connects front and rear ports	Primary and secondary separated
EGR Solenoid Valve	Supplies intake manifold vacuum to EGR valve	Yellow
EGR Valve	Supplies exhaust gas into intake manifold	
Fast Idle System	Opens primary throttle valve slightly at idle	Only during cold condition
Fuel Filter	Filters particles from fuel	
Fuel Pump	Provides fuel to injectors	Operates while engine is running Installed in fuel tank
Fuel Pump Resistor Relay	Controls voltage for fuel pump	
Heat Hazard Sensor	Detects floor temperature; sends signal to control unit	Heat hazard sensor turned ON; relieves secondary air
Initial Set Coupler	Sends initial set signal to control unit	During adjustment of idle speed, idle mixture, and knock system; coupler is shorted
Injector	Injects fuel into intermediate housing and secondary intake manifold	Controlled by signals from control unit
Intake Air Temperature Sensor	Detects intake air temperature and temperature into the engine; sends signal to control unit	Located on the air flow meter and air intake pipe Thermistor
Intercooler	Prevents to increase of intake air temperature	Air cooled type
Knock Sensor	Detects engine knock; sends signal to knock control unit	
Mileage Switch	Detects vehicle mileage sends signal to control unit	Above 20,000 miles; mileage switch is ON
Oxygen (O_2) Sensor	Detects O_2 concentration; sends signal to control unit	Zilconia ceramic and platinum coating
Pressure Regulator	Adjusts fuel pressure supplied to injectors	
Pressure Regulator Control Solenoid Valve	Shuts vacuum passage between dynamic chamber and pressure regulator	Only during hot condition Orange
Pulsation Damper	Absorbs fuel pulsation	
Purge Valve	Regulates evaporative fumes from gas tank and canister to intake manifold	

77U04B-211

Component	Function	Remarks
Relief Solenoid Valve	Controls relief valve	Blue
Shift Indicator Light	Reveals shift condition to driver	
Switching Solenoid Valve	Controls switching valve of the air control valve	Gray
Switching Valve & Actuator	Adjusts the passage area of exhaust gas to turbocharger	
Throttle Body	Controls intake air quantity	
Throttle Sensor	Detects primary throttle valve opening angle; sends signal to control unit	
Turbocharger	Pressurizes intake air utilizing exhaust gas flow	Twin-scroll turbocharger
Twin-Scroll Turbocharger Solenoid Valve	Controls exhaust gas flow area	Green
Variable Resistor	Adjusts air/fuel ratio; sends signal to control unit	Tamper-proof
Waste Gate Valve	Controls amount of exhaust gas bypassing exhaust turbine to control intake air boost pressure	
Water Thermo Sensor	Detects engine coolant temperature; sends signal to control unit	Thermistor
Water Temperature Switch	Detects radiator coolant temperature; sends signal to control unit	

87U04B-002

SPECIFICATIONS

			13B Turbocharged engine
Idle speed		(rpm)	725—775 (with BAC valve)
Air cleaner	Element type		Long life dry
Throttle body	Type		Horizontal-draft (2 stage-3 barrel)
	Throat diameter	Primary (mm(in))	45 (1.772)
		Secondary (mm(in))	45 (1.772) x 2
	Water thermo valve	Operation temp (°C(°F))	58—62 (136.4—143.6) or more
Dashpot	Adjustment		1.8—3.8 kΩ (Throttle sensor)
Turbocharger	Type		Water cooled
	Lubrication		Engine oil
	Boost pressure		45.2 kPa (0.46 kg/cm², 6.56 psi)
Waste gate valve			Incorporated with turbocharger
Fuel tank	Capacity	(liter (us gal))	63 (16.6)
Fuel filter	Type	Low pressure	Nylon 6 (164 & 45 mesh)
		High pressure	Filter paper
Pressure regulator	Type		Diaphragm
	Regulated pressure	(kPa (kg/cm², lb/in²))	245.2—255.0 (2.5—2.6, 35.6—37.0)
Fuel pump	Type		Impeller (intank)
	Output pressure	(kPa (kg/cm², lb/in²))	490—637 (5.0—6.5, 71.1—92.4)
	Feeding capacity	(liter (us gal)/minute)	2.2—3.3 (0.58—0.87)
Injector (Primary and Secondary)	Drive		Voltage drive
	Injection volume [cc (cu in)/15 sec.]		133—142 (8.1—8.7)
Heat hazard sensor	Operation temperature	(°C (°F))	105—115 (221—239)
Main silencer	Capacity	(cc (cu in))	12,000 (732) x 2
Ignition timing			Leading: 5° ATDC Trailing: 20° ATDC (at idle)
Distribution	Type		Control unit
Spark advance	Type		Control unit
Idle up system	A/C	(rpm)	800
Anti-afterburn valve	Operating time	(sec)	1.60—2.20
Exhaust gas recirculation valve	Valve opening vacuum	(mmHg (inHg))	Min 50 (1.97)
Intercooler	Type		Air cooled

87U04B-003

TROUBLESHOOTING GUIDE

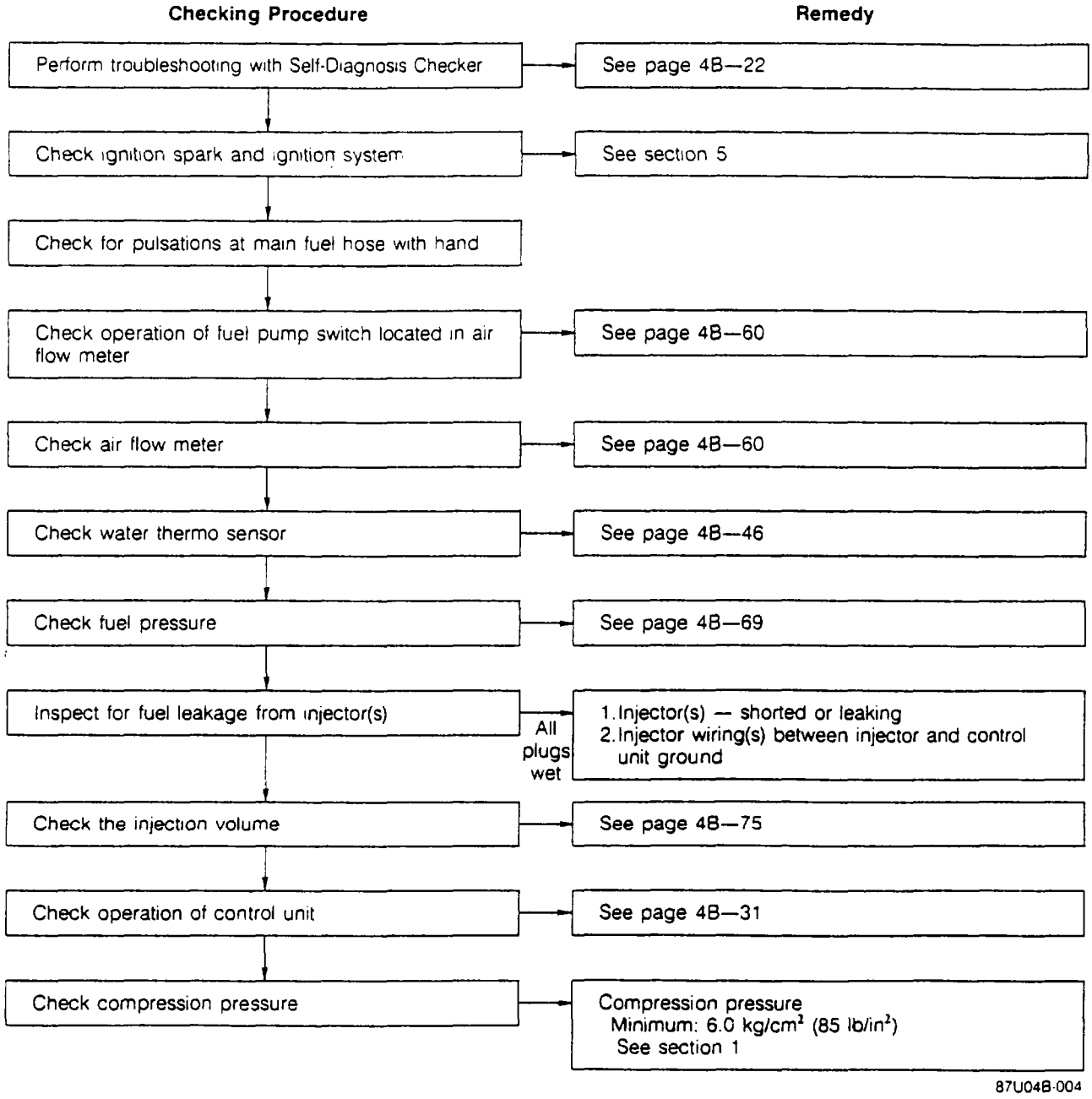
PRELIMINARY CHECKS

When troubleshooting, always first check the below.

1. Main relay
2. Main fuse
3. Circuit opening relay
4. Fuses
5. Connectors
6. Vacuum hoses and air hoses routing

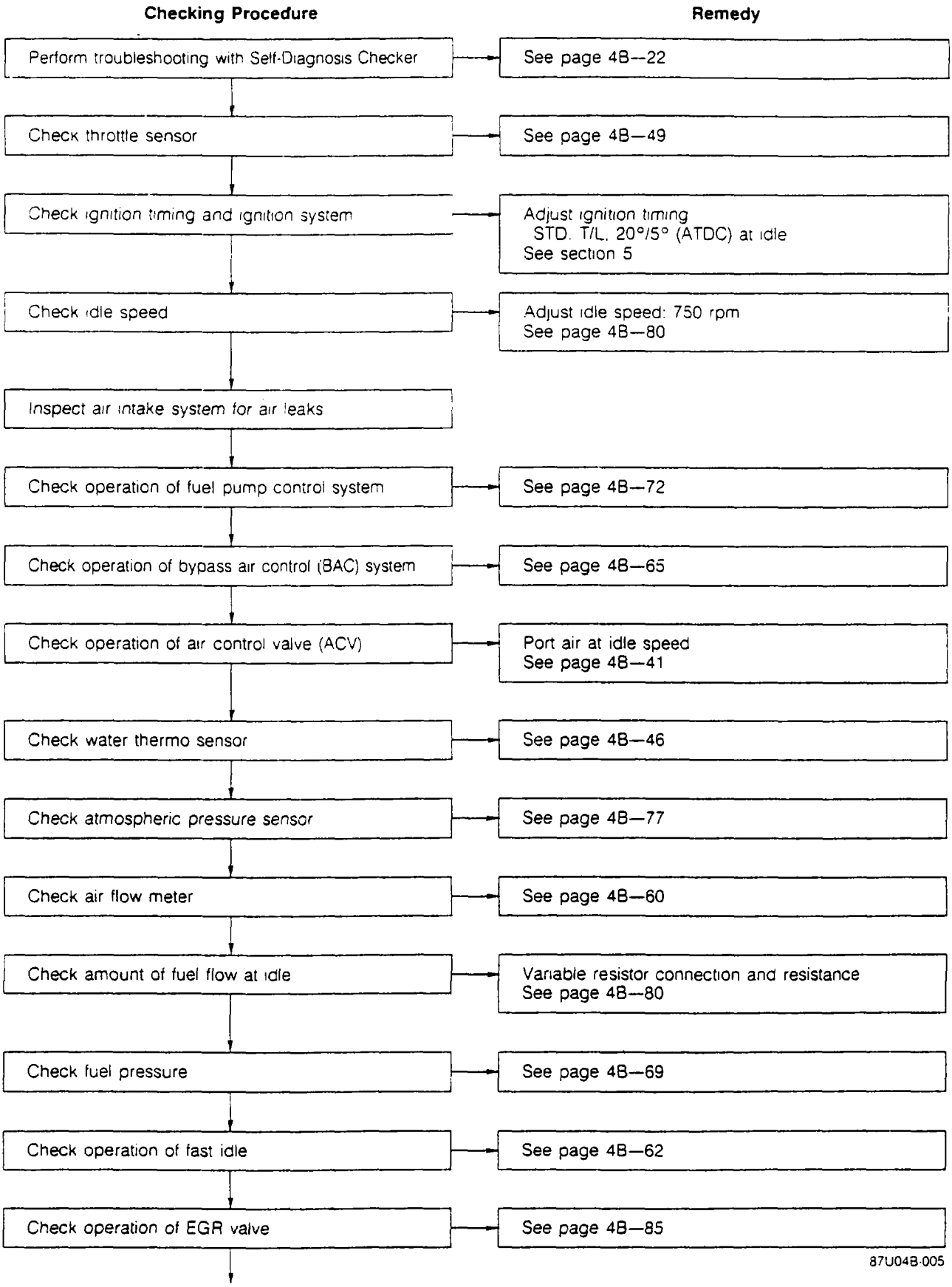
77U04B-050

1. HARD START OR NO START (CRANKS OK)



87U04B-004

2. ROUGH IDLE

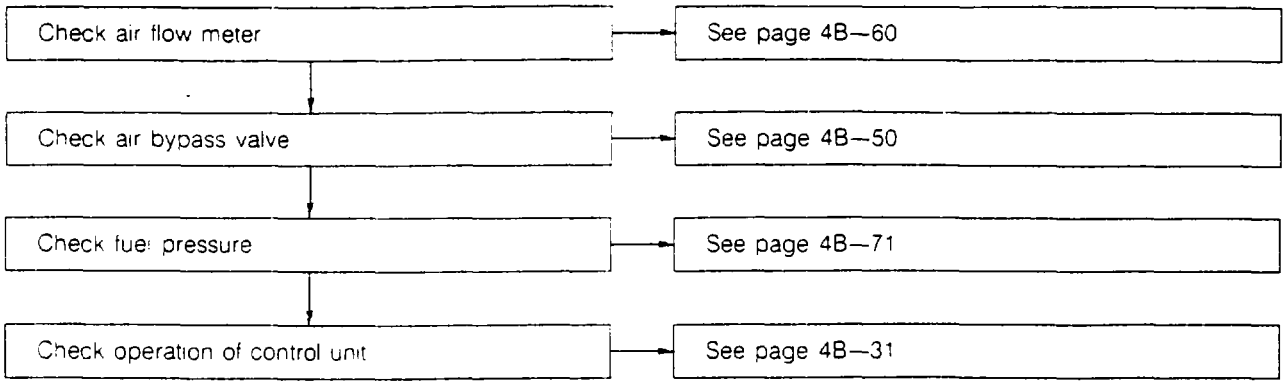

Checking Procedure
Remedy
Perform troubleshooting with Self-Diagnosis Checker
See page 4B—22
Check throttle sensor
See page 4B—49
Check ignition timing and ignition system
Adjust ignition timing
STD. T/L. 20°/5° (ATDC) at idle
See section 5
Check idle speed
Adjust idle speed: 750 rpm
See page 4B—80
Inspect air intake system for air leaks
Check operation of fuel pump control system
See page 4B—72
Check operation of bypass air control (BAC) system
See page 4B—65
Check operation of air control valve (ACV)
Port air at idle speed
See page 4B—41
Check water thermo sensor
See page 4B—46
Check atmospheric pressure sensor
See page 4B—77
Check air flow meter
See page 4B—60
Check amount of fuel flow at idle
Variable resistor connection and resistance
See page 4B—80
Check fuel pressure
See page 4B—69
Check operation of fast idle
See page 4B—62
Check operation of EGR valve
See page 4B—85
87U04B-005

Check intake air temperature sensor located on air intake pipe	See page 4B—84
Check operation of control unit	See page 4B—31
Check compression pressure	Compression pressure Minimum: 6.0 kg/cm² (85 lb/in²) See section 1

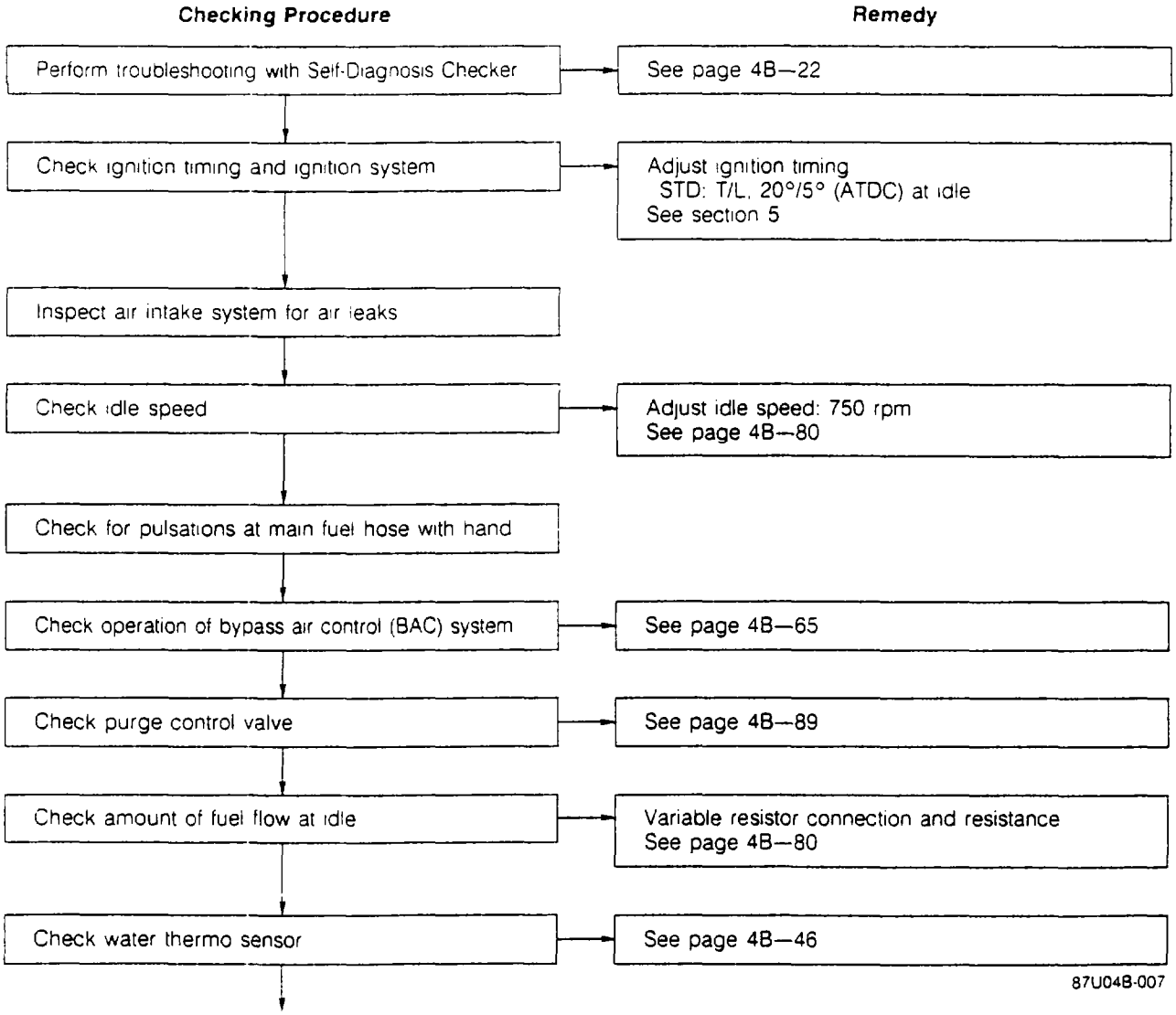
3. HIGH IDLE SPEED AT NORMAL OPERATING TEMPERATURE

Checking Procedure	Remedy
Perform troubleshooting with Self-Diagnosis Checker	See page 4B—22
Check that throttle valves operate smoothly	
Inspect air intake system for air leaks	
Check accelerator cable	See page 4B—64
Check operation of bypass air control (BAC) system	See page 4B—65
Check operation of air bypass solenoid valve	See page 4B—66
Check operation of air supply valve	See page 4B—66
Check 3B terminal voltage at control unit	See page 4B—31
Check idle speed	Adjust idle speed: 750 rpm See page 4B—80
Check ignition timing	Adjust ignition timing STD: T/L, 20°/5° (ATDC) at idle See section 5
Confirm fast idle cam releases from roller	See page 4B—63
Check operation of dashpot	See page 4B—50

87U04B-006



4. ENGINE DOES NOT RUN SMOOTHLY AT NORMAL OPERATING TEMPERATURE



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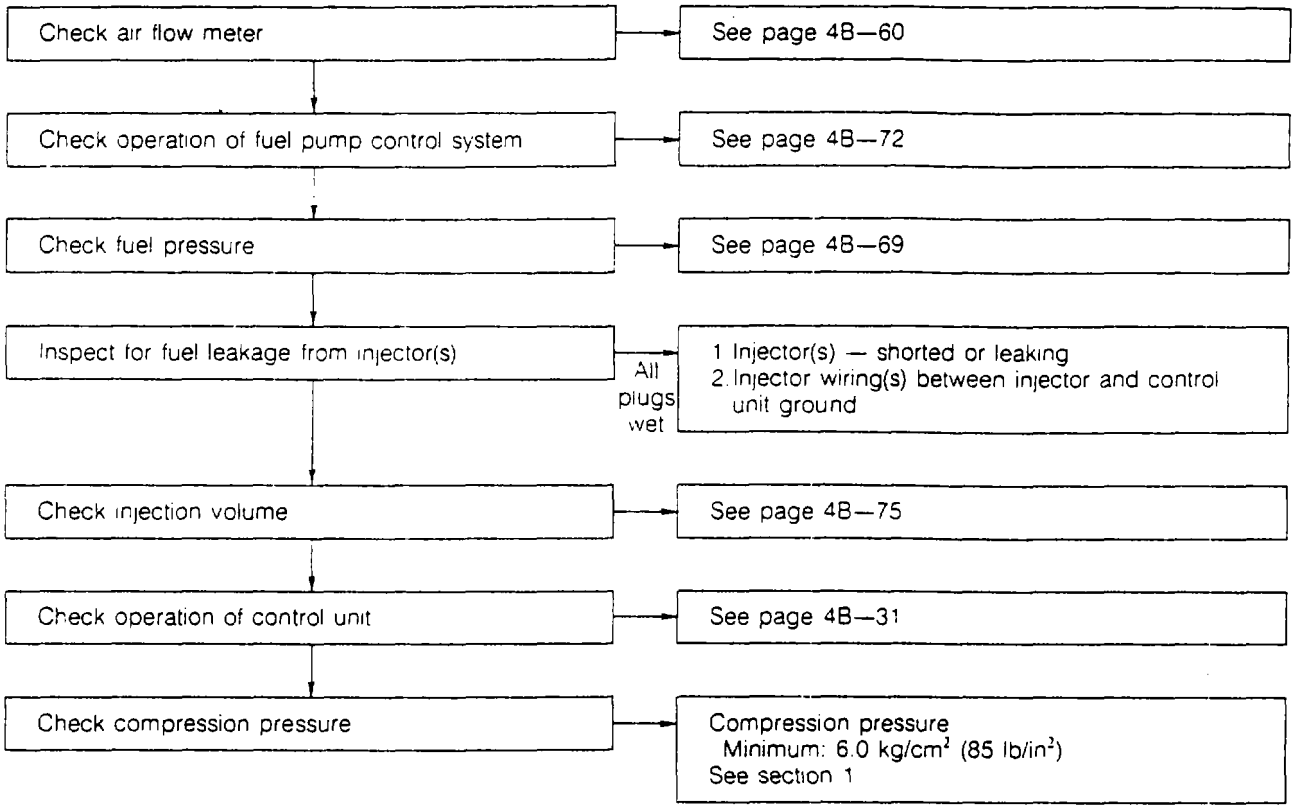
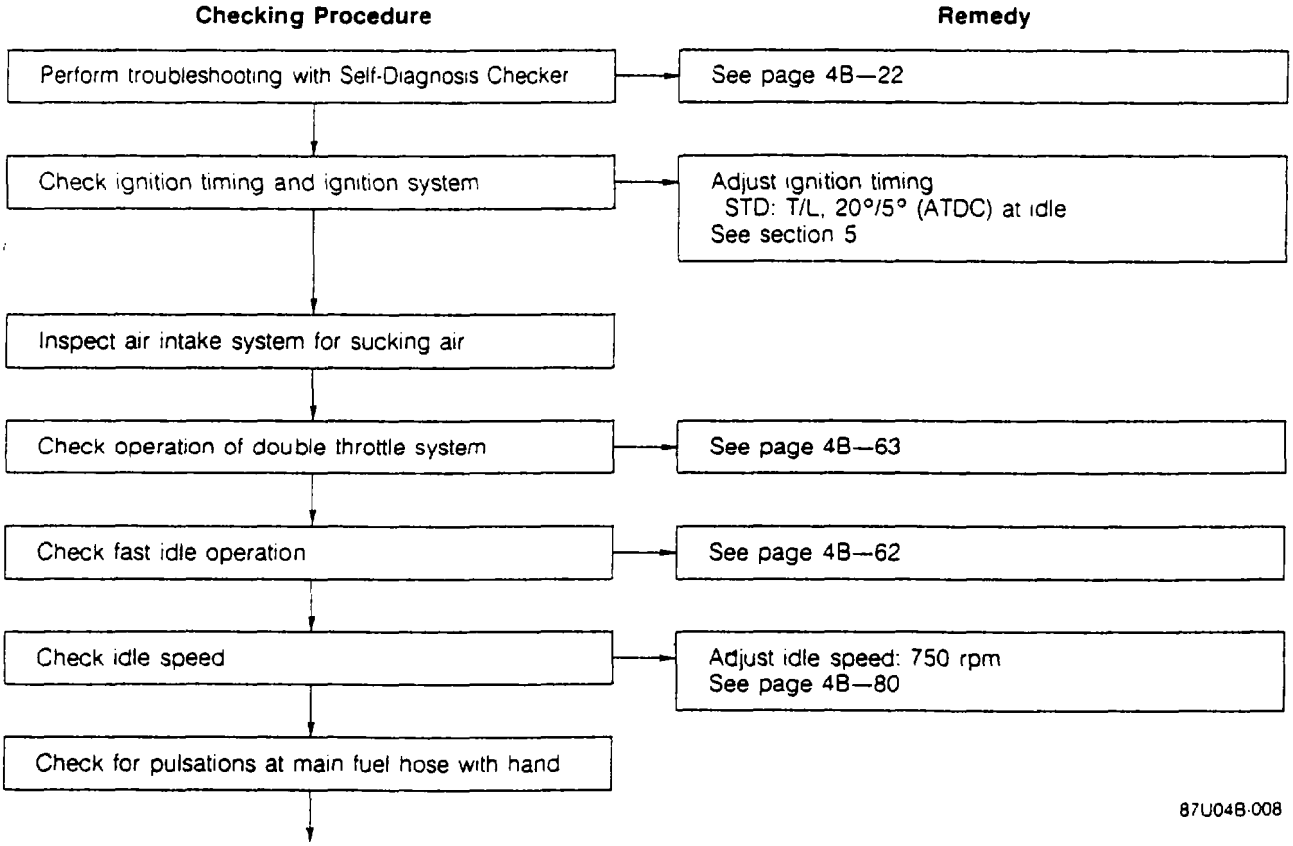
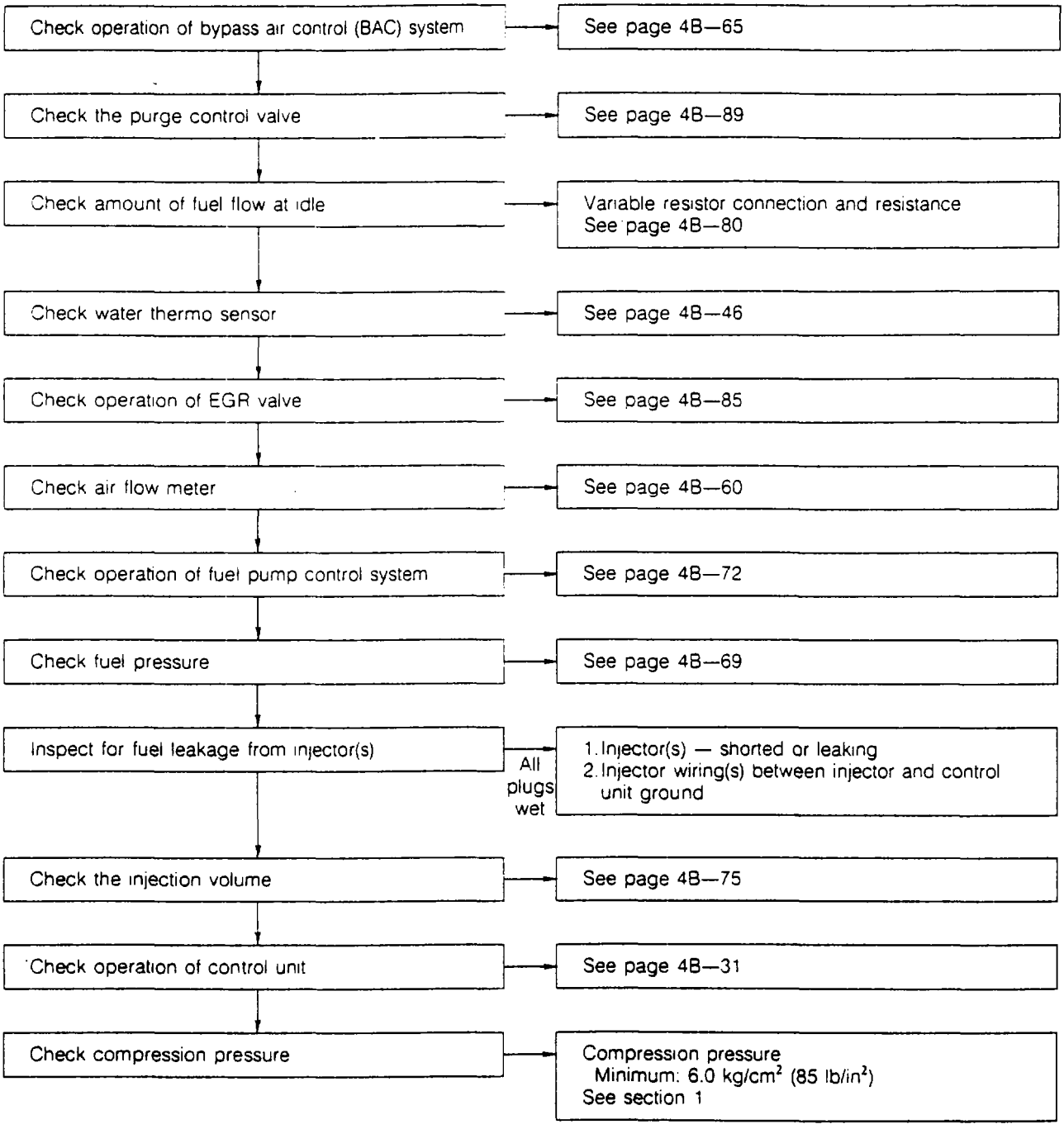


5. ENGINE DOES NOT RUN SMOOTHLY AT COLD CONDITION

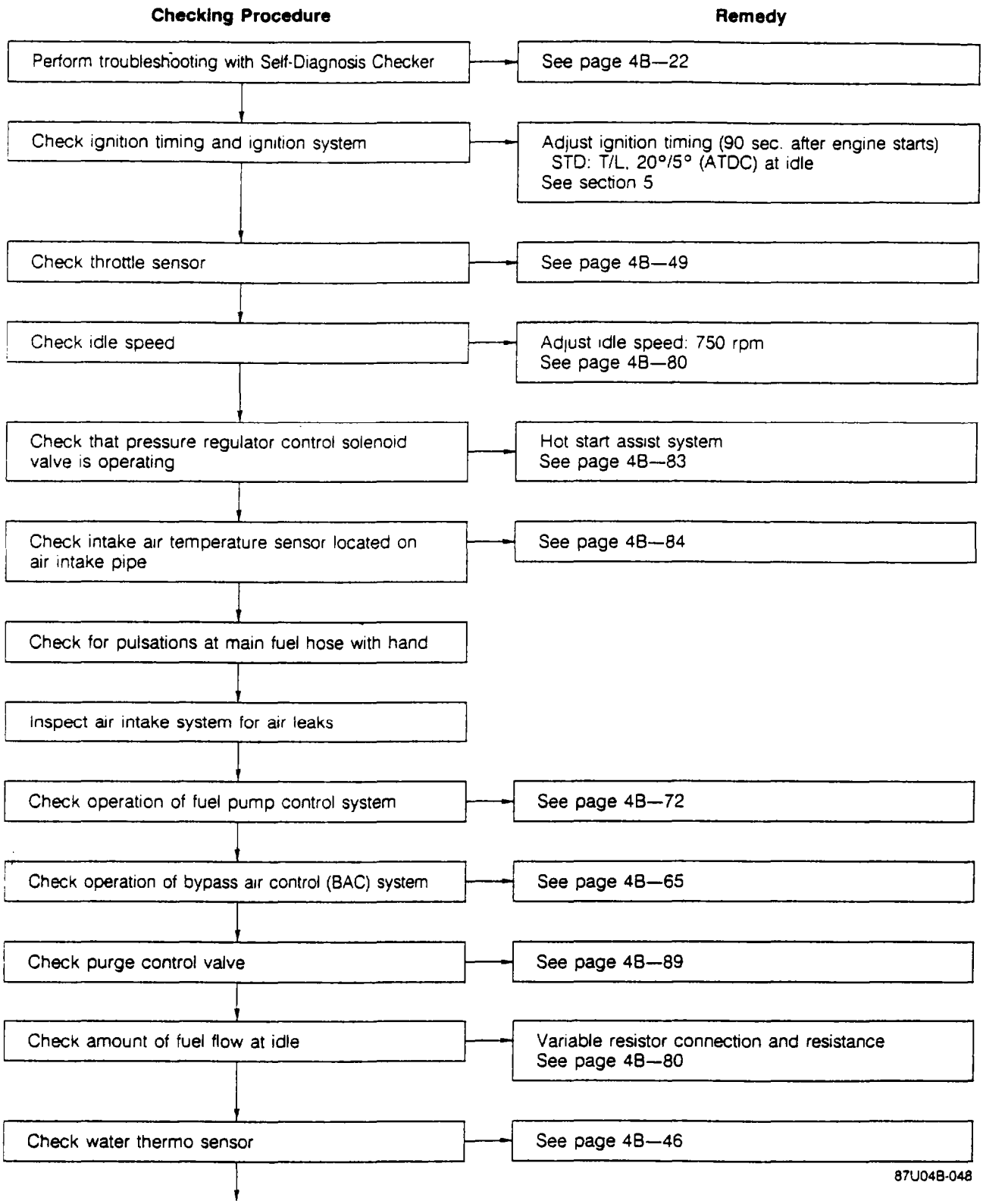


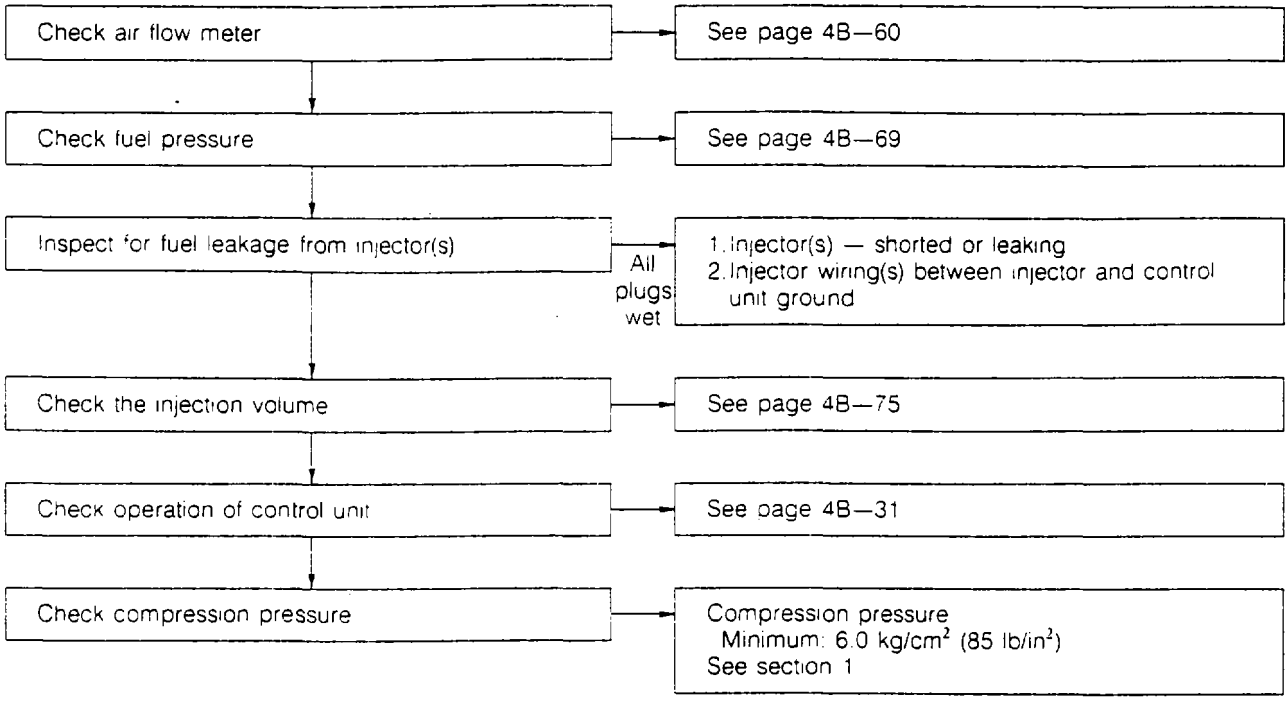
87U04B-008


Check operation of bypass air control (BAC) system
See page 4B—65
Check the purge control valve
See page 4B—89
Check amount of fuel flow at idle
Variable resistor connection and resistance
See page 4B—80
Check water thermo sensor
See page 4B—46
Check operation of EGR valve
See page 4B—85
Check air flow meter
See page 4B—60
Check operation of fuel pump control system
See page 4B—72
Check fuel pressure
See page 4B—69
Inspect for fuel leakage from injector(s)
All plugs wet
1. Injector(s) — shorted or leaking
2. Injector wiring(s) between injector and control unit ground
Check the injection volume
See page 4B—75
Check operation of control unit
See page 4B—31
Check compression pressure
Compression pressure
Minimum: 6.0 kg/cm² (85 lb/in²)
See section 1

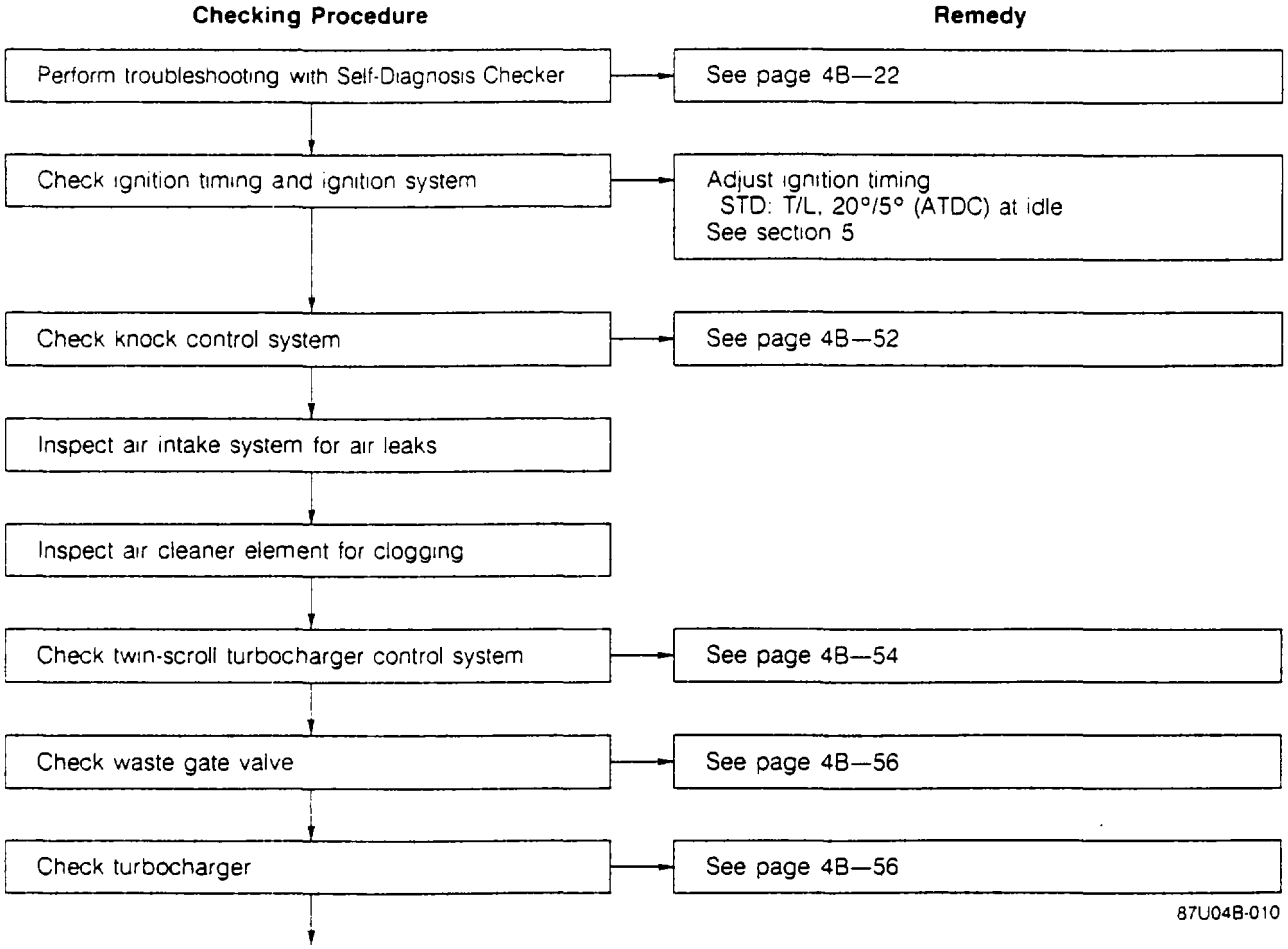
87U04B-009

6. ENGINE DOES NOT RUN SMOOTHLY AT HOT CONDITION





7. LACK OF POWER



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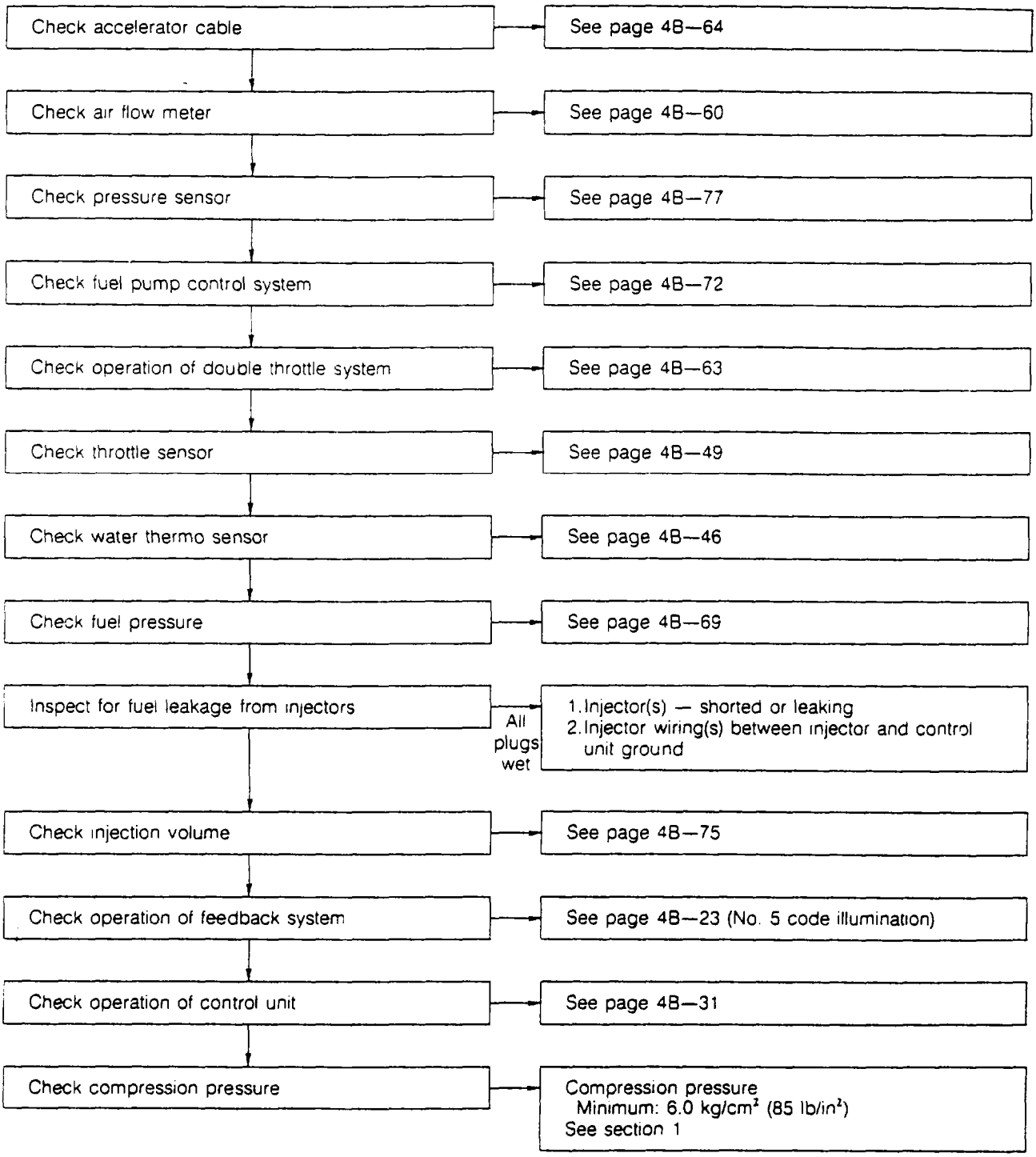


87U04B-011

8. POOR ACCELERATION OR HESITATION

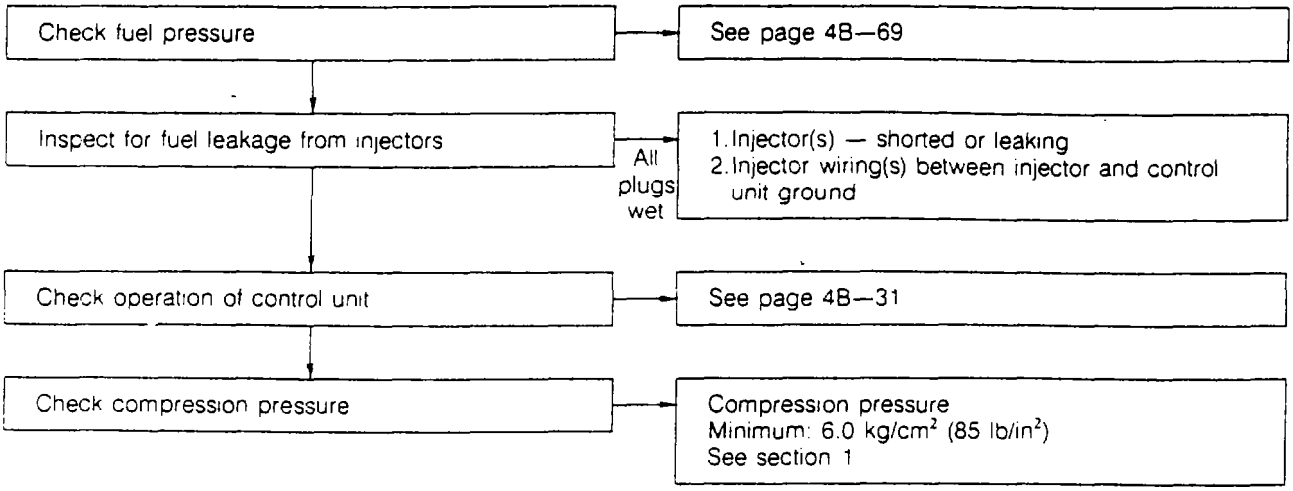
Refer to "LACK OF POWER"

67U04X-036

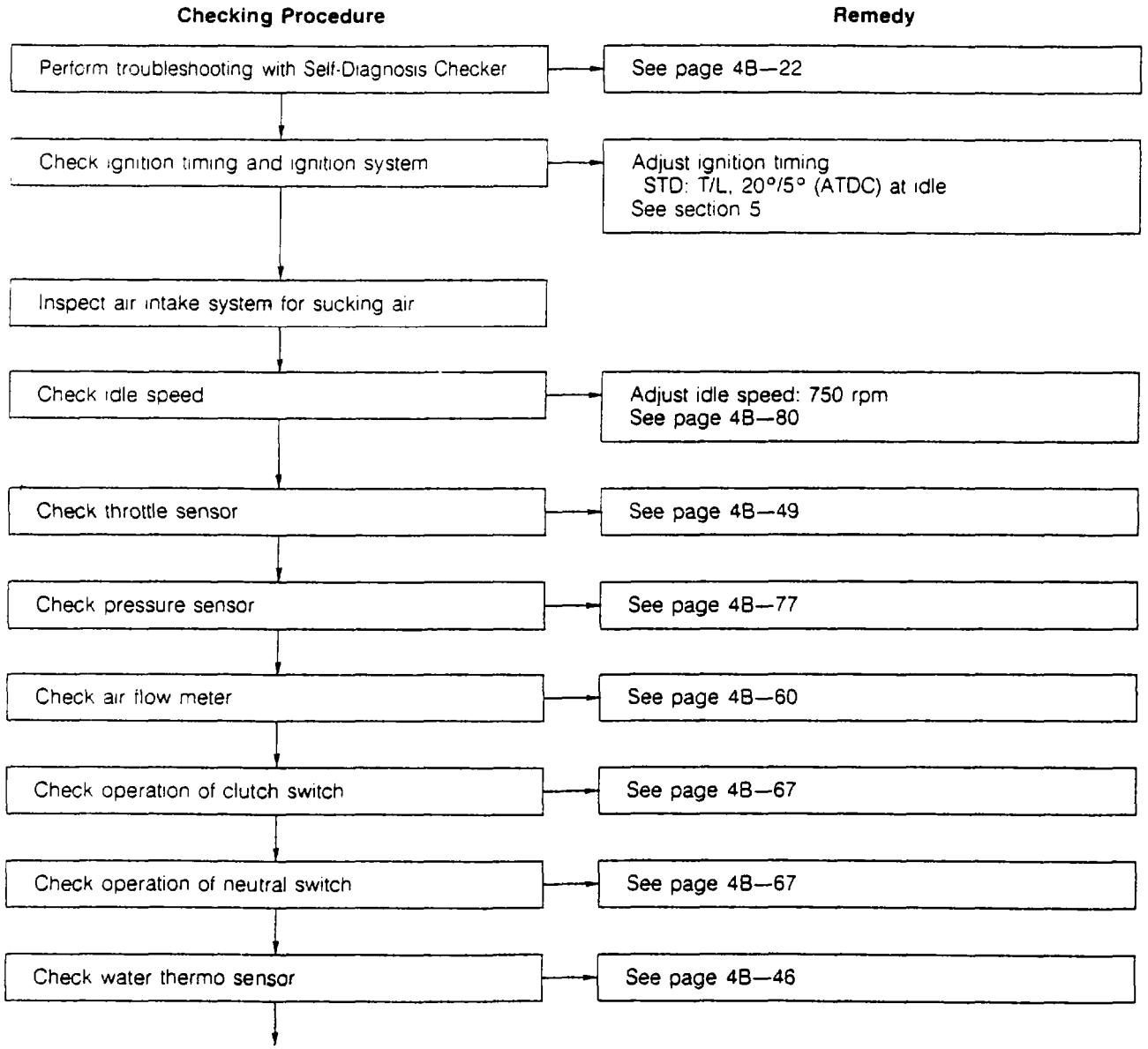
9. AFTERBURN

Checking Procedure	Remedy
Perform troubleshooting with Self-Diagnosis Checker	See page 4B—22
Check ignition timing and ignition system	Adjust ignition timing STD: T/L, 20°/5° (ATDC) at idle See section 5
Inspect air intake system for air leaks	
Check idle speed	Adjust idle speed: 750 rpm See page 4B—80
Check throttle sensor	See page 4B—49
Check pressure sensor	See page 4B—77
Check water thermo sensor	See page 4B—46
Check operation of air control valve (ACV)	Port air at idle speed See page 4B—41
Check operation of dashpot	See page 4B—50
Check that anti-afterburn valve (AAV) is operating	See page 4B—49
Check operation of bypass air control (BAC) system	See page 4B—65
Check fuel pump control system	See page 4B—72
Check air flow meter	See page 4B—60
Check amount of fuel flow at idle	Variable resistor connection and resistance See page 4B—80
Check operation of EGR valve	See page 4B—85

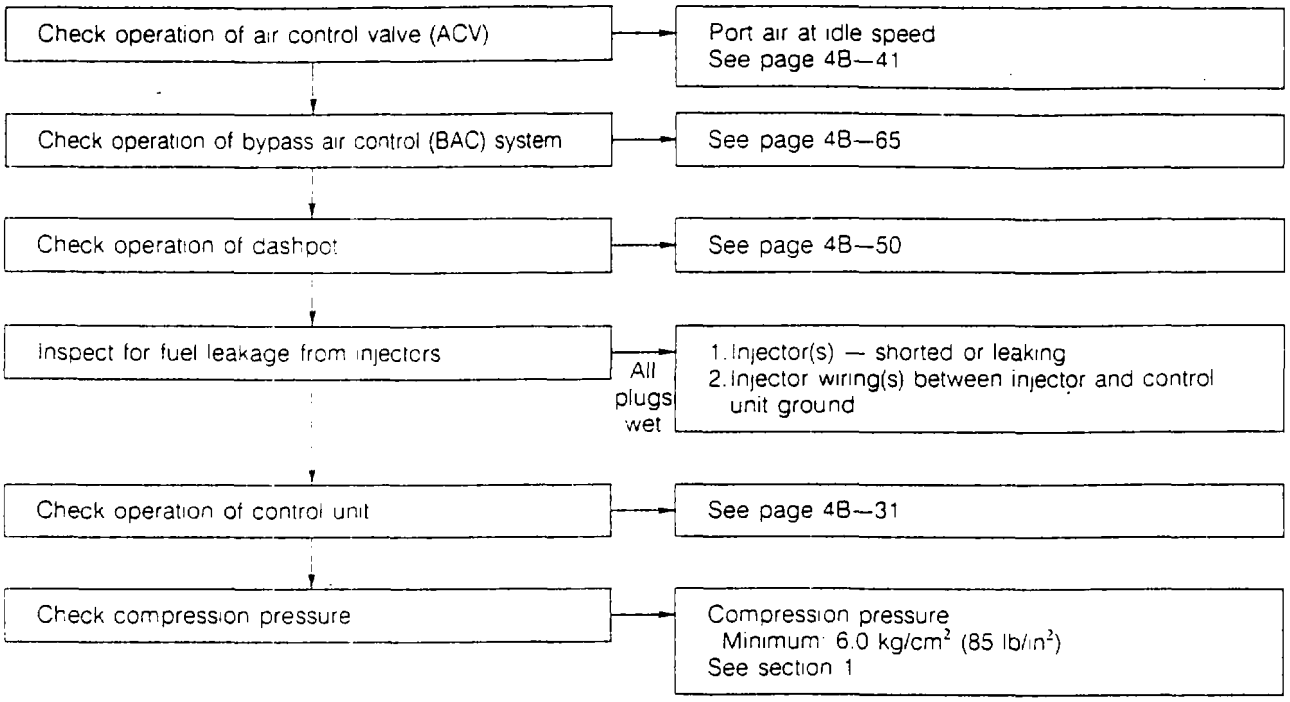
87U04B-012

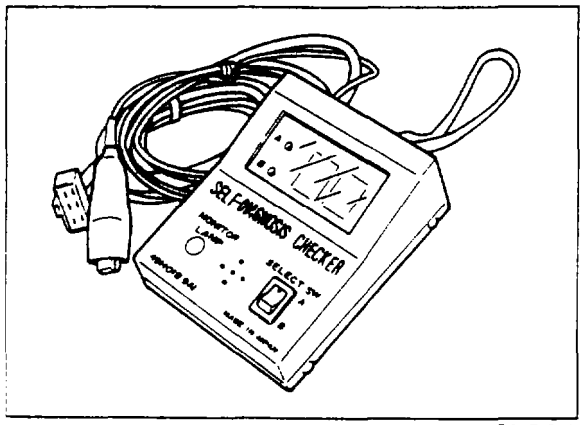


10. RUNS ROUGH ON DECELERATION



87U04B-013


Check operation of air control valve (ACV)
Port air at idle speed
See page 4B—41
Check operation of bypass air control (BAC) system
See page 4B—65
Check operation of dashpot
See page 4B—50
Inspect for fuel leakage from injectors
All plugs wet
1. Injector(s) — shorted or leaking
2. Injector wiring(s) between injector and control unit ground
Check operation of control unit
See page 4B—31
Check compression pressure
Compression pressure
Minimum: 6.0 kg/cm² (85 lb/in²)
See section 1



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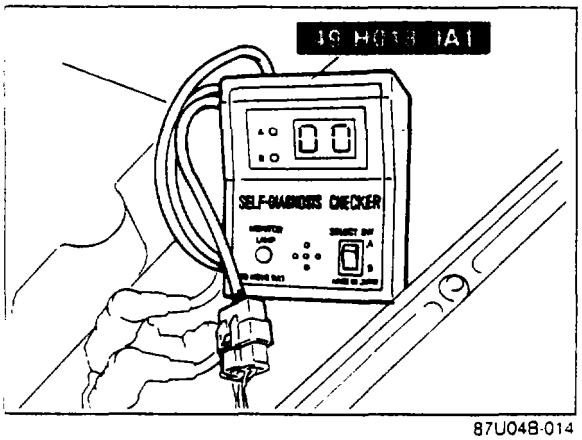


87U04B-014

SELF-DIAGNOSIS CHECKER

Self-Diagnosis Checker (49 H018 9A1)

Self-Diagnosis Checker (49 H018 9A1) can be used to detect (via the control unit check terminal) problems with each sensor and damaged wiring, poor contact or short circuits between the sensors and the control unit.

The code numbers are shown in the table below.

INSPECTION

1. Warm up the engine to normal operating temperature.
2. Connect **Self-Diagnosis Checker** (49 H018 9A1) to the check connector as shown.
3. Turn the select switch to "B" on **Self-Diagnosis Checker**.
4. Check for code number indication.
5. If a code number is indicated, check for the cause of the problem (Refer to 4B—24).

Note

The Self-Diagnosis Checker buzzer will sound for approx. 3 seconds after the ignition switch is turned ON.

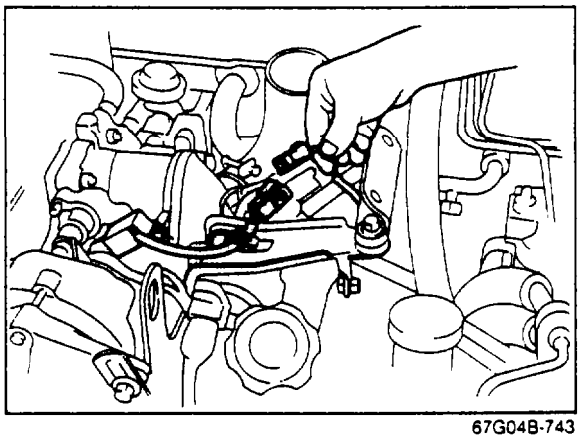
Code No.	Location problem	Fail safe function
01	Crank angle sensor	—
02	Air flow meter	Maintains basic signal at preset value
03	Water thermo sensor	Maintains constant 80°C (176°F) command
04	Intake air temperature sensor (air flow meter)	Maintains constant 20°C (68°F) command
05	Oxygen (O_2) sensor	Stops feedback correction
06	Throttle sensor	Maintains constant 100% (approx.18°) command
07	Pressure sensor	Maintains constant 26.3 kPa (0.27 kg/cm^2, 3.82 psi) command
09	Atmospheric pressure sensor	Maintains constant command of sea-level pressure
12	Coil with igniter (trailing side)	Stops operation of ignition system (only trailing side)
15	Intake air temperature sensor (intake air pipe)	Maintains constant 20°C (68°F) command

87U04B-015

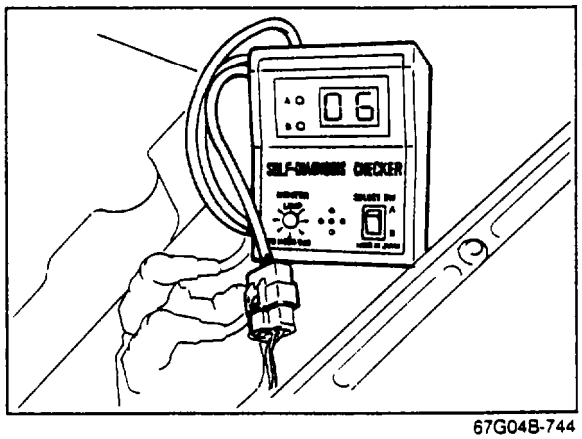
MONITOR LAMP (FEEDBACK SYSTEM)
Lamp flashes to indicate O2 sensor signal.

Monitor Lamp	Air/Fuel Ratio
ON	Too rich
Flashes ON and OFF	Best
OFF	Too lean

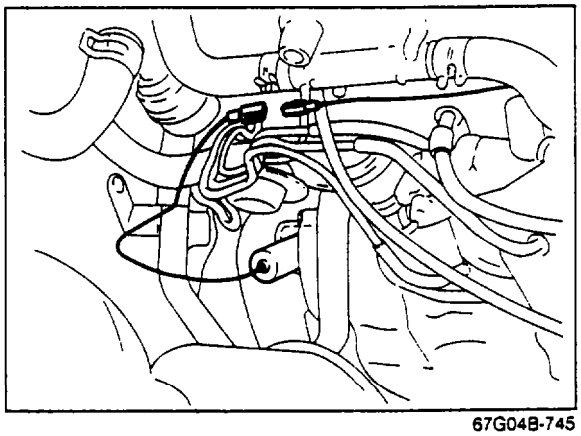
67G04B-742



67G04B-743



67G04B-744



67G04B-745

OPERATION OF FEEDBACK SYSTEM
Inspection

Step 1

Before checking the O_2 sensor, disconnect the neutral switch connector.

1. Warm up the engine, and stop it.
2. Remove the intercooler.
3. Disconnect the throttle sensor connector.
4. Install the intercooler in the reverse order of removal.
5. Start the engine and check the Self-Diagnosis Checker.
   Code number: 06
   Monitor lamp: ON

Step 2

6. Check that the monitor lamp starts to flash within 10 seconds after increasing the engine speed to between 1,500 and 2,000 rpm.

   Code number: 06
   Monitor lamp: Flashes ON and OFF

Step 3

7. Check that the number of flashes is within specification.

   Specification: more than 8 times/10 seconds (at 1,500—2,000 rpm)

Step 4

8. Hold the engine speed at 1,750 rpm and disconnect the O2 sensor connector.
   Check that the code number and lamp change as follows.

   Code number: 05
   Monitor lamp: OFF

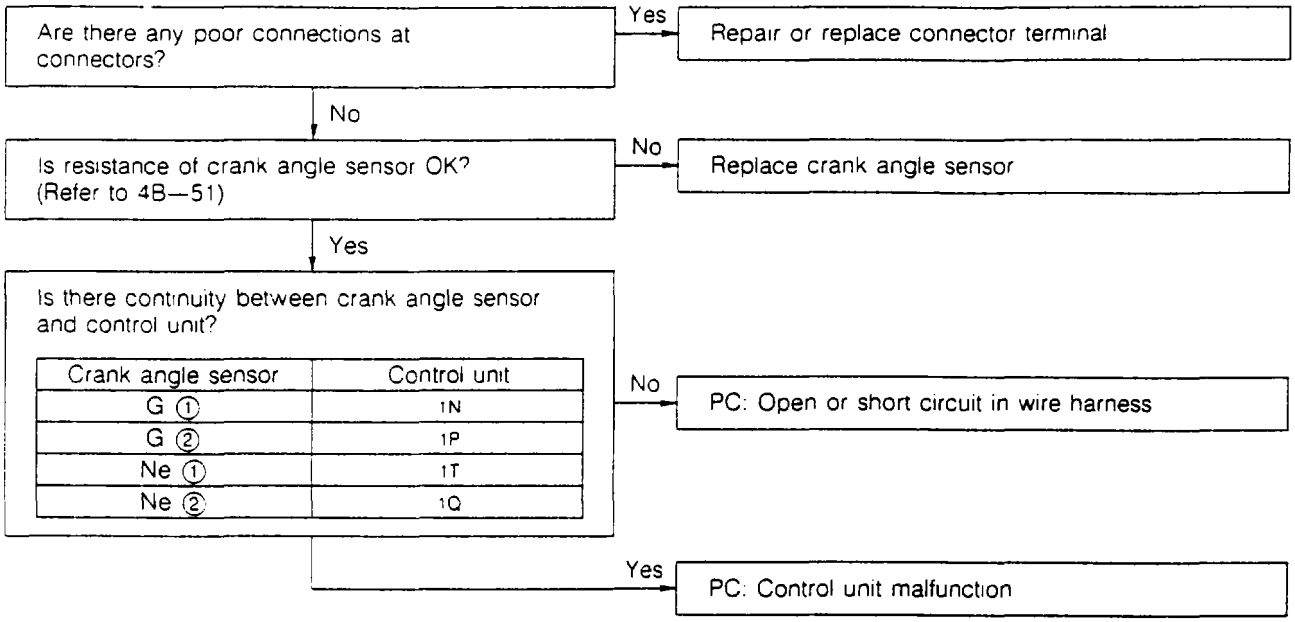
9. If the Self-Diagnosis Checker shows other than the above, the control unit is faulty.
10. Replace the control unit.

TROUBLESHOOTING WITH SELF-DIAGNOSIS CHECKER

If code a number is illuminated on the Self-Diagnosis Checker, check the following chart along with the wiring diagram (Section 50).

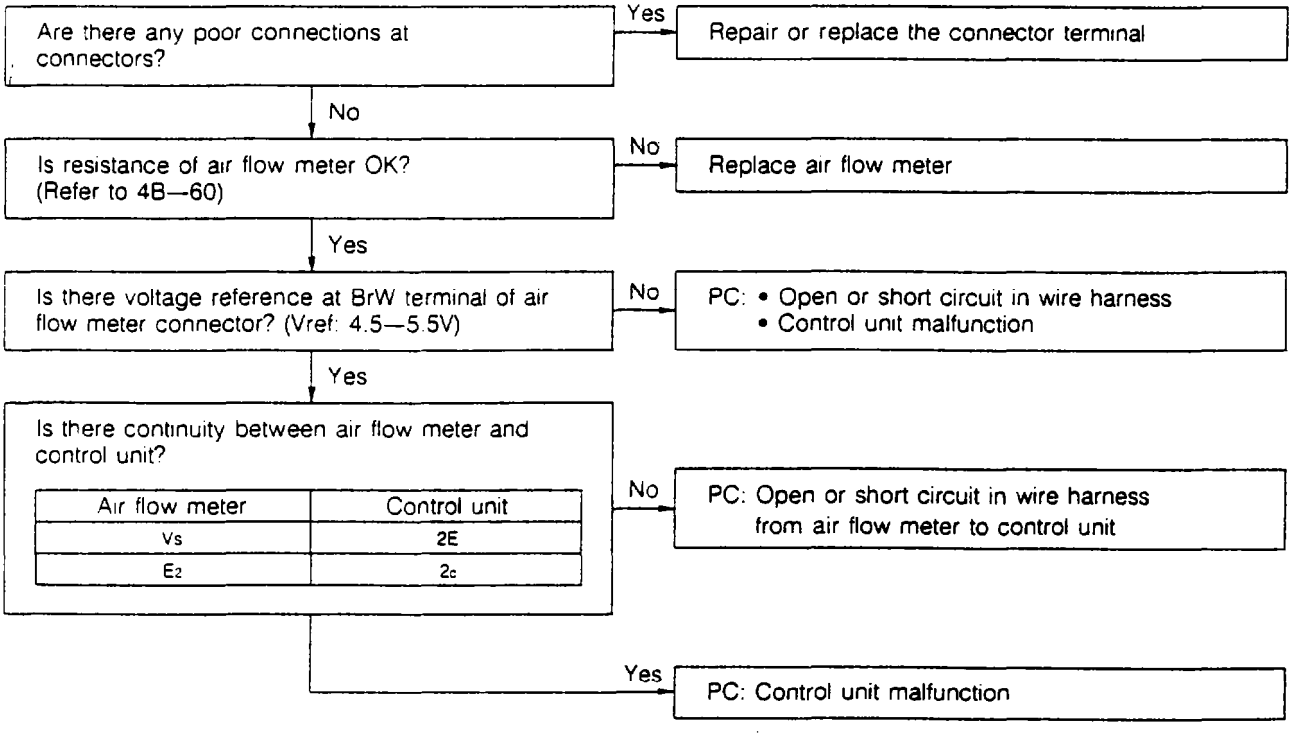
87U04B-016

No. 01 code illumination



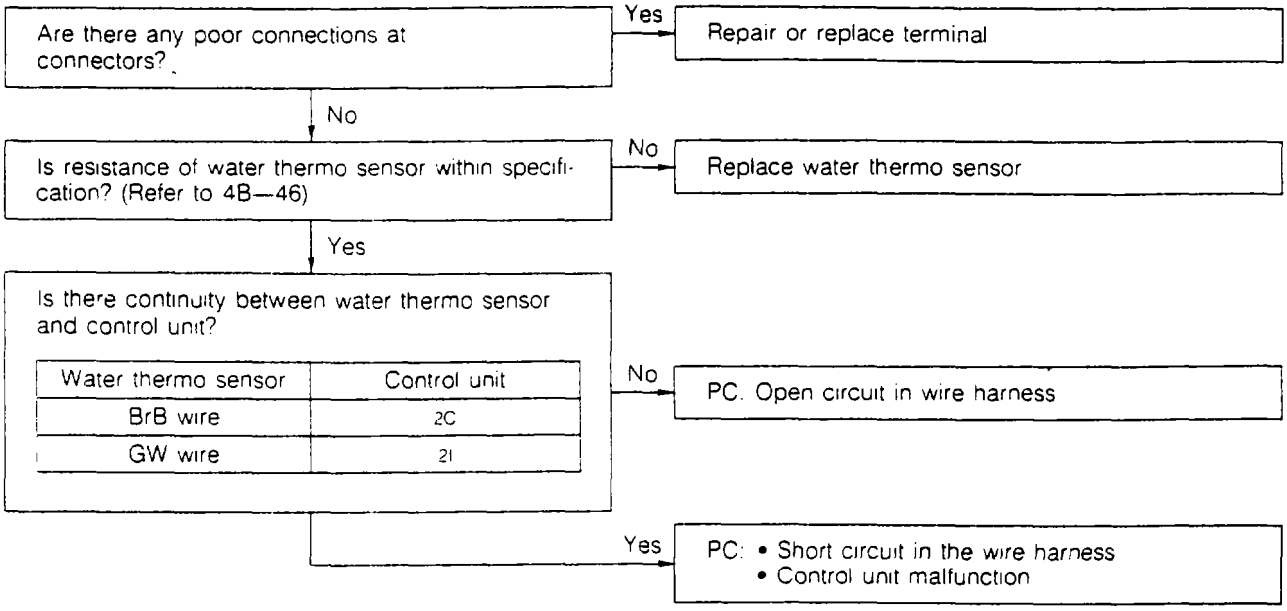
77U04B-063p

No. 02 code illumination



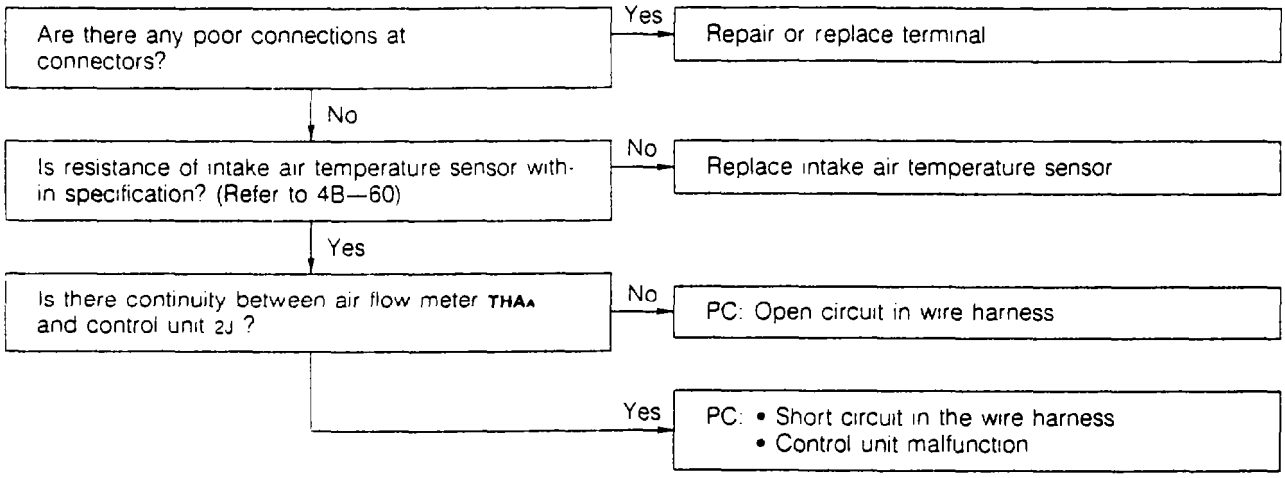
77U04B-064p

No. 03 code illumination



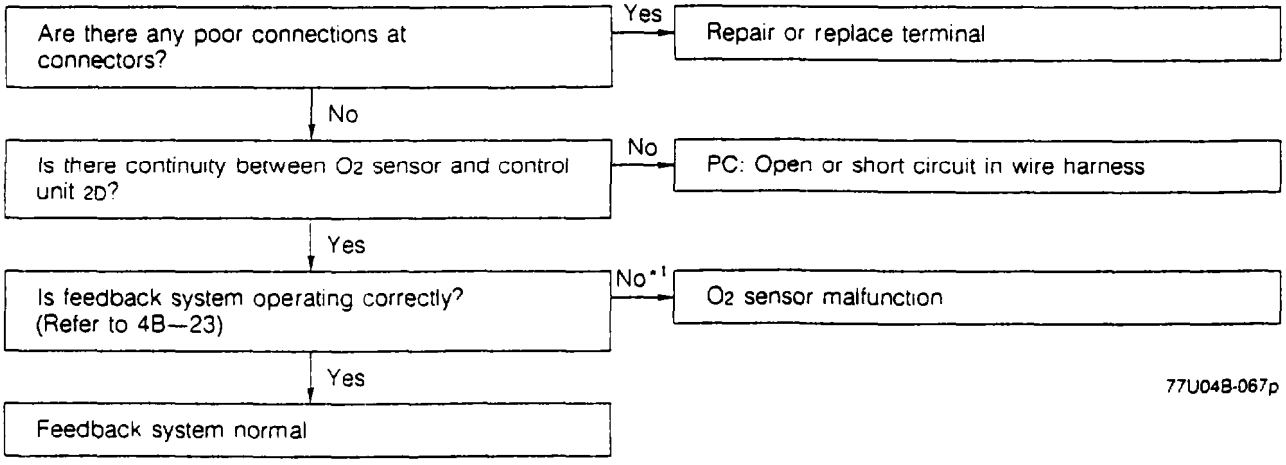
77U04B-065p

No. 04 code illumination



77U04B-066p

No. 05 code illumination

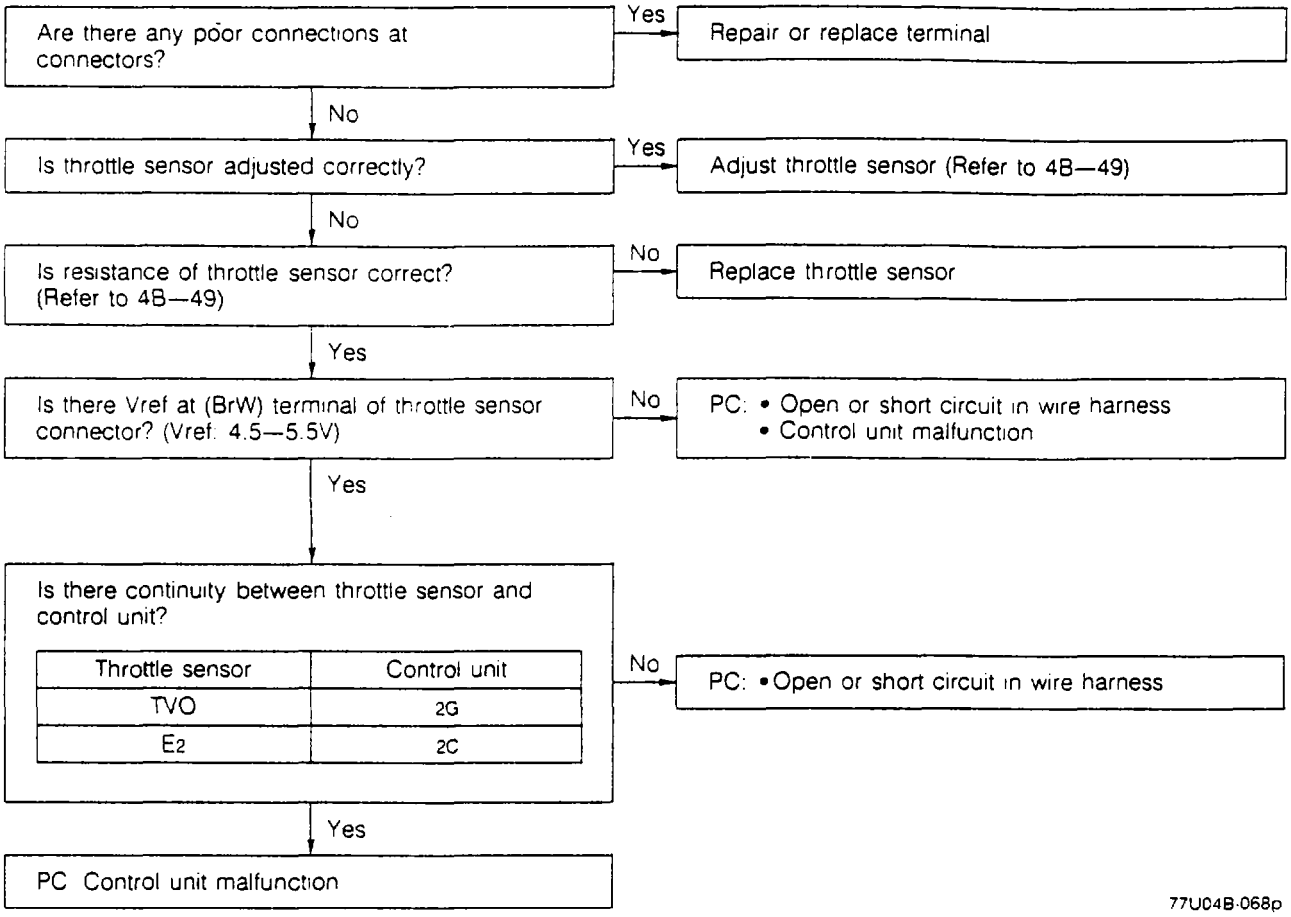


77U04B-067p

*1; Do not perform step 2 or step 3 on page 4B—23.

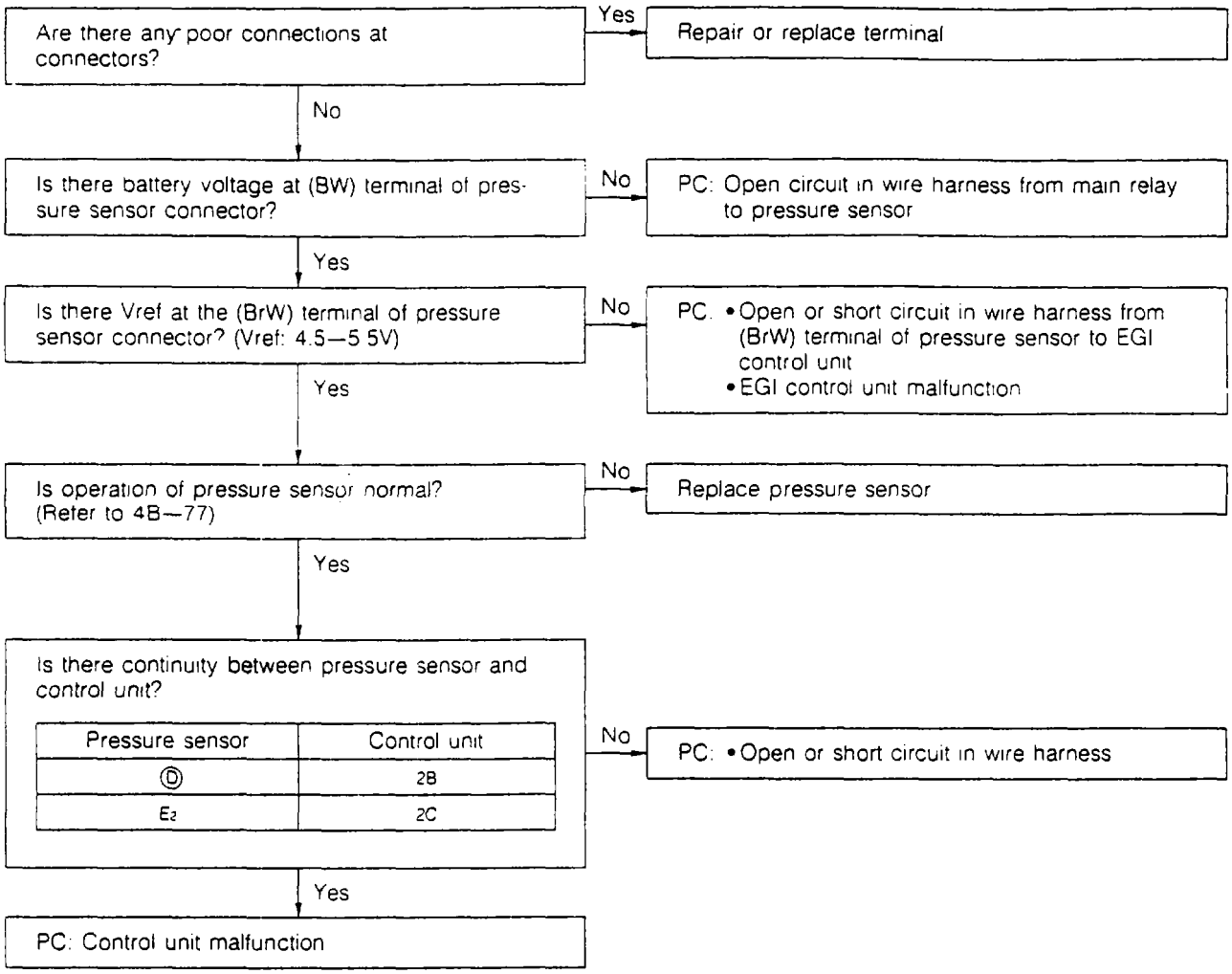
67U04X-212p

No. 06 code illumination



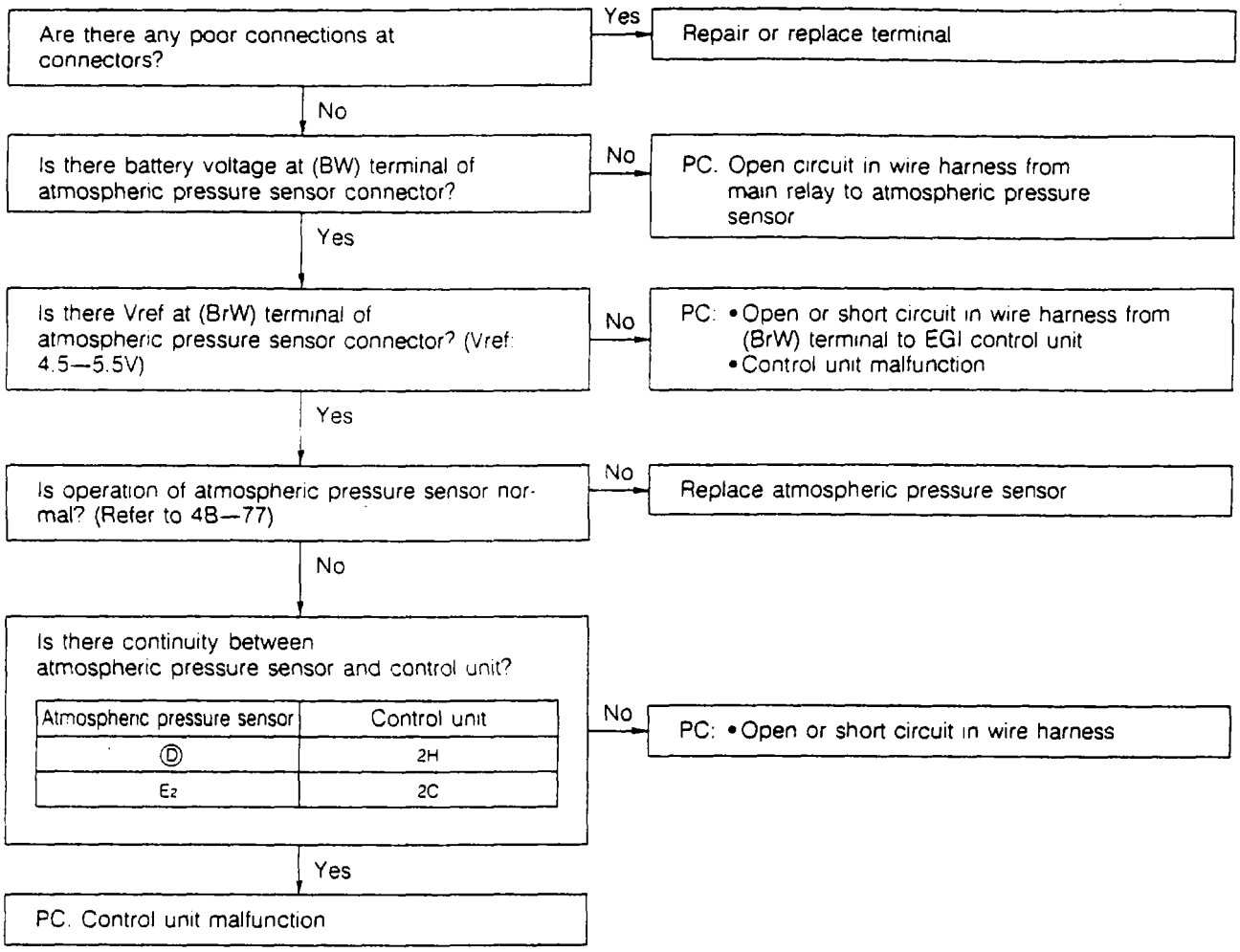
77U04B-068p

No. 07 code illumination



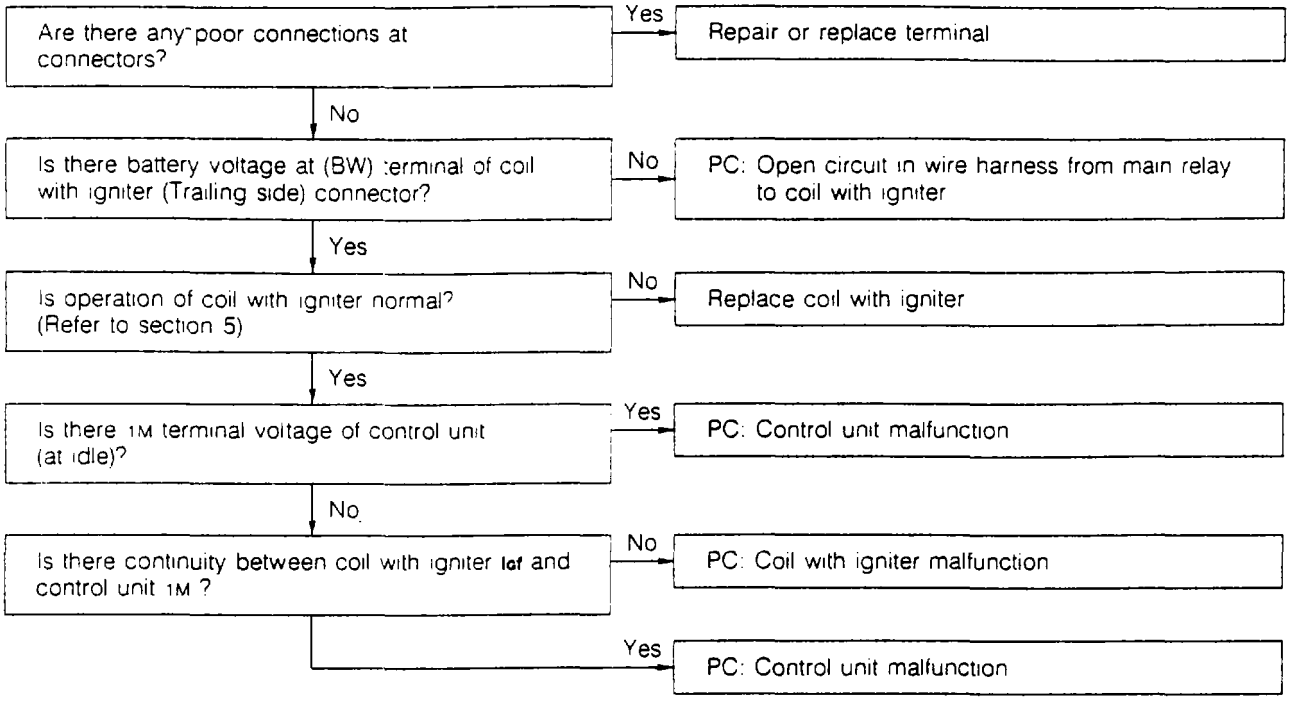
77U04B-069D

No. 09 code illumination



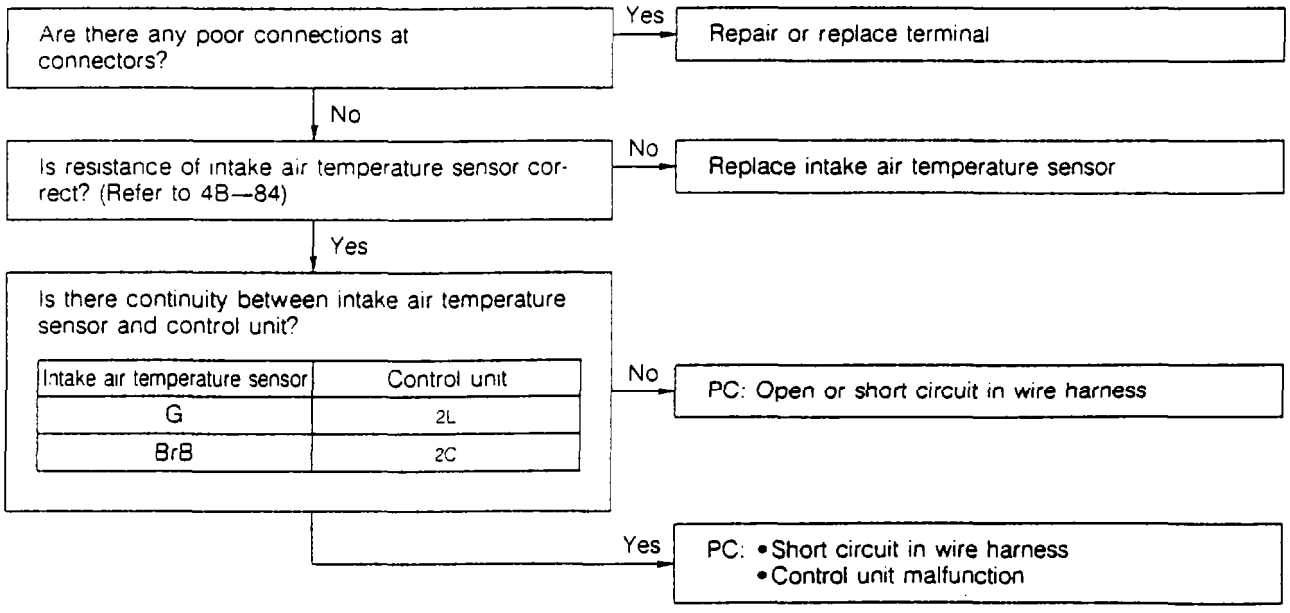
77U04B-070p

No. 12 code illumination



77U04B-116

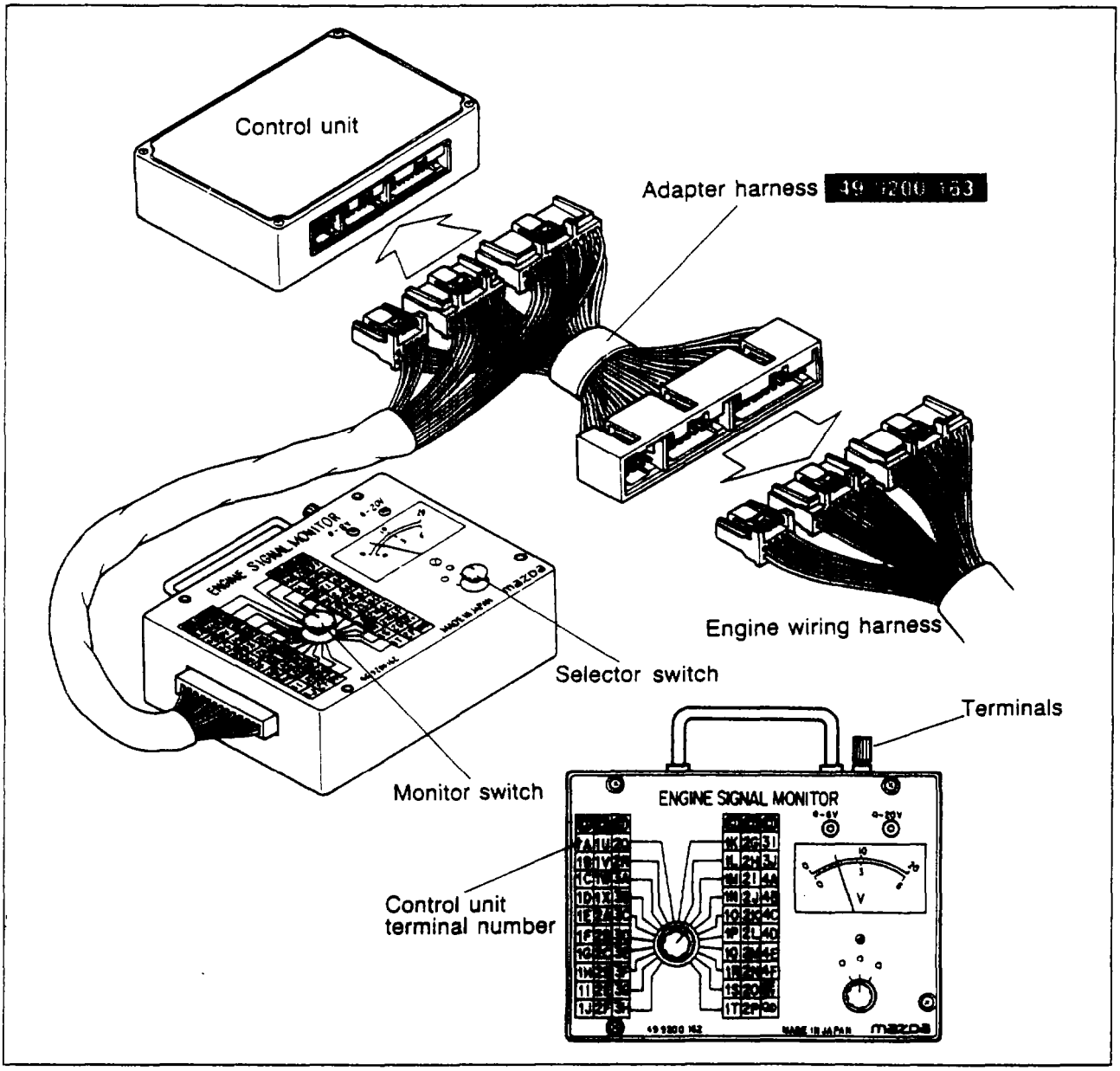
No. 15 code illumination



77U04B-072p

CONTROL UNIT

ENGINE SIGNAL MONITOR (49 9200 162) AND ADAPTER (49 9200 163)



87U04B-017

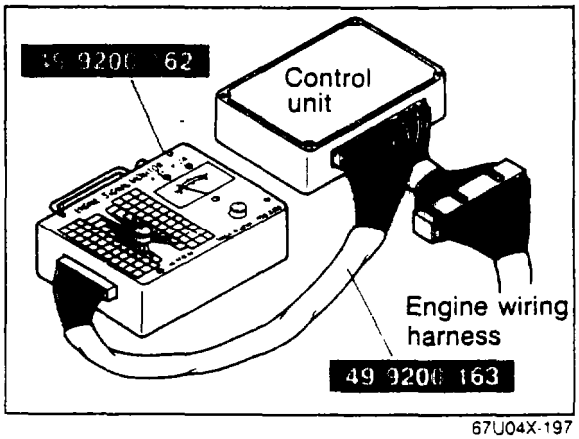
The **Engine Signal Monitor** (49 9200 162) has been developed to check the EGI control unit terminal voltage. This monitor easily inspects the terminal voltage by setting the monitor switch.

How to Use The Engine Signal Monitor

1. Connect the **Engine Signal Monitor** (49 9200 162) between the control unit and the engine harness using the **adapter** (49 9200 163).
2. Turn the selector switch and monitor switch to select the terminal number.
3. Check the terminal voltage.

Caution
Do not apply voltage to terminals.

77U04B-231



67U04X-197

INSPECTION

1. Connect **engine signal monitor** (49 9200 162) and **adapter** (49 9200 163) as shown in the figure.
2. Turn the ignition switch ON, and check the voltage of the terminals.

Caution

a. Before checking the control unit, warm up the engine to normal operating temperature.

b. If the proper voltage is not indicated on the voltmeter, check all wiring, connections and finally, check that component.

Terminal	Input	Output	Connection to	Voltage (after warming up)		Remark
				Ignition switch: ON	Idle	
1A		○	Self-Diagnosis Checker	Ignition switch OFF → ON for 3 sec. below 5V, after 3sec. approx. 12V		with Self-Diagnosis Checker
1B		○	Self-Diagnosis Checker	Ignition switch OFF → ON for 3 sec. below 5V after 3 sec. approx. 12V		with Self-Diagnosis Checker
1C		○	Air bypass solenoid valve	Approx. 12V		
1D		○	Self-Diagnosis Checker (Monitor lamp)	Ignition switch OFF → ON for 3 sec. below 5V after 3 sec. approx. 12V		with Self-Diagnosis Checker
1E	○		A/C switch	below 2.5V (A/C: ON), approx. 12V (A/C: OFF)		Blower motor ON
1F		○	A/C main relay	approx. 12V (A/C: OFF)		Blower motor ON
1G	○		Neutral switch	below 1.5V (in neutral), approx. 12V (others)		
1H	○		Water temperature switch	below 1.5V (water temperature; above 17°C (62.6°F))		
1I	○		5th switch	below 1.5V; (Others), approx. 12V (5th gear)		
1J	○		Initial set coupler	approx. 4—7V (Initial set coupler: OFF), below 1.5V (Initial set coupler: ON)		
1K		○	Shift indicator light	below 1.5V	approx. 12V	
1L	○		Clutch switch	below 1.5V (clutch pedal; released) approx. 12V (clutch pedal; depressed)		
1M	○		Coil with igniter (Trailing) IGf-T	below 2V	*1	
1N	○		Crank angle sensor G ①	below 1.0V		G
1O	○		Mileage switch	approx. 12V (below 20,000 miles), below 1.5V (above 20,000 miles)		
1P	○		Crank angle sensor G ②	below 1.0V		B
1Q	○		Crank angle sensor Ne ②	below 1.0V		W
1R	○		Knock control unit	3—5V		
1S		○	Port air solenoid valve	approx. 12V		Mileage switch ON: below 2.5V
1T	○		Crank angle sensor Ne ①	below 1.0V		R

87U048-018

Terminal	Input	Output	Connection to	Voltage (after warming up)		Remark
				Ignition switch: ON	Idle	
1U		○	Coil with igniter (Trailing) IGs-T (Select signal)	approx. 4.4V	approx. 2.2V	
1V		○	Coil with igniter (Leading) IGT-L (Ignition timing signal)	0V	approx. 0.8V	
1W	○		Heat hazard sensor	below 1.5V	approx. 12V	Floor Temp.: below 110°C (230°F)
1X		○	Coil with igniter (Trailing) IGT-T (Ignition timing signal)	0V	approx. 0.8V	
2A		○	V ref	4.5—5.5V		
2B	○		Pressure sensor	2.3—2.7V		Disconnect vacuum hose
2C	—	—	Ground	0V		
2D	○		O_2 sensor	below 1.0V		Acceleration: 0.5—1.0 V Deceleration: 0—0.4 V
2E	○		Air flow meter (Vs)	approx. 4V	2.5—3.5V	
2F	○		Variable resistor	1—4V (varies according to the variable resistor adjustment)		
2G	○		Throttle sensor (TVO)	approx. 1V (throttle sensor adjusted properly)		
2H	○		Atmospheric pressure sensor	3.5—4.5V (at sea level) 2.5—3.5V (at 2,000 m (6,500 ft))		
2I	○		Water thermo sensor	approx. 0.4—1.8V		Warm engine
2J	○		Air flow meter (intake air temperature sensor)	2—3V at 20°C (68°F)		
2K		○	Twin-scroll turbocharger solenoid valve	below 2.0V		above 2,700 rpm: approx. 12V
2L	○		Intake air temperature sensor (inlet air pipe)	1—2V at 80°C (176°F)		
2M		○	Pressure regulator control solenoid valve	below 2.0V	approx. 12V	Cranking: below 2.0V
2N		○	EGR solenoid valve	approx. 12V		
2O		○	Switching solenoid valve	approx. 12V (throttle sensor is adjusted properly)	approx. 12V	
2P		○	Relief solenoid valve	below 2V (throttle sensor is adjusted properly)	below 2.0V	
2Q		○	Bypass air control (BAC) valve	8—12V Engine signal monitor green and red light flash		
2R	—	—	Ground	0V		
3A	—	—	Ground	0V		
3B	○		Starter switch	below 1.5V		approx. 10V (at cranking)
3C		○	Injector (Rear primary)	approx. 12V	approx. 12V*1	

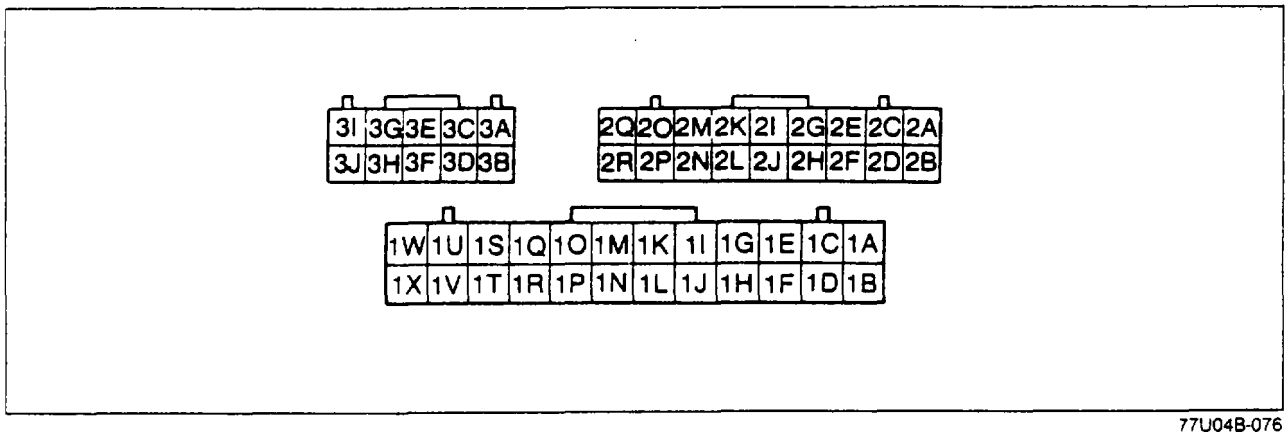
87U048-019

Terminal	Input	Output	Connection to	Voltage (after warming up)		Remark
				Ignition switch: ON	Idle	
3D		○	Fuel pump resistor relay	approx. 12V	below 2.0V	
3E		○	Injector (Front primary)	approx. 12V	approx. 12V*1	
3F		○	Injector (Rear secondary)	approx. 12V		
3G	—	—	Ground	0V		
3H		○	Injector (Front secondary)	approx. 12V		
3I	—	—	Main relay	approx. 12V		
3J	○		Battery	approx. 12V		

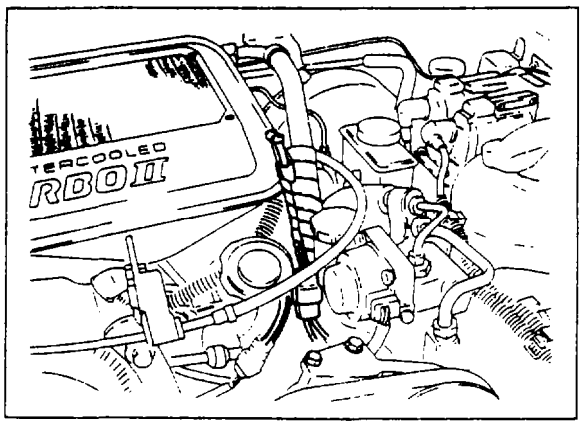
*1: Engine signal monitor green and red light flash

87U04B-020

Control unit connector (Control unit side)



77U04B-076

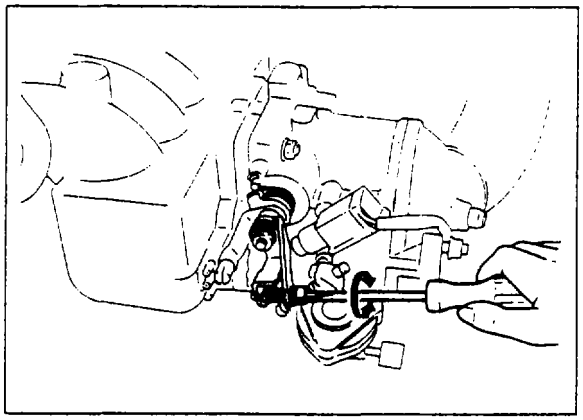


67U04X-007

EMISSION CHECKING PROCEDURE

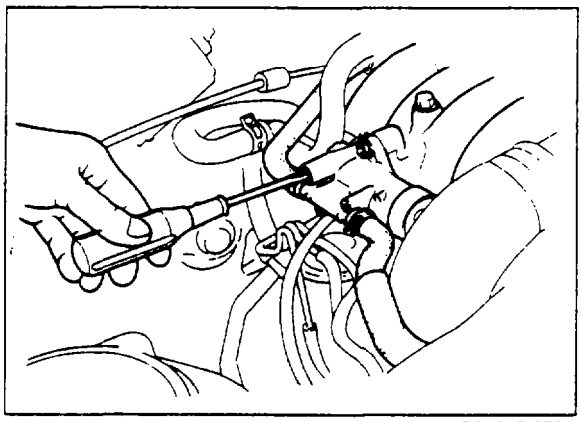
INSPECTION OF THROTTLE SENSOR

1. Warm up the engine, then turn it off.
2. Connect the **checker lamp** (49 F018 001) to the check connector (Green).
3. Turn the ignition switch on and check whether one of the lamps illuminates.



77U04B-077

4. If both lamps illuminate or neither does, turn the throttle sensor adjusting screw until only one of the lamps illuminates.
   a) If both lamps illuminate, turn the adjusting screw clockwise.
   b) If both lamps do not illuminate, turn the adjusting screw counterclockwise.

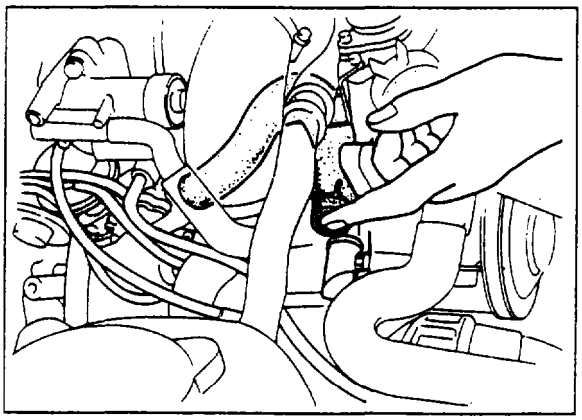


77U04B-078p

INSPECTION OF IDLE SPEED

5. Connect a tachometer to the engine.
6. Connect a jumper wire to the terminals of the initial set coupler.
7. Start the engine and adjust the idle speed. (Refer to 4B—80)
8 After adjusting, disconnect the jumper wire from the initial set coupler.

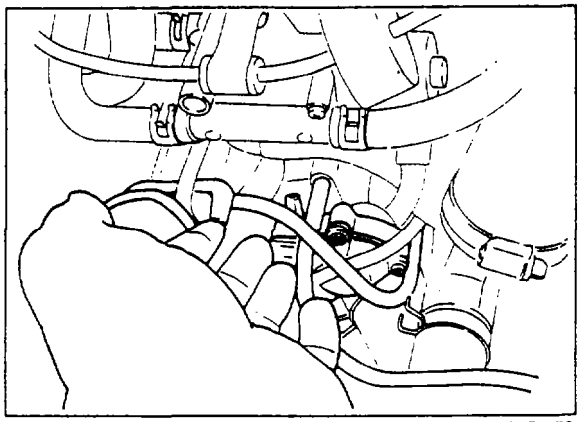
Note
Failure to use a jumper wire at the initial set coupler will result in a misadjustment.



67U04X-010

INSPECTION OF ANTI-AFTERBURN VALVE

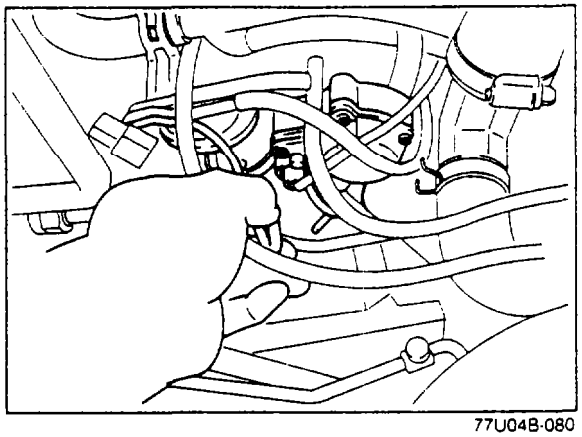
9. Disconnect the air hose (air pump—air control valve) at the air pump and place a finger over the air hose opening.
10. Increase the engine speed to **3,000 rpm**, and then decrease the engine speed rapidly.
11. Check that air is sucked into the air hose for a few seconds while decelerating.
12. Reconnect the air hose to the air pump.



77U04B-079

INSPECTION OF SWITCHING SOLENOID VALVE

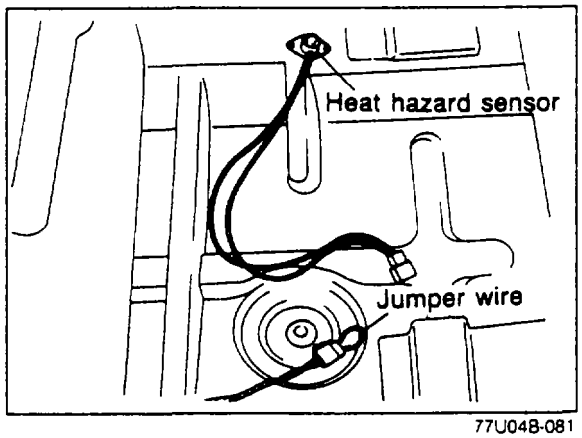
13. Disconnect the vacuum hose (switching solenoid valve to air control valve) at the air control valve.
14. Place a finger over the port opening and check that air is sucked into the port at idle.
15. Gradually increase the engine speed and check that air is not sucked into the port when the engine speed is above **4,200 rpm**.
16. Check that air is sucked into the port during deceleration.
17. Reconnect the vacuum hose.



77U04B-080

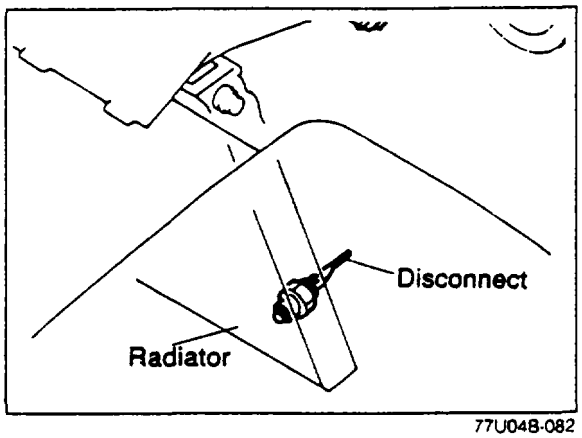
INSPECTION OF RELIEF SOLENOID VALVE

18. Disconnect the vacuum hose (relief solenoid valve to air control valve) at the air control valve.
19. Place a finger over the port opening and check that air does not flow from the port at idle.
20. Gradually increase the engine speed and check that the air does flow from the port when the engine speed is above **3,850 rpm**.
21. Check that air does not flow from the port durion deceleration.



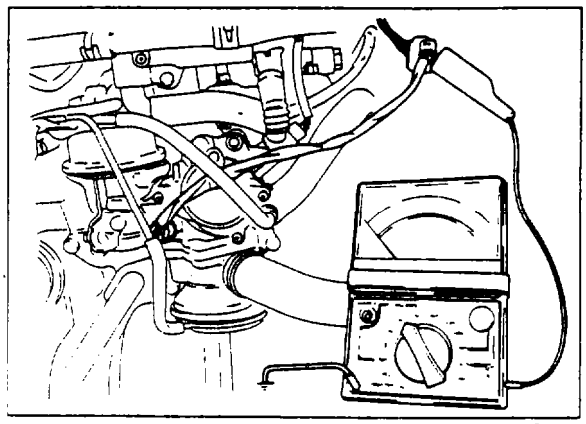
77U04B-081

22. Disconnect the heat hazard sensor connector and connect a jumper wire to both terminals in the connector.
23. Check that the air flows from the port opening at any engine speed.
24. Disconnect the jumper wire from both terminals in the connector and connect the heat hazard sensor connector.



77U04B-082

25. Stop the engine and disconnect the water temperature switch connector at the radiator.
26. Start the engine and gradually increase the engine speed. Check that air flows from the port opening when the engine speed is over **1,000—1,200 rpm**.
27. Reconnect the vacuum hose to the relief solenoid valve.
28. Stop the engine and reconnect the water temperature switch connector.



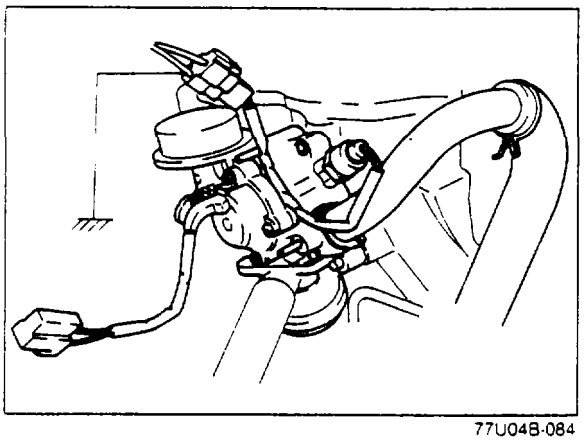
87U04B-021

INSPECTION OF SPLIT AIR SOLENOID VALVE

29. Turn the ignition switch ON.
30. Connect the voltmeter to the split air solenoid valve (BW) terminal and ground.
31. Shift into 5th gear and check the voltmeter reading.

    5th gear: below 2.5V
    Others: approx. 12V

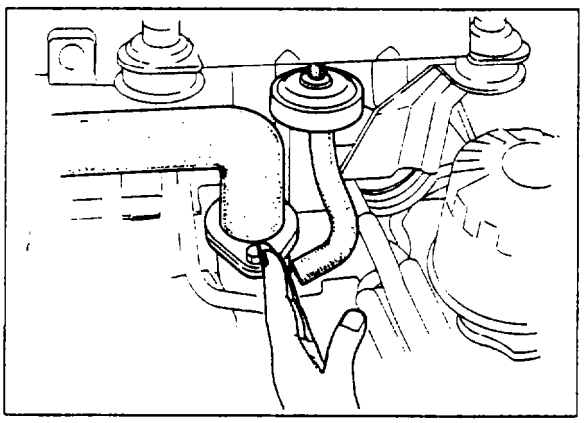
32. Disconnect the voltmeter.



77U04B-084

INSPECTION OF PORT AIR SOLENOID VALVE

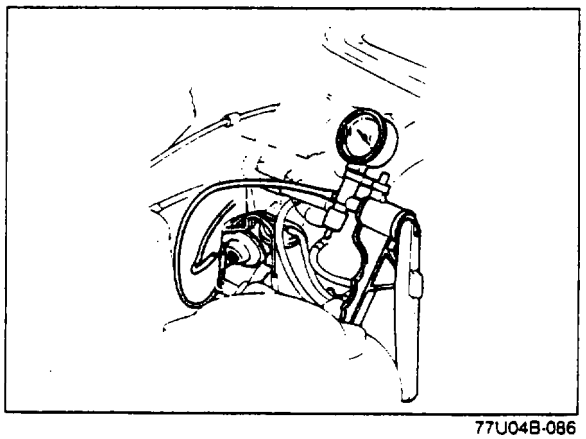
33. Connect a jumper wire to the port air solenoid valve (BR) terminal and ground.
34. Check for an operating sound of the solenoid valve when the jumper wire is connected to ground.
35. Disconnect the jumper wire and start the engine.



77U04B-085

INSPECTION OF PURGE VALVE

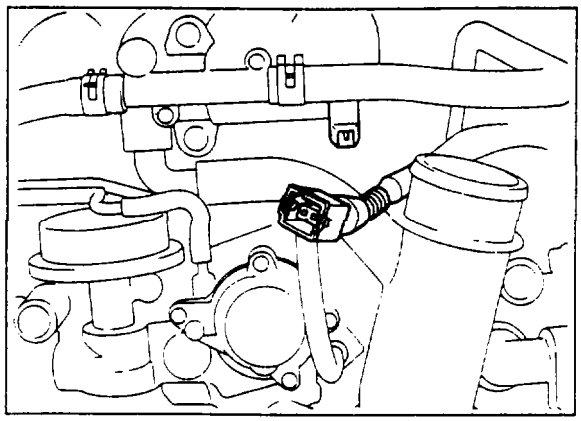
36. Disconnect the hose (purge valve—oil filler pipe) from the oil filler pipe.
37. Place a finger over the port of the hose opening.
38. Increase the engine speed to **2,000 rpm** and check that the air is sucked into the port.
39. Reconnect the hose to the purge valve.



77U04B-086

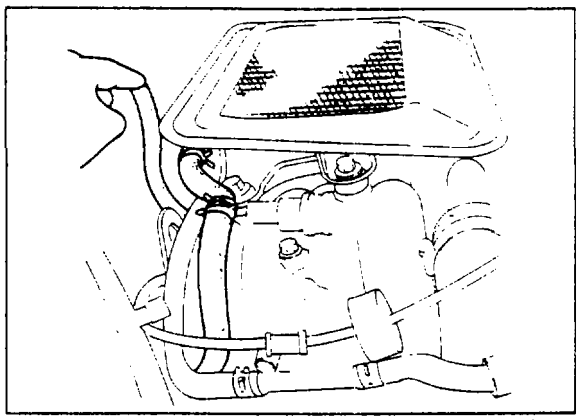
INSPECTION OF EGR VALVE

40. Disconnect the vacuum hose (EGR solenoid valve to EGR valve) at the EGR valve.
41. Connect the vacuum pump tester to the EGR valve.
42. Apply **100 mmHg (3.9 inHg)** vacuum and check that the engine speed decreases.
43. Disconnect the vacuum pump tester and reconnect the vacuum hose.


87U04B-046

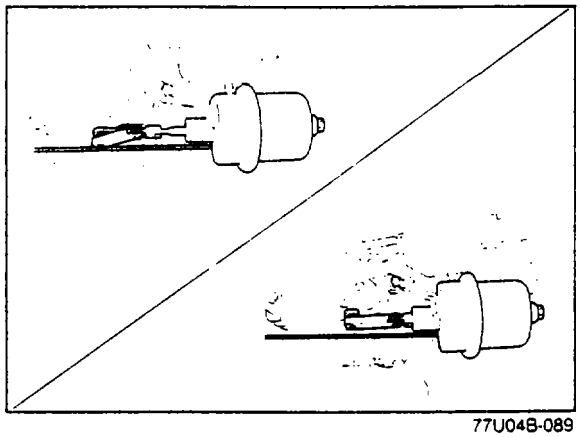
INSPECTION OF BAC VALVE

44. Connect a jumper wire to both terminals of initial set coupler, disconnect the BAC valve connector.
45. Check that the engine speed decreases.
46. Reconnect the BAC valve connector and disconnect the jumper wire from the initial set coupler.


77U04B-088

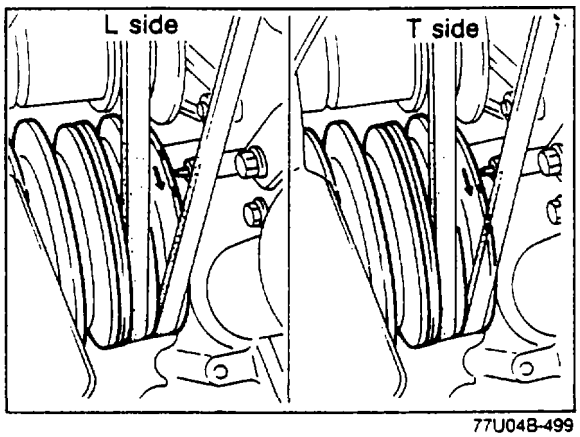
INSPECTION OF AIR SUPPLY VALVE

47. Disconnect the air hose (intercooler to dynamic chamber) at the intercooler.
48. Place a finger over the port opening and check that the air is not sucked into the port opening.
49. Turn the steering wheel either to the right or left, and check that the air is sucked into the port opening.
50. Reconnect the air hose.


77U04B-089

INSPECTION OF TWIN-SCROLL TURBOCHARGER CONTROL SYSTEM

51. Check that the rod returns when engine speed increases at above **2,700 rpm**.
52. Decrease engine speed and check that the rod moves.

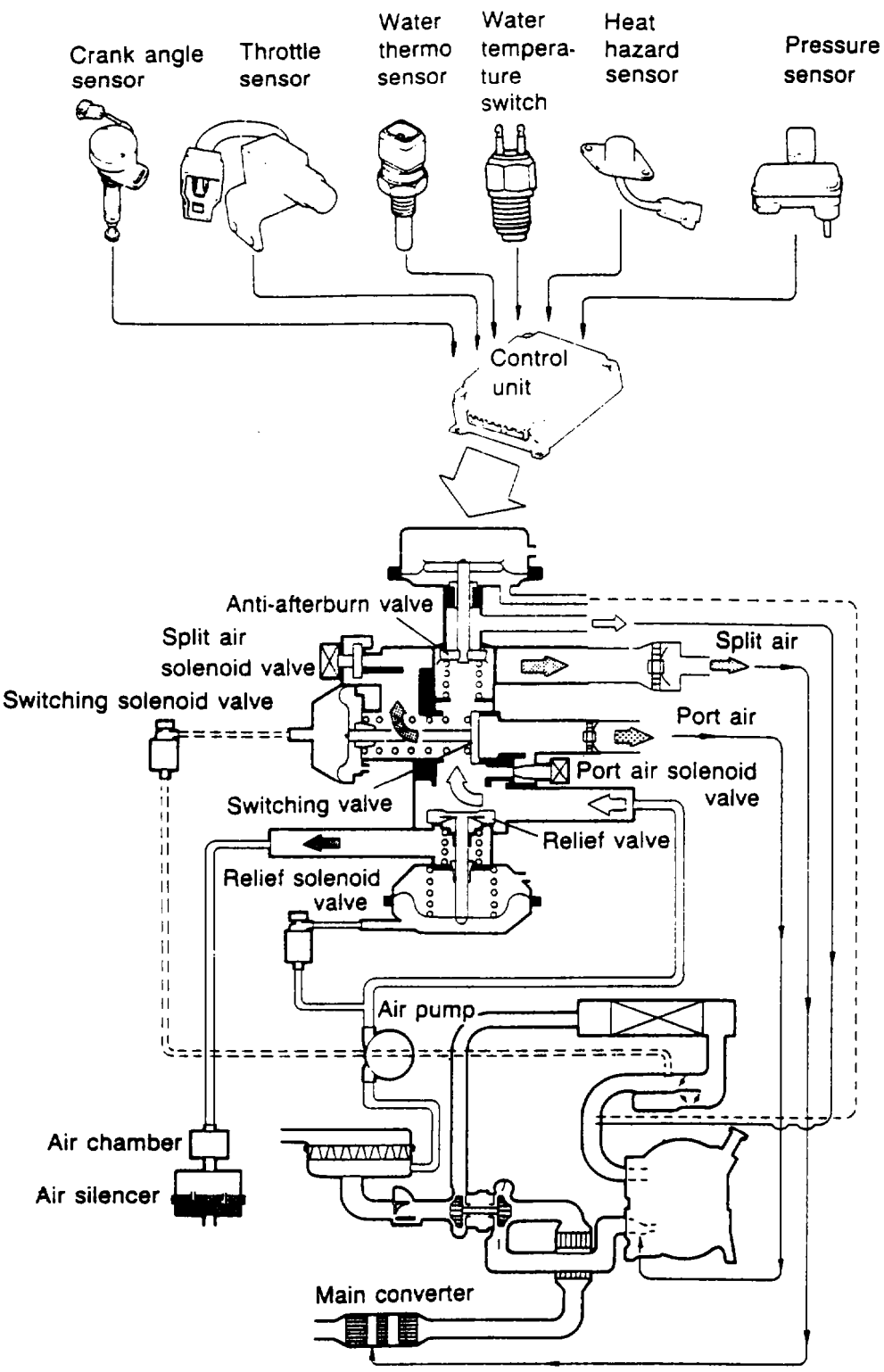


77U04B-499

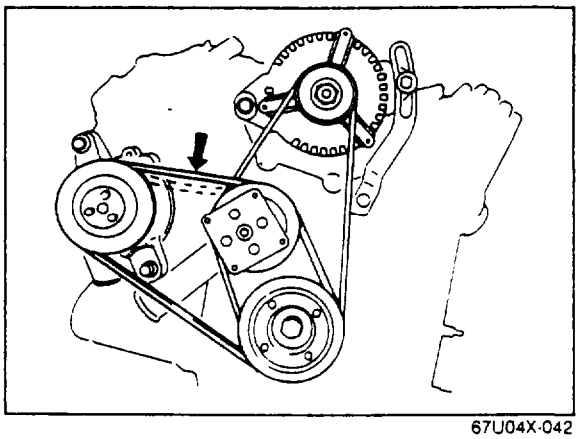
INSPECTION OF KNOCK CONTROL SYSTEM

53. Connect a timing light to the "L-1" high tension lead.
54. Tap the engine hanger lightly with a plastic hammer and make sure that the ignition timing does not move.
55. Connect a jumper wire to the initial set coupler.
56. Tap the engine hanger lightly with a plastic hammer and make sure that the ignition timing retards.
57. Disconnect the jumper wire, timing light and tachometer.
58. Perform the same test for the trailing side.
59. Stop the engine.

SECONDARY AIR INJECTION CONTROL SYSTEM



77U04B-092



67U04X-042

AIR PUMP

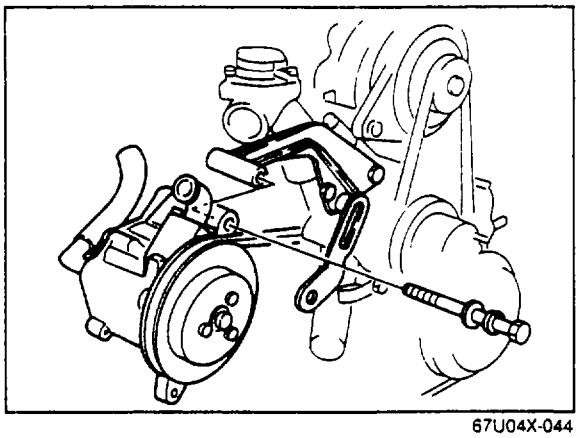
Inspection

1. Warm up the engine to normal operating temperature.
2. Check the hoses and connections for leaks.
3. Check the air pump for noise.
4. Check the air pump drive belt tension.
5. Adjust, repair or replace, if necessary.

87U04B-022

6. Disconnect the air hose (air pump—air control valve) at the air control valve.
7. Connect the **air pump gauge set** (49 2113 010B) to the air hose.
8. Connect a tachometer to the engine.
9. Start the engine and run it at idle.
10. Observe the pressure reading.
11. Replace the pump, if necessary.

Pressure: 11.8 kPa (0.12 kg/cm^2, 1.7 psi) at idle



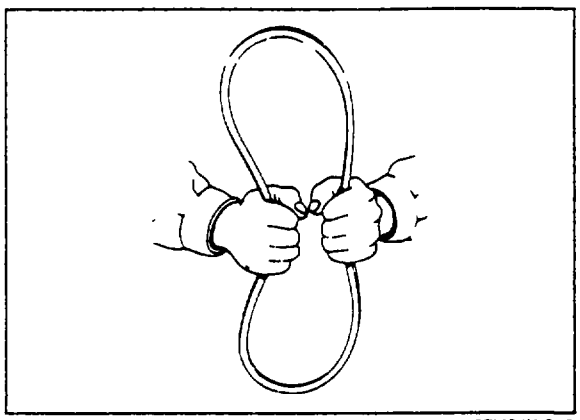
67U04X-044

Removal

1. Disconnect the air hose.
2. Remove the air pump strap bolt.
3. Remove the air pump mounting bolt.
4. Remove the air pump drive belt and remove the air pump.

Installation

Install the air pump in the reverse order of removal and adjust the drive belt tension.

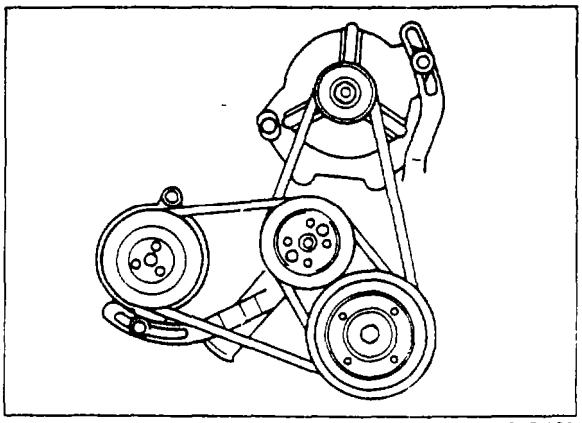


67U04X-045

AIR PUMP DRIVE BELT

Inspection

1. Check the drive belt for cracks, deterioration or oil contamination, replace if necessary.
2. If the belt is noisy, check for loose or misaligned pulleys.



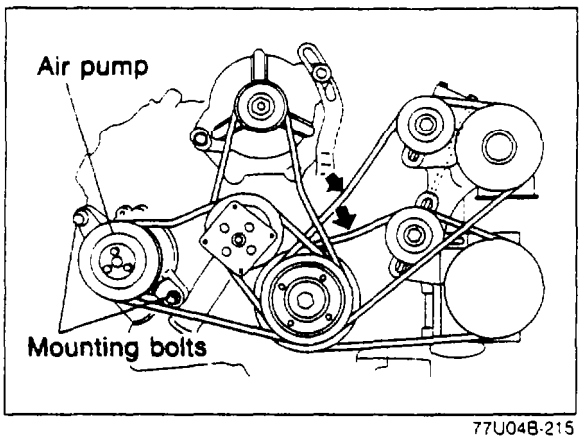
77U04B-093

Adjustment

1. Loosen the air pump strap bolt and mounting bolt.
2. Move the air pump closer to, or away from the engine until the correct belt tension is obtained.

Belt tension:
8—10 mm (0.31—0.39 in)
when pressed at 98.1 N (10 kg, 22 lb)

3. Tighten the bolts.



77U04B-215

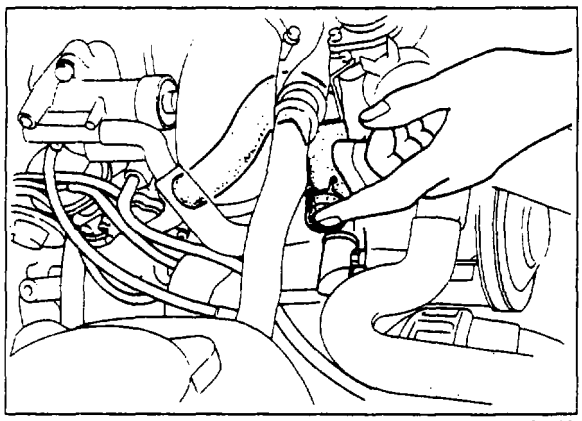
Removal

1. Loosen the A/C and P/S pulley drive belts (if equipped).
2. Loosen the air pump strap and mounting bolts, and move the air pump to remove the drive belt.

Installation

1. Install a new belt and adjust the belt tension (Refer to "Adjustment").
2. Install the other drive belts and adjust the belt tension.

Belt tension:
6—8 mm (0.24—0.32 in) — A/C
11—13 mm (0.43—0.51 in) — P/S
when pressed at 98.1 N (10 kg, 22 lb)

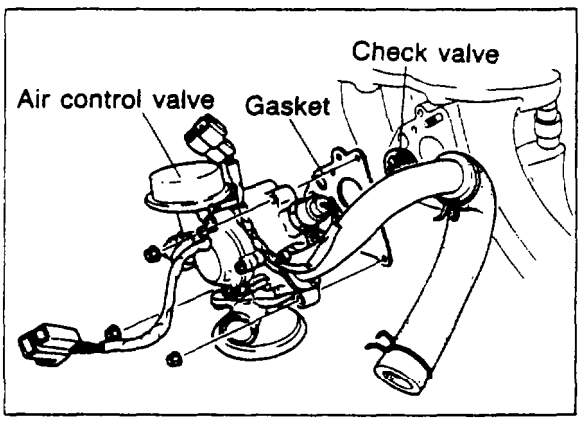


77U04B-109

CHECK VALVE (IN INTAKE MANIFOLD)

Inspection

1 Disconnect the air hose (air pump to air control valve) at the air pump.
2. Connect a tachometer to the engine.
3. Start the engine and disconnect the connector from the switching solenoid valve.
4. Increase the engine speed to **1,500 rpm** and check for exhaust gas leakage at the air inlet fitting on the air control valve.
5 Replace the check valve, if there is exhaust gas leakage.



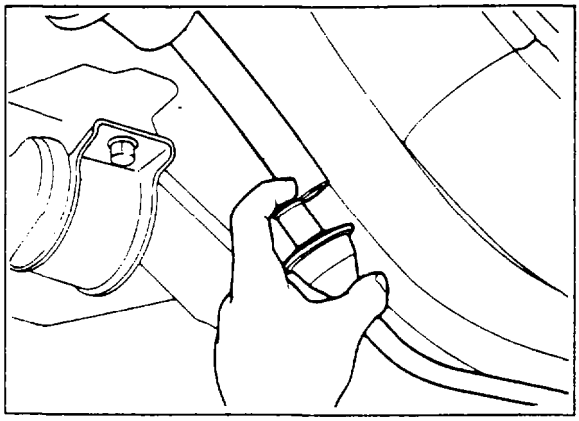
77U04B-110p

Removal

1. Remove the air control valve. (Refer to 4B—42)
2. Remove the gasket and check valve.

Installation

Install the check valve in the reverse order of removal.

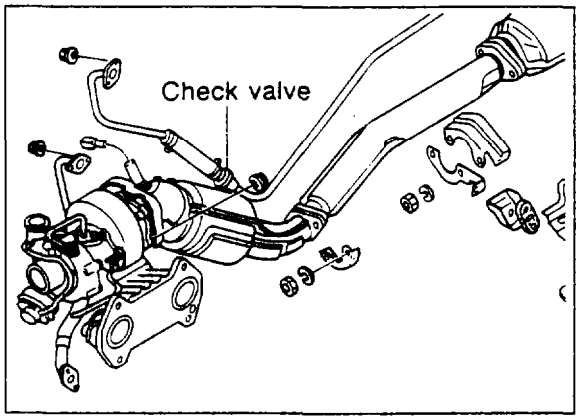


77U04B-095

CHECK VALVE (INTAKE MANIFOLD TO CATALYTIC CONVERTER)

Inspection

1. Disconnect the air hose (intake manifold to check valve) at the check valve.
2. Connect a tachometer to the engine.
3. Start the engine.
4. Place a finger over the check valve opening.
5. Increase the engine speed to **1,500 rpm** and check for exhaust gas leakage from the check valve opening.
6. Replace the check valve, if there is exhaust gas leakage.



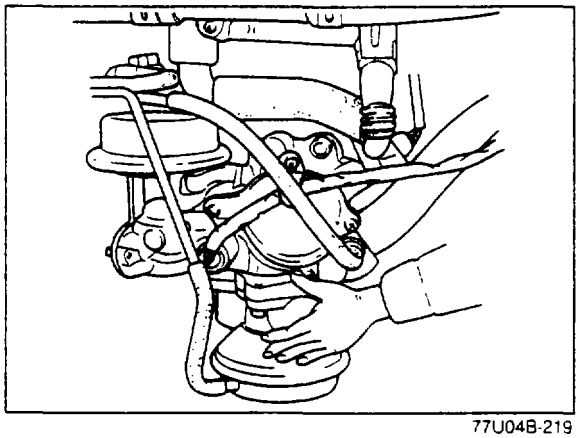
67U04X-051

Removal

1. Unfasten the clip and disconnect the air hose from the check valve.
2. Remove the split air pipe attaching bolts and remove the air pipe assembly.

Installation

Install the check valve and air pipe assembly in the reverse order of removal.



77U04B-219

AIR CONTROL VALVE

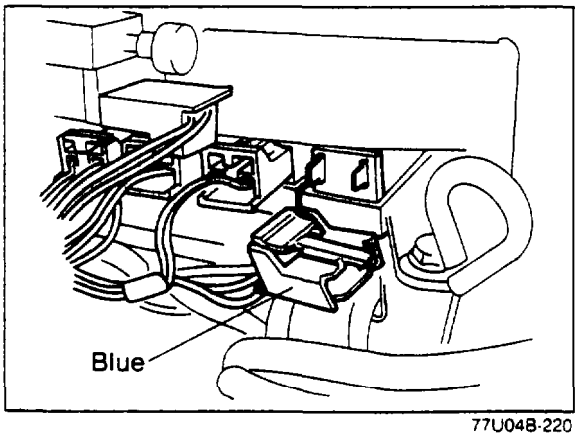
Inspection

1. Warm up the engine to normal operating temperature.
2. Connect a tachometer to the engine.

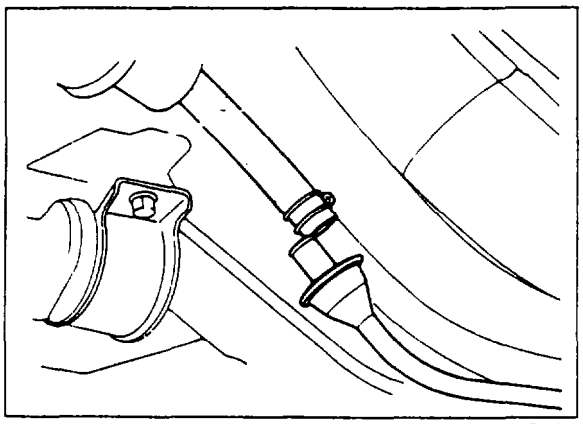
Note

Only for vehicles equipped with ABS, disconnect the air hose and vacuum hose of the air bypass valve from the turbocharger and plug the hoses before disconnecting the air hose (air silencer to air control valve) at the air control valve.

3. Disconnect the air hose (air silencer to air control valve) at the air control valve.
4. Place a finger over the air control valve outlet.
5. Slowly increase the engine speed and check that air begins to flow out at **3,750 rpm**.
6. Run the engine at idle.
7. Disconnect the relief solenoid valve connector.
8. Check that air flows out at **1,200 rpm** or more.
9. Reconnect the solenoid valve connector.

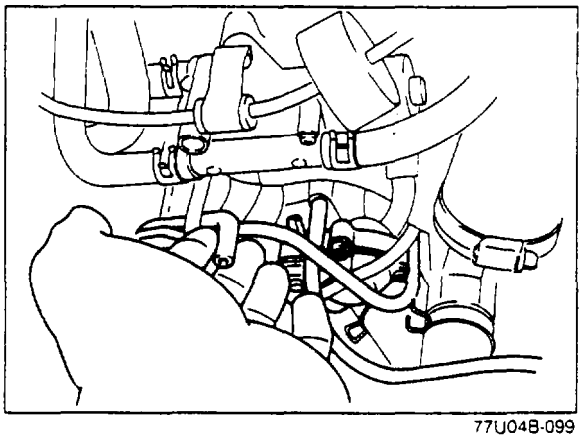


77U04B-220



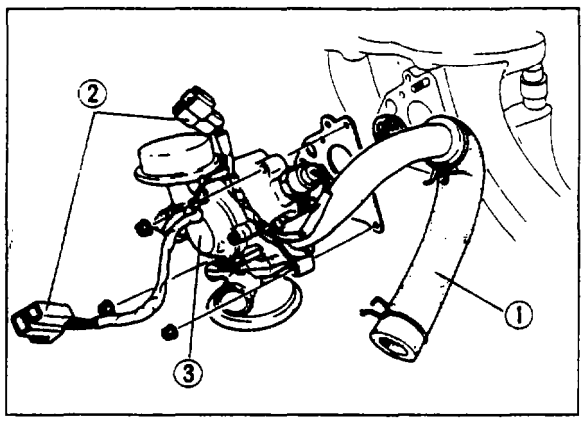
77U04B-098

10. Disconnect the split air hose (intake manifold to check valve) at the check valve.
11. Place a finger over the port opening.



77U04B-099

12. Disconnect the vacuum hose (switching solenoid valve to air control valve) at the air control valve.
13. Check that air flows out of the split air hose.
14. Reconnect the vacuum hose and split air hose.
15. Replace the air control valve, if necessary.



67U04X-056

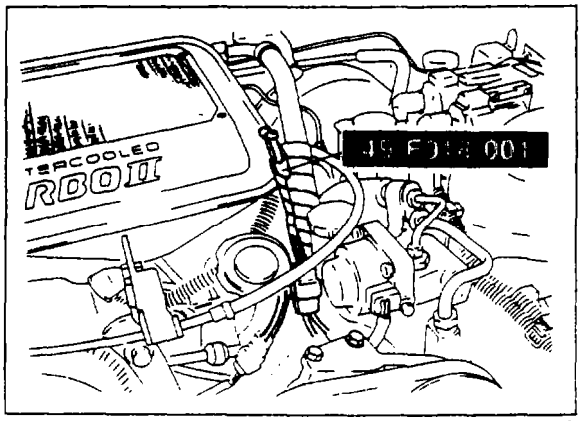
Removal

Remove the parts in the sequence as shown in the figure.

1 Air hose.
2. Split air solenoid valve and port air solenoid valve connector.
3 Air control valve.

Installation

Install the air control valve in the reverse order of removal.



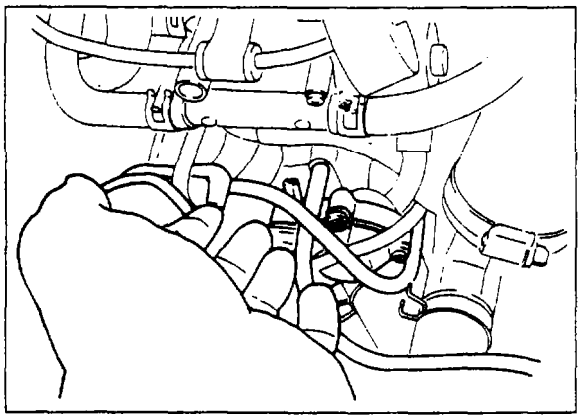
77U04B-100

SWITCHING SOLENOID VALVE

Inspection

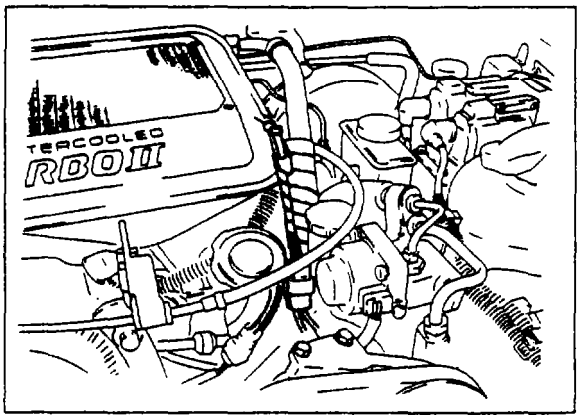
Signal

1. Warm up the engine and run it at idle.
2. Connect a tachometer to the engine.
3. Connect the **checker lamp** (49 F018 001) to the check connector (Green).



77U04B-101

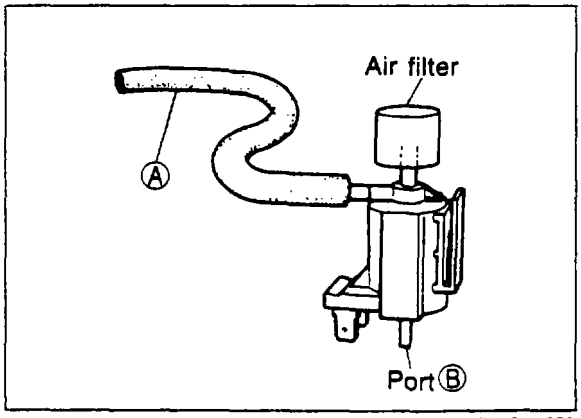
4. Disconnect the vacuum hose (switching solenoid valve to air control valve) at the air control valve.
5. Place a finger over the port opening.



77U04B-216

6. Check that **checker lamp** (49 F018 001) illuminates (red lamp) and for suction at the port.

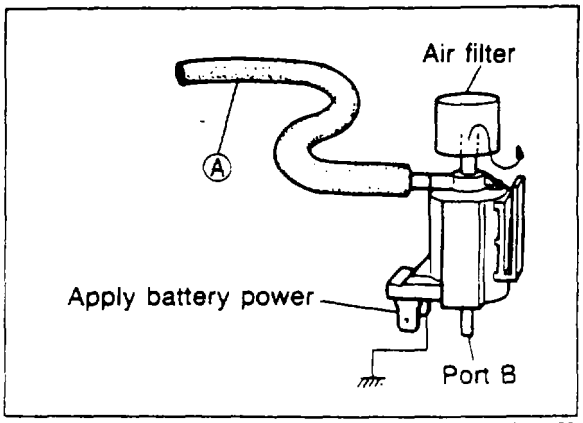
Engine condition	Checker lamp illumination	Sucking air	Remark
Idle	Red lamp does not illuminate	Yes	
Deceleration			
Above 4,200 rpm	Red lamp illuminates	No	Increase engine speed
Acceleration	Red lamp illuminates	No	



67U04X-059

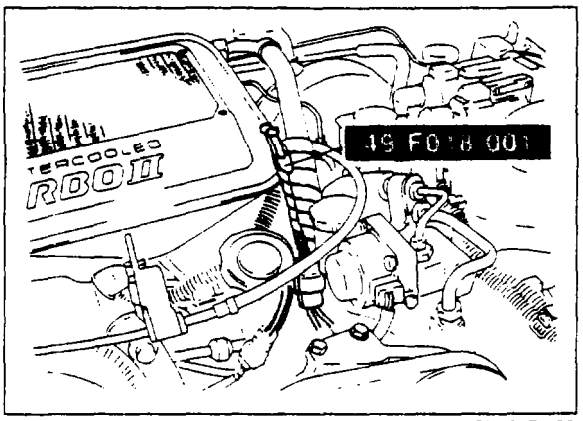
Switching solenoid valve

1. Disconnect the vacuum hoses from the switching solenoid valve.
2. Blow through the solenoid valve from port Ⓐ. Check that air passes through the valve and flows from port Ⓑ.



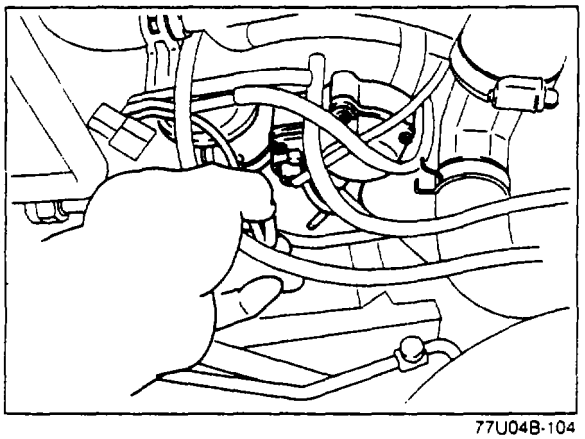
67U04X-060

3. Disconnect the solenoid valve connector and connect 12V and ground to the terminals on the solenoid valve.
4. Blow through the solenoid valve from port Ⓐ. Check that air passes through the valve and flows from the air filter.

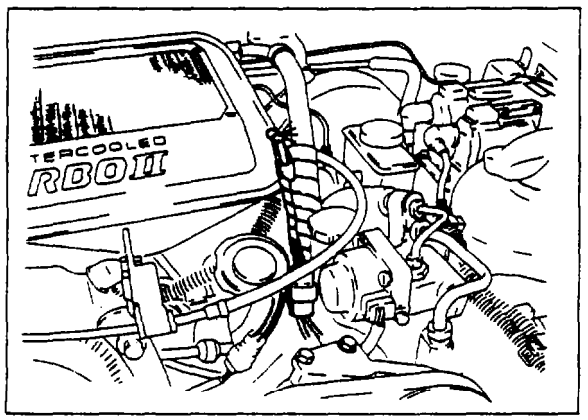


77U04B-103

RELIEF SOLENOID VALVE
Inspection
Signal
1. Warm up the engine and run it at idle.
2. Connect a tachometer to the engine.
3. Connect the **checker lamp** (49 F018 001) to the check connector (Green).


77U04B-104

4. Disconnect the vacuum hose (relief solenoid valve to air control valve) at the air control valve.
5. Place a finger over the port opening.

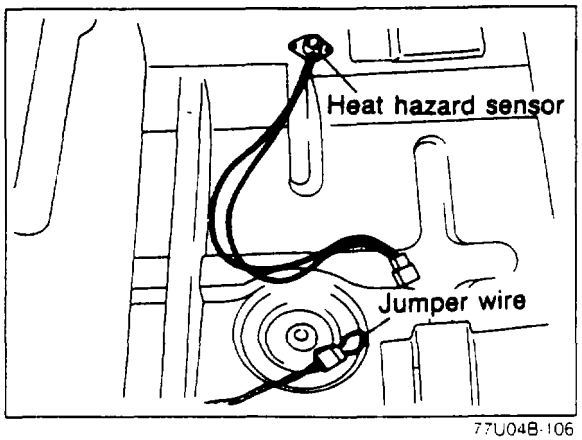


77U04B-217

6. Check that **checker lamp** (49 F018 001) illuminates (Green lamp) and that air flows from the port opening.

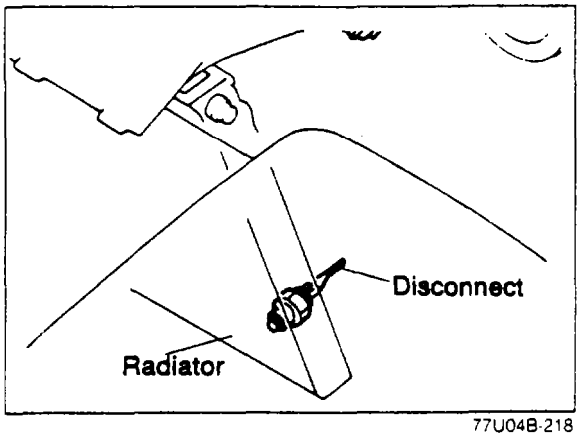
Engine condition	Checker lamp illumination	Flowing air	Remark
Idle	Green lamp illuminates	No	
Deceleration			
Above 3,750 rpm	Green lamp does not illuminate	Yes	Gradually increase engine speed

Note
The checker lamp sometimes turns OFF at approx. 1,200 rpm. It is normal.



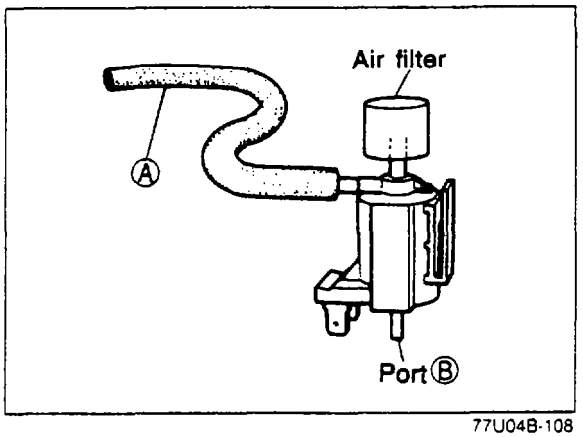
77U04B-106

7. Disconnect the heat hazard sensor connector, and connect a jumper wire to the terminals in the connector.
8. Check that the Green lamp does not illuminate and the air flows from the port opening at any engine speed.
9. Disconnect the jumper wire and reconnect the heat hazard sensor.



77U04B-218

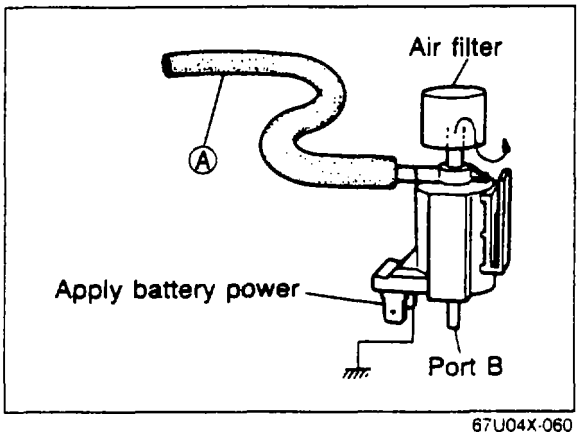
10. Stop the engine and disconnect the water temperature switch connector at the radiator.
11. Start the engine and gradually increase the rpm. Check that the Green lamp does not illuminate and that air flows from the port opening when the engine speed is **over 1,000—1,200 rpm.**



77U04B-108

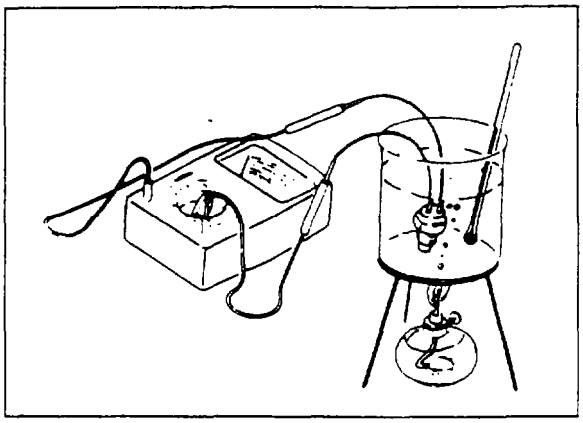
Relief solenoid valve

1. Disconnect the vacuum hoses from the relief solenoid valve.
2. Blow through the solenoid valve from port Ⓐ. Check that air passes through the valve and flows from port Ⓑ.



67U04X-060

3. Disconnect the solenoid valve connector and connect 12V and ground to the terminals on the solenoid valve.
4. Blow through the solenoid valve from port Ⓐ. Check that air passes through the valve and flows from the air filter.



67U04X-069

WATER TEMPERATURE SWITCH

Removal

Remove the water temperature switch from the radiator.

Installation

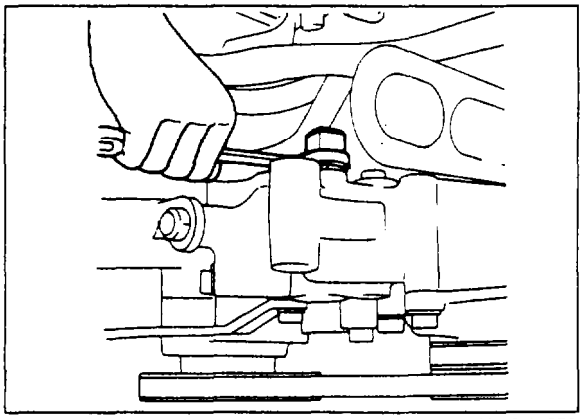
Install in the reverse order of removal.

Inspection

1. Place the water temperature switch in water with a thermometer and heat the water gradually.
2. Check the temperature at which continuity exists between the terminals.

Specified temperature: 15—19°C (59—66.2°F)

3. Replace the switch, if necessary.



67U04X-070

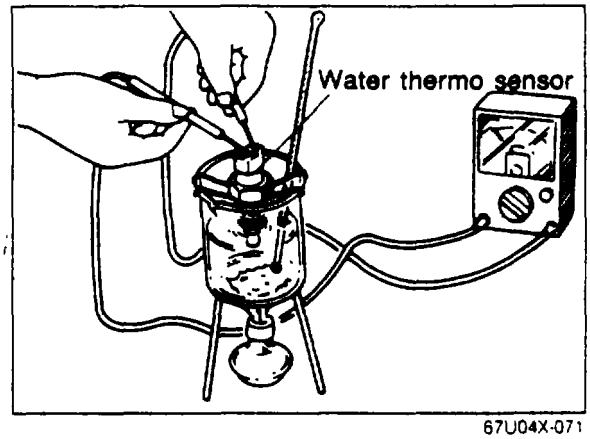
WATER THERMO SENSOR

Removal

1. Disconnect the water thermo sensor connector.
2. Remove the sensor from the water pump.

Installation

Install in the reverse order of removal.



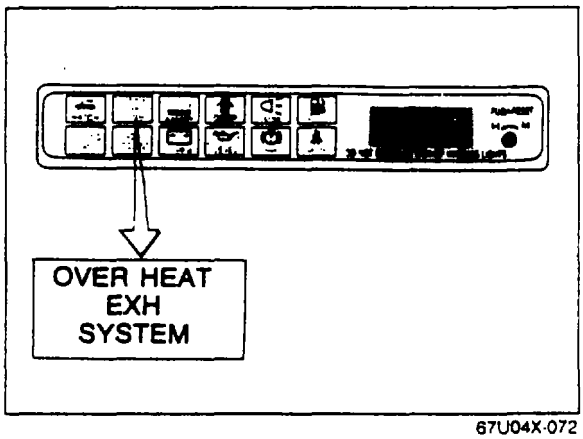
67U04X-071

Inspection

1. Place the water thermo sensor in water with a thermometer and heat the water gradually.
2. Check the resistance of the sensor using a circuit tester.

Water temperature	Resistance
−20°C (−4°F)	16.2 ± 1.62 kΩ
20°C (68°F)	2.45 ± 0.24 kΩ
80°C (176°F)	0.32 ± 0.032 kΩ

3. Replace the sensor, if necessary.



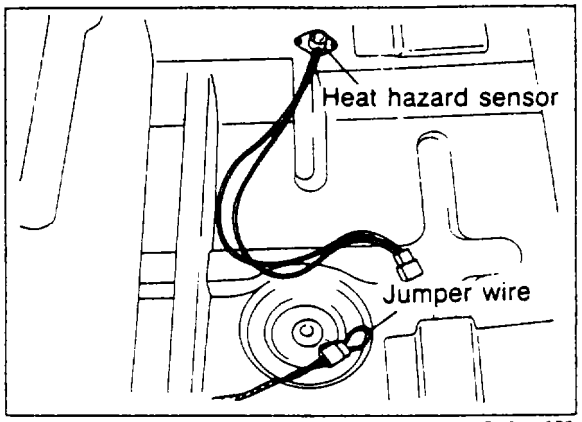
67U04X-072

HEAT HAZARD SENSOR

Inspection

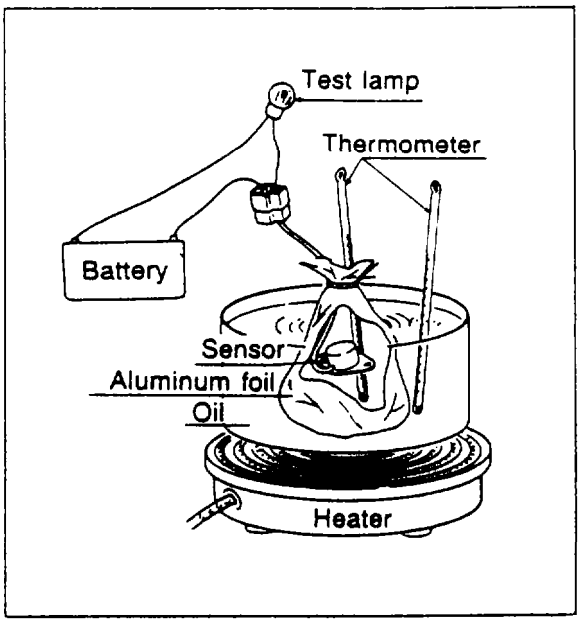
Warning system

1. Turn the ignition switch ON. Check that the heat hazard warning light comes on.
2. Start the engine and the warning light should go off.



67U04X 073

3. Disconnect the heat hazard sensor connector.
4. Check that the heat hazard warning light comes on when a jumper wire is connected to the terminals of the sensor connector.



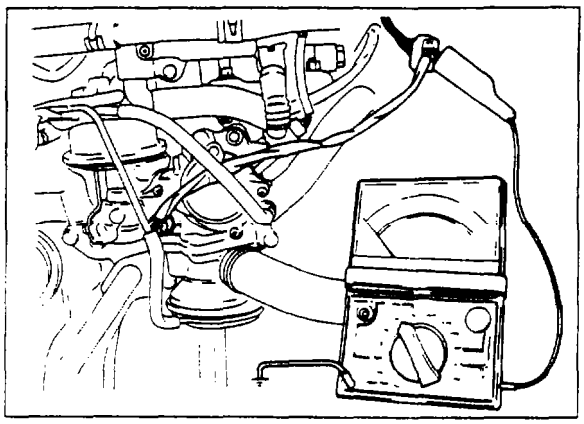
67U04X-074

Heat hazard sensor
Removal
1. Remove right seat.
2. Lift up the floor mat.
3. Disconnect the heat hazard sensor connector and remove the sensor connector.

Installation
Install in the reverse order of removal.

Inspection
1. Wrap the sensor and thermometer with aluminum foil to prevent oil penetration and place it in a container of oil.
2. Connect a test lamp and battery power to the terminals of the sensor connector.
3. Gradually heat the oil.
   The test lamp should come on when the temperature in the aluminum foil reaches **105—115°C (221—239°F)**.
4. Replace the sensor if necessary.

Note
Do not heat the oil to more than 150°C (302°F).


87U04B-023

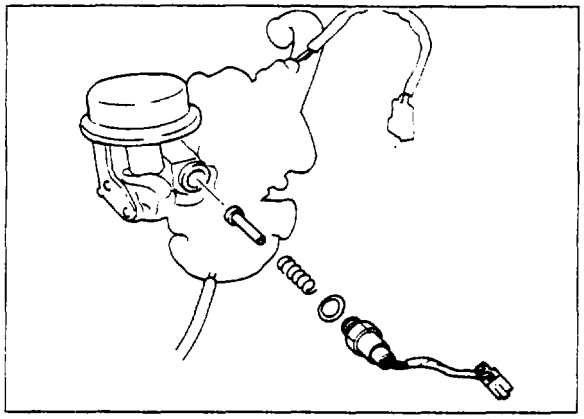
SPLIT AIR SOLENOID VALVE

Inspection

Signal

1. Connect a voltmeter to the split air solenoid valve (BW) terminal and ground.
2. Turn the ignition switch on.
3. Shift into 5th gear and observe the voltmeter reading.

Voltmeter reading
5th gear: below 2.5V
Others: approx. 12V

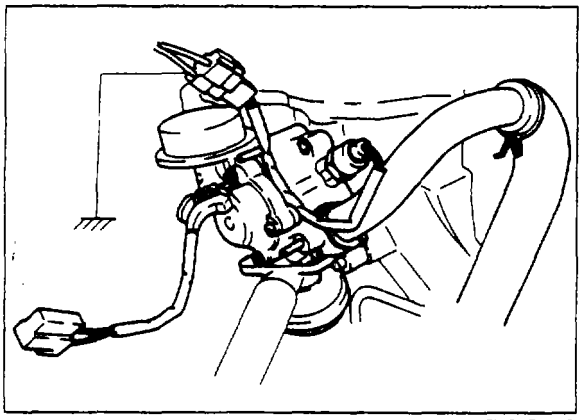

67U04X-077

Removal

1. Disconnect the split air solenoid valve connector.
2. Remove the solenoid valve.

Installation

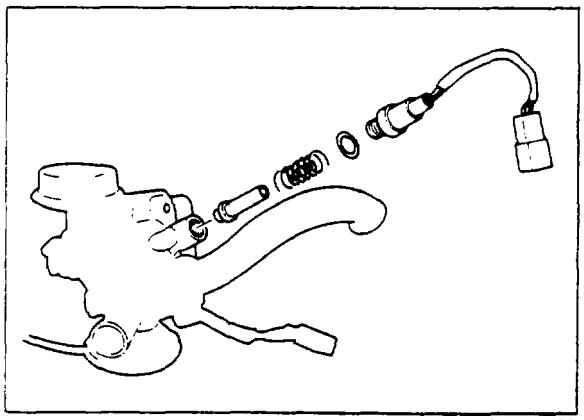
Install in the reverse order of removal.


77U04B-112

PORT AIR SOLENOID VALVE

Inspection

1. Connect a jumper wire to the port air solenoid valve (BR) terminal and ground.
2. Turn the ignition switch on.
3. Check for operating sound of the solenoid valve.

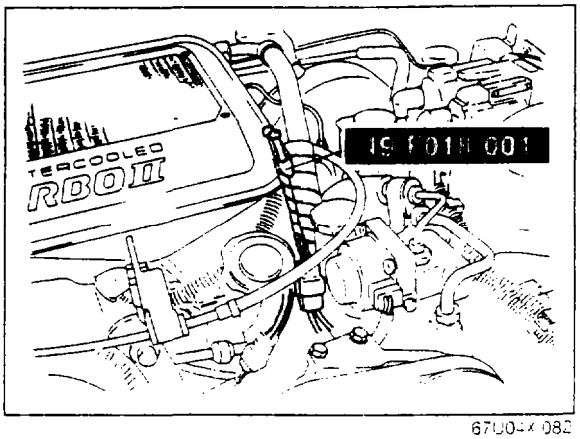

67U04X-080

Removal

1. Disconnect the port air solenoid valve connector.
2. Remove the solenoid valve.

Installation

Install in the reverse order of removal.



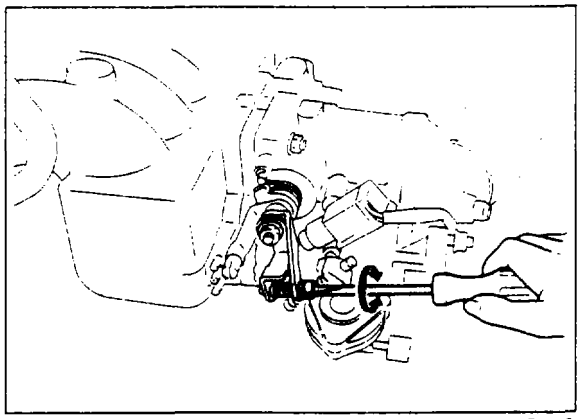
67U04X-082

DECELERATION CONTROL SYSTEM

THROTTLE SENSOR

Adjustment

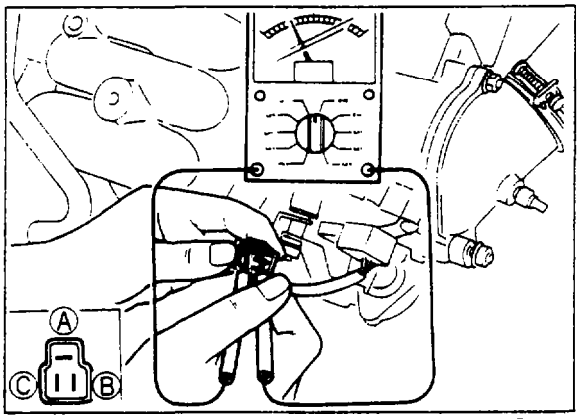
1. Warm up the engine, then stop it.
2. Connect the **checker lamp** (49 F018 001) to the check connector (Green).
3. Turn the ignition switch on and check whether one of the lamps illuminates.



77U04B-113

4. If both lamps illuminate or if neither does, turn the throttle sensor adjust screw until one of the lamps illuminates.
   a) If both lamps illuminate turn the adjust screw clockwise.
   b) If both lamps do not illuminate turn the adjust screw counterclockwise.

Note
Do not use excessive pressure on the screw; this may cause incorrect adjustment.



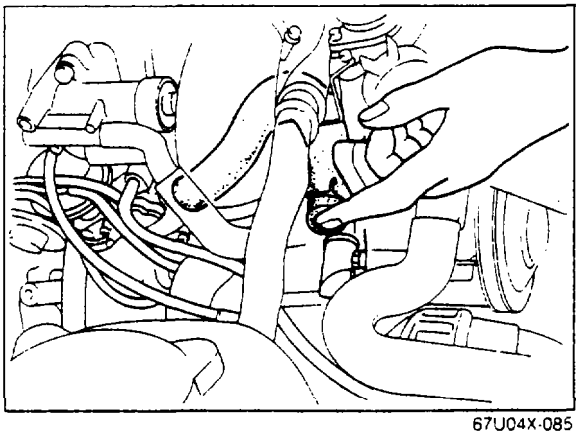
77U04B-114p

Inspection

1. Remove the intercooler. (Refer to 4B—61)
2. Disconnect the throttle sensor connector.
3. Connect a circuit tester between Ⓐ terminal and Ⓑ terminal of the sensor as shown.
4. Open the throttle valve and observe the sensor resistance.

Throttle opening
Idle position: approx. 1 kΩ
Full open: approx. 5 ± 1 kΩ

5. Reconnect the connector and install the intercooler in reverse order of removal.

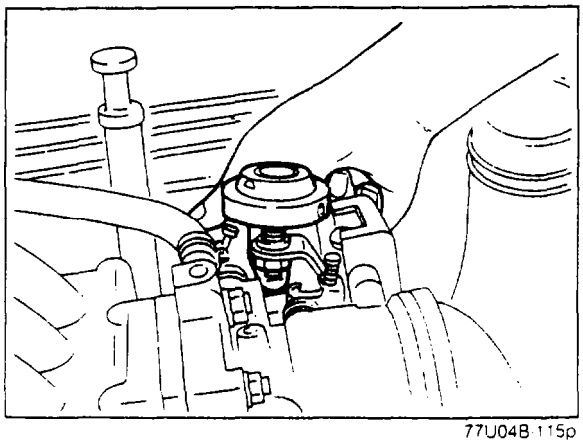


67U04X-085

ANTI-AFTERBURN VALVE

Inspection

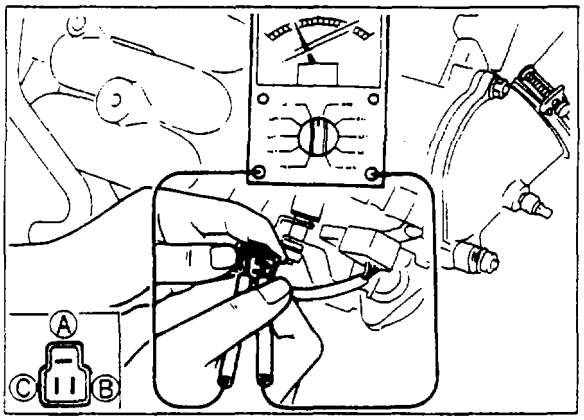
1. Warm up the engine and run it at idle.
2. Disconnect the air hose (air control valve to air pump) at the air pump.
3. Place a finger over the air hose opening.
4. Check that air is not sucked into the air hose at idle.
5. Increase the engine speed to over **3,000 rpm**, then decrease the engine speed **rapidly**.
6. Check that air is sucked into the air hose for a few seconds while decelerating.
7. Replace the air control valve, if necessary.


77U04B-115p

DASHPOT

Inspection

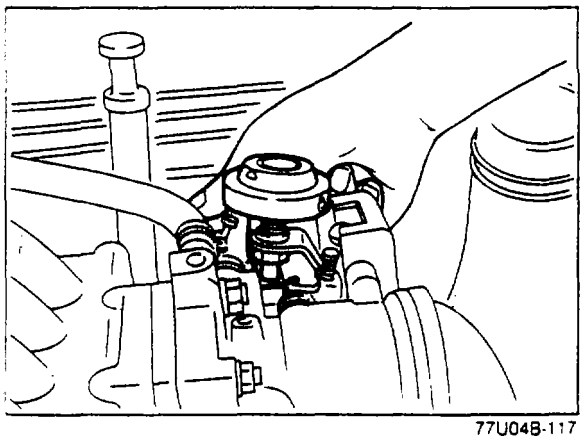
1 Remove the intercooler. (Refer to 4B—61)
2. Open the throttle valve fully, then push the dash pot rod with a finger and check that the rod goes into the dashpot slowly.
3 Release the rod and check that it comes out quickly.
4 Replace it, if necessary.
5. Install the intercooler in reverse order of removal.



77U04B-116p

Adjustment

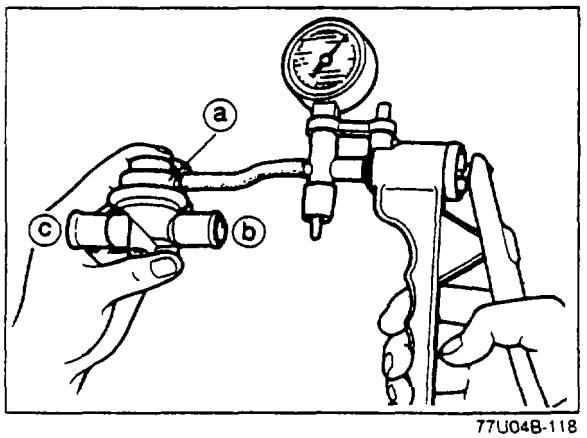
1. Warm up the engine to the normal operating temperature and stop it.
2. Remove the intercooler. (Refer to 4B—61)
3. Disconnect the throttle sensor connector and connect the circuit tester between Ⓐterminal and Ⓑ terminal of the sensor.


77U04B-117

4. Check the resistance when the dashpot rod separates from the lever.

   Resistance: 1.8—3.8 kΩ

5. Loosen the lock nut and adjust by turning the dashpot, if necessary.
6. Install the intercooler in the reverse order of removal.

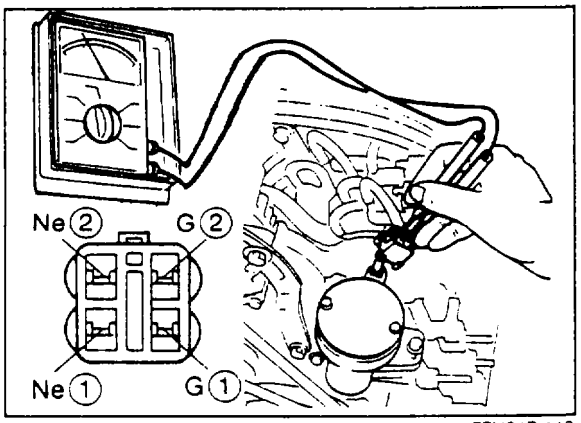


77U04B-118

AIR BYPASS VALVE

Inspection

1. Remove the air bypass valve.
2. Connect a vacuum pump tester to the port ⓐof the valve shown in the figure.
3. Apply vacuum and check that the air flows through the valve from port ⓑport ⓒat **300 mmHg (11.8 inHg)** the vacuum.
4. Replace it, if necessary.



77U04B-119

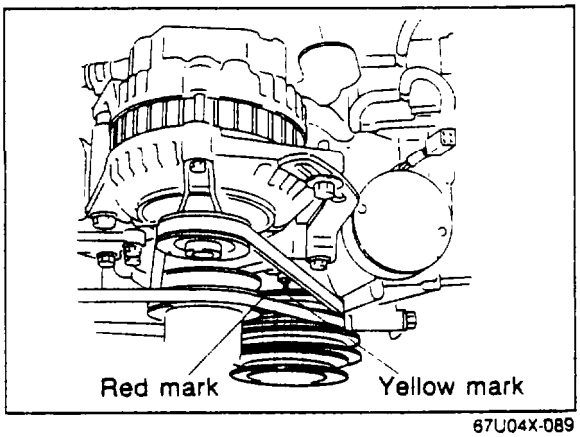
ELECTRONIC SPARK ADVANCE (ESA) CONTROL SYSTEM

CRANK ANGLE SENSOR

Inspection

1. Disconnect the crank angle sensor connector.
2. Connect a circuit tester to the terminals of the crank angle sensor connector.
3. Check the resistance of the following.

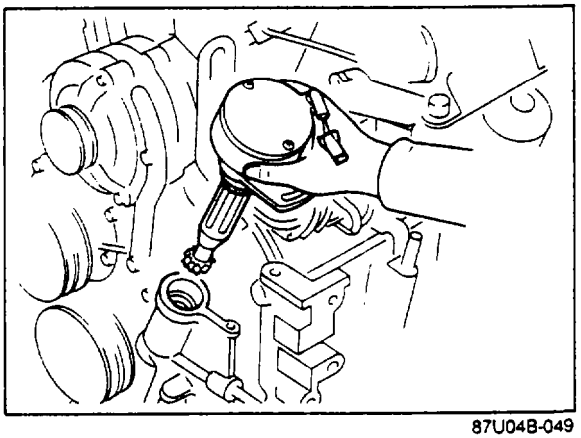
Terminal	Resistance
G ① (G) — G ② (B)	110—210 Ω
Ne ① (R) — Ne ② (W)	110—210 Ω



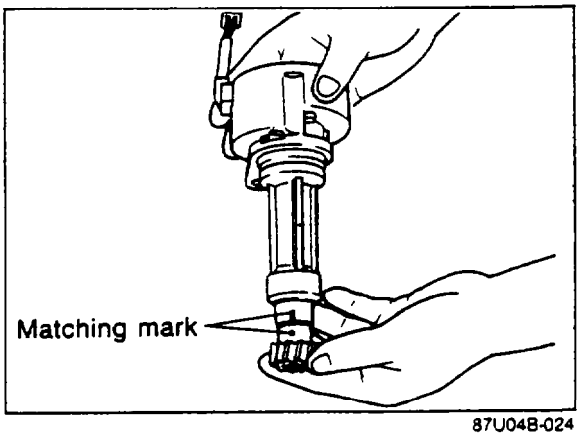
67U04X-089

Removal

1. Set the eccentric shaft pulley to the leading mark (Yellow mark) by turning the pulley.


87U04B-049

2. Disconnect the crank angle sensor connector.
3. Remove the blind cap and the lock bolt.
4. Remove the sensor.



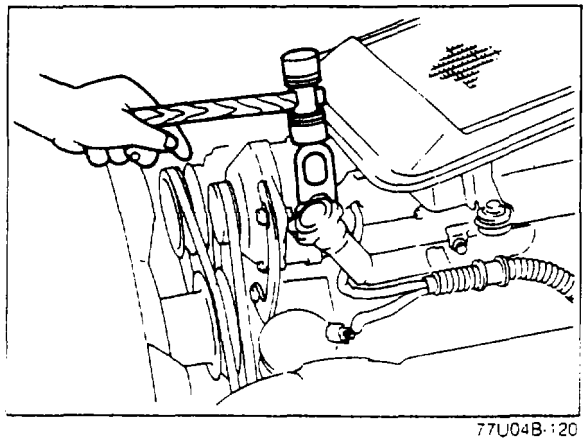
87U04B-024

Installation

1. Align the matching mark on the crank angle sensor housing and driven gear.
2. Check that the eccentric shaft pulley is set to the leading mark (Yellow mark).
3. Install the sensor and lock bolt.
4. Check the ignition timing. (Refer to section 5)
5. Tighten the lock bolt.

Tightening torque: 7.8—10.8 N·m (0.8—1.1 m-kg, 5.8—8.0 ft-lb)

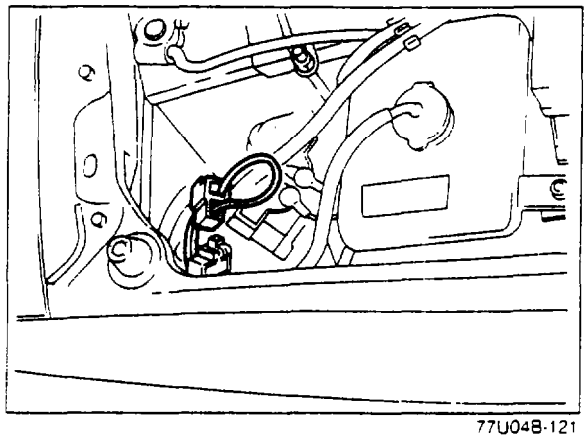
6. Install a new blind cap.


77U04B-120

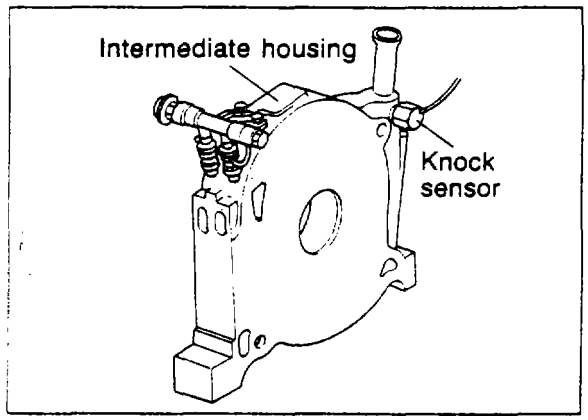
KNOCK CONTROL SYSTEM

Inspection

1. Warm up the engine and run it at idle.
2. Tap the engine hanger lightly with a plastic hammer and make sure that the ignition timing does not move.


77U04B-121

3 Connect a jumper wire to the initial set coupler terminal.
4 Tap the engine hanger lightly with a plastic hammer and make sure that the ignition timing retards.
5 Disconnect the jumper wire from the initial set coupler.



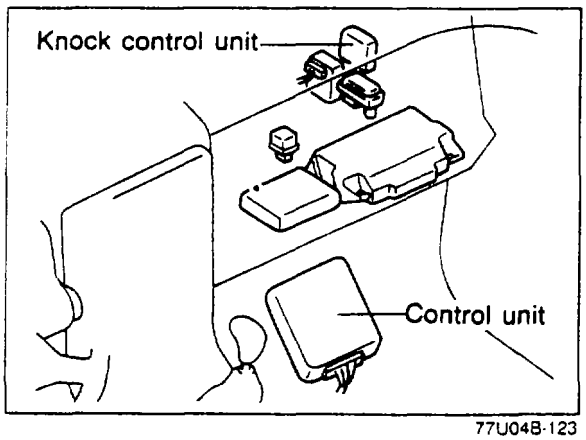
77U04B-122D

Removal of Knock Sensor

1. Disconnect the knock sensor connector.
2. Remove the throttle chamber. (Refer to 4B—61)
3. Remove the knock sensor.

Installation of Knock Sensor

Install in the reverse order of removal.



77U04B-123

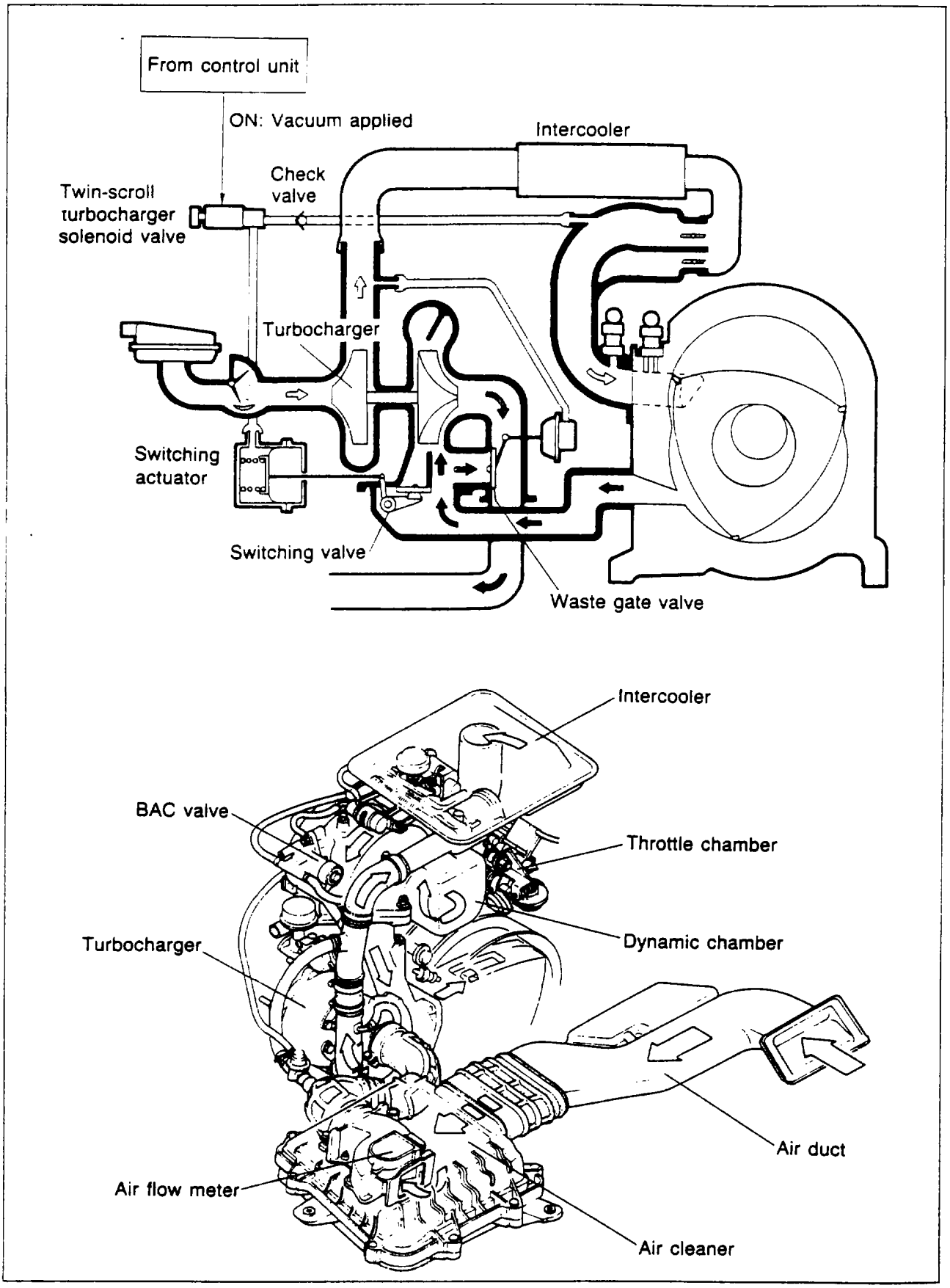
Removal of Knock Control Unit

1. Remove the front scuff plate (right side) and front side trim (right side).
2. Disconnect the knock control unit connector.
3. Remove the knock control unit.

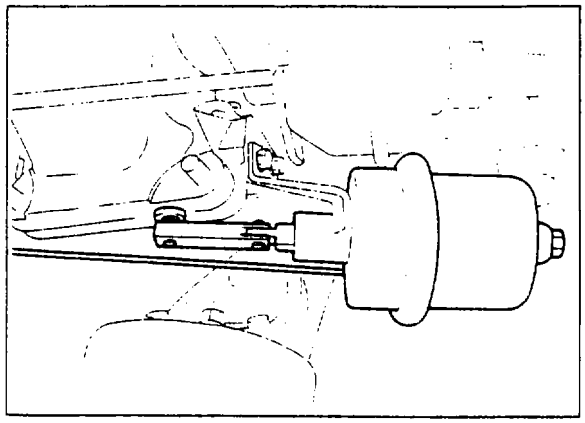
Installation of Knock Control Unit

Install in the reverse order of removal.

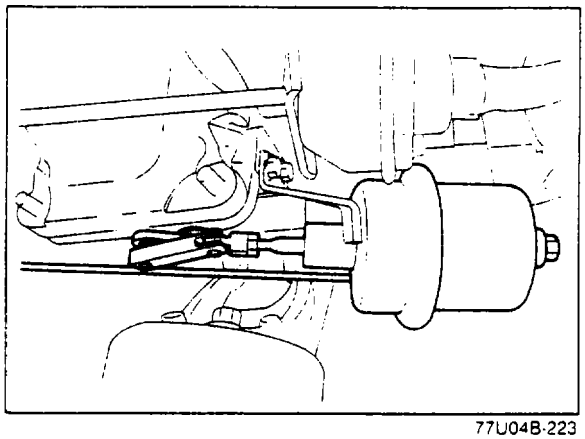
TWIN-SCROLL TURBOCHARGER CONTROL SYSTEM



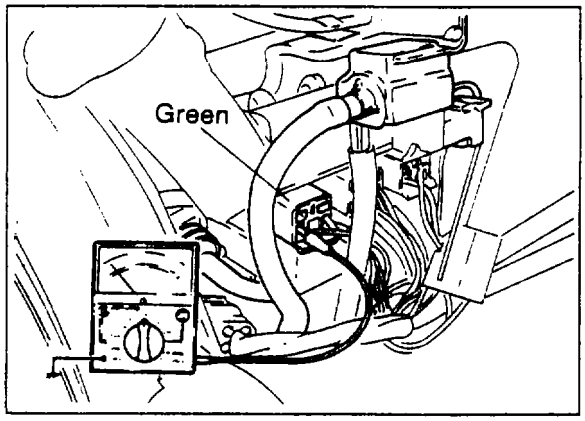
77U04B-124



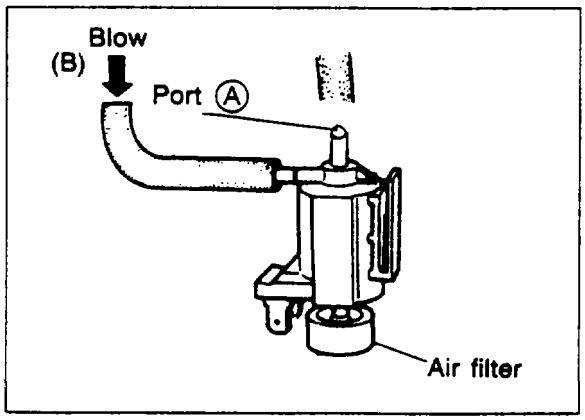
77U04B-222



77U04B-223



77U04B-127



77U04B-128

TWIN-SCROLL TURBOCHARGER CONTROL SYSTEM

Inspection

1. Warm up the engine to normal operating temperature.
2. Stop the engine.
3. Check that the rod moves in when the engine is restarted.

Note
When checking on a vehicle with ABS, move the air hose (air control valve—relief air silencer) toward the engine to view the rod.

4. Disconnect the twin-scroll turbocharger solenoid valve connector (Green).
5. Check that the rod returns.
6. Reconnect the solenoid valve connector.
7. Increase the engine speed and check that the rod starts to move at **above 2,700 rpm**.

TWIN-SCROLL TURBOCHARGER SOLENOID VALVE

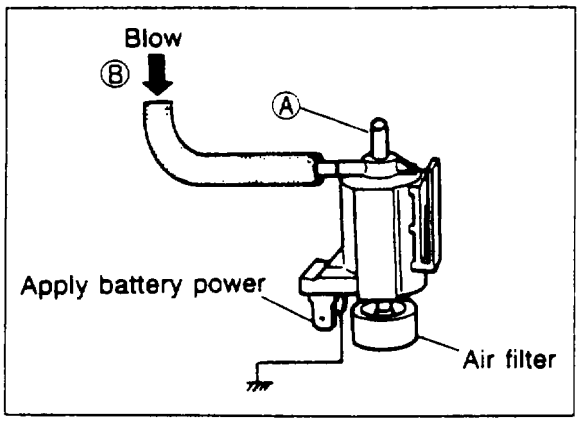
Signal

1. Warm up the engine to normal operating temperature.
2. Connect the voltmeter to the (LB) terminal of the twin-scroll turbocharger solenoid valve.
3. Increase the engine speed and check the voltmeter reading.

Voltmeter reading;
below 2,700 rpm; below 2.0V
above 2,700 rpm; approx. 12V

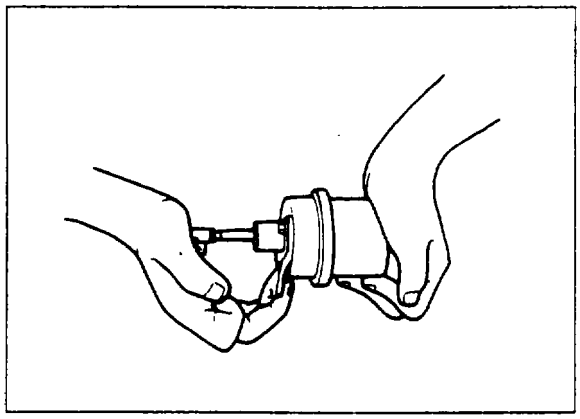
Twin-scroll turbocharger solenoid valve

1. Disconnect the vacuum hose from the twin-scroll turbocharger solenoid valve.
2. Blow through the solenoid valve from the port Ⓑ. Check that air passes through the valve and flows from the air filter.



67U04X 068

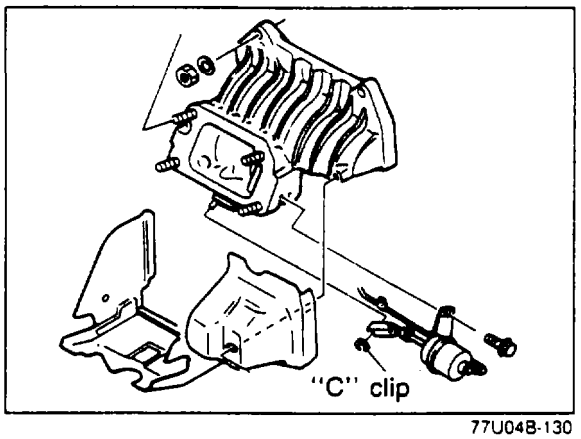
3. Disconnect the solenoid valve connector and connect 12V and ground to the terminals of the solenoid valve.
4. Blow through the solenoid valve from port Ⓑ. Check that air passes through the valve and flows from port Ⓐ.


77U04B-129

SWITCHING ACTUATOR

Inspection

1. Remove the switching actuator.
2. Check that the rod moves smoothly when pushing it.
3. Block the vacuum port and check that air does not leak and the rod is held in.



77U04B-130

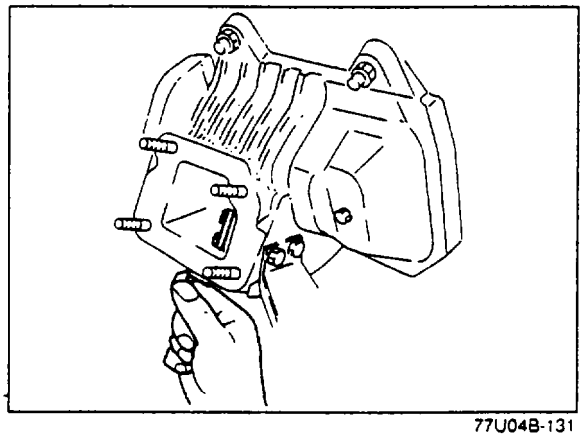
Removal And Installation

Removal

1. Raise the vehicle and support it with safety stands.
2. Remove the "C" clip.
3. Remove the attaching bolt.
4. Remove the switching actuator.

Installation

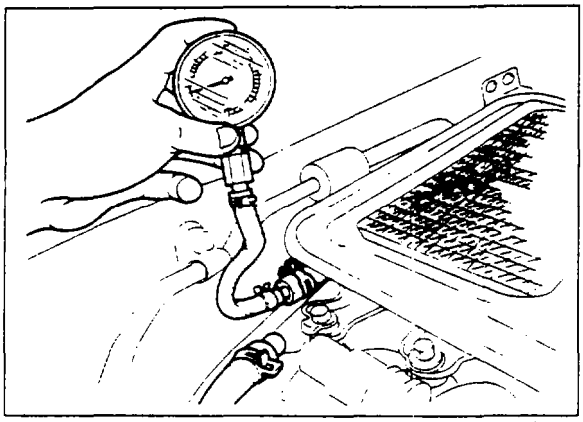
Install in the reverse order of removal.


77U04B-131

SWITCHING VALVE

Inspection

1. Remove "C" clip and disconnect the switching actuator rod from the switching valve.
2. Check that the switching valve moves smoothly.



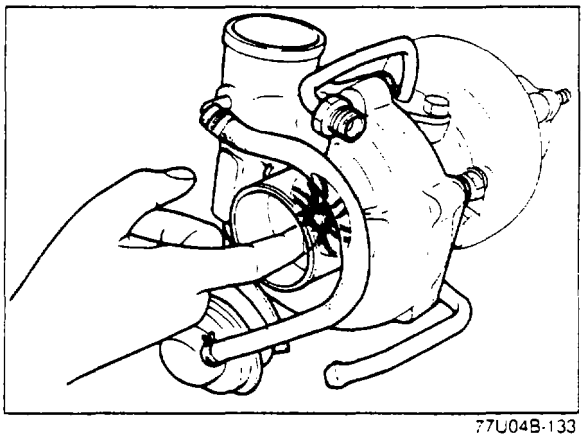
87U04B-025

TURBOCHARGER

Boost Pressure

1. Disconnect the air hose (intercooler to air bypass solenoid valve) at the intercooler.
2. Connect the pressure gauge as shown.
3. Warm up the engine.
4. Check the boost pressure as the engine speed suddenly increases.

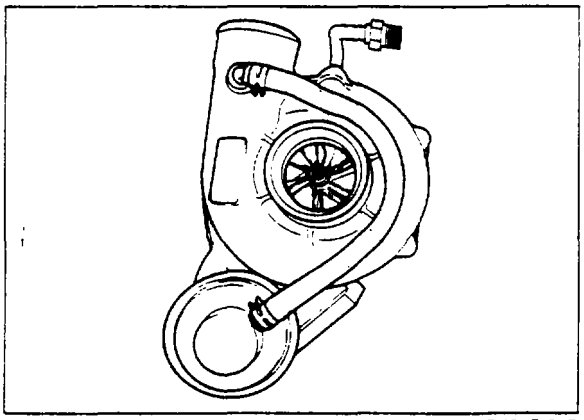
Specification
approx. 4,000 rpm: boost begins
above approx. 5,000 rpm: above 4.8 kPa (0.049 kg/cm^2, 0.7 psi)



77U04B-133

Inspection of Turbine Rotor Assembly

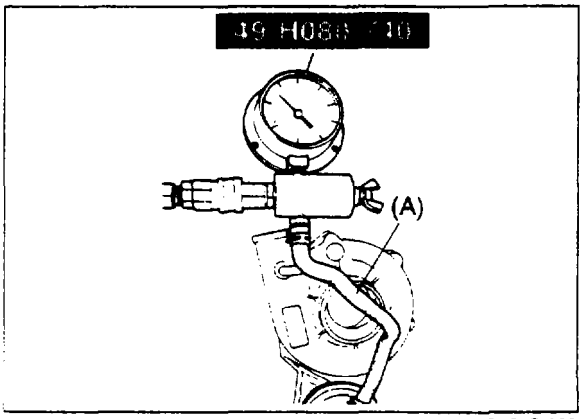
1. Allow the engine to cool.
2. Remove the air funnel.
3. Check that the rotor assembly turns smoothly.
4. If there is excessive load or noise, replace the turbocharger.



77U04B-217

Inspection of Compressor Wheel Deflection

1. Allow the engine to cool.
2. Remove the air funnel.
3. Check if the turbine wheel touches the compressor housing.
4. If the turbine wheel touches the housing, replace the turbocharger.



87U04B-026

WASTE GATE VALVE

1. Allow the engine to cool.
2. Disconnect the air hose (A) and attach the **pressure tester** (49 H080 740) as shown.
3. Adjust the compressed air pressure to **68.7 kPa (0.7 kg/cm^2, 10 psi)**.
4. Check that the rod moves when applying and releasing air pressure.

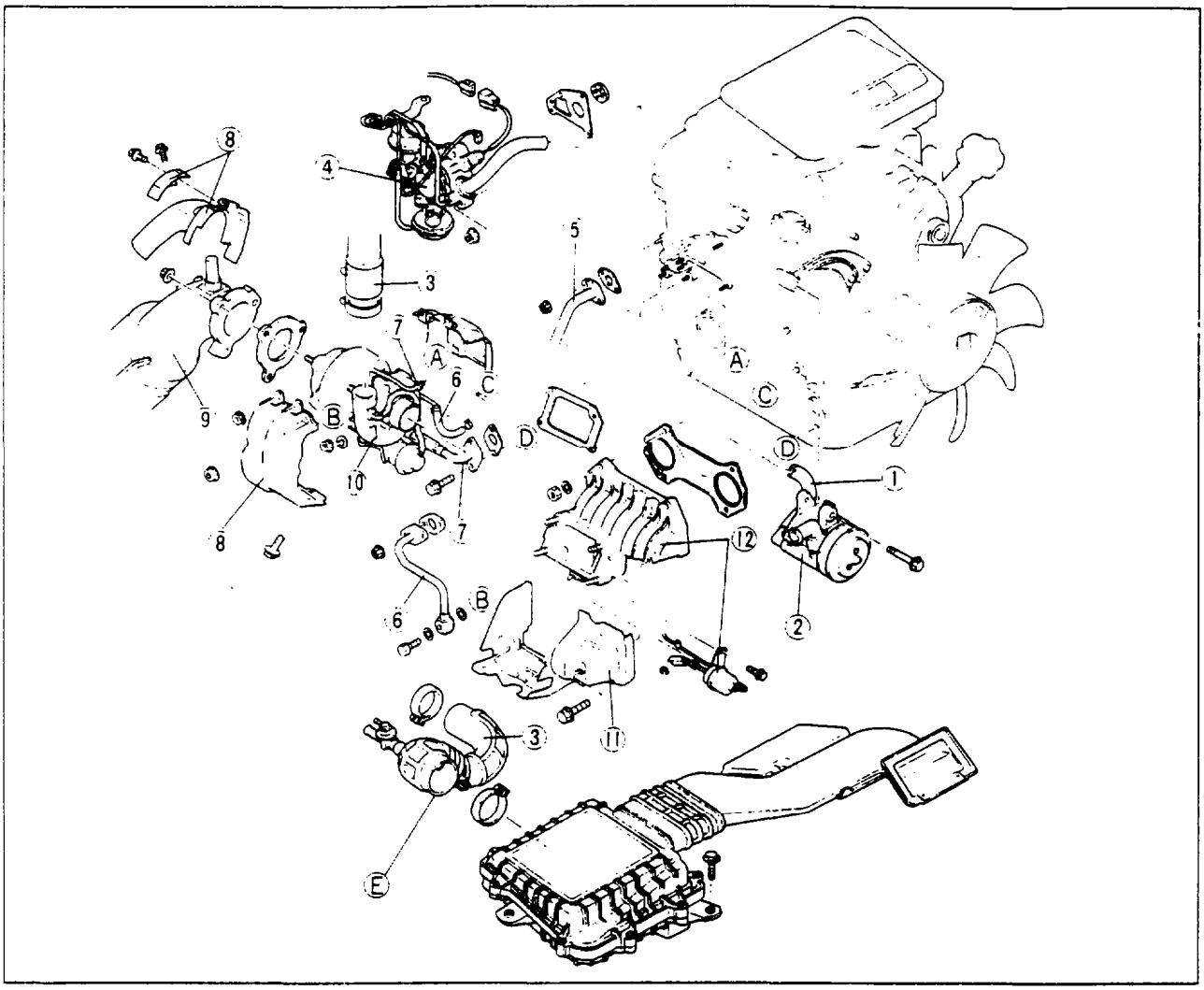
Caution
Do not apply compressed air higher than 98 kPa (1.0 kg/cm^2, 14 psi)

Note
Before inspection of waste gate valve operation, mark a reference line on the rod with white paint.

REMOVAL AND INSTALLATION

Removal

1. Remove the lower cover and drain the engine coolant from the radiator.
2. Remove in the sequence shown in the figure.



77U04B-224

1. Air hoses
2. Air pump
3. Air funnel and air hose
4. Air control valve
5. Split air pipe
6. Water hose and water pipe
7. Oil pipes
8. Insulator covers (Bolts: 4 Nuts: 4)
9. Front converter
10. Turbocharger
11. Insulator covers
12. Exhaust manifold and actuator

87U04B-027

Note

Before removing the air pump, loosen air hose Ⓔ from the air flow meter to remove the air pump easily.

Installation

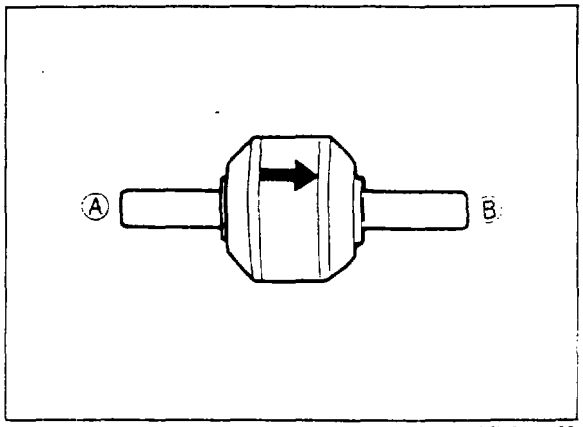
Install in the reverse order of removal. When installing the turbocharger, tighten to the specified torque.

Tightening torque

Turbocharger; 44.1—53.9 N·m (4.5—5.5 m-kg, 33—39 ft-lb)
Exhaust manifold; 31.4—46.1 N·m (3.2—4.7 m-kg, 24—33 ft-lb)
Front converter; 44.1—53.9 N·m (4.5—5.5 m-kg, 33—39 ft-lb)

Note

After tightening the turbocharger retaining nuts to the specified torque, crimp the edges of the retainer plate against the nuts to prevent loosening.

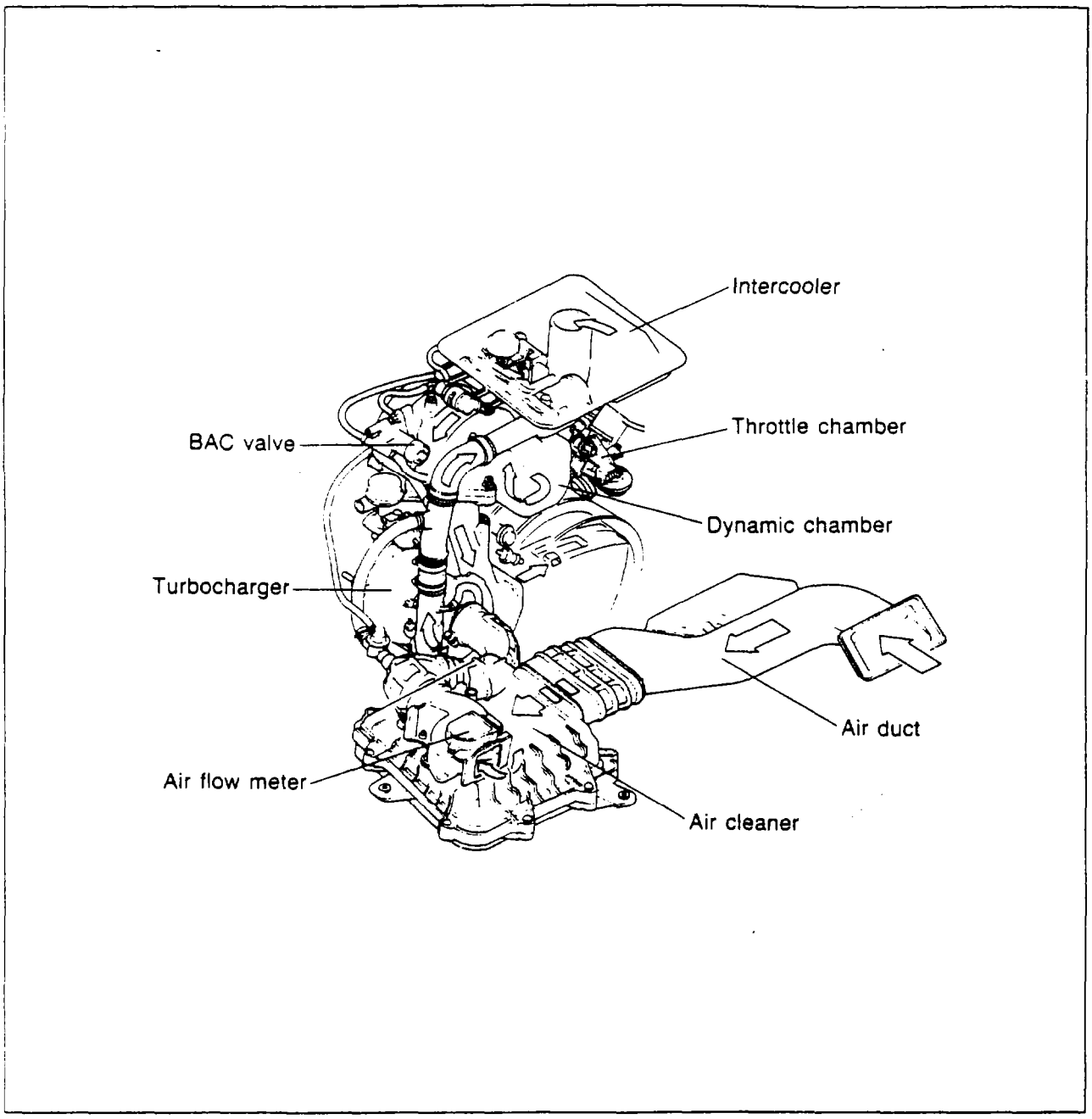


67U04X-109

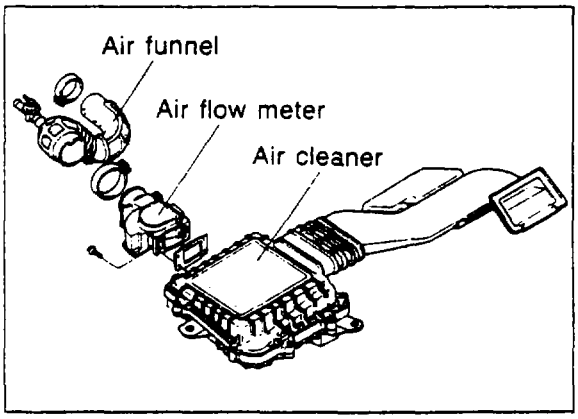
Check valve

1. Remove the check valve.
2. Blow through Ⓐ and check that air flows from Ⓑ.
3. Blow through Ⓑ and check that air does not flow from Ⓐ.

INTAKE AIR SYSTEM



67U04X-092



77U04B-138

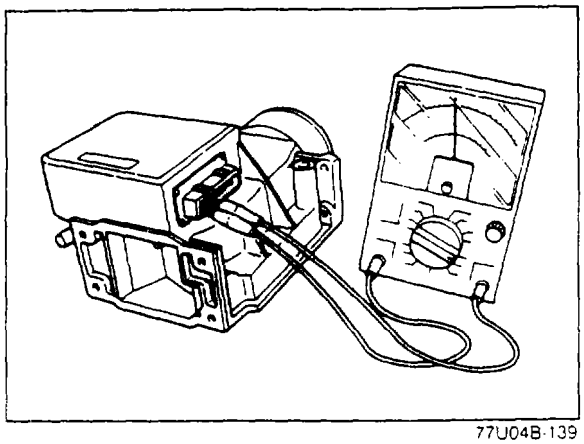
AIR FLOW METER

Removal

1. Disconnect the connector from the air flow meter.
2. Remove the air flow meter attaching bolts and remove the air cleaner.
3. Loosen the air funnel band and remove the air flow meter.

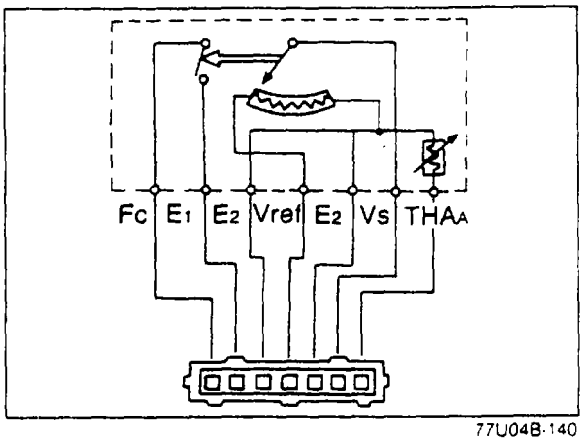
Installation

Install in the reverse order of removal.


77U04B-139

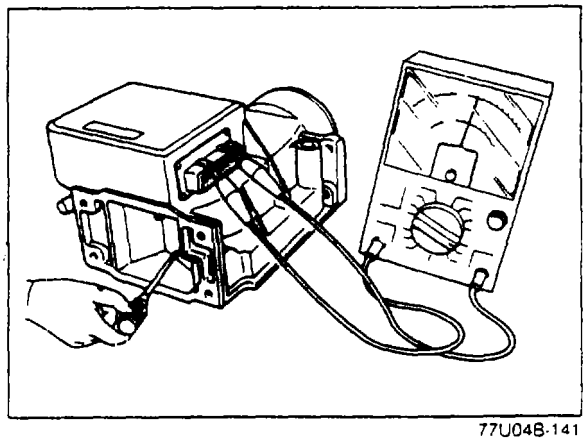
Inspection

1. Check the air flow meter body for cracks or damage.
2. Check that the measuring plate opens smoothly.
3. Check the resistance of the terminals using a circuit tester.



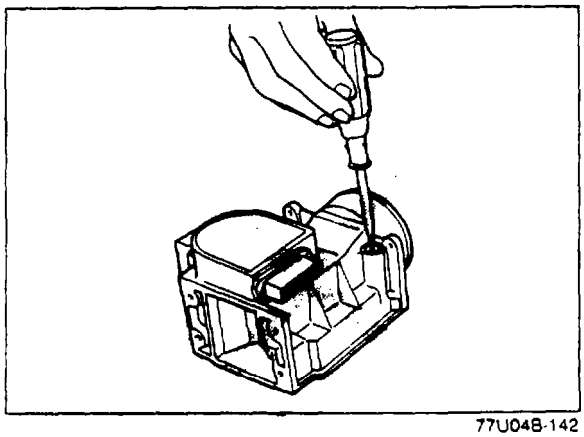
77U04B-140

Terminal	Resistance (Ω)
E_2 ↔ V_s	200—600
E_2 ↔ Vref	200—400
E_2 ↔ THA (Intake air temperature sensor)	−20°C (−4°F) 10,000—20,000 0°C (32°F) 4,000— 7,000 20°C (68°F) 2,000— 3,000 40°C (104°F) 900— 1,300 60°C (140°F) 400— 700
E_1 ↔ F_c	∞


77U04B-141

4. Press open the measuring plate. Measure the resistance between E_1 and F_c (fuel pump switch) and between E_2 and V_s.

Condition / Terminal	Measuring plate	
	Fully closed	Fully open
E_1 ↔ F_c	∞	0
E_2 ↔ V_s	200—600	20—1,000


77U04B-142

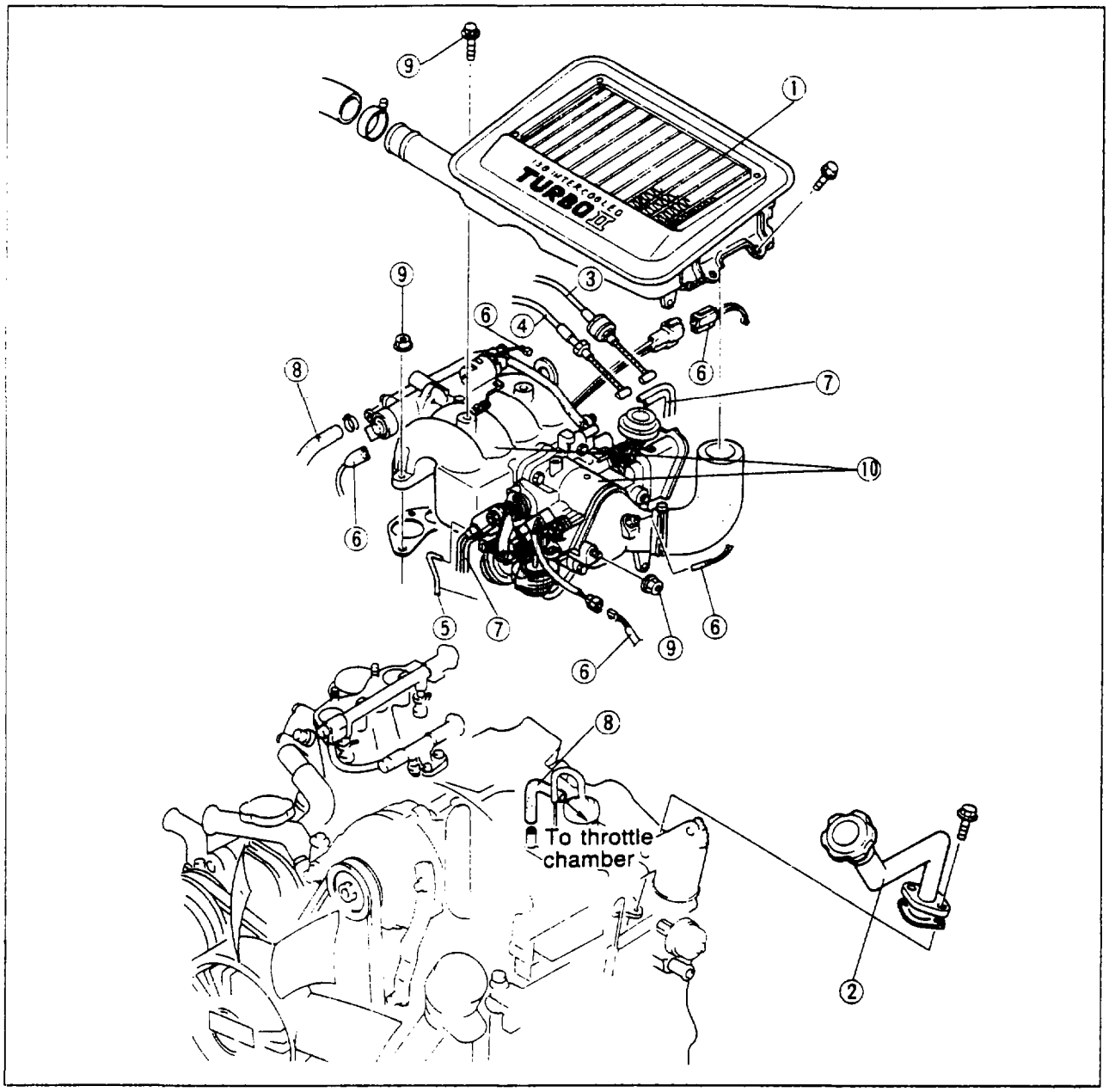
Precaution

The air bypass adjust screw is pre-set and sealed at the factory and must not be tampered with.

THROTTLE BODY

Removal

1. Drain the engine coolant from the radiator.
2. Remove in the sequence shown in the figure.



87U04B-028

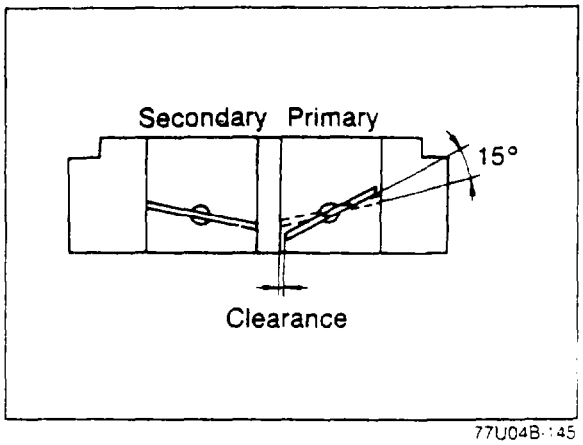
1 Intercooler
2 Oil filler pipe
3 Accelerator cable
4 Cruise control cable (if equipped)
5 Metering oil pump connecting rod
6 Connectors
7 Vacuum tubes
8 Water hoses
9 Nuts and bolts
10 Throttle body and dynamic chamber

Caution
Cover the intake manifold opening with a clean cloth to prevent dust or dirt from entering after the throttle body and dynamic chamber are removed.

Installation

Install in the reverse order of removal.

87U04B-029



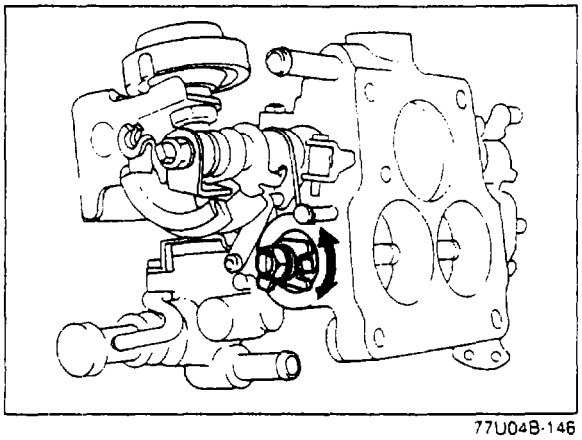
77U04B-145

Inspection

No. 1 secondary throttle valve

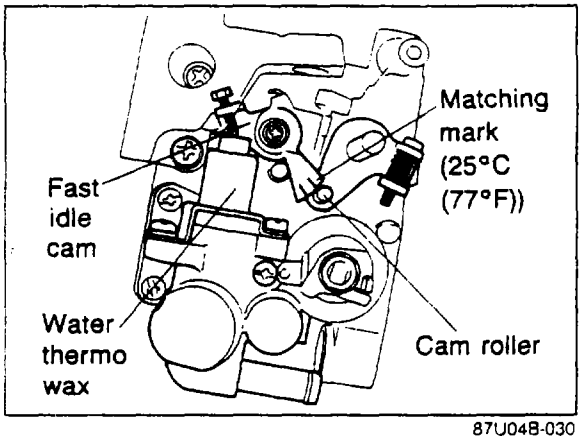
1. Check the clearance between the primary throttle valve and the wall of the throttle bore when the No. 1 secondary throttle valve starts to open.

   Standard clearance:
   1.1—1.7 mm (0.04—0.07 in)



77U04B-146

2. If the clearance is not within the specification, bend the tab until the proper clearance is obtained.

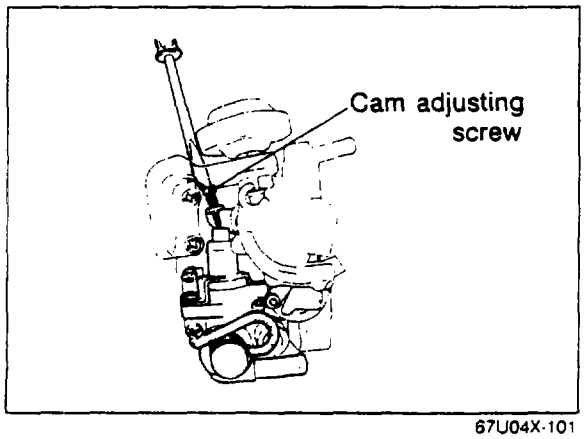


87U04B-030

Fast idle operation

For this operation to be checked, the vehicle and throttle body must be at **25°C (77°F)**.

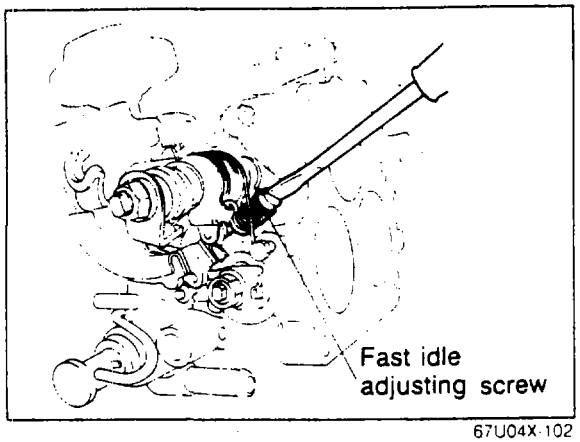
1. Check that the matching mark on the fast idle cam is aligned with the center of the cam roller.



67U04X-101

2. If the matching mark and the center of the cam roller do not align, turn the cam adjusting screw until proper alignment is obtained.

   Note
   Fast idle adjustment is unnecessary unless it has been tampered with.

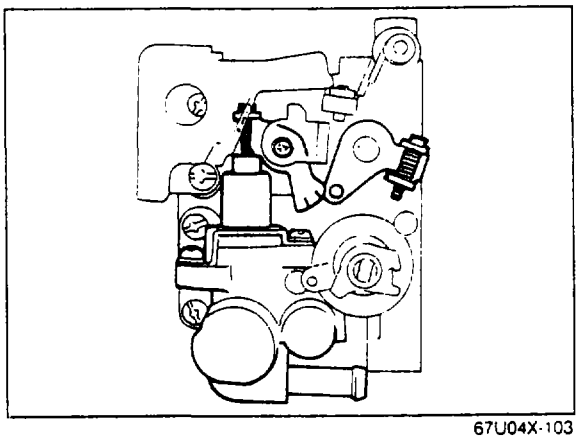


67U04X-102

3. With the matching mark aligned, check the clearance between the primary throttle valve and the wall of the throttle bore.

Standard clearance:
0.4—0.5 mm (0.016—0.02 in)

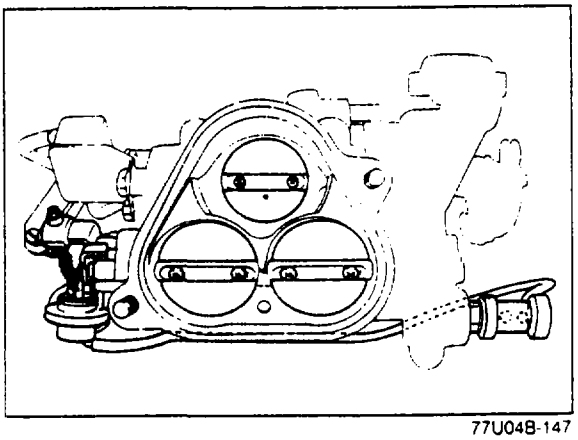
4. To adjust, turn the fast idle adjusting screw, if necessary.



67U04X-103

On Vehicle

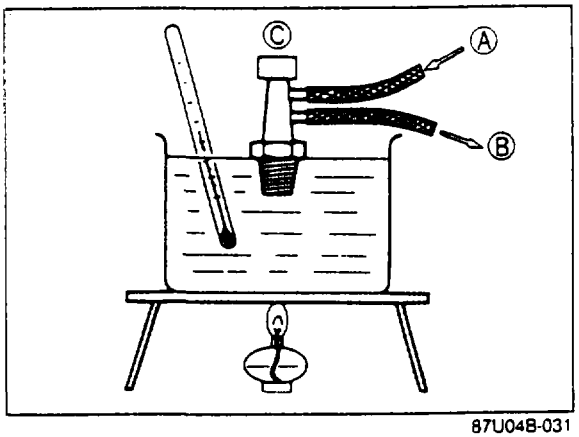
1. Warm up the engine to operating temperature.
2. Check that the wax rod extends outward fully and the idle cam separates from the roller.



77U04B-147

Double throttle valve

Check that the No. 2 secondary throttle valve and linkage moves smoothly when the primary throttle valve is fully opened.



87U04B-031

Water thermo valve

Removal

Remove the water thermo valve from the throttle body.

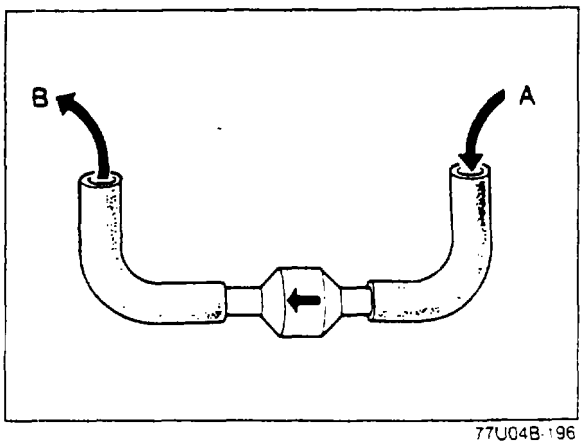
Installation

Install in the reverse order of removal.

Inspection

1. Immerse the water thermo valve in a container.
2. Heat the water gradually and observe the temperature.
3. Blow through port Ⓐ and check the thermo valve operation.

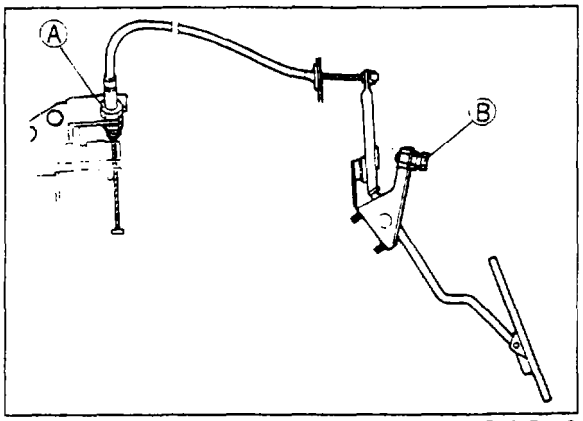
Water temperature	Air passes
Below 60°C (140°F)	From Ⓐ to Ⓑ
Above 60°C (140°F)	From Ⓐ to Ⓒ



77U04B-196

Check valve

1. Remove the check valve.
2. Blow through Ⓐ and check that air flows from Ⓑ.
3. Blow through Ⓑ and check that air does not flow from Ⓐ.



77U04B-148

ACCELERATOR LINKAGE

Adjustment

1. Check the free play of the cable at the throttle chamber.

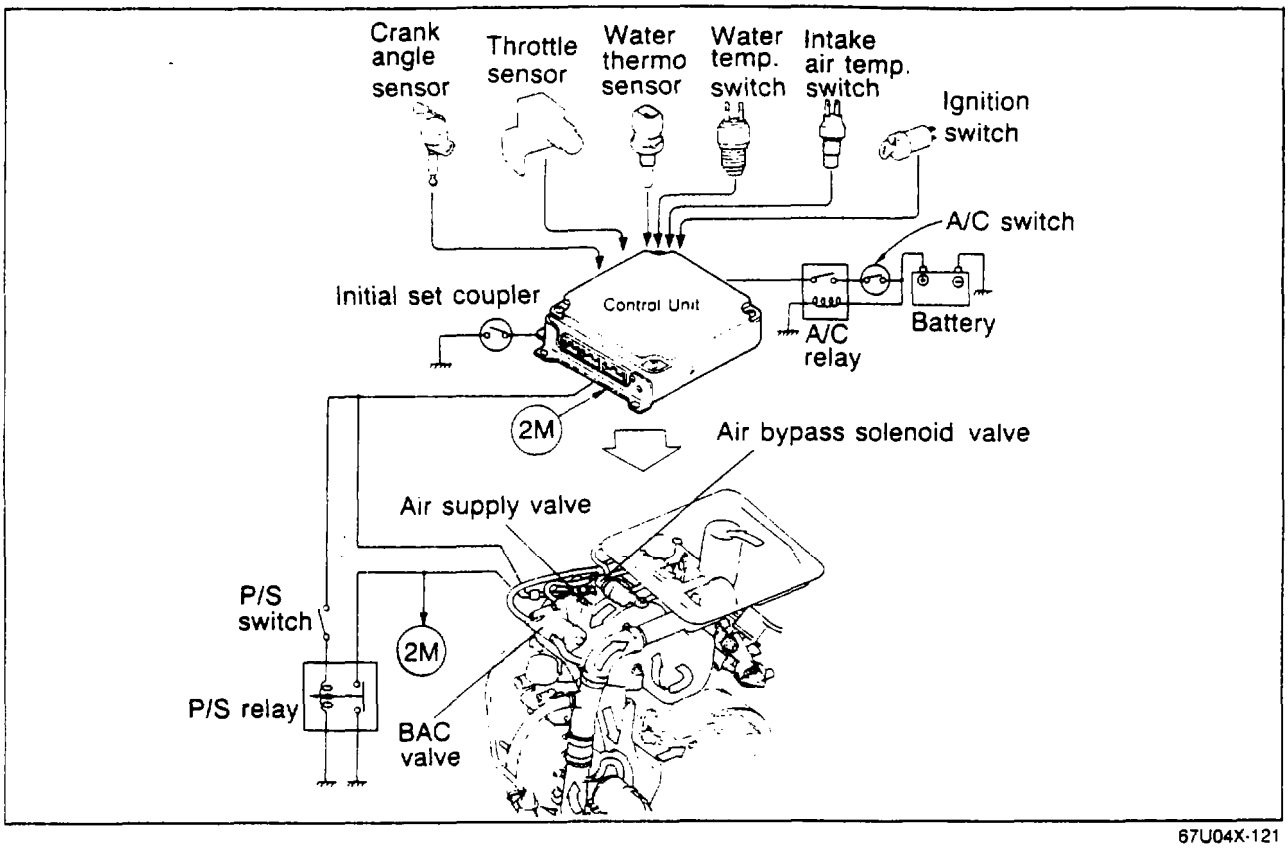
   Free play: 1—3 mm (0.04—0.12 in)

2. Adjust with nut Ⓐ, if not within specifications.

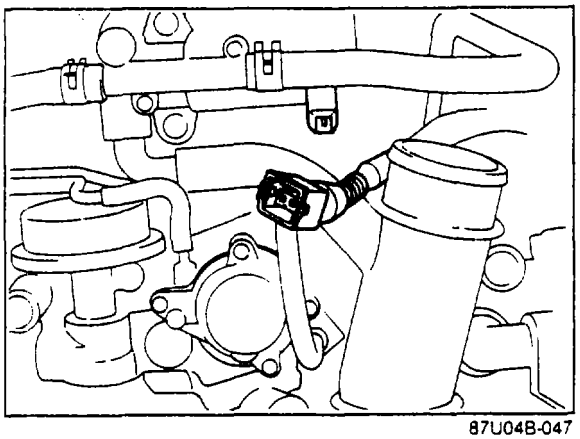
   Caution
   Check first that the fast idle operation is fully cancelled.

3. Check that the throttle valves are fully opened with the accelerator pedal fully depressed.
4. Adjust stopper bolt Ⓑ, if necessary.

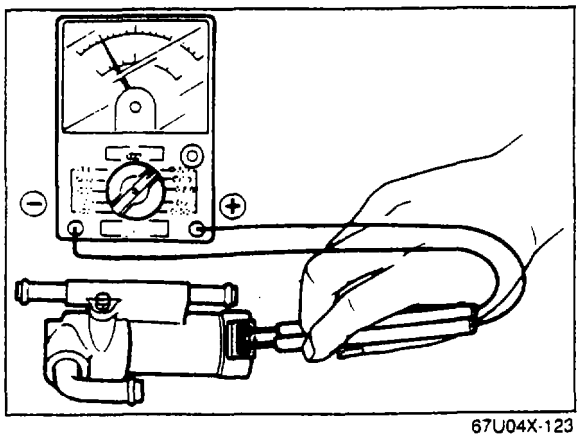
BYPASS AIR CONTROL (BAC) SYSTEM



67U04X-121



87U04B-047



67U04X-123

BAC SYSTEM

Inspection

Note
Connect a jumper wire to both terminals of the initial set coupler

1. Warm up the engine and run it at idle.
2. Connect a tachometer to the engine.
3. Disconnect the BAC valve connector.
4. Check that the engine speed decreases.
5. Reconnect the BAC valve connector.

Removal

1. Drain the engine coolant.
2. Disconnect the air hose and water hoses from the valve.
3. Remove the BAC valve attaching nuts.
4. Remove the BAC valve.

Installation

Install in the reverse order of removal.

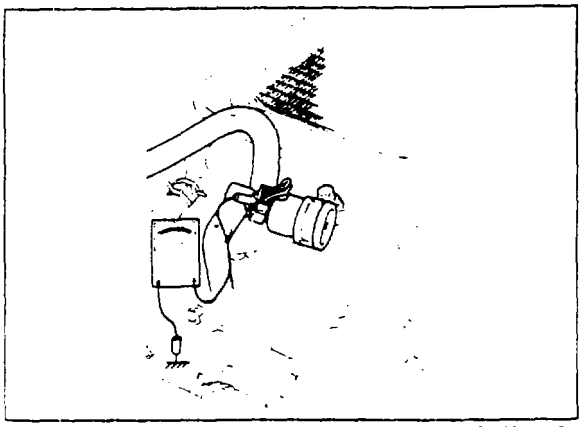
BAC VALVE

Inspection

1. Disconnect the BAC valve connector.
2. Check the valve resistance using a circuit tester.

Resistance: 10.7—12.3 Ω

3. Apply 12V and a ground to the terminals of the BAC valve.
4. The valve should click when voltage is applied.
5. Replace the valve, if necessary.



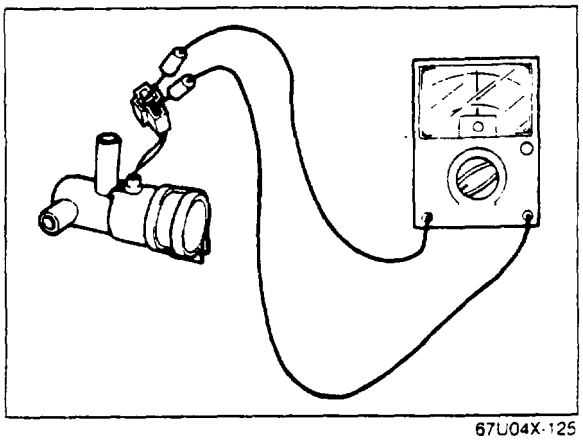
67U04X-124

AIR BYPASS SOLENOID VALVE

Inspection

Signal

1. Disconnect the water thermo sensor connector.
2. Connect a resistor **(2 kΩ)** to the terminals of the sensor connector.
3. Connect a voltmeter to the (BrY) terminal of the air bypass solenoid valve connector and ground.
4. Start the engine and check the following:
   - For 17 seconds after engine starts.
     Voltmeter reading is 0V.
   - After 17 seconds.
     Voltmeter reading is 12V.



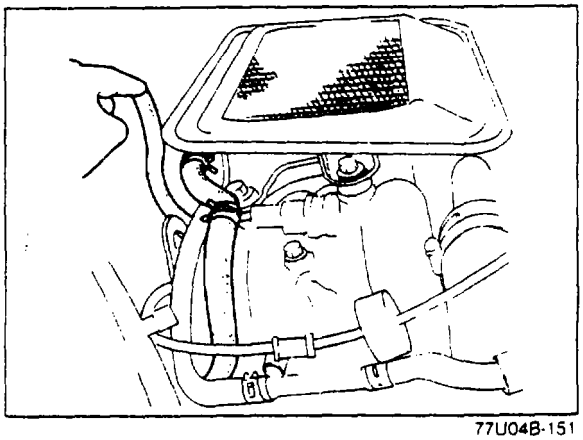
67U04X-125

Air bypass solenoid valve

1. Disconnect the air bypass solenoid valve connector.
2. Check the solenoid valve resistance using a circuit tester.

   Resistance: 16.2—19.8 Ω

3. Replace the solenoid valve, if necessary.



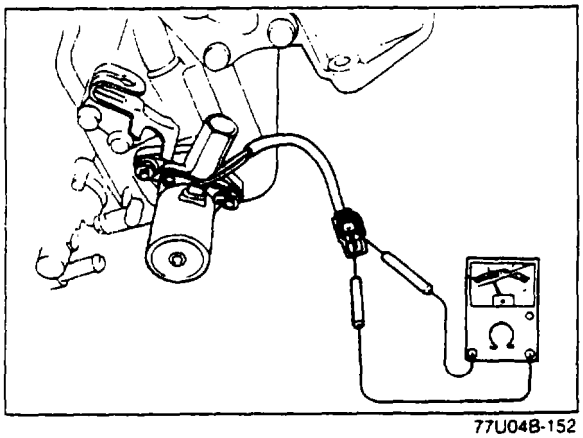
77U04B-151

AIR SUPPLY VALVE

Inspection

Signal

1. Warm up the engine and run it at idle.
2. Disconnect the air hose (intercooler to dynamic chamber) at the intercooler.
3. Place a finger over the port opening and check that the air is not sucked into the port opening.
4. Turn the steering wheel either to the right or left, and check that the air is sucked into the port opening.



77U04B-152

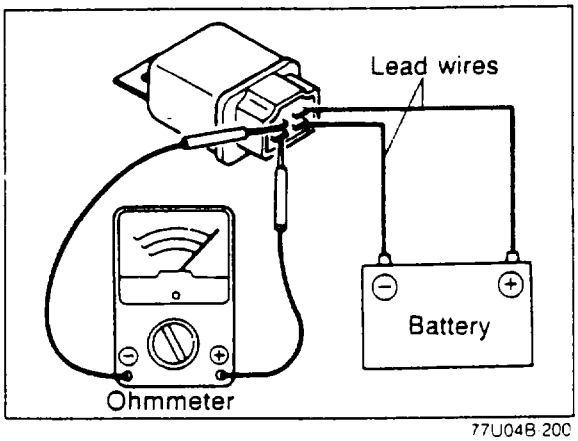
Air supply valve

1. Disconnect the air supply valve connector.
2. Check the air supply valve resistance using a circuit tester.

   Resistance: 16.2—19.8 Ω

3. Replace the air supply valve, if necessary.

Caution
Do not tamper with the adjust screw.



77U04B 200

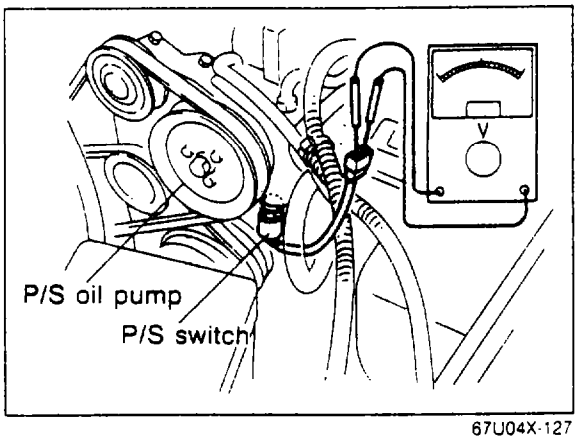
POWER STEERING RELAY

Inspection

1. Apply 12V and ground (12V to Ⓐ terminal and ground to Ⓑ terminal), and check that there is continuity at terminals Ⓒ and Ⓓ using a circuit tester.

Operation / Terminals	12V Not applied	12V Applied
Ⓒ — Ⓓ	No continuity	Continuity

2. Replace the relay, if necessary.



67U04X-127

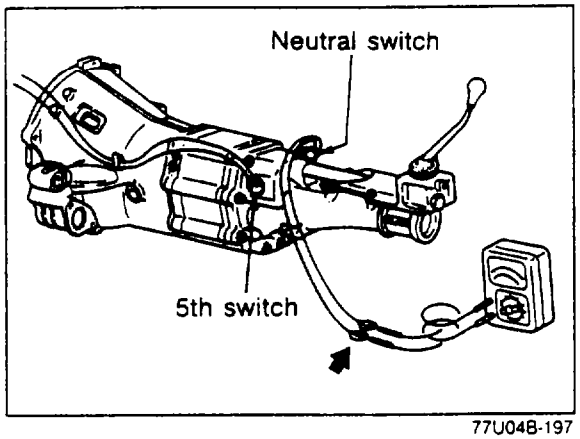
POWER STEERING SWITCH

Inspection

1. Start the engine and run it at idle.
2. Disconnect the P/S switch connector.
3. Connect a circuit tester to the switch.
4. Turn the steering wheel either to the right or left, and check the continuity.

Steering wheel	Continuity
Turn	Yes
Straight ahead	No

5. Replace the switch, if necessary.



77U04B-197

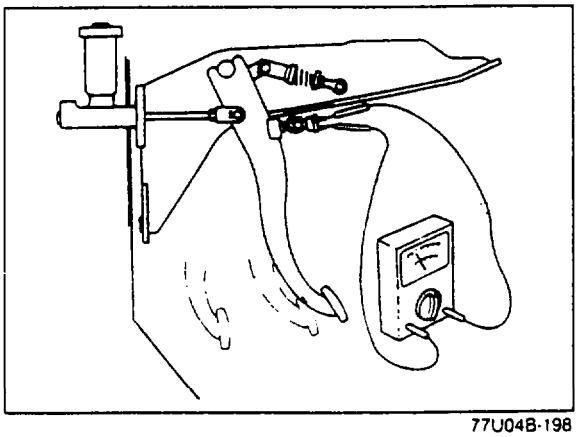
NEUTRAL SWITCH

Inspection

1. Disconnect the neutral switch connector.
2. Connect a circuit tester to the switch.
3. Check the continuity.

Transmission	Continuity
In neutral	Yes
In other ranges	No

4. Replace the switch, if necessary.



77U04B-198

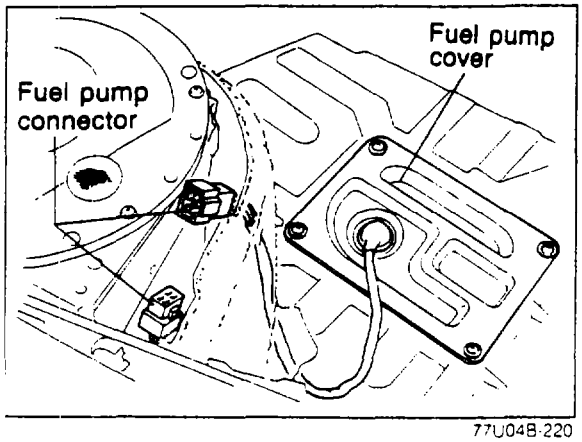
CLUTCH SWITCH

Inspection

1. Disconnect the clutch switch connector.
2. Connect a circuit tester to the switch.
3. Check the continuity.

Pedal	Continuity
Depressed	Yes
Released	No

4. Replace the switch, if necessary.



77U048-220

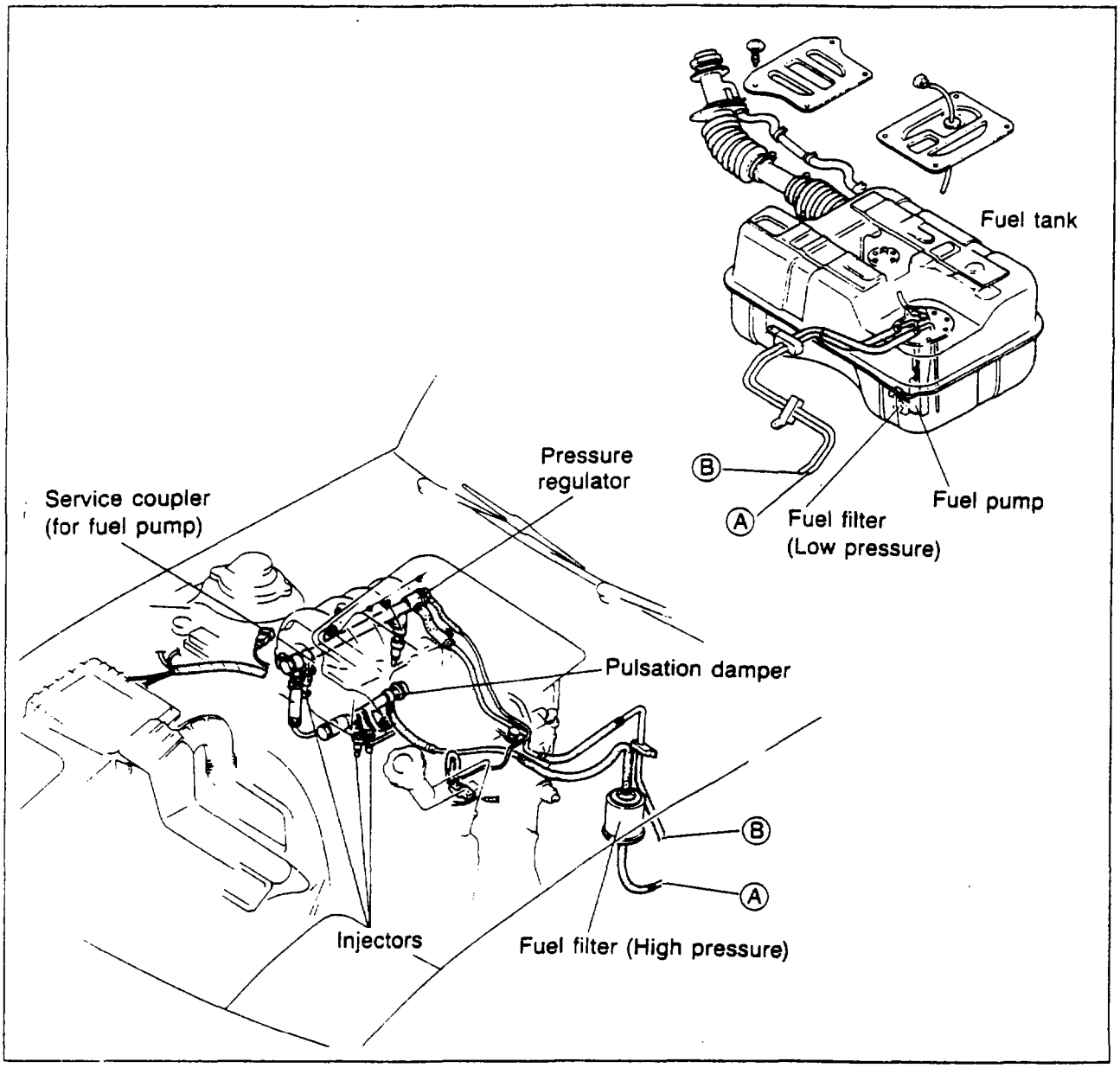
FUEL SYSTEM

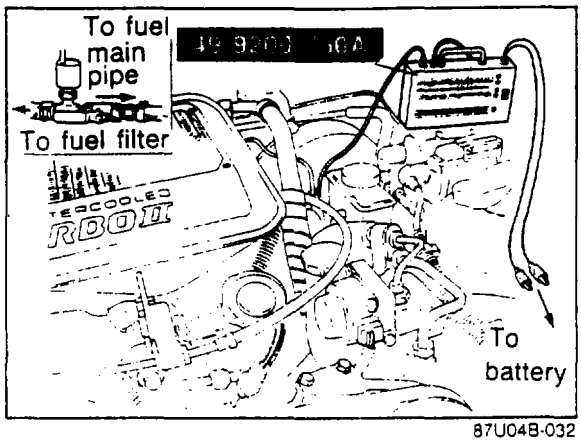
FUEL PRESSURE RELEASE AND SERVICING FUEL SYSTEM

Fuel in the fuel lines remains under high pressure even when the engine is not running.

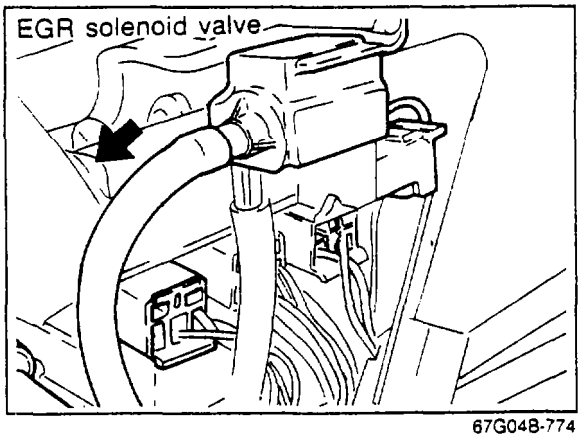
a) Before disconnecting fuel line, release fuel pressure from fuel line to eliminate possibly causing injury and a fire.
   1. Start the engine.
   2. Disconnect the fuel pump connector with engine running.
   3. After stalling the engine, turn the ignition switch OFF.

b) Use a rag to protect from fuel spraying out when disconnecting the hose and plug the hoses after removal.

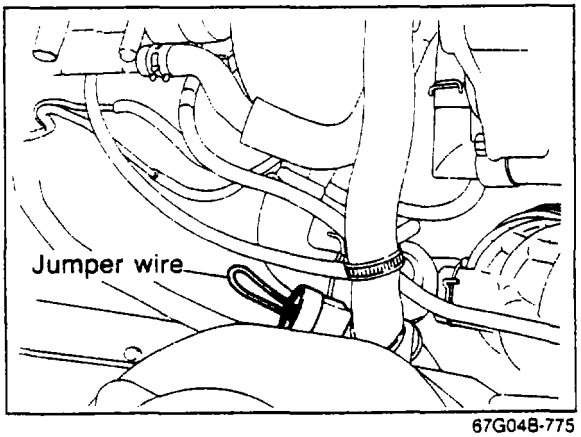




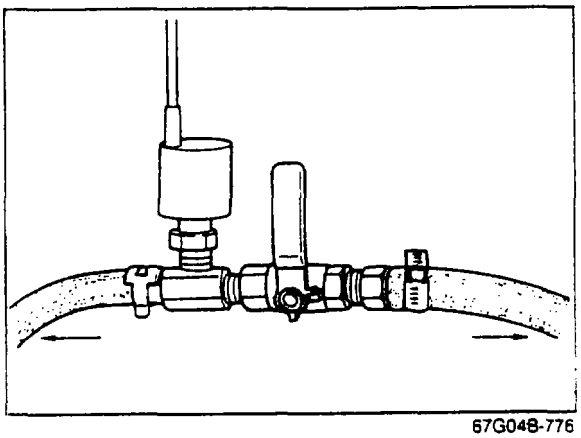
87U04B-032



67G04B-774



67G04B-775


67G04B-776

HOW TO USE THE MULTI-PRESSURE TESTER

When inspecting the fuel pressure, use the Multi-pressure tester (49 9200 750A).

Warning
Before connecting the multi-pressure tester (49 9200 750A), release the fuel pressure from the fuel line to eliminate possibly causing injury or a fire. (Refer to 4B—68)

1. Disconnect the negative battery terminal.
2. Disconnect the fuel main hose from the fuel main pipe.
3. Connect a **Multi-Pressure Tester (49 9200 750A) Adapter** between fuel main hose and fuel main pipe.

Caution
Do not reverse the adapter connection.

4. Disconnect the vacuum hose from the EGR solenoid valve, and connect the **Multi-Pressure Tester (49 9200 750A) Vacuum Hose** using three-way joint.
5. Connect the negative battery terminal.
6. Connect the **Multi-Pressure Tester (49 9200 750A) Wires** to the battery.

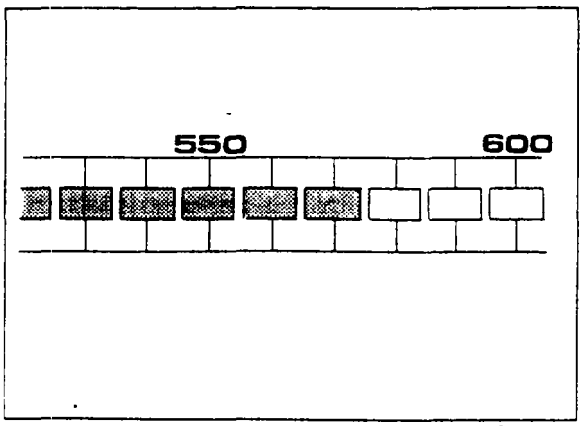
7. Connect the terminals of the check connector (yellow connector) with a jumper wire. Turn on the ignition switch to operate the fuel pump.
8. Check for fuel leaks.
9. Check the fuel pressure after checking fuel leakage.

Caution
Afer checking fuel leakage, turn off the ignition switch and disconnect the jumper wire from the check connector.

FUEL PRESSURE

Fuel Pump

1. Connect the terminals of the check connector (yellow connector) with a jumper wire.
   Turn on the ignition switch to operate the fuel pump.
2. Move the lever on the adapter as shown in the figure.

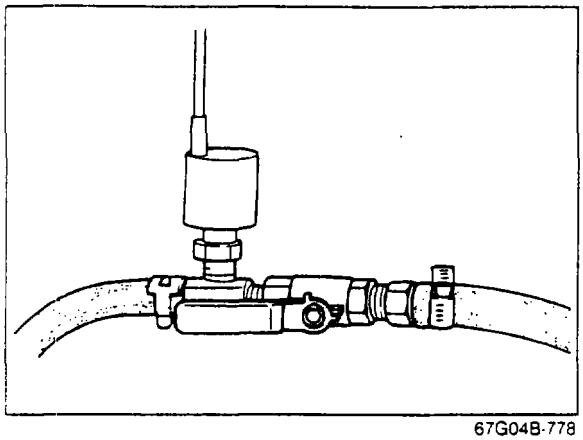


67G04B-777

3. Check the fuel pump pressure.

Fuel pump pressure: 490—637 kPa (5.0—6.5 kg/cm², 71.1—92.4 psi)

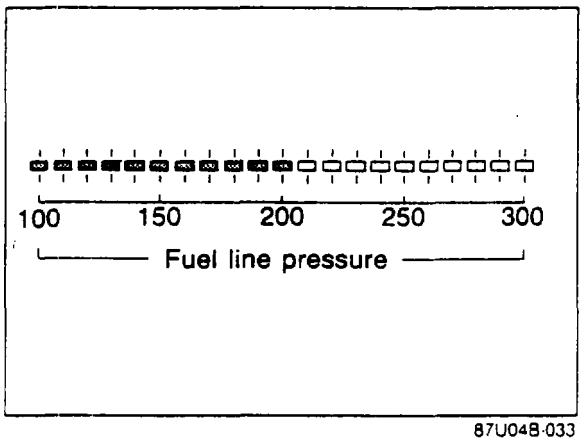
4. If it is not within specified value, check the wiring harness and main relay.
   When these are normal, replace the fuel pump.
5. After checking fuel pump pressure, turn OFF the ignition switch and disconnect the jumper wire from the check connector.



67G04B-778

Fuel Line

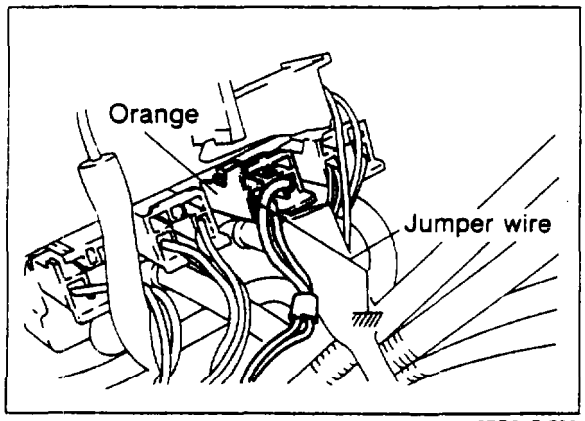
1. Warm up the engine to the normal operating temperature and run it at idle.
2. Move the lever on the adapter as shown in the figure.



87U04B-033

3. Check the fuel line pressure

Fuel line pressure: Approx. 196 kPa (2.0 kg/cm², 28.4 psi)

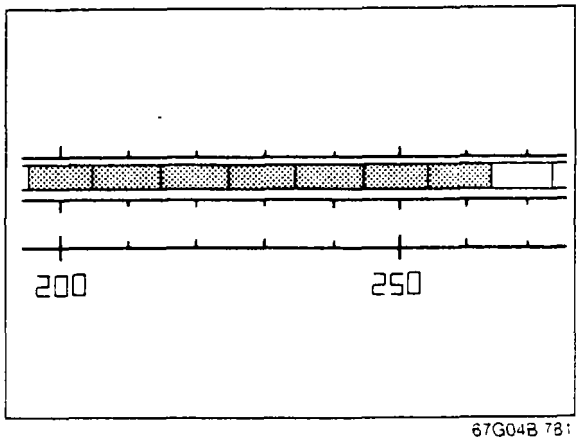


67G04B-780

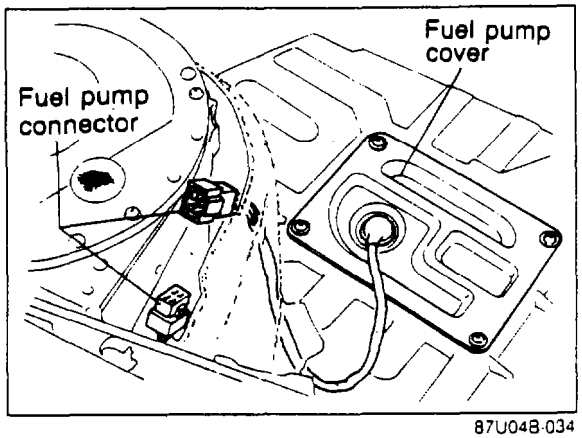
4. Connect a jumper wire to the pressure regulator control solenoid valve, and check the fuel line pressure again.

Fuel line pressure: 235—275 kPa (2.4—2.8 kg/cm², 34.1—39.8 psi)

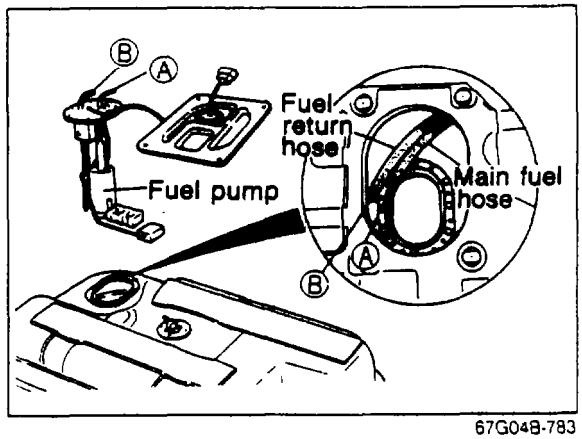
5. If it is not within specified value, check the wiring harness and pressure regulator solenoid valve, when these are normal, replace the pressure regulator.



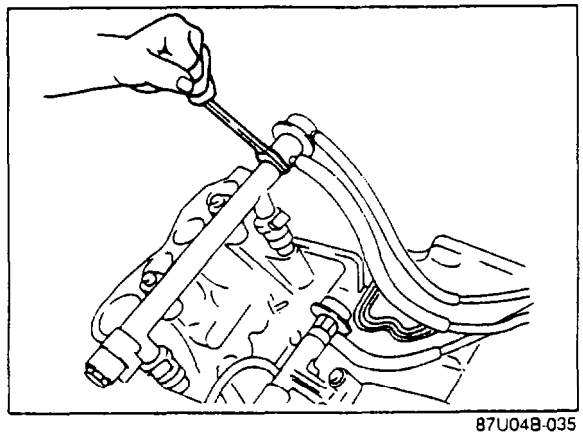
67G04B 781



87U04B-034



67G04B-783


87U04B-035

Injection pressure
When the trouble is poor acceleration or hesitation, check the injection pressure.
1. Run the vehicle and measure the injection pressure on the **Multi-Pressure Tester**.

   Fuel pressure (Injection pressure)
   Approx. 235—275 kPa
   (2.4—2.8 kg/cm^2, 34.1—39.8 psi)

2. If the injection pressure is lower than specifications, check the following points.
   a) Fuel pump outlet pressure.
   b) Fuel filter clog.
3. If the injection pressure is higher than specifications, check the following points.
   a) Fuel return pipe clog.
   b) Fuel line pressure.

REMOVAL

Warning
Before removing the fuel pump and pressure regulator, release the fuel pressure from the fuel line to eliminate possibly causing injury or a fire. (Refer to 4B—68)

Fuel Pump
1. Lift up the rear mat.
2. Remove fuel pump cover.
3. Disconnect the fuel pump connector.
4. Disconnect the fuel main hose and the fuel return hose.
5. Remove the fuel pump screws.
6. Remove the fuel pump from the fuel tank.

Installation
Install in the reverse order of removal.

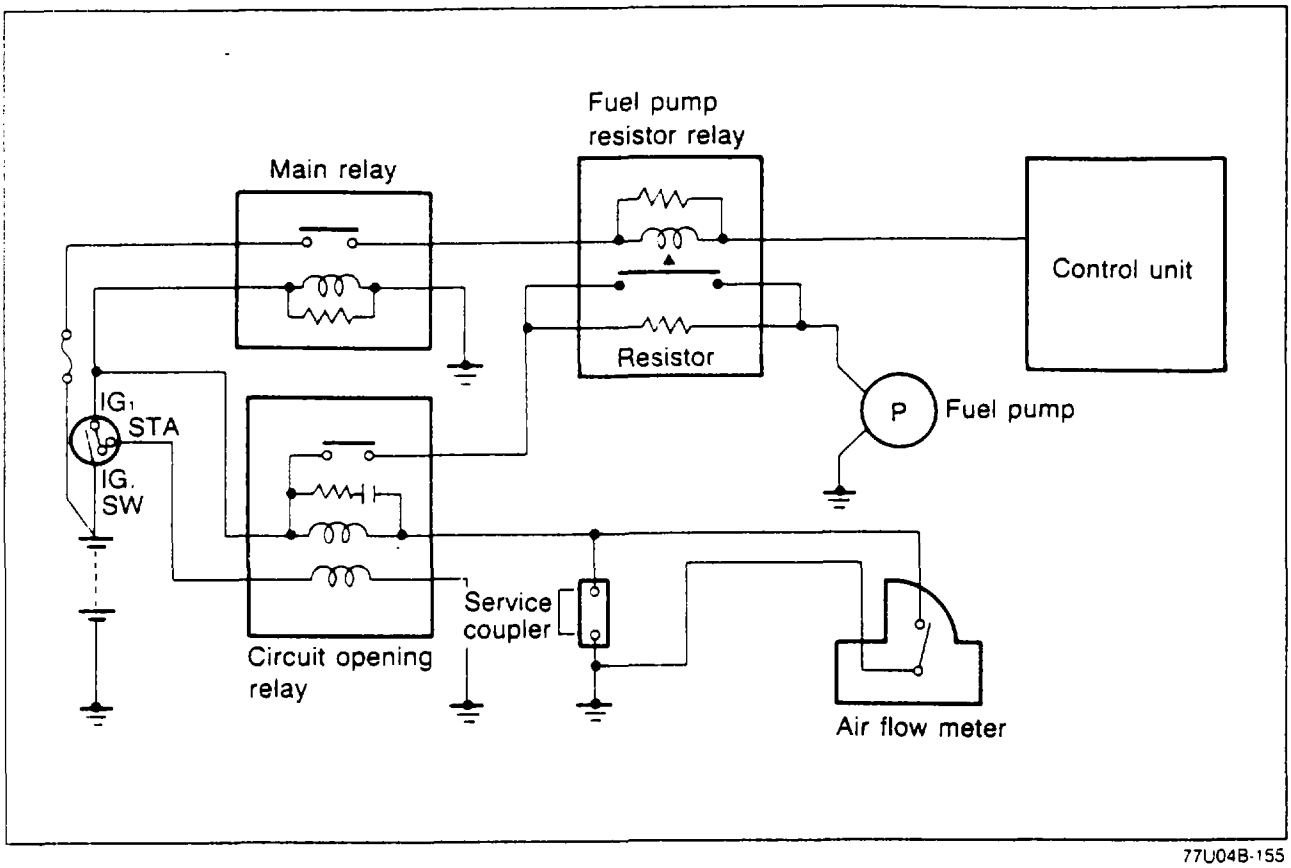
Pressure Regulator
1. Remove the throttle body and dynamic chamber. (Refer to page 4B—61)
2. Disconnect the vacuum hose and fuel return hose from the pressure regulator.
3. Remove the pressure regulator.

Warning
a) Cover the hose with a cloth as a small amount of fuel will come out when it is disconnected.
b) Plug the fuel hoses to prevent leakage.

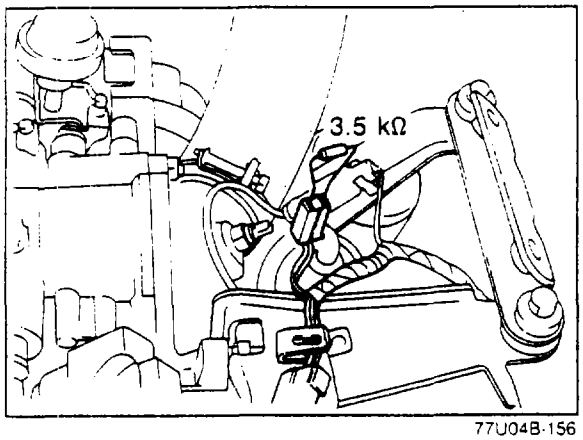
Installation
Install in the reverse order of removal.

Caution
Check for fuel leaks after installing the pressure regulator.

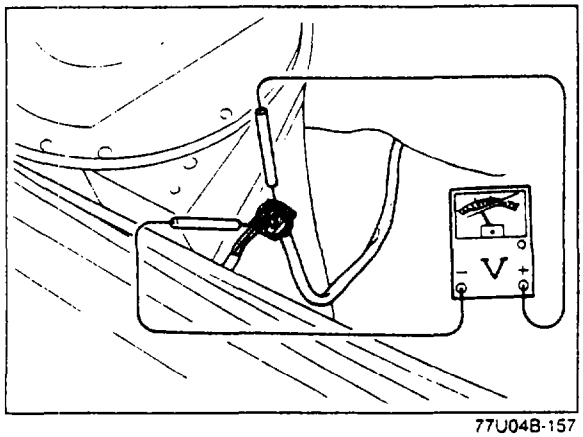
FUEL PUMP CONTROL SYSTEM



77U04B-155



77U04B-156



77U04B-157

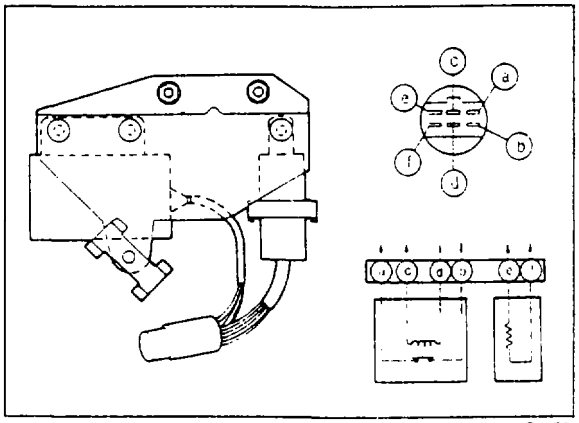
Inspection

Signal

1. Remove the intercooler.
2. Disconnect the intake air temperature sensor connector and connect a resistance (**3.5 kΩ**) to the terminals of the sensor connector.
3. Install the intercooler.
4. Connect a voltmeter between (B) terminal and (Bu) terminal of the fuel pump connector.
5. Warm up the engine and stop it.
6. Restart the engine and check the voltage.

Color	B — Bu [V]
After starting for approx. 50 sec	approx. 12
after above	approx. 9

7. Check the fuel pump resistor relay, 3D terminal of control unit, engine wiring harness and connectors, if necessary.



87U04B-158

Fuel pump resistor relay

1. Remove the air cleaner and air flow meter.
2. Disconnect the fuel pump resistor relay connector.
3. Check the resistance.

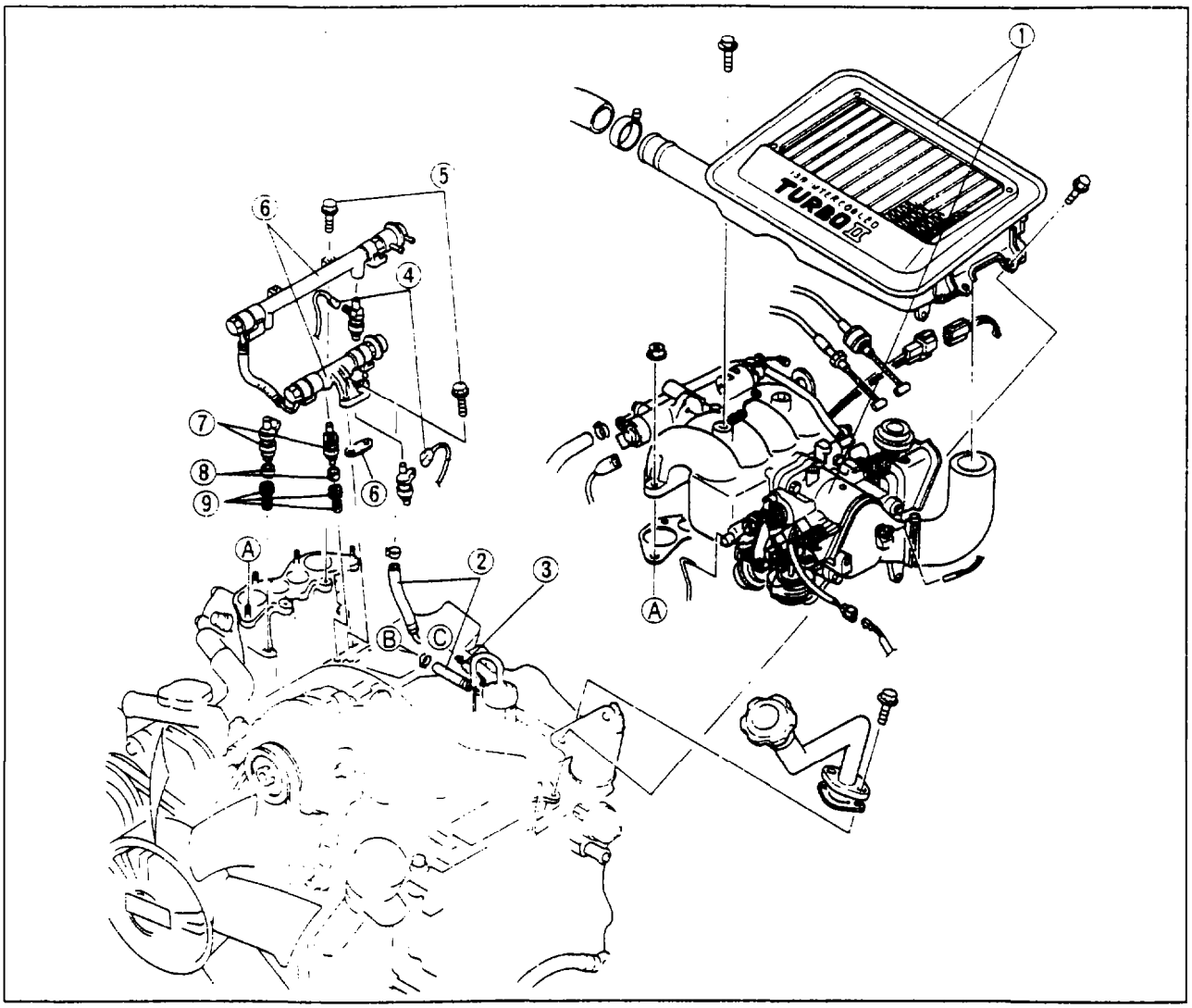
Resistance: a—b 0 Ω
c—d 68—92 Ω
e—f 0.64 Ω

4. Replace, if necessary

INJECTOR

Removal

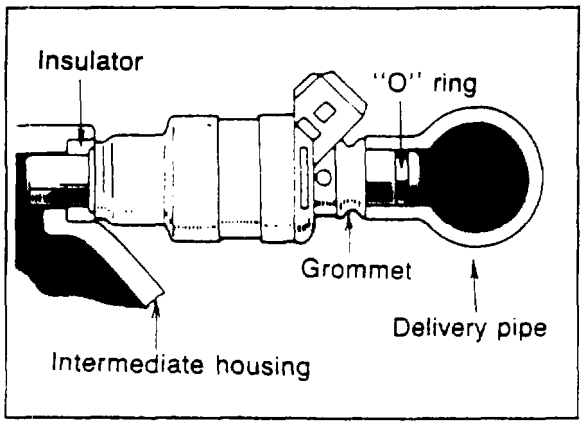
Before performing the following procedures, release the fuel pressure from the fuel line to eliminate possibly causing injury or a fire. (Refer to 4B—68)



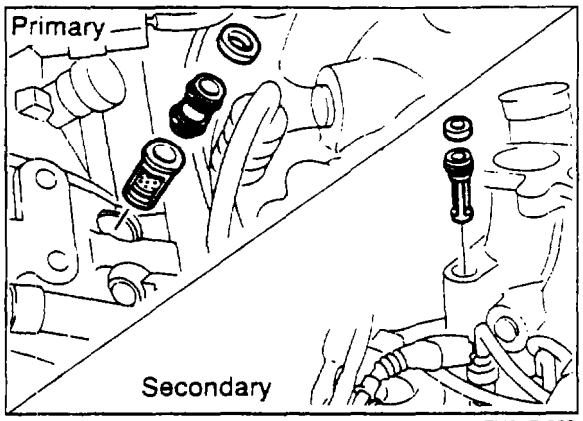
87U04B-036

Remove the parts in the sequence shown in the figure.

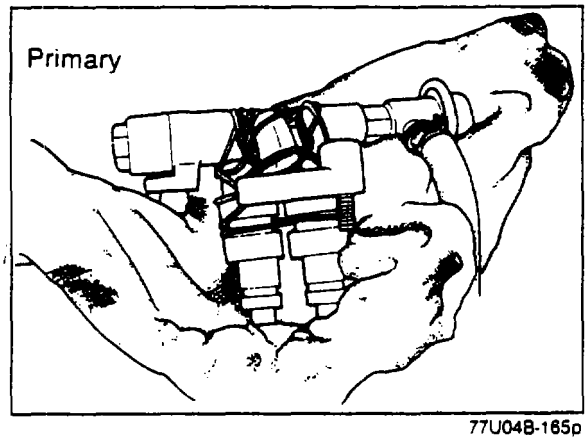
1. Intercooler, throttle body and dynamic chamber (Refer to page 4B—61)
2. Fuel main hose and fuel return hose
3. Vacuum hose
4. Connectors
5. Attaching bolts
6. Delivery pipes and insulator
7. Injectors
8. Injector insulators
9. Air bleed sockets



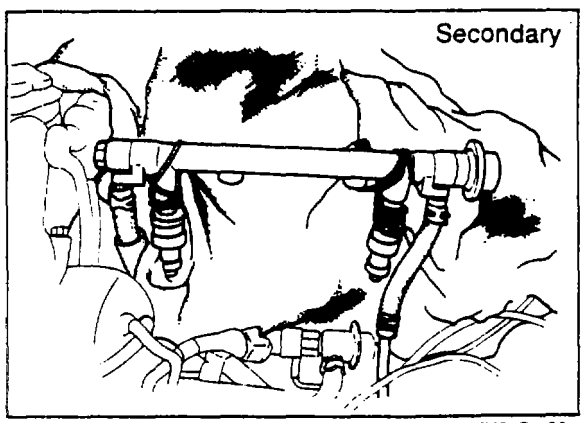
77U04B-163p



87U04B-037



77U04B-165p



77U04B-166p

Installation

Install the injectors in the reverse order of removal.

Caution

a) Do not misinstall the air bleed sockets when installing.

b) Replace "O" rings with new ones when installing.
Use a lubricant and be careful not to damage the "O" rings during installation.

c) Check for leaks with fuel pressure applied (Refer to 4B—69) before installing the dynamic chamber and throttle body.

Inspection

Warning

Before performing the following procedures, release the fuel pressure from the fuel line to reduce possibility of injury or fire. (Refer to 4B—68)

Fuel injection leakage test

1. Affix the injectors to the delivery pipe with wire.

Caution

Affix the injectors firmly to the delivery pipe so no movement of the injectors is possible.

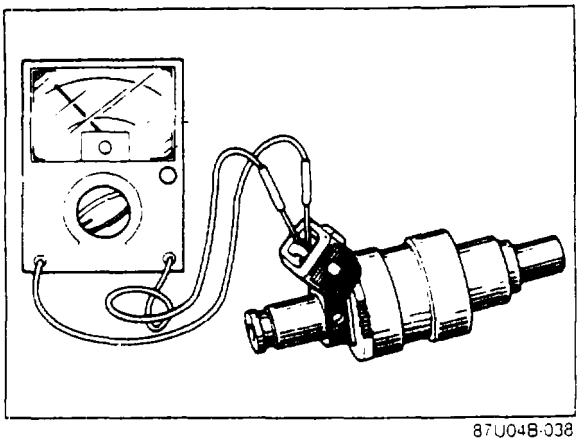
Warning

Be extremely careful when working with fuel. Always work away from sparks or open flames.

2. Connect the terminals of the fuel pump check connector with a jumper wire (Refer to 4B—69). Turn on the ignition switch.
3. Check that fuel does not leak from the injector nozzles.

Note

After 5 minutes a very slight amount of fuel leakage from the injector is acceptable.

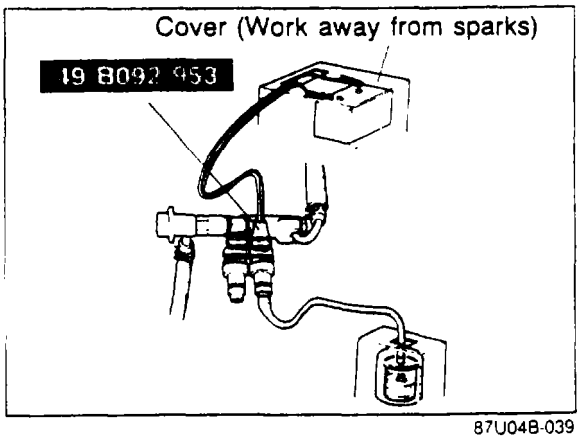


87U04B-038

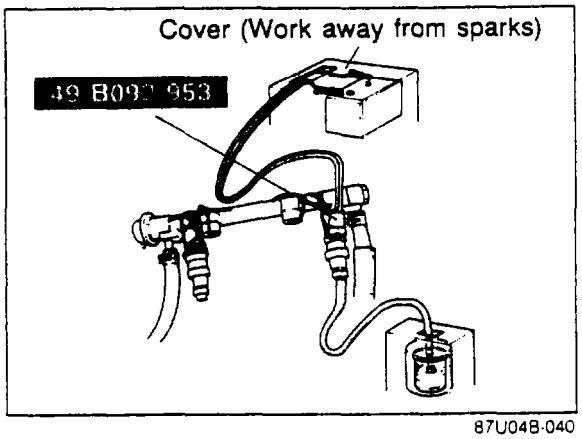
Resistance

Check the resistance of the injector using a circuit tester.

Resistance: 12—16 Ω



87U04B-039



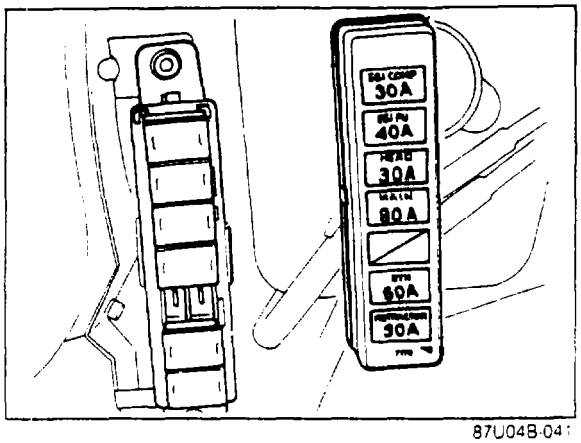
87U04B-040

Injection volume test

1. Affix the injectors to the delivery pipes with wire.
2. Connect the terminals of the fuel pump check connector with a jumper wire (Refer to 4B—69). Turn on the ignition switch.
3. Connect the **injector checker** (49 B092 953) to the battery and injector.
4. Check the injection volume with a graduated container.

Volume: 133—142 cc (8.1—8.7 cu in)/15 sec.

Warning
Be extremely careful when working with fuel. Always work away from sparks or open flames.

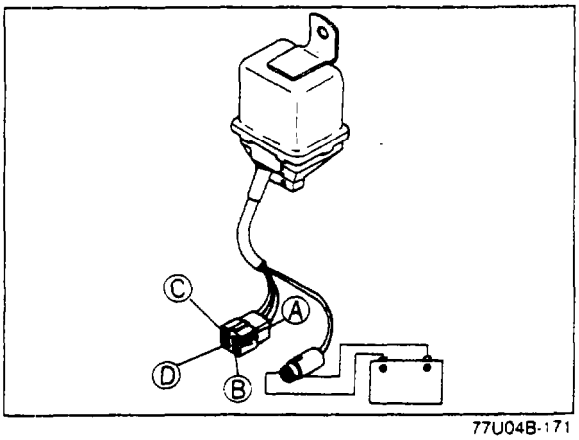


87U04B-041

EGI MAIN FUSE

Inspection

1. Check the EGI main fuses.
2. Replace fuses, if necessary.



77U04B-171

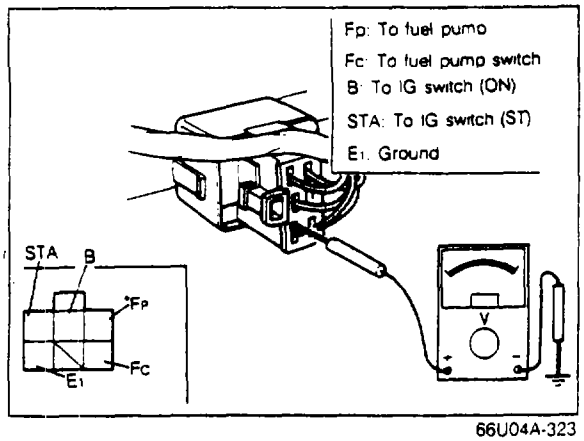
MAIN RELAY

Inspection

1. Check for a "clicking" sound of the main relay by turning the ignition switch ON and OFF.
2. Apply 12V and ground the 2-prong connector of the main relay.
3. Check continuity of the terminals using an ohmmeter.

Terminals \ Operation	12V Not applied	12V Applied
Ⓐ — Ⓑ	No continuity	Continuity
Ⓒ — Ⓓ		

4. Replace the main relay, if necessary.



66U04A-323

CIRCUIT OPENING RELAY

Inspection of Terminal Voltage

1. Check voltage between each terminal and ground by using a voltmeter.

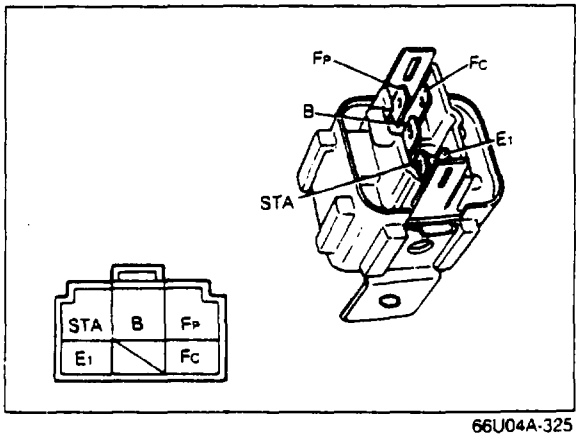
Condition \ Terminal	Fp	Fc	B	STA	E1
G SW: ON	0V	12V	12V	0V	0V
Measuring plate: open	12V	0V	12V	0V	0V
IG SW: ST	12V	0V	12V	12V	0V

Inspection of Resistance

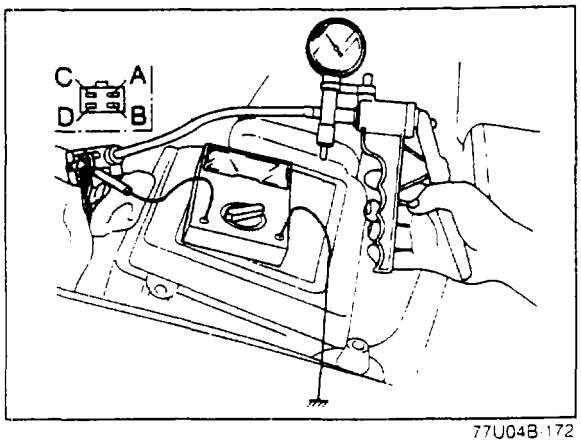
1 Check the resistance between the terminals by using an ohmmeter.

Between terminals	Resistance (Ω)
STA ↔ E1	15—30
B ↔ Fc	80—150
B ↔ Fp	∞

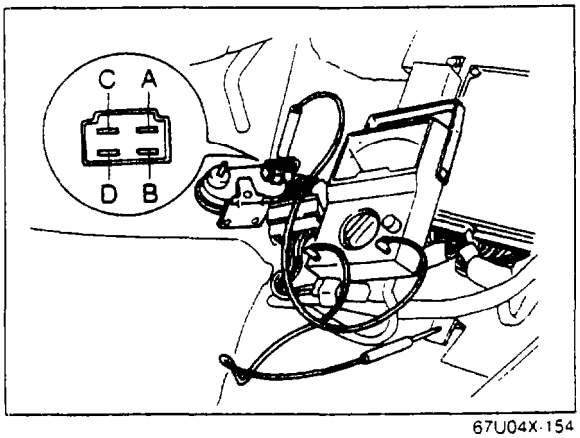
2. If the resistance is not within specification, replace the circuit opening relay.



66U04A-325



77U04B-172



67U04X-154

PRESSURE SENSOR

Inspection

1. Disconnect the vacuum hose from pressure sensor.
2. Connect a voltmeter to the pressure sensor (D) terminal.
3. Apply 100 mmHg (3.9 inHg) of vacuum to the pressure sensor using a vacuum pump tester.
4. Turn on the ignition switch and check the voltmeter reading.

Voltage:
2.0—2.5V at 100 mmHg (3.9 inHg)

5. Replace the sensor, if necessary.

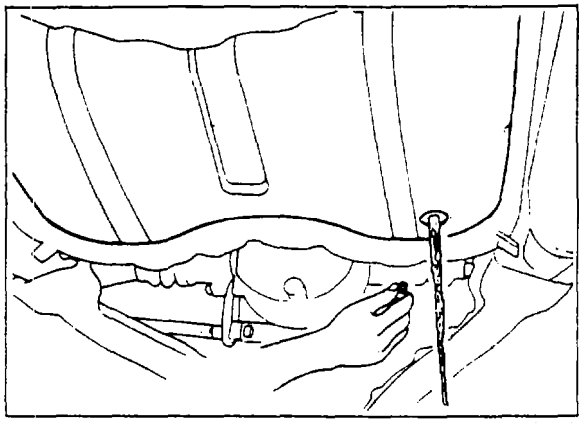
ATMOSPHERIC PRESSURE SENSOR

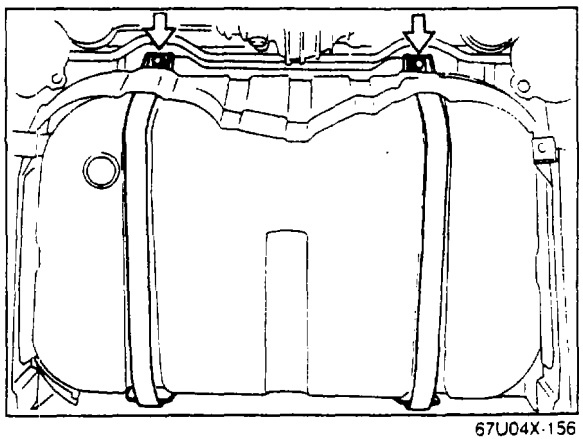
Inspection

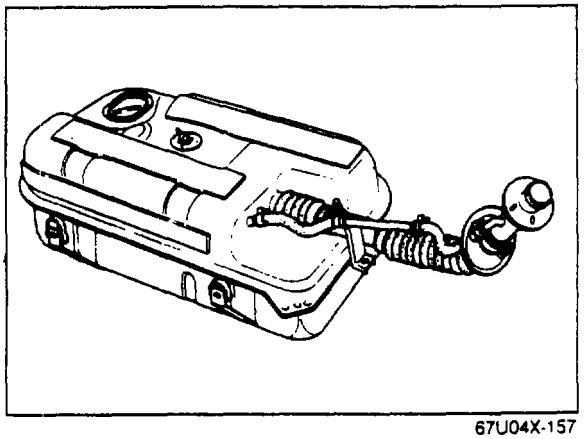
1. Connect a voltmeter to the atmospheric pressure sensor (D) terminal.
2. Turn the ignition switch on and take a voltage reading.

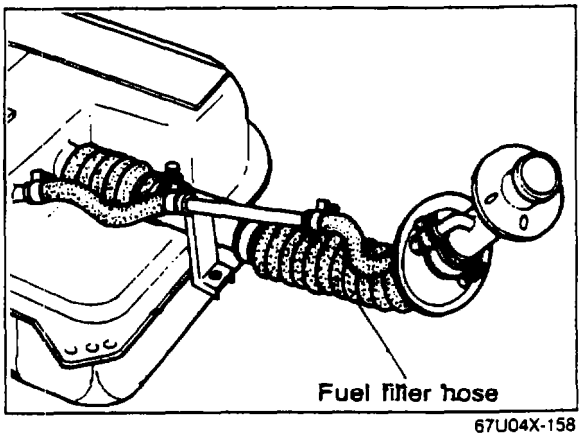
Voltage: 3.5—4.5V at sea level
2.5—3.5V at high altitude
[2,000m (6,500 ft)]

3. Replace the sensor, if necessary.


87U04B-042


67U04X-156


67U04X-157



67U04X-158

FUEL TANK

Removal

Warning
Before performing the following procedures, release the fuel pressure from the fuel line to reduce possibility of injury or fire. (Refer to 4B—68)

1. Drain the fuel tank.
2. Remove the fuel pump (Refer to 4B—71).
3. Disconnect the fuel filler hose from the fuel tank.
4. Raise the rear of the vehicle and support it with stands.
5. Remove the fuel tank protectors.
6. Disconnect the evaporation hoses from the fuel tank.
7. Remove the fixing band attaching bolts.
8. Remove the fuel tank.

Note
When removing the fuel tank, keep sparks, cigarettes and open flames away.

Inspection

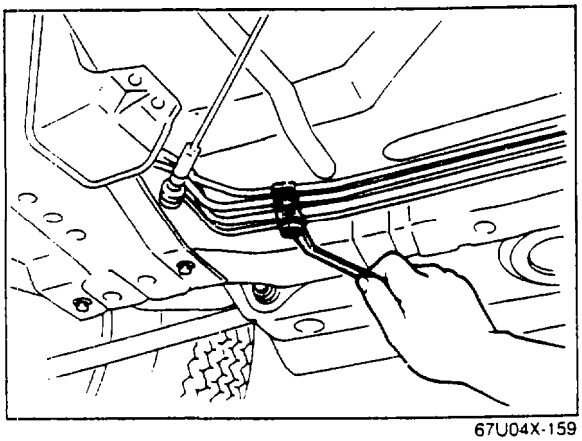
1. Check the fuel tank for cracks and corrosion.
2. If any defect is found, repair or replace the tank.

Warning
Before repairing, clean the fuel tank thoroughly with steam to sufficiently remove all explosive gas.

Installation

Install the fuel tank in the reverse order of removal.

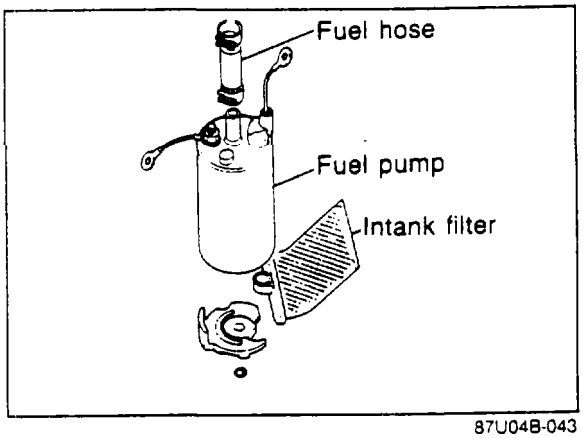
1. Push the fuel main hose, fuel return hose and evaporation hoses onto the fuel tank fittings **at least 25 mm (1.0 in)**.
2. Push the fuel filler hoses onto the fuel tank pipe and filler pipe **at least 40 mm (1.6 in)**.


67U04X-159

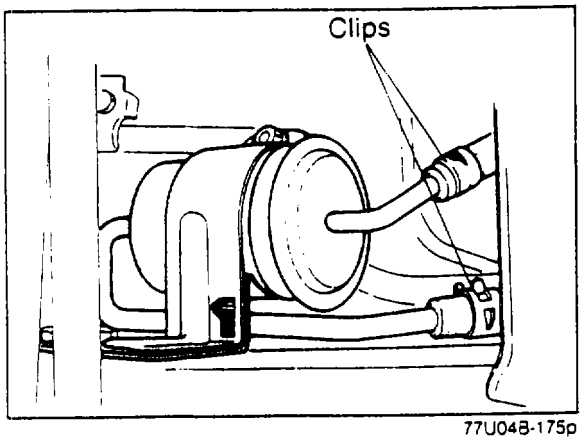
FUEL LINE

Inspection

1. Check the fuel lines for leaks and tighten the fuel line connections, if necessary.
2. Drain the fuel tank and blow out the fuel lines with compressed air if an excessive amount of dirt or water is found.
3. Push the fuel hose onto the fuel pipe **at least 30—35 mm (1.2—1.4 in)**.



87U04B-043



77U04B-175p

FUEL FILTER (LOW PRESSURE SIDE)

Replacement

Warning
Before performing the following procedures, release the fuel pressure from the fuel line to reduce possibility of injury or fire. (Refer to 4B—68)

1. Remove the fuel pump (Refer to 4B—71).
2. Remove the rubber boot and clip.
3. Remove the filter and install a new filter.

Note
Always use new clips and filter.

(HIGH PRESSURE SIDE)

Replacement

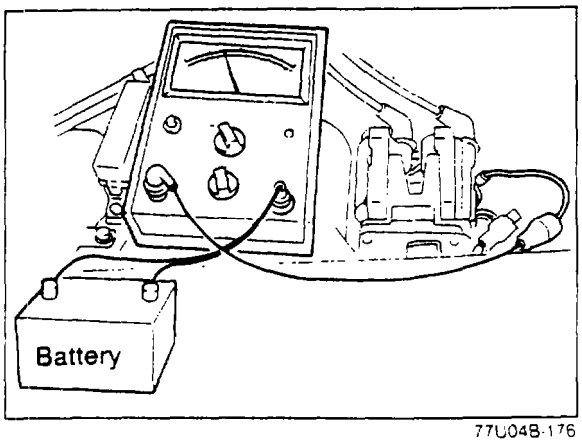
Warning
Before performing the following procedures, release the fuel pressure from the fuel line to reduce possibility of injury or fire. (Refer to 4B—68)

The fuel filter is to be replaced at intervals as outlined in the maintenance schedule.

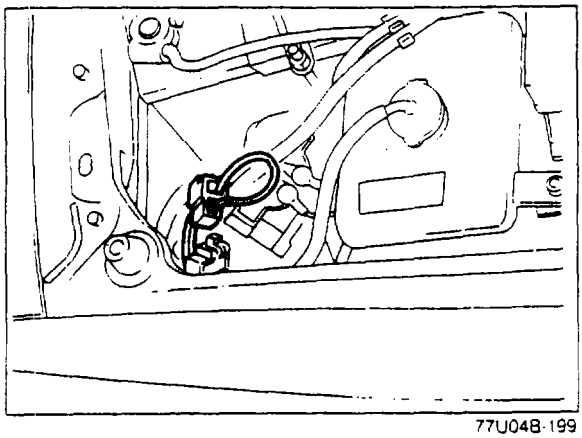
1. Raise the front of the vehicle and support it with safety stands.
2. Loosen the clips at both ends of the filter and disconnect the fuel hoses.
3. Remove the fuel filter with the bracket.
4. Install a new filter and connect the fuel hoses.

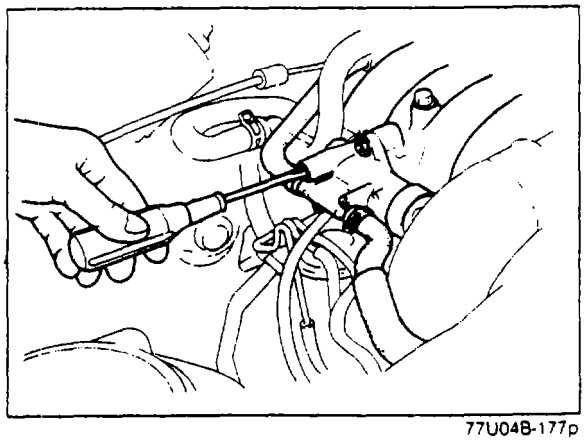
Warning
Always work away from sparks or open flames.

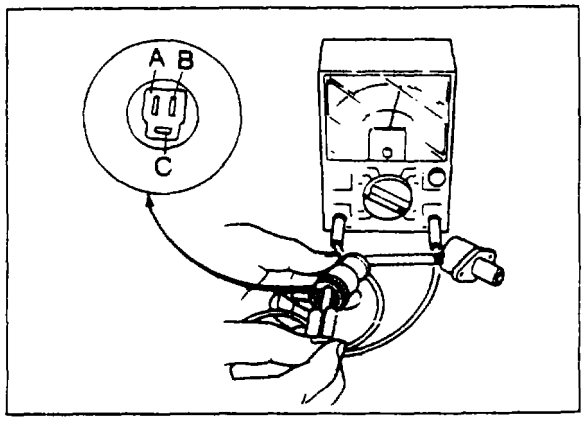
Note
When installing the filter, push the fuel hoses fully onto the fuel filter and secure the hoses with clips.



77U04B-176


77U04B-199


77U04B-177p



IDLE SPEED AND IDLE MIXTURE

Note
a) To check or adjust idle speed and idle mixture, connect a tachometer to the check coupler at the trailing side coil with igniter.
b) If the tachometer does not function correctly on the trailing side coil with igniter, reconnect to the leading side coil with igniter (Black coupler).
c) If using an inductive (Secondary pick up) type tachometer, connect it only at the trailing side high tension leads. If connected on the leading side coil with igniter, it will function incorrectly.

IDLE SPEED

Before checking or adjusting the idle speed, follow these directions.
- Switch off all accessories.
- Connect a tachometer to the engine.
- Warm up the engine to normal operating temperature.
- Connect a jumper wire to the initial set coupler.

1. Check and adjust the throttle sensor. (Refer to 4B—49)
2. Remove the blind cap from the BAC valve and adjust the idle speed by turning the air adjust screw.

   Idle speed: 725—775 rpm

3. Install the blind cap and disconnect the jumper wire from the initial set coupler.

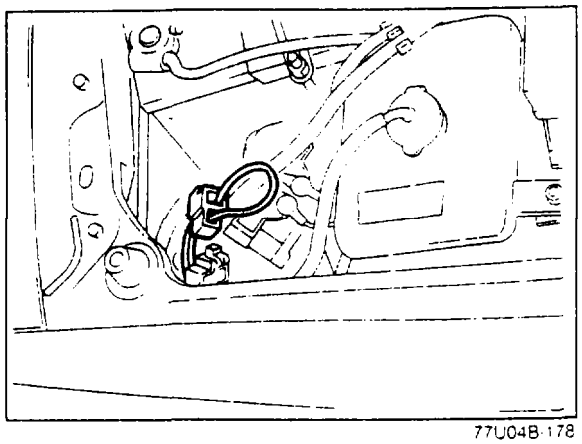
   Caution
   Make certain the jumper wire is removed.

IDLE MIXTURE

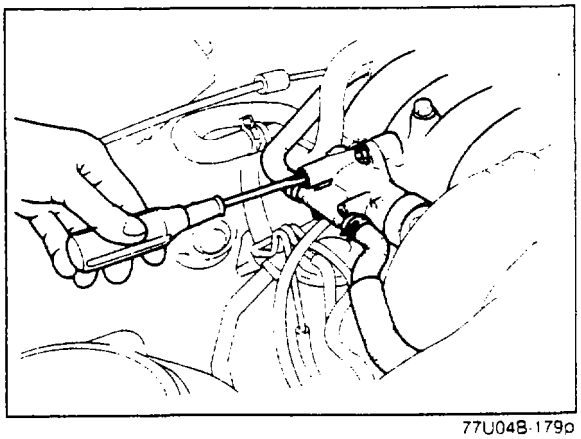
Variable Resistor
Inspection
1. Disconnect the variable resistor connector.
2. Check the resistance of the variable resistor using a circuit tester.

   Resistance
   A — C: 0.5—4.5 kΩ
   B — C: 0.5—4.5 kΩ

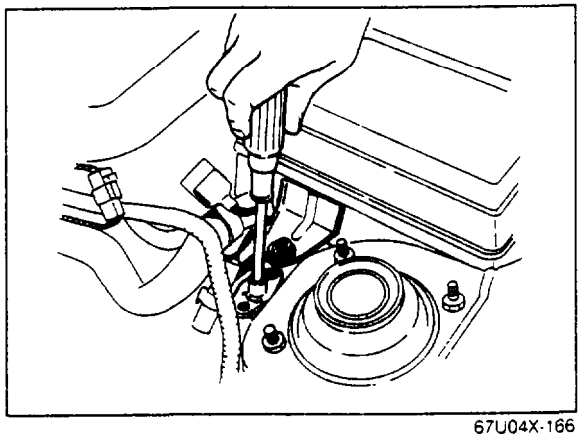
3 Replace the resistor, if necessary.
4 Adjust the idle mixture.



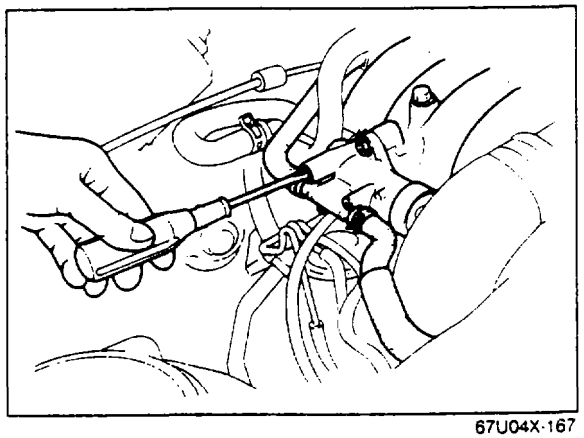
77U04B-178



77U04B-179D



67U04X-166



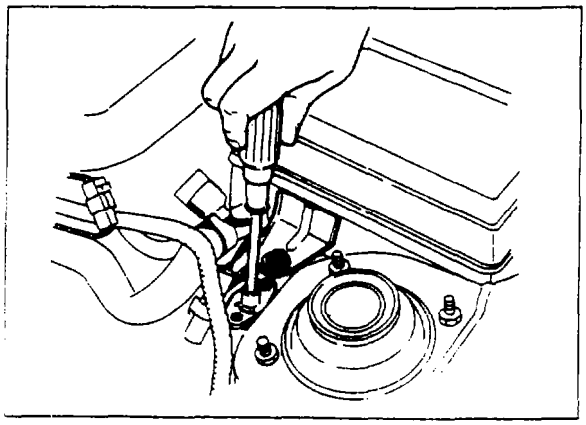
67U04X-167

Adjustment of Idle Mixture

Note
Usually idle mixture adjustment is unnecessary. Idle mixture adjustment should be performed only when the variable resistor or the engine is replaced.

Before adjusting the idle mixture, follow these directions.
- Switch off all accessories.
- Connect a tachometer to the engine.
- Warm up the engine to normal operating temperature.
- Connect a jumper wire to the initial set coupler

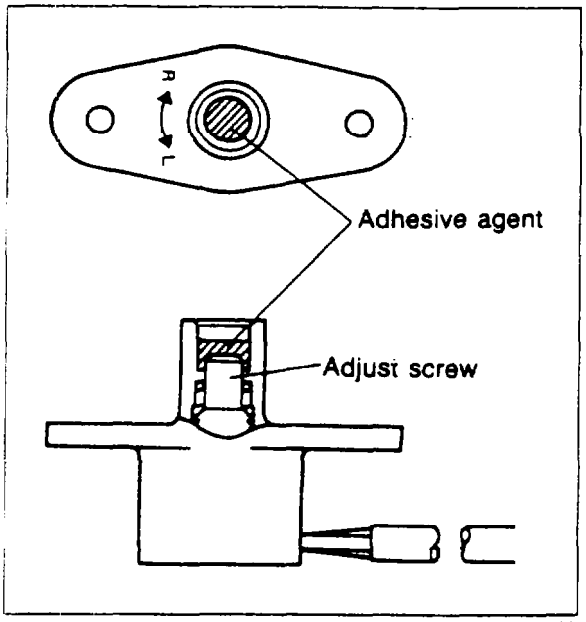
1. Check and adjust the throttle sensor. (Refer to 4B—49)
2. Remove the blind cap from the BAC valve and adjust the idle speed to **750 rpm** by turning the air adjust screw.
3. Set the idle speed to the highest rpm by turning the variable resistor.
4. Reset the idle speed to **750 rpm** by turning the air adjust screw.



77U04B 180

5 Turn the variable resistor **counterclockwise** until the idle speed becomes **730 rpm**, and then turn it **clockwise** to reset the speed to **750 rpm.**
6 Install the blind cap and disconnect the jumper wire.

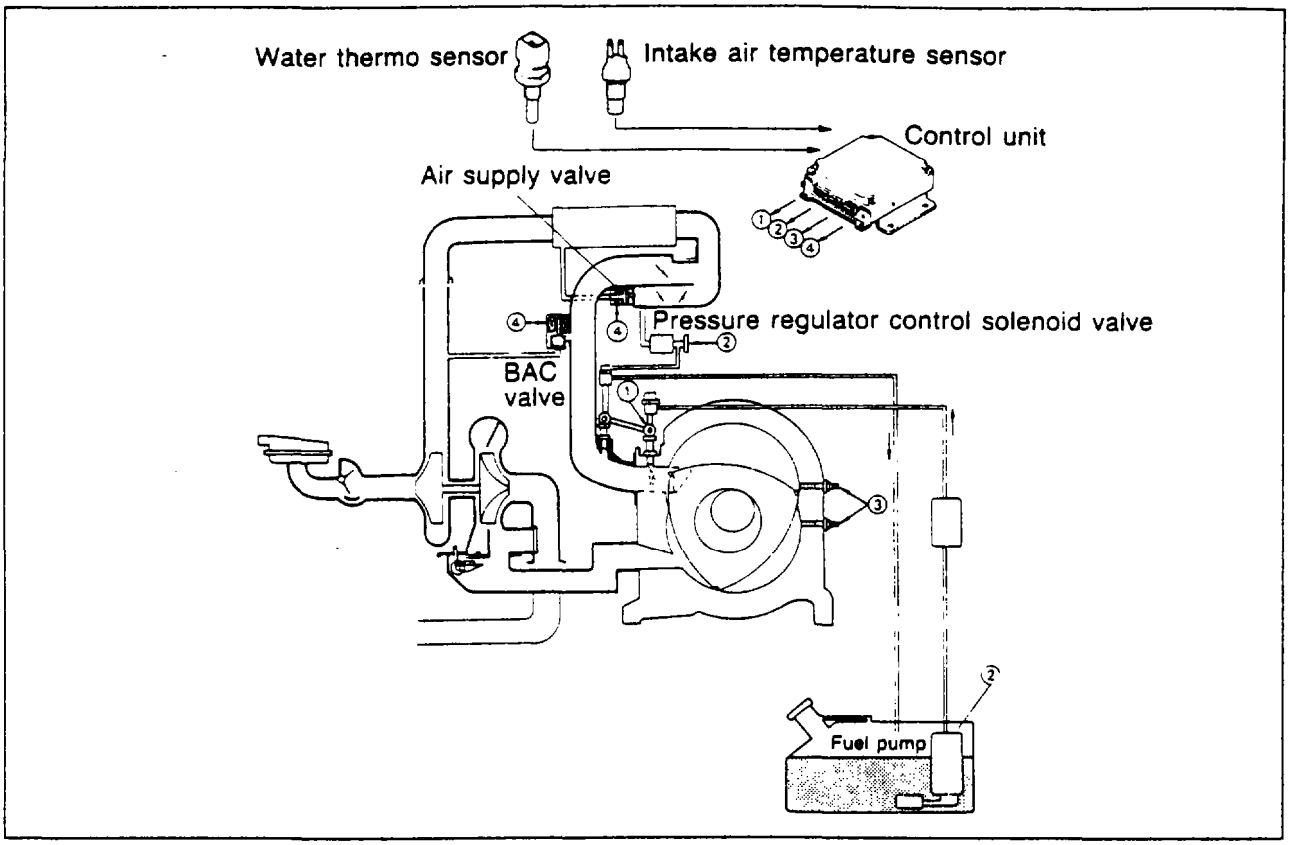
Caution
Make certain the jumper wire is removed.



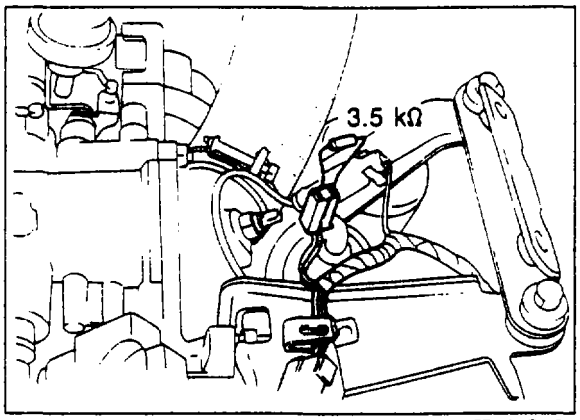
67U04X-169

7 Plug the head of the adjust screw with **adhesive agent** (P/N N304 23 795).

HOT START ASSIST SYSTEM



77U04B-181



77U04B-182

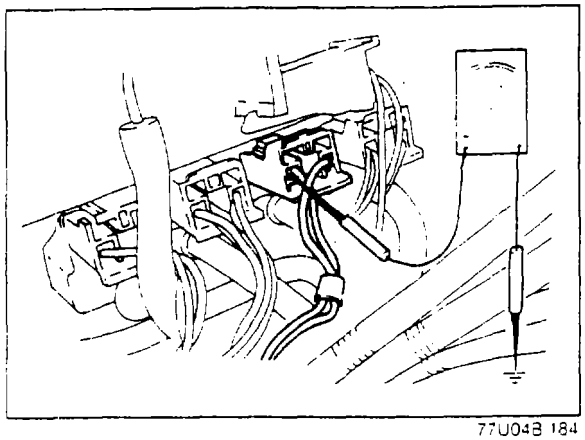
ON VEHICLE INSPECTION

1. Warm up the engine to the normal operating temperature and stop it.
2. Remove the intercooler.
3. Disconnect the intake air temperature sensor connector.
4. Connect a resistor **(3.5 kΩ)** to the sensor connector.

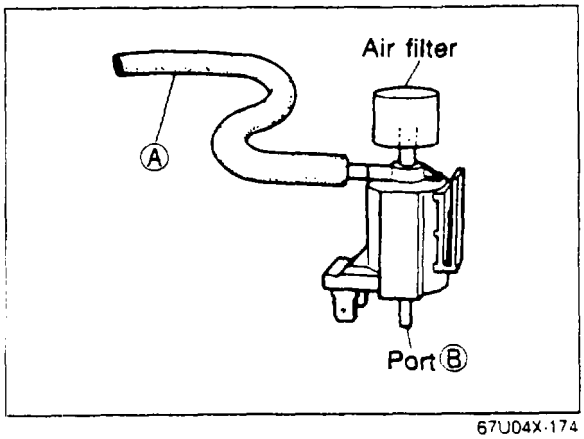
	Engine speed
After starting, for 50 sec	850 rpm
After 50 sec	750 rpm

77U04B-183

6. Connect a tachometer to the engine.
7. Start the engine and check the engine speed as shown in the chart.


77U04B-184

8. Stop the engine and connect the voltmeter to the pressure regulator control solenoid valve as shown in the figure..
9. Start the engine and check the following:
- **For 50 seconds** after engine is started, **below 2.0V**.
- **After 50 seconds, approx. 12V**.

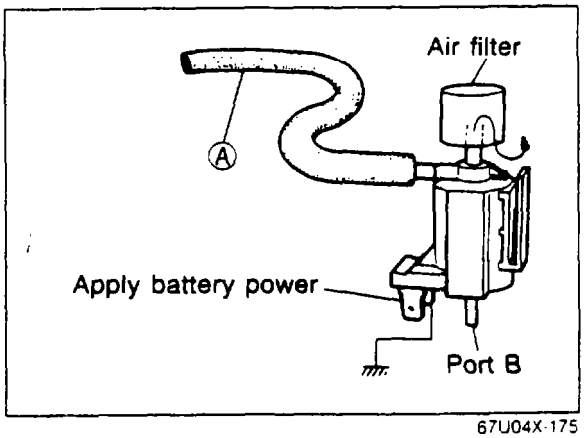


67U04X-174

PRESSURE REGULATOR CONTROL SOLENOID VALVE

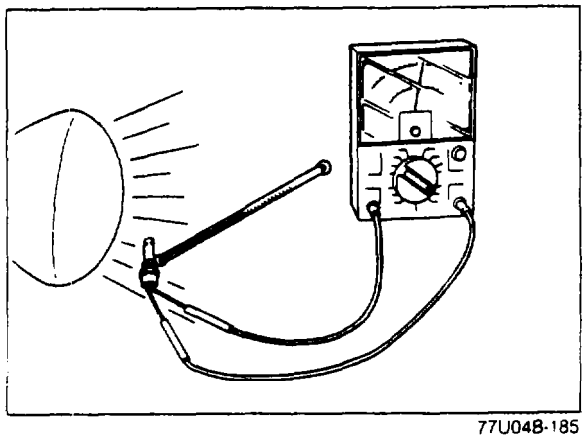
Inspection

1. Disconnect the vacuum hose from the solenoid valve and vacuum pipe.
2. Blow through the valve from vacuum hose Ⓐ.
3. Check that air passes through the valve and flows from port Ⓑ



67U04X-175

4. Disconnect the solenoid valve connector.
5. Connect 12V and a ground to the terminals of the valve.
6. Blow through the valve from the vacuum hose Ⓐ.
7. Check that air passes through the valve and flows from the air filter.


77U04B-185

INTAKE AIR TEMPERATURE SENSOR (INTAKE AIR PIPE)

Removal

Remove the intake air temperature sensor from the inlet air pipe.

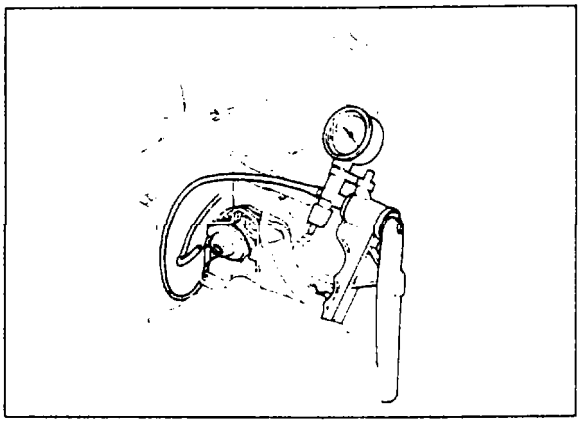
Installation

Install in the reverse order of removal.

Inspection

1. Connect an ohmmeter to the sensor terminals.
2. Check the resistance of the sensor.

Temperature	Resistance
20°C (68°F)	41.5 ± 4.15 kΩ
50°C (122°F)	11.85 ± 1.19 kΩ
85°C (185°F)	3.5 ± 0.35 kΩ



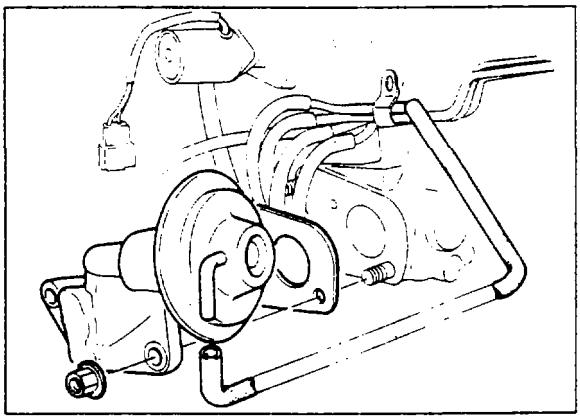
77U04B-186

EXHAUST GAS RECIRCULATION (EGR) CONTROL SYSTEM

EGR Valve

Inspection

1. Warm up the engine and run it at idle.
2. Disconnect the vacuum hose from the EGR valve and connect a vacuum pump tester to the EGR valve.
3. Apply **100 mmHg (3.9 inHg)** vacuum.
4. Check that the engine speed decreases.



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Removal

1. Disconnect the vacuum hose from the EGR valve.
2. Remove the EGR valve.

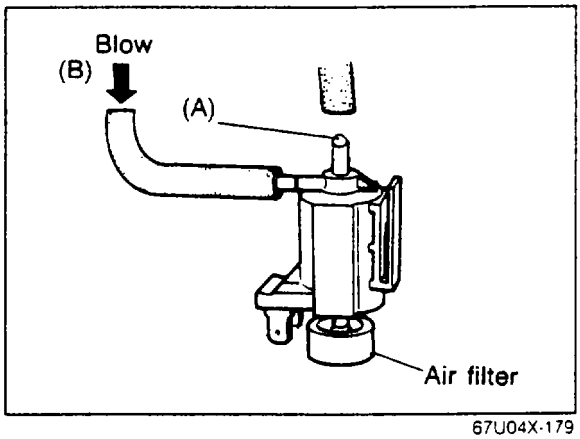
Installation

Install in the reverse order of removal.

EGR SOLENOID VALVE

Inspection

1. Disconnect the vacuum hose from the EGR solenoid valve.
2. Blow through the valve from port Ⓑ. Check that air passes through the valve and flows from the air filter.



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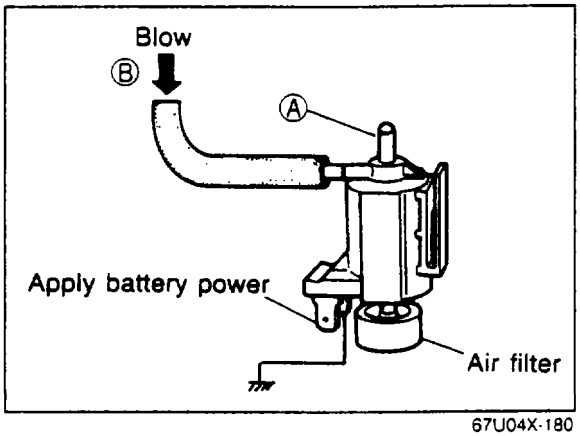
3. Disconnect the EGR solenoid valve connector and connect 12V and a ground to the terminals of the valve.
4. Blow through the valve from port Ⓑ. Check that air passes through the valve and flows from port Ⓐ.

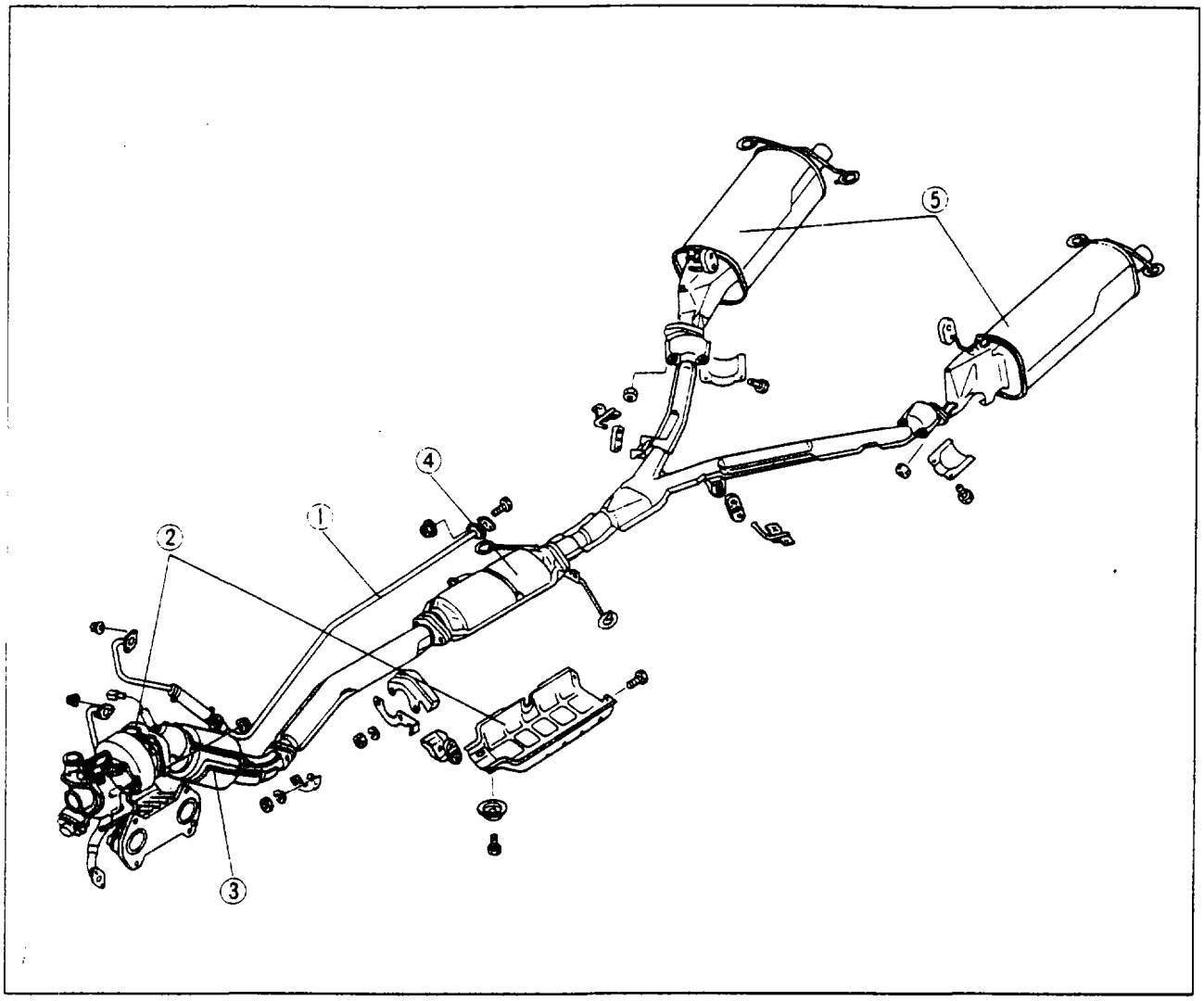


67U04X-180

CLOSED LOOP CONTROL SYSTEM

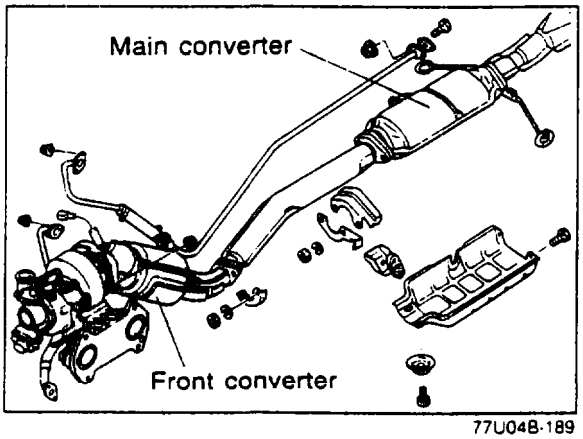
Removal

Remove in the sequence shown in the figure.



77U04B-224

1. Split air pipe
2. Insulator covers
3. Front converter
4. Main converter
5. Main silencer



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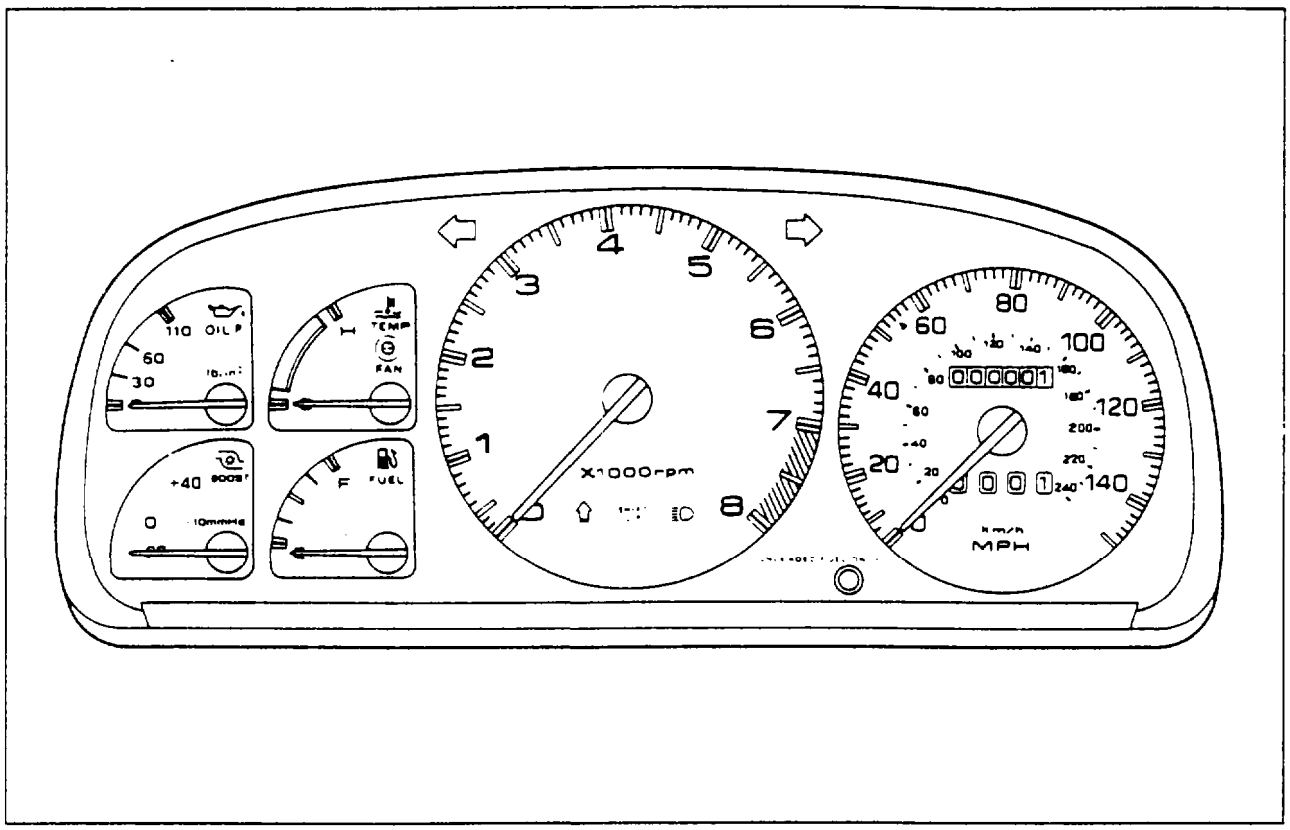
Inspection

1. Visually inspect the front converter and main converter for cracks or damage.
2. Check the front converter and main converter connections for tightness.
3. Start the engine and run it at idle.
4. Check for exhaust gas leakage from the front converter and main converter connections.

Installation

Install in the reverse order of removal.

SHIFT INDICATOR LIGHT CONTROL SYSTEM



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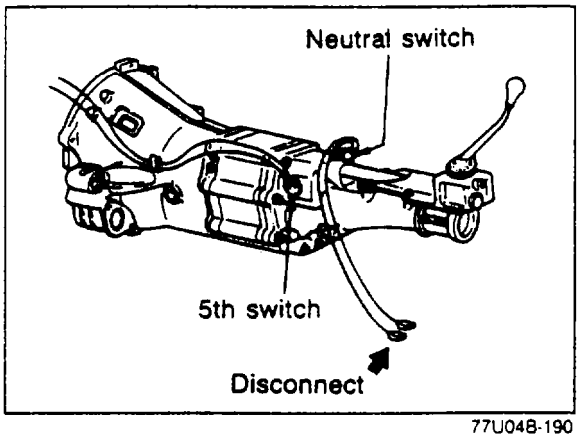

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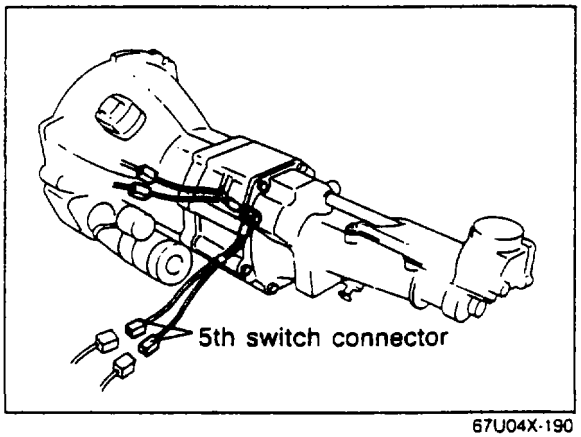
SHIFT INDICATOR LIGHT

Inspection

1. Warm up the engine and then turn it off.
2. Disconnect the neutral switch connector.
3. Start the engine and increase the engine speed to **above 2,600 rpm.**
4. Check that the shift indicator light comes on.
5. Stop the engine.



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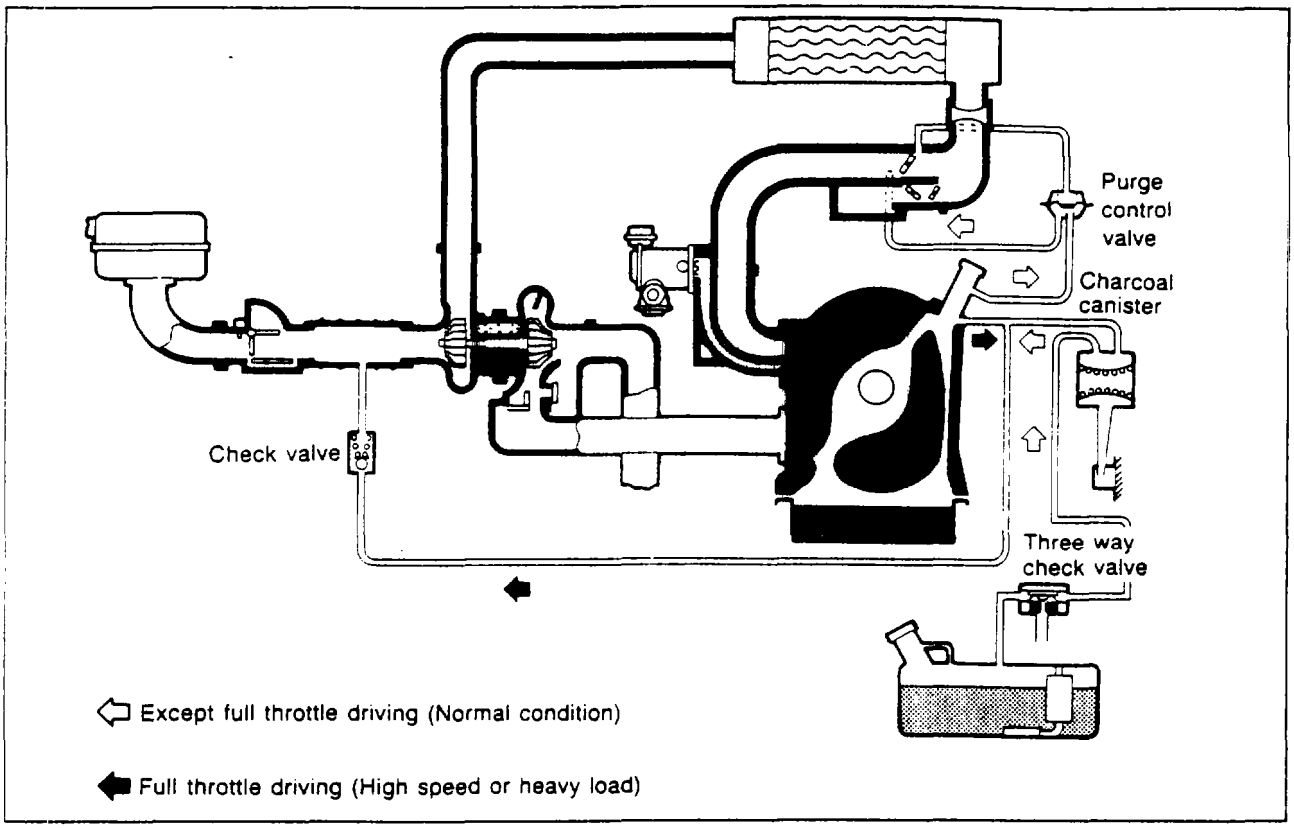
6. Disconnect the 5th gear switch connector.
7. Start the engine and increase the engine speed to **above 2,600 rpm.**
8. Check that the shift indicator light does not come on.

CRANKCASE AND EVAPORATIVE EMISSION CONTROL SYSTEM



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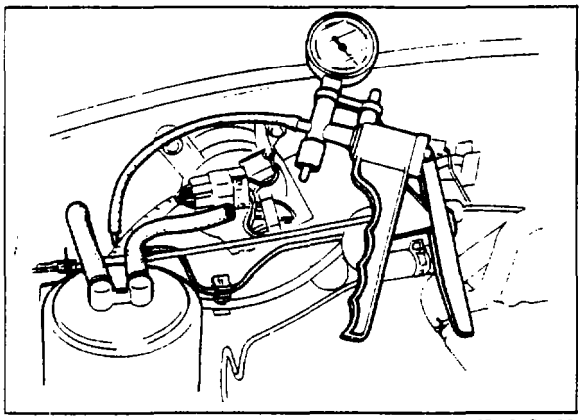

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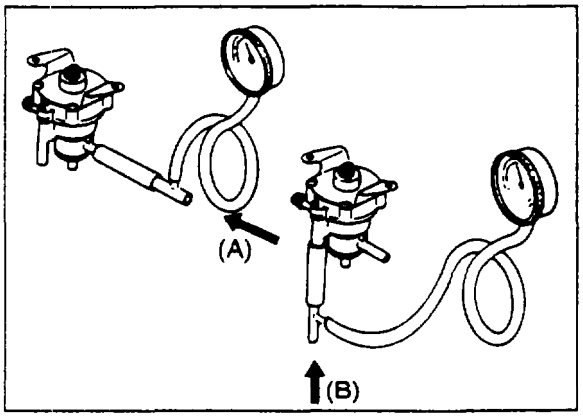


87U04B-044

EVAPORATIVE LINE

Inspection

1. Disconnect the ventilation hose from the canister and connect a vacuum pump tester to the ventilation hose.
2. Operate the vacuum pump tester and make sure no vacuum is held.
3. If vacuum is held, check the three-way check valve and evaporation pipe for blockage.

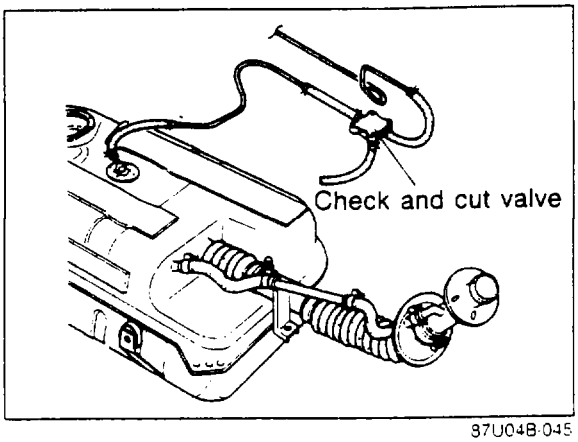
CHECK AND CUT VALVE

Inspection

1. Remove the check and cut valve.
2. Connect a pressure gauge to the passage from the fuel tank.
3. Blow through the valve from (A) and check that the valve opens at a pressure of 0.98—4.9 kPa (0.01—0.05 kg/cm^2, 0.14—0.71 psi).
4. Remove the pressure gauge and connect it to the passage to atmosphere.
5. Blow through the valve from (B) and check that the valve opens at a pressure of 5.39—6.87 kPa (0.055—0.07 kg/cm^2, 0.78—1.00 psi).

Note

The test should be performed with the valve held horizontally. Otherwise the check balls in the valve will close the passages.



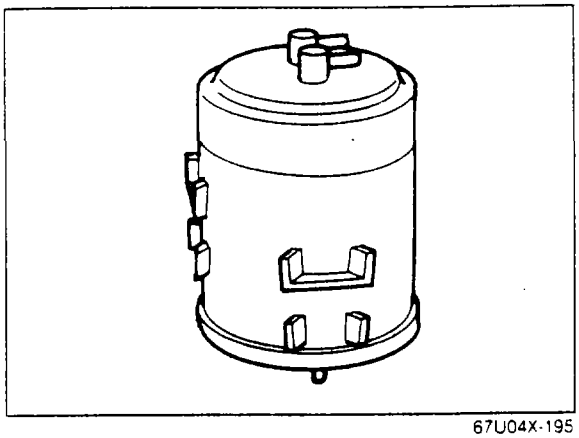
87U04B-045

Removal
1. Raise the rear of the vehicle and support it with safety stands.
2. Unfasten the hose bands and disconnect the evaporative hoses from the check and cut valve.
3. Remove the valve.

Installation
Install in the reverse order of removal noting the hose positions.

Caution
a) When installing the check and cut valve, fully push the evaporative hoses onto the valve and secure the hoses with bands.
b) When connecting the hoses to the valve, note the direction of the valve fittings.

CHARCOAL CANISTER
Visually check the canister for leakage or damage.



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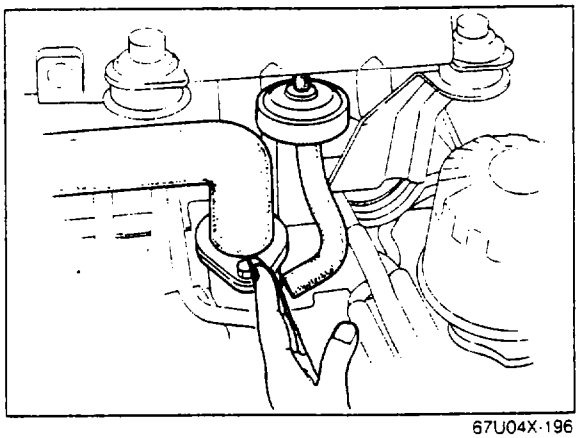
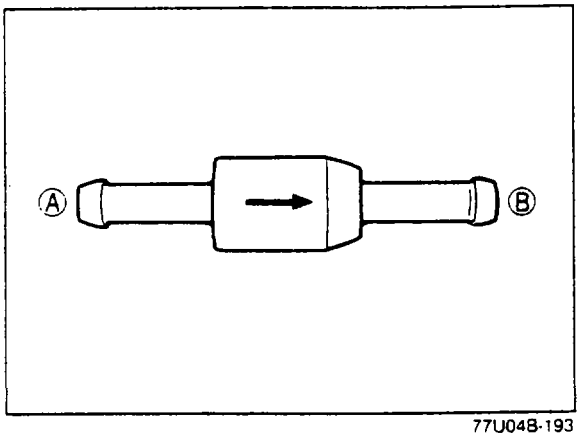


67U04X-196

PURGE CONTROL VALVE
Inspection
1. Disconnect the hose (purge control valve to oil filler pipe) from the purge control valve.
2. Start the engine and run it at idle.
3. Place a finger on the port opening and check that air is not drawn into the port.
4. Increase the engine speed to **2,000 rpm** and air should be drawn into the port.
5. Replace the valve, if necessary.



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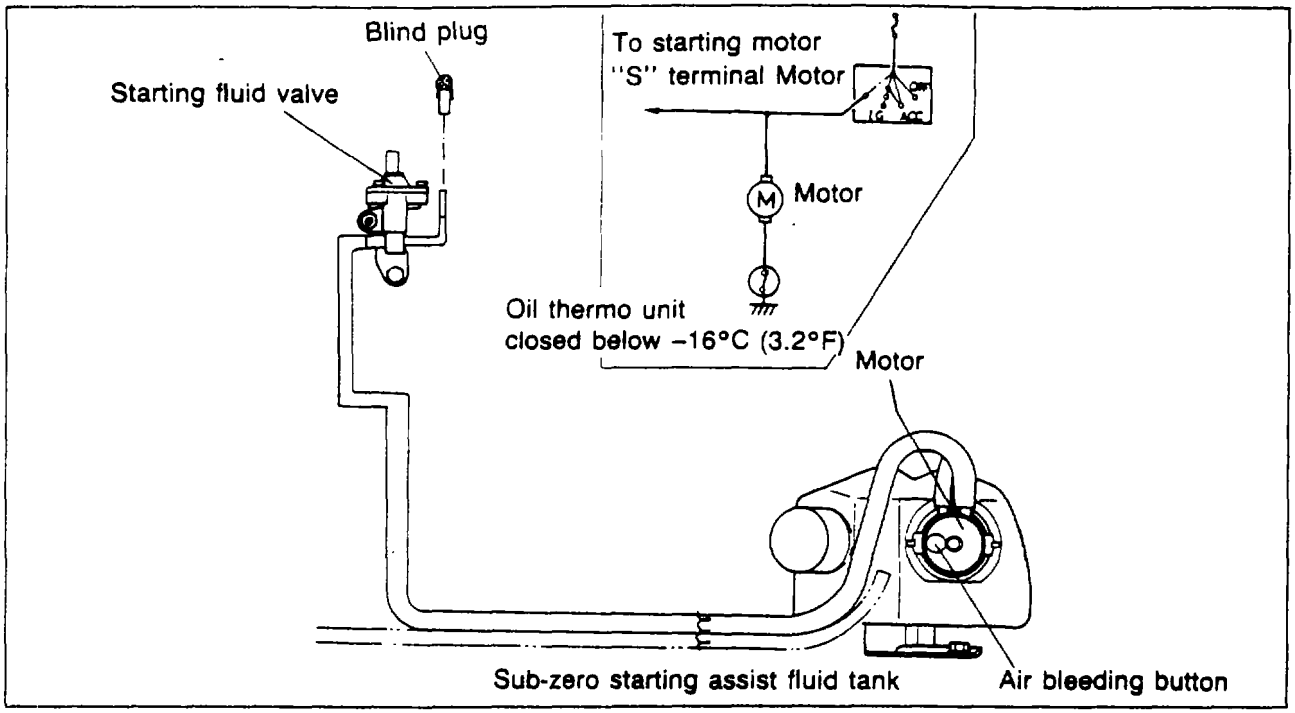
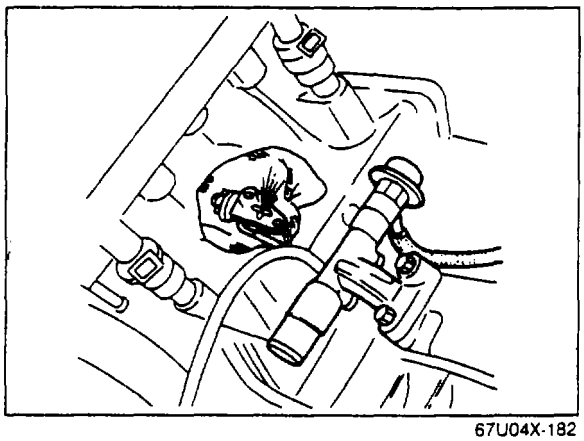
CHECK VALVE
Inspection
1. Remove the check valve.
2. Blow through the check valve from port Ⓐ, and check that the air comes out of port Ⓑ.
3. Blow through the check valve from port Ⓑ, and check that the air does not come out of port Ⓐ.

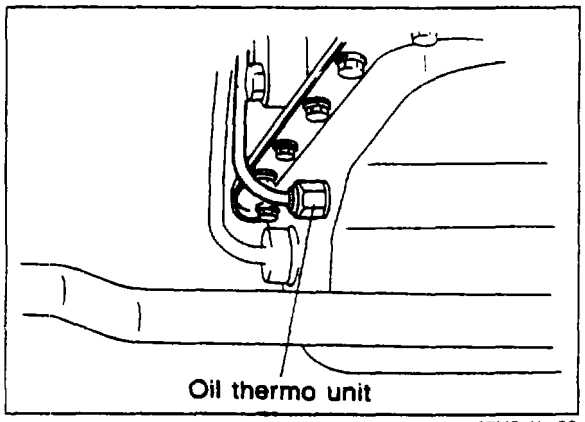
SUB-ZERO STARTING ASSIST DEVICE (EXCEPT FOR CALIFORNIA)



67U04X-181



67U04X-182



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SUB-ZERO STARTING ASSIST DEVICE

Inspection

1. Check that there is sufficient starting assist fluid in the tank, and add if necessary.
2. Disconnect the Ⓢ terminal connector from the starter.
3. Remove the starting fluid valve from the intake manifold.
4. Turn the ignition key to the "START" position and check that no starting assist fluid is ejected from the valve.
   [Ambient temperature: **above −20—−12°C (−4°F—10.4°F)**]
5. Disconnect the oil thermo unit connector on the oil pan and ground the connector.
6. Turn the ignition key to the "START" position. Push the air bleed button on the tank and check that starting assist fluid is ejected from the valve.

SUB-ZERO STARTING ASSIST FLUID

The mixture of the starting assist fluid should be **90%** high quality ethylene glycol antifreeze solution and **10%** water.

OIL THERMO UNIT

Check the oil thermo unit continuity using a circuit tester.

Ambient temperature	Continuity
Below −16°C (3.2°F)	Yes
Above −16°C (3.2°F)	No