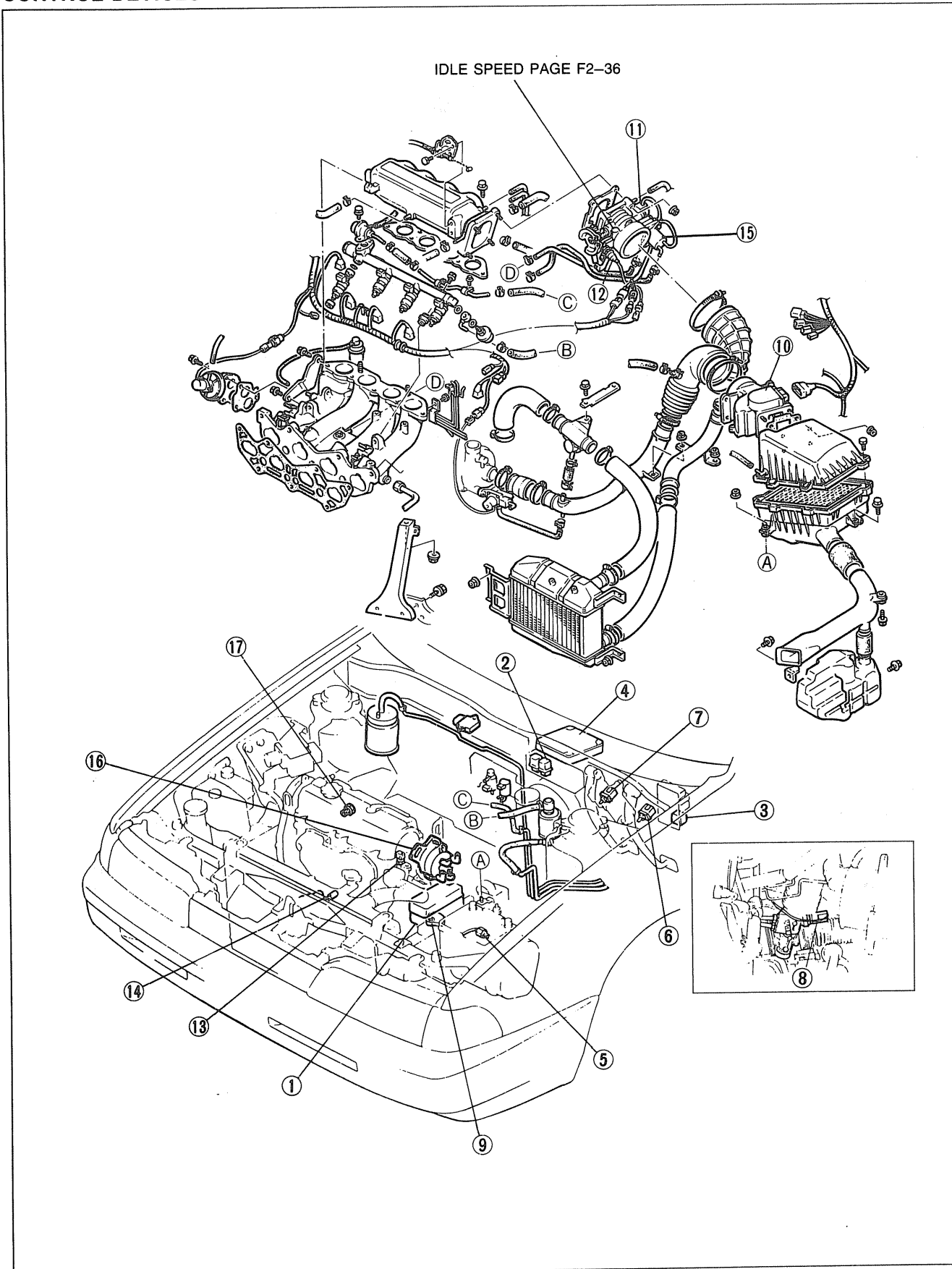


FUEL AND EMISSION CONTROL SYSTEMS (TURBO)

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CONTROL DEVICES

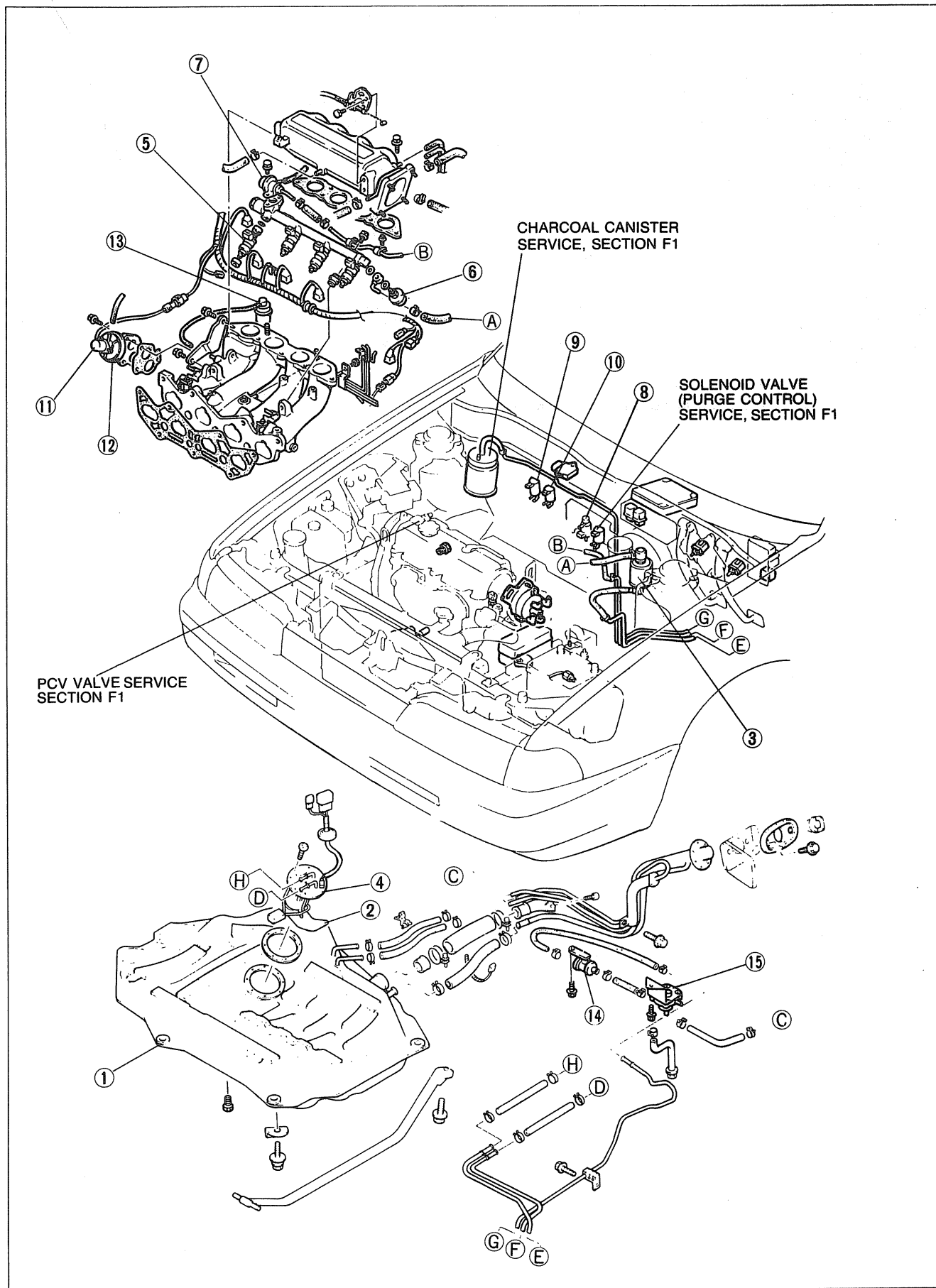


1. EGI main fuse		11. Throttle sensor	
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9. Inhibitor switch (ATX)		Replacement.....	page F2- 81
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10. Airflow meter (includes intake air thermosensor)			
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F2

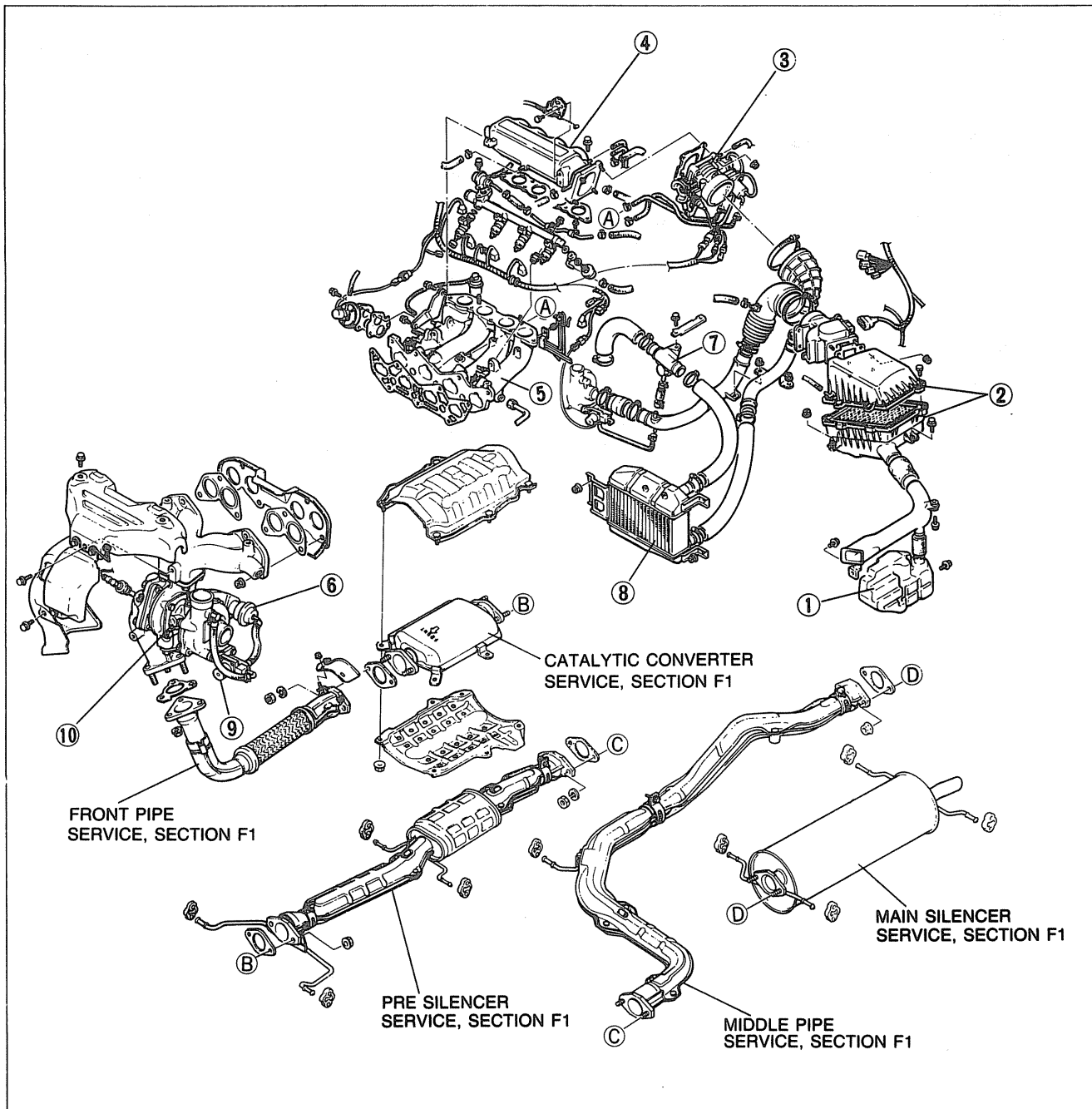
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8. Solenoid valve (PRC)
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 - Inspection page F2-84
10. Solenoid valve (EGR, Vacuum side)
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15. Check-and-cut valve
 - Replacement page F2-87

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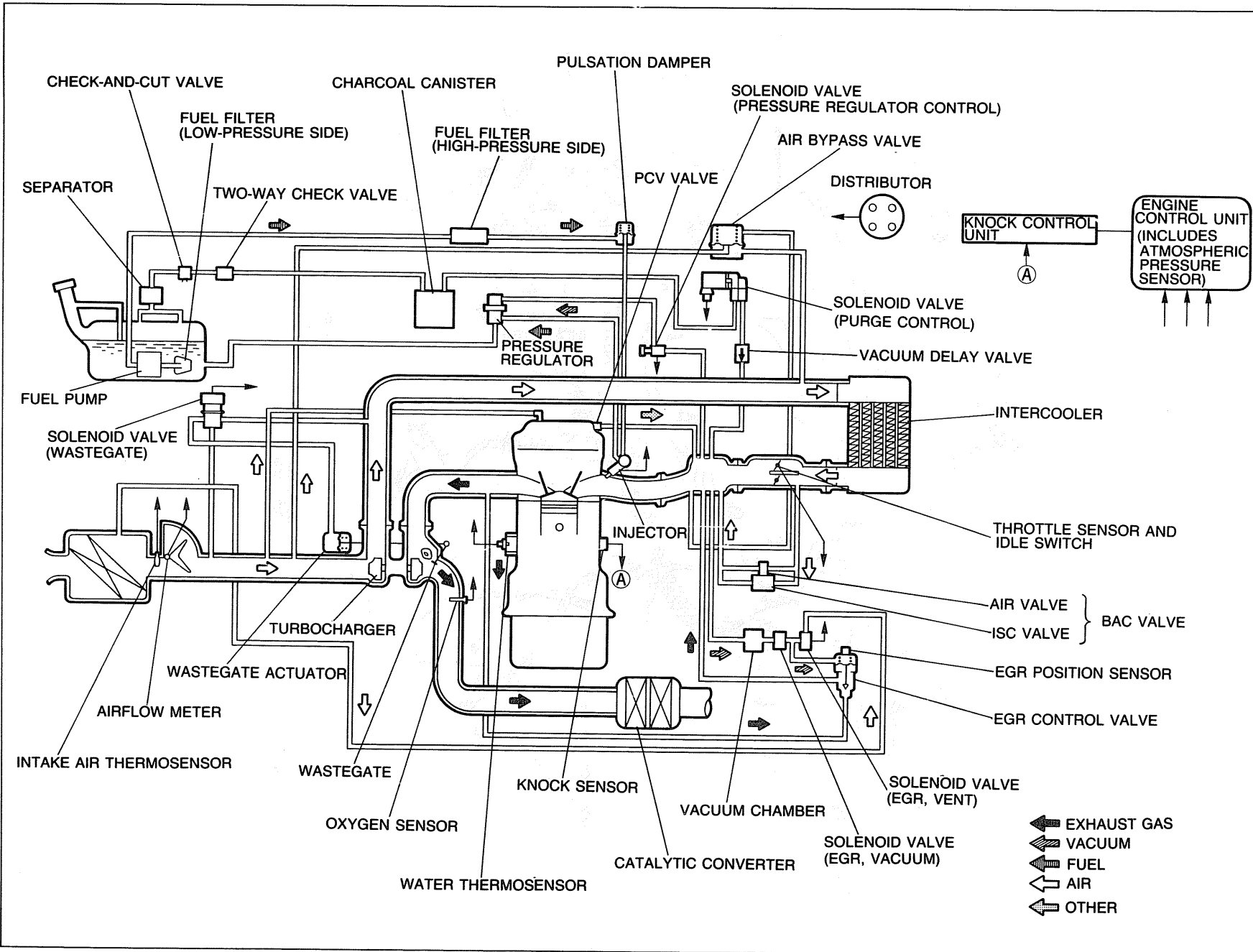
INTAKE AND EXHAUST DEVICES



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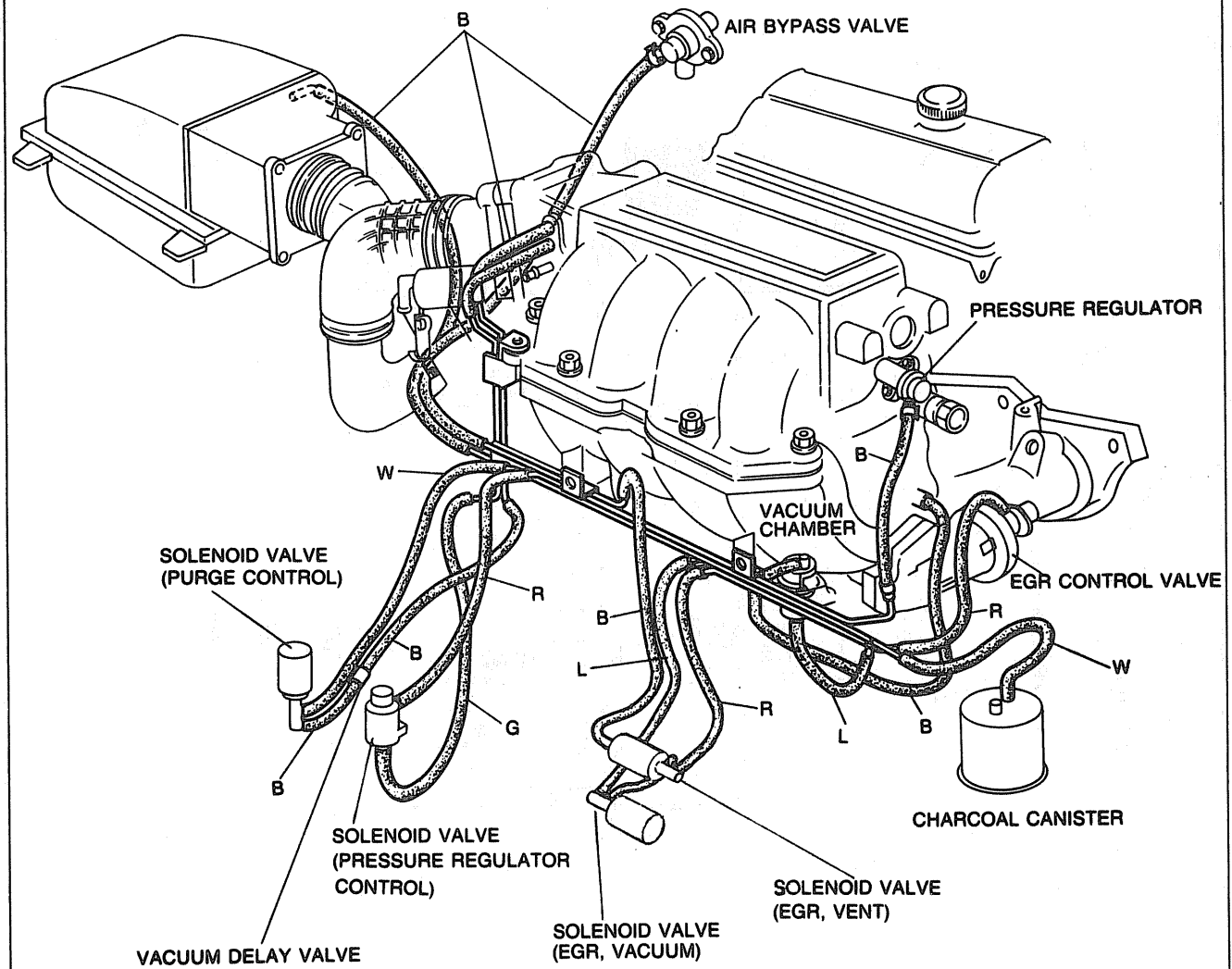
- | | | |
|--|---|--|
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Removal page F2-38
Installation page F2-41 | 4. Dynamic chamber
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Inspection page F2-39
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| | 7. Air bypass valve
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SYSTEM DIAGRAM



- ➔ EXHAUST GAS
- ➔ VACUUM
- ➔ FUEL
- ➔ AIR
- ➔ OTHER

VACUUM HOSE ROUTING DIAGRAM



SPECIFICATIONS

Item		Engine type	Turbo Engine
Idle speed		rpm	750 ± 25 (ATX: P range)*
Throttle body			
Type		Horizontal draft (2-barrel)	
Throat diameter	mm (in)	No.1	MTX: 40 (1.6), ATX: 46 (1.8)
		No.2	MTX: 46 (1.8), ATX: 40 (1.6)
Airflow meter			
Resistor	Ω	E2-Vs	Fully closed: 20—400 Fully open: 20—1,000
		E2-Vc	100—400
		E2-VB	200—400
		E2-THA	-20°C (-4°F) 13,600—18,400 20°C (68°F) 2,210— 2,690 60°C (140°F) 493— 667
Fuel pump			
Type		Impeller (in tank)	
Output pressure		kPa (kg/cm ² , psi)	Main pump: 441—588 (4.5—6.0, 64—85) Transfer pump: 39 (0.4, 5.7) max.
Feeding capacity		cc (cu in)/10 seconds	Main pump: 220 (13.4) min. Transfer pump: 190 (11.6) min.
Fuel filter			
Type	Low-pressure side		Nylon element
	High-pressure side		Paper element
Pressure regulator			
Type		Diaphragm	
Regulating pressure		kPa (kg/cm ² , psi)	235—275 (2.4—2.8, 34—40)
Injector			
Type		High-ohmic	
Type of drive		Voltage	
Resistance		Ω	12—16
Injection amount		cc (cu in)/15 seconds	73—90 (4.45—5.49)
Idle speed control valve			
Solenoid resistance		Ω	6.3—9.9
Turbocharger			
Cooling method		Engine coolant	
Lubrication method		Engine oil	
Boost pressure (Maximum)		kPa (kg/cm ² , psi)	60 (0.61, 8.7): Solenoid duty value 100% 45 (0.46, 6.5): Solenoid duty value 0%
Fuel tank			
Capacity		liters (US gal, Imp gal)	60 (15.9, 13.2)
Air cleaner			
Element type		Oil permeated	
Fuel			
Specification		Unleaded premium (Unleaded regular)	

F2

* With test connector grounded.

TROUBLESHOOTING GUIDE

This troubleshooting guide shows the malfunction numbers and the symptoms of various failures. Perform troubleshooting as described below.

Possible cause		Input sensors and switches														Output solenoid valves																							
		Ignition pulse	Distributor (Ne signal)	Distributor (G1 signal)	Distributor (G2 signal)	Knock sensor	Airflow meter	Water thermostensor	Intake air thermostensor	Throttle sensor	Atmospheric pressure sensor	Oxygen sensor	EGR position sensor	Feedback system	Solenoid valve (Pressure regulator)	Solenoid valve (Purge)	Solenoid valve (EGR, vacuum side)	Solenoid valve (EGR, vent side)	ISC valve	Solenoid valve (Waste gate)																			
Symptom		F2-18	F2-18	F2-19	F2-19	F2-20	F2-21	F2-22	F2-23	F2-24	F2-24	F2-25	F2-26	F2-27	F2-27	F2-28	F2-28	F2-29	F2-29	F2-30																			
1	Fault Indicated by SST Code No.	01	02	03	04	05	08	09	10	12	14	15	16	17	25	26	28	29	34	42																			
2	Hard start or won't start (Cranks OK)	<p align="center">TROUBLESHOOTING PROCEDURE</p> <p>Note</p> <ul style="list-style-type: none"> Step 1 under symptom is to quickly determine what system or unit may be at fault by use of the SST. (Self-Diagnosis Checker 49 H018 9A1) <p>1st: Check input sensors and output solenoid valves with the SST. (Refer to page F2-13.)</p> <p>2nd: Check other switches with the SST. (Refer to page F2-32.)</p> <p>3rd: Check the following items:</p> <table border="0"> <tr> <td> <p>Electrical system</p> <ul style="list-style-type: none"> 1) Battery condition 2) Fuses </td> <td> <p>Ignition system</p> <ul style="list-style-type: none"> 1) Ignition spark 2) Ignition timing (with test connector grounded) </td> </tr> <tr> <td> <p>Fuel system</p> <ul style="list-style-type: none"> 1) Fuel level 2) Fuel leakage 3) Fuel filter 4) Idle speed (with test connector grounded) </td> <td> <p>Intake air system</p> <ul style="list-style-type: none"> 1) Air cleaner element 2) Vacuum or air leakage 3) Vacuum hose routing 4) Accelerator cable </td> </tr> <tr> <td> <p>Engine</p> <ul style="list-style-type: none"> 1) Compression 2) Overheating </td> <td> <p>Others</p> <ul style="list-style-type: none"> 1) Clutch slippage 2) Brake dragging </td> </tr> </table> <p>4th: Check Fuel and Emission Control Systems. (Refer to page F2-11.)</p>																			<p>Electrical system</p> <ul style="list-style-type: none"> 1) Battery condition 2) Fuses 	<p>Ignition system</p> <ul style="list-style-type: none"> 1) Ignition spark 2) Ignition timing (with test connector grounded) 	<p>Fuel system</p> <ul style="list-style-type: none"> 1) Fuel level 2) Fuel leakage 3) Fuel filter 4) Idle speed (with test connector grounded) 	<p>Intake air system</p> <ul style="list-style-type: none"> 1) Air cleaner element 2) Vacuum or air leakage 3) Vacuum hose routing 4) Accelerator cable 	<p>Engine</p> <ul style="list-style-type: none"> 1) Compression 2) Overheating 	<p>Others</p> <ul style="list-style-type: none"> 1) Clutch slippage 2) Brake dragging 													
<p>Electrical system</p> <ul style="list-style-type: none"> 1) Battery condition 2) Fuses 	<p>Ignition system</p> <ul style="list-style-type: none"> 1) Ignition spark 2) Ignition timing (with test connector grounded) 																																						
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<p>Engine</p> <ul style="list-style-type: none"> 1) Compression 2) Overheating 	<p>Others</p> <ul style="list-style-type: none"> 1) Clutch slippage 2) Brake dragging 																																						
3	Engine stalls																				While warming up	After warming up																	
4	Rough idle																				While warming up	After warming up																	
5	High idle speed after warming up																																						
6	Poor acceleration, hesitation or lack of power																																						
7	Runs rough on deceleration																																						
8	Afterburn in exhaust system																																						
9	Poor fuel consumption																																						
10	Excessive oil consumption																																						
11	Engine stalls or rough after hot starting																																						
12	Knocking																																						
13	Abnormal noise or vibration																																						

06U0F2-007

The Troubleshooting Guide lists the systems most likely to cause a given symptom. After finding systems to check, refer to the pages shown for detailed guides for each system.

Possible cause		Fuel and Emission Control Systems										
		Intake Air System (Poor connection of components, throttle body)	Fuel System (Fuel injection, Fuel pressure)	Pressure Regulator Control System	Idle Speed Control (ISC) System (Air valve, ISC valve malfunction)	Turbocharging System (Oil & water passage, Turbine and compressor wheels malfunction)	Electronic Spark Advance (ESA) System (Knock control system)	EGR System (EGR control valve stuck and open)	Evaporative Emission Control System (Solenoid valve [Purge control] malfunction)	PCV System (System clogged)	Deceleration System (Fuel cut operation malfunction)	Exhaust System (System clogged)
Page		F2-37	F2-57	F2-76	F2-43	F2-48	F2-78	F2-82	F2-87	F2-88	F2-76	F2-89
Symptom	2	3	2				1					
	3	4	3		1			2				
		5	4		2			3		1		
	4	5	4		1			3		2		
		6	5		2			3	4	1		
	5	2			1							
	6	3	4			6		1	2			5
	7		3		2						1	
	8	3	4		1						2	
	9		2					3			1	4
	10					1						
	11		2	1								
	12					2	1					
13					1							

16U0F2-004

The numbers of the list show the priorities of inspections from the most probable to that with the lowest probability.

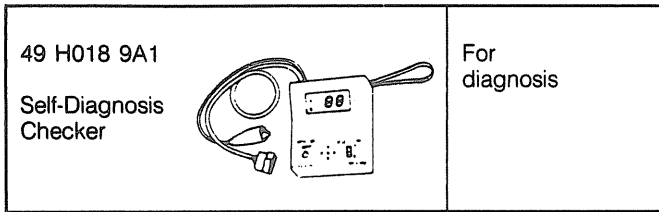
These were determined on the following basis:

- Ease of inspection
- Most probable system
- Most probable point in system

TROUBLESHOOTING WITH SST

PREPARATION

SST

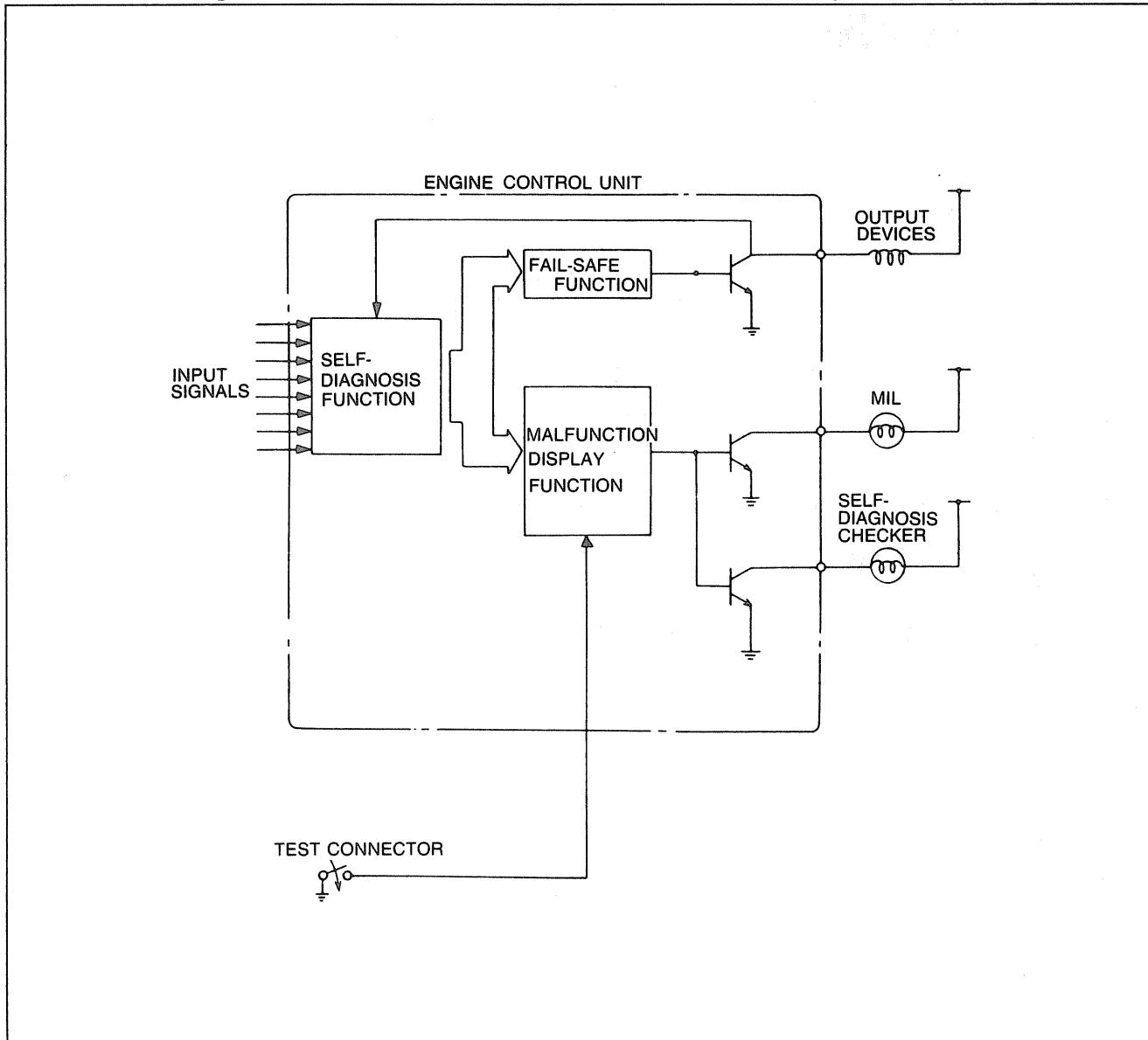


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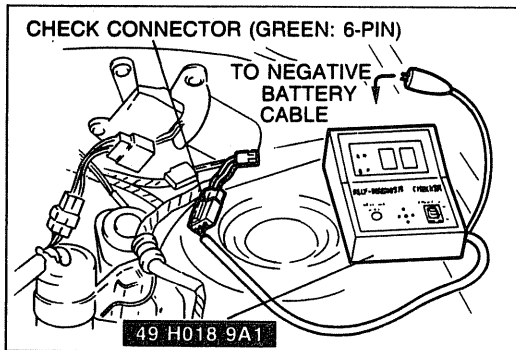
When troubles occur in the main input devices or output devices, check for the cause using the **SST**. Failures of each input and output device are indicated and retrieved from the engine control unit as malfunction code numbers.

Note

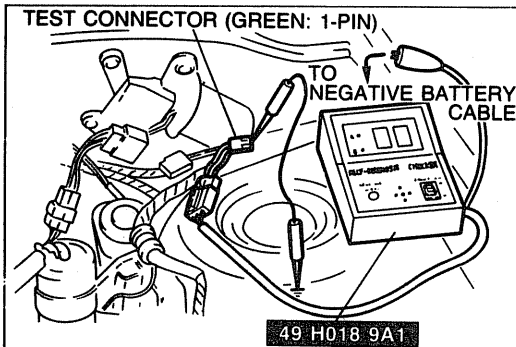
- The engine control unit constantly checks for malfunction of the input devices. But, the engine control unit checks for malfunction of output devices only in a 3 second period after the ignition switch is turned ON and the test connector (Green: 1-pin) is grounded.



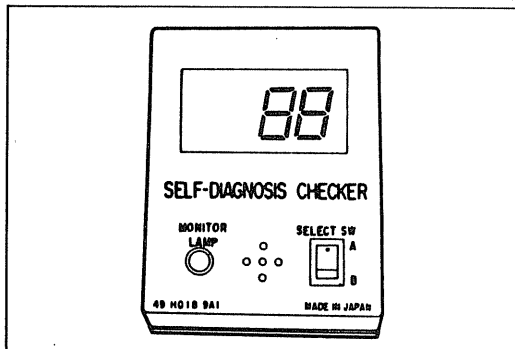
9MU0F2-070



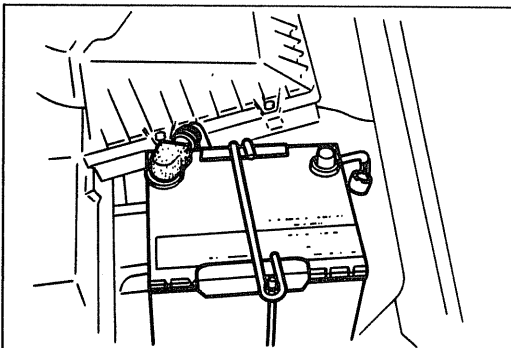
86U04A-011



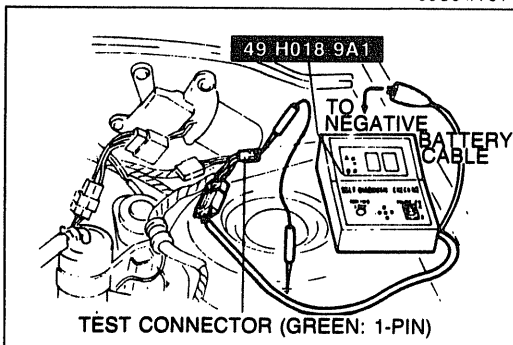
86U04A-012



06U0F2-010



86U04A-014



86U04A-015

INSPECTION PROCEDURE

1. Connect the **SST** to the check connector. (Green: 6-pin) and the negative battery terminal.
2. Set the select switch to position A.

Note

- The check connector is located at the rear of the left side wheel housing.

3. Ground the test connector (Green: 1-pin) with a jumper wire.

Note

- The test connector is located near the Self-Diagnosis Checker check connector.

4. Turn the ignition switch ON.
5. Verify that **88** flashes on the digital display and that the buzzer sounds for **three seconds** after turning the ignition switch ON.
6. If **88** does not flash, check the main relay (Refer to page F2-94), power supply circuit, and check connector wiring.
7. If **88** flashes and the buzzer sounds continuously for more than **20 seconds**, replace the engine control unit and perform steps 3 and 4 again.
8. Note the code numbers and check for the causes by referring to the check sequences shown on pages **from F2-18 to F2-30**. Repair as necessary.

Note

- Cancel the code numbers by performing the after-repair procedure after repairing.

AFTER-REPAIR PROCEDURE

1. Cancel the memory of malfunctions by disconnecting the negative battery cable and depressing the brake pedal for **at least five seconds**; then reconnect the negative battery cable.

2. Connect the **SST** to the check connector.
3. Ground the test connector (Green: 1-pin) with a jumper wire.

4. Turn the ignition switch ON, but do not start the engine for **six seconds**.
5. Start and warm up the engine, then run it at **2,000 rpm** for **two minutes**.
6. Verify that no code numbers are displayed.

86U04A-016

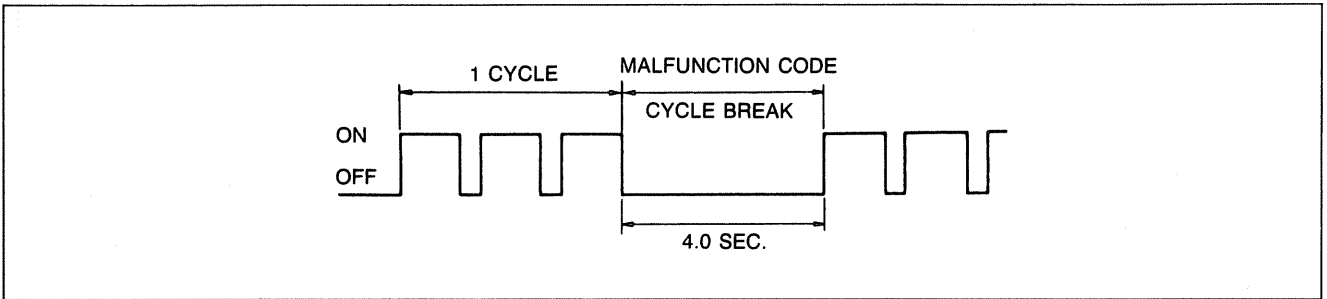
PRINCIPLE OF CODE CYCLE

Malfunction codes are determined as shown below

86U04A-017

1. Code cycle break

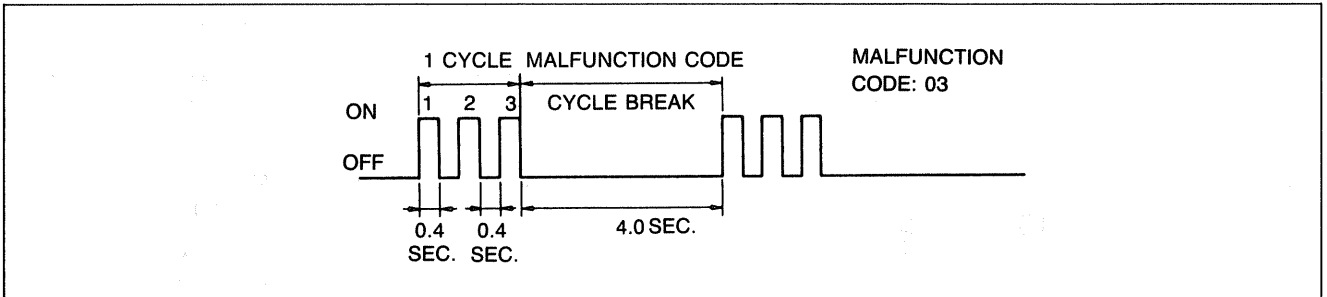
The time between malfunction code cycles is 4.0 sec (the time the light is off).



86U04A-018

2. Second digit of malfunction code (ones position)

The digit in the ones position of the malfunction code represents the number of times the buzzer is on 0.4 sec during one cycle.

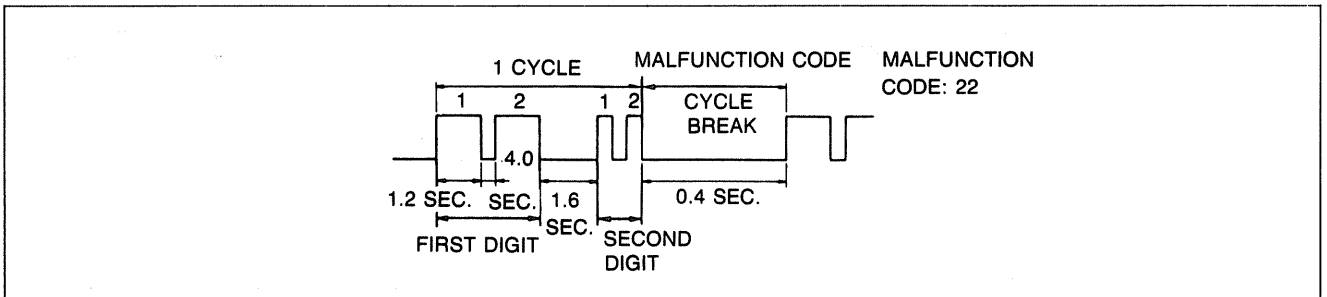


86U04A-019

3. First digit of warning code (tens position)







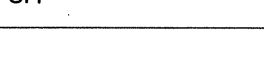





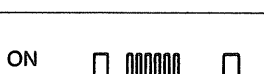
The digit in the tens position of the malfunction code represents the number of times the buzzer is on 1.2 sec during one cycle.







It should also be noted that the light goes off for 1.6 sec. between the long and short pulses of the buzzer.



69G04C-554

CODE NUMBER

Malfunction display		Sensor or subsystem	Self-diagnosis	Fail-safe
Code No.	MIL output signal pattern			
01	ON  OFF	Ignition pulse	No ignition signal	—
02	ON  OFF	Ne signal	No Ne signal from crank angle sensor	—
03	ON  OFF	G1 signal	No G1 signal	Neither G1 nor G2 signal: Engine stopped
04	ON  OFF	G2 signal	No G2 signal	
05	ON  OFF	Knock sensor and knock control unit	Open or short circuit	<ul style="list-style-type: none"> Retards ignition timing 6° in heavy-load condition Waste gate opens earlier
08	ON  OFF	Airflow meter	Open or short circuit	Maintains basic signal at preset value
09	ON  OFF	Water thermosensor	Open or short circuit	Maintains constant command <ul style="list-style-type: none"> 40°C (104°F) for EGI 50°C (122°F) for ISC control use
10	ON  OFF	Intake air thermosensor (airflow meter)	Open or short circuit	Maintains constant 20°C (68°F) command
12	ON  OFF	Throttle sensor	Open or short circuit	Maintains constant command of throttle valve fully open
14	ON  OFF	Atmospheric pressure sensor	Open or short circuit	Maintains constant command of sea level pressure
15	ON  OFF	Oxygen sensor	Sensor output continues less than 0.55V 120 sec. after engine starts (1,500 rpm)	Cancels EGI feedback operation
16	ON  OFF	EGR position sensor	Open or short circuit	Cuts off EGR
			Sensor output does not match target value (incorrect output)	—
17	ON  OFF	Feedback system	Sensor output not changed 20 sec. after engine exceeds 1,500 rpm	Cancels EGI feedback operation

Malfunction display		Sensor or subsystem	Self-diagnosis	Fail-safe
Code No.	MIL output signal pattern			
25	ON  OFF	Solenoid valve (pressure regulator)	Open or short circuit	—
26	ON  OFF	Solenoid valve (purge control)		—
28	ON  OFF	Solenoid valve (EGR-vacuum)		—
29	ON  OFF	Solenoid valve (EGR-vent)		—
34	ON  OFF	ISC valve		—
42	ON  OFF	Solenoid valve (waste gate)		—

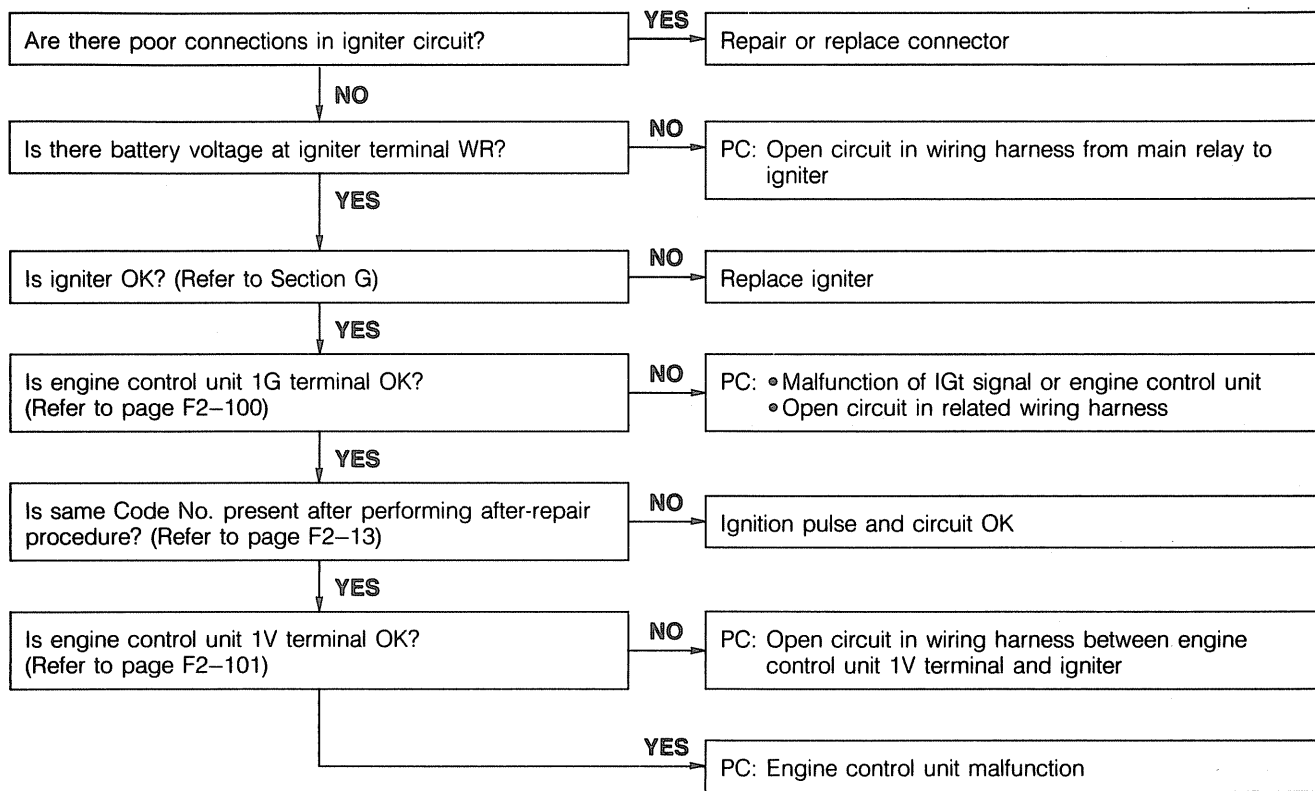
06U0F2-011

Caution

- If there is more than one failure present, the lowest number malfunction code is displayed first, the remaining codes are displayed sequentially.
- After repairing a failure, turn off the ignition switch and disconnect the negative battery cable and depress the brake pedal for at least 5 seconds to erase the memory of a malfunction code.

Code No.01 (Ignition pulse)

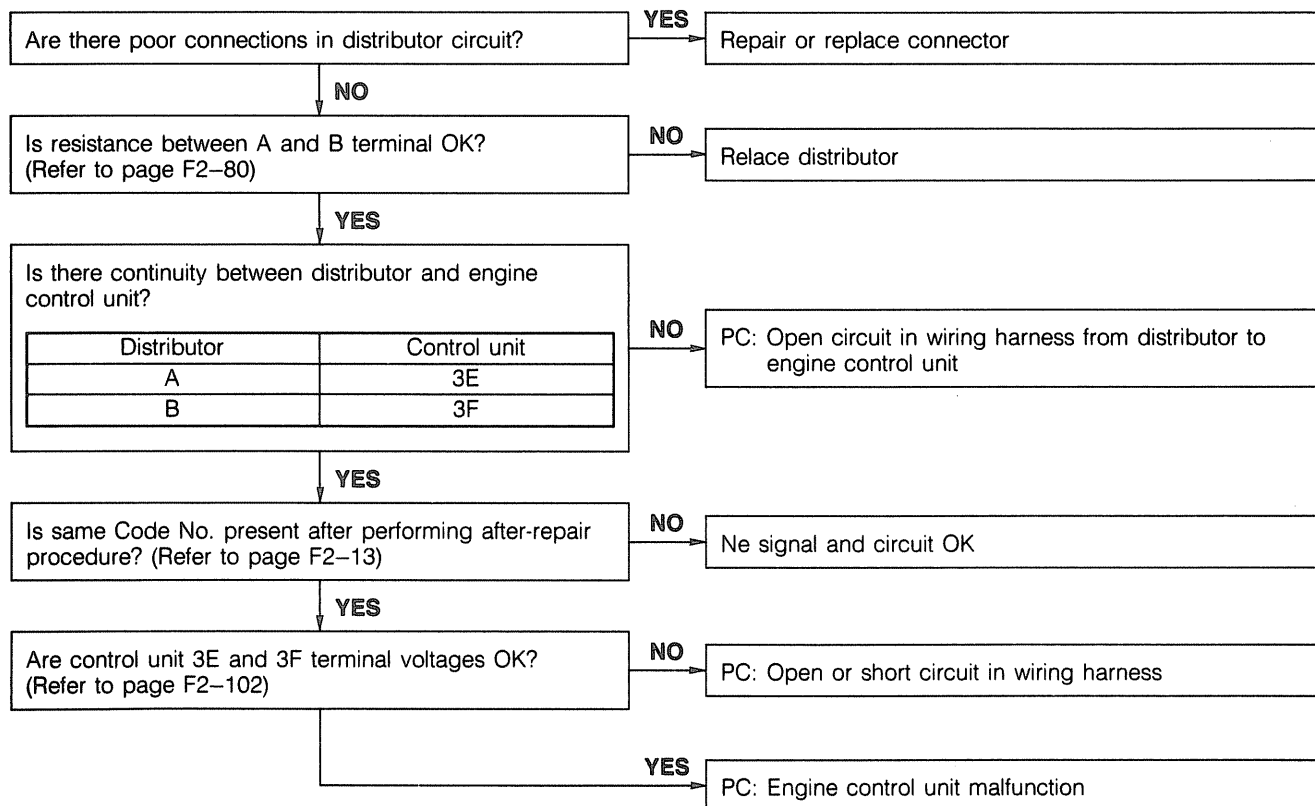
PC: Possible Cause



16U0F2-005

Code No.02 (Ne signal)

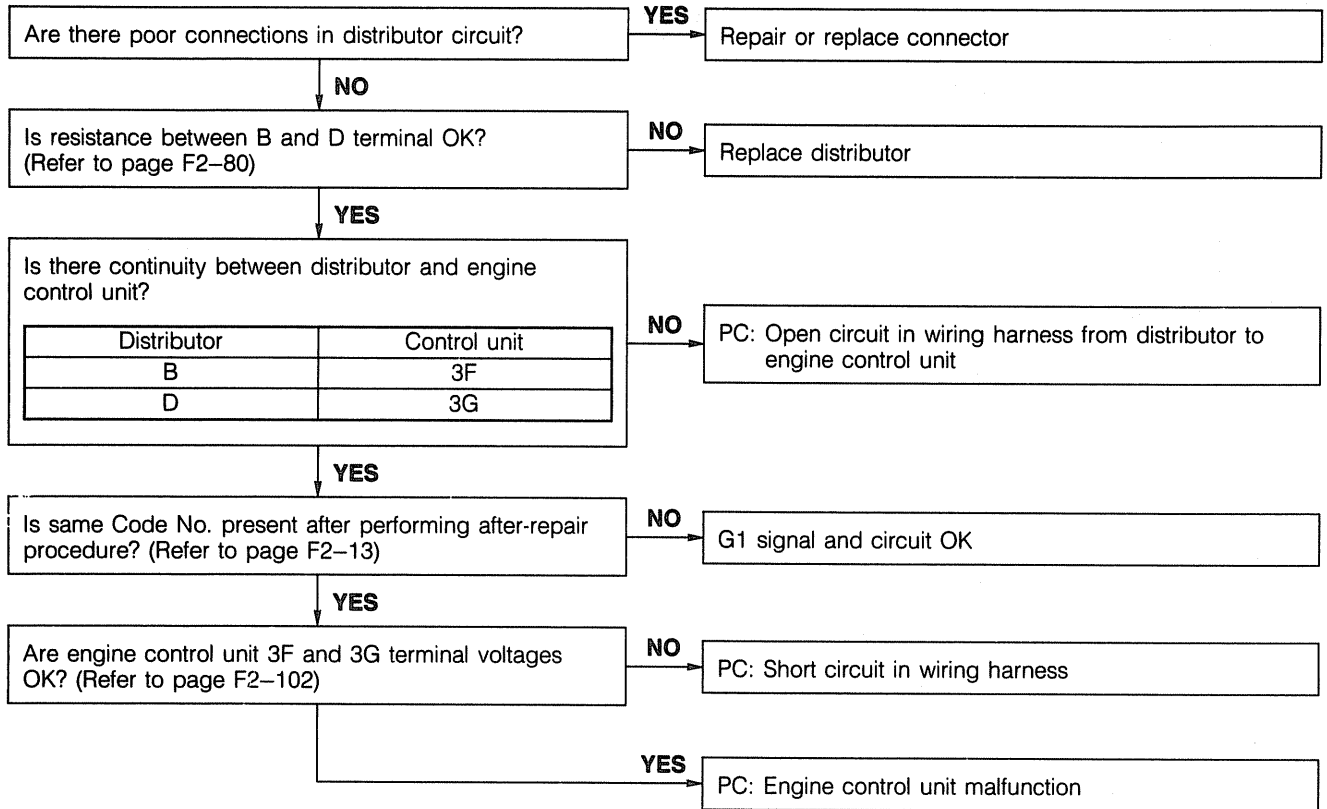
PC: Possible Cause



16U0F2-006

Code No.03 (G1 signal)

PC: Possible Cause

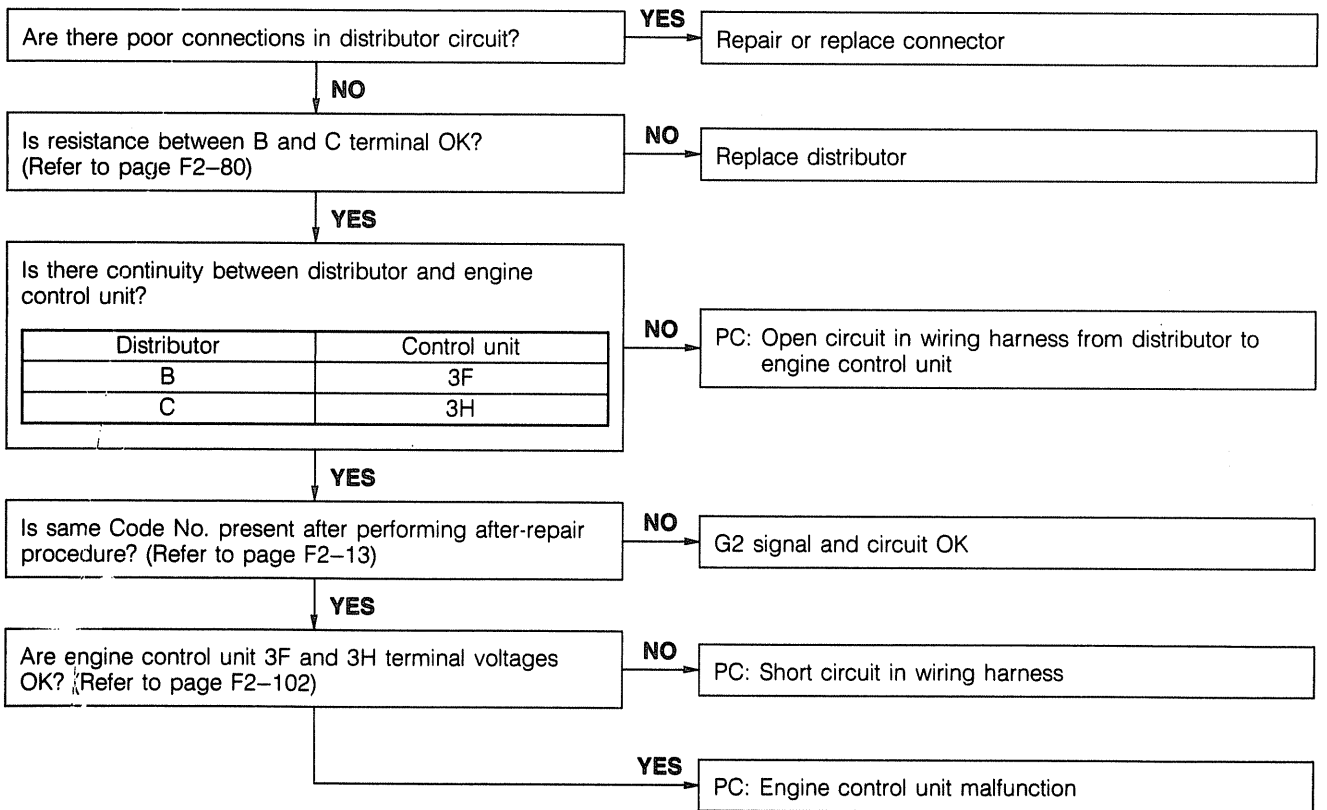


Distributor	Control unit
B	3F
D	3G

16U0F2-007

Code No.04 (G2 signal)

PC: Possible Cause

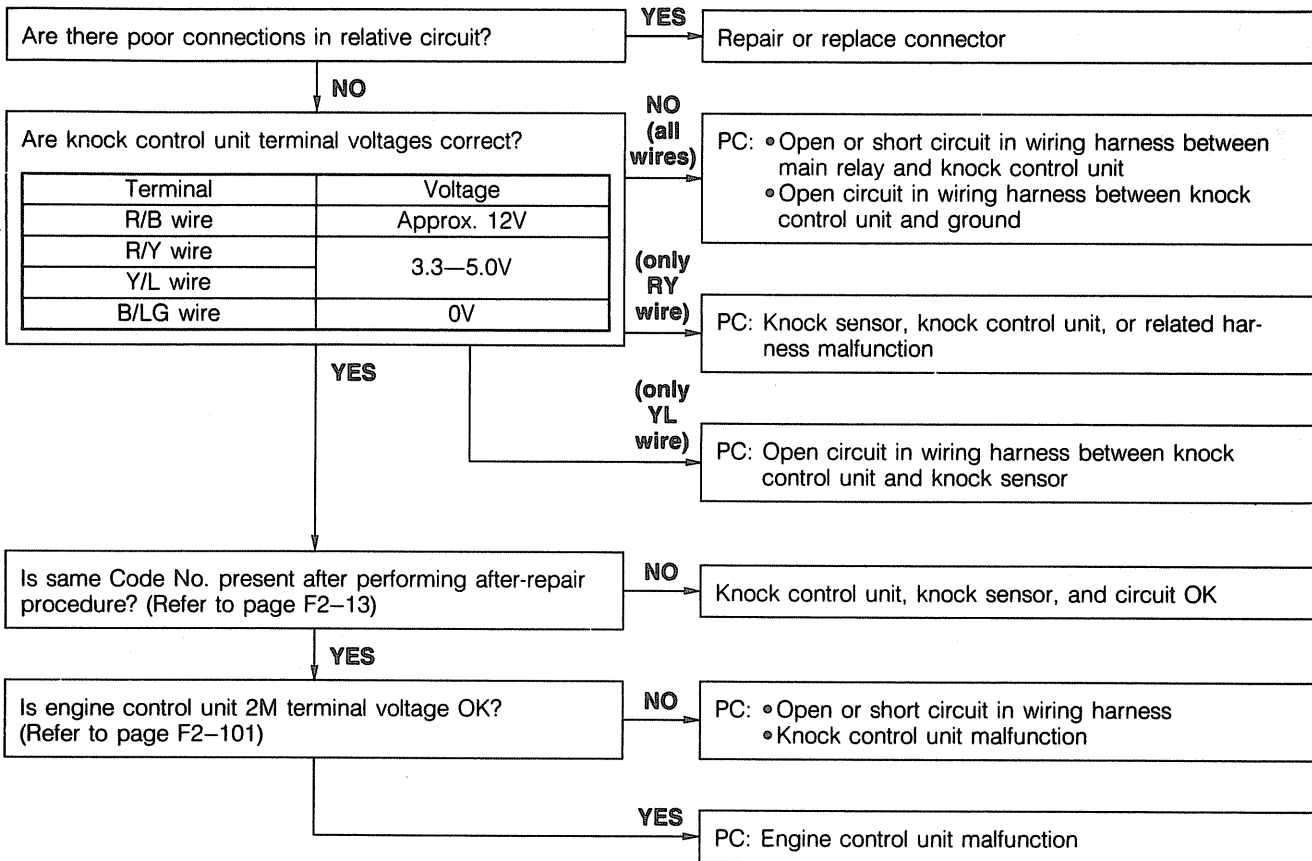


Distributor	Control unit
B	3F
C	3H

16U0F2-008

Code No.05 (Knock sensor and Knock control unit)

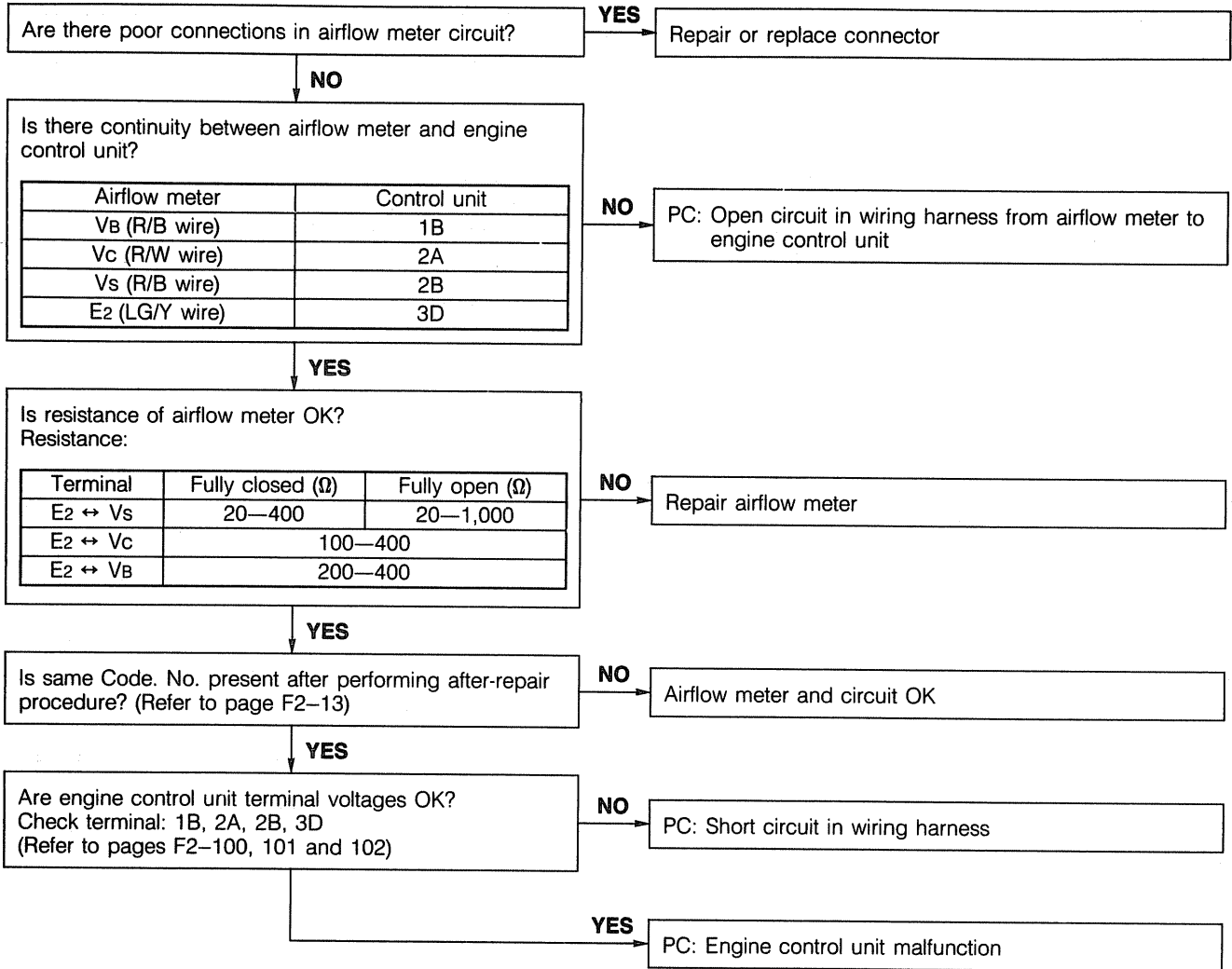
PC: Possible Cause



16U0F2-009

Code No.08 (Airflow meter)

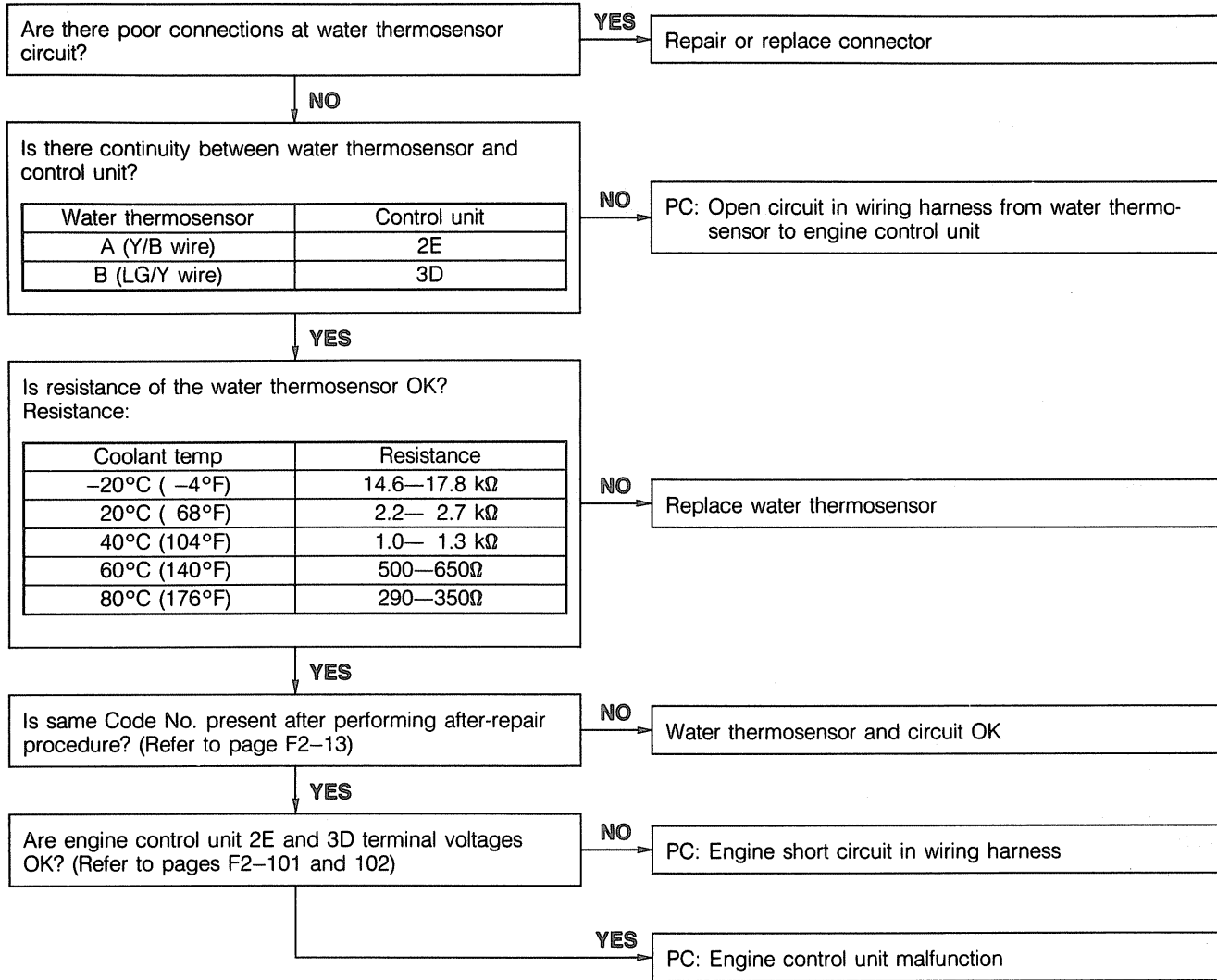
PC: Possible Cause



16U0F2-010

Code No.09 (Water thermosensor)

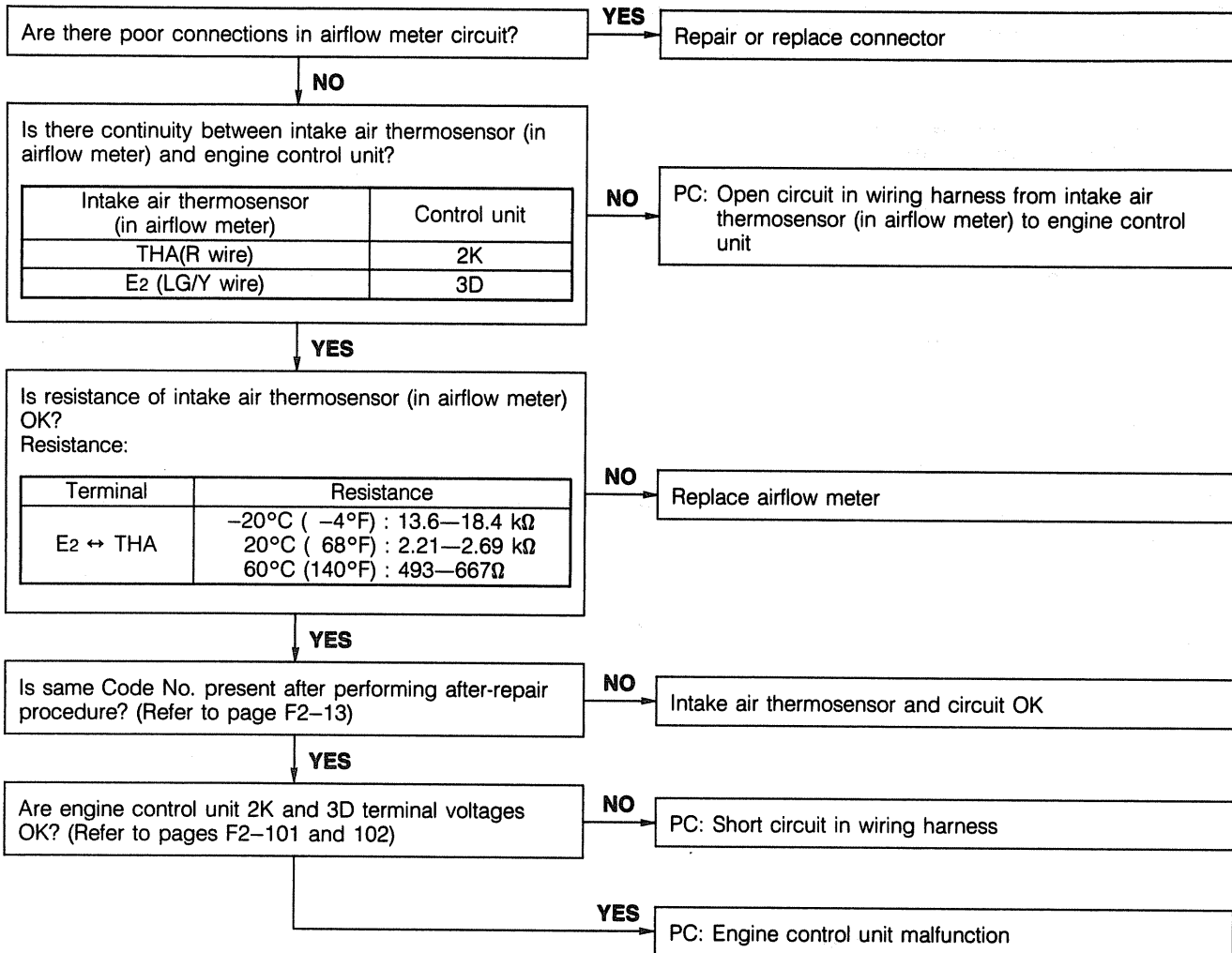
PC: Possible Cause



16U0F2-011

Code No.10 (Intake air thermosensor)

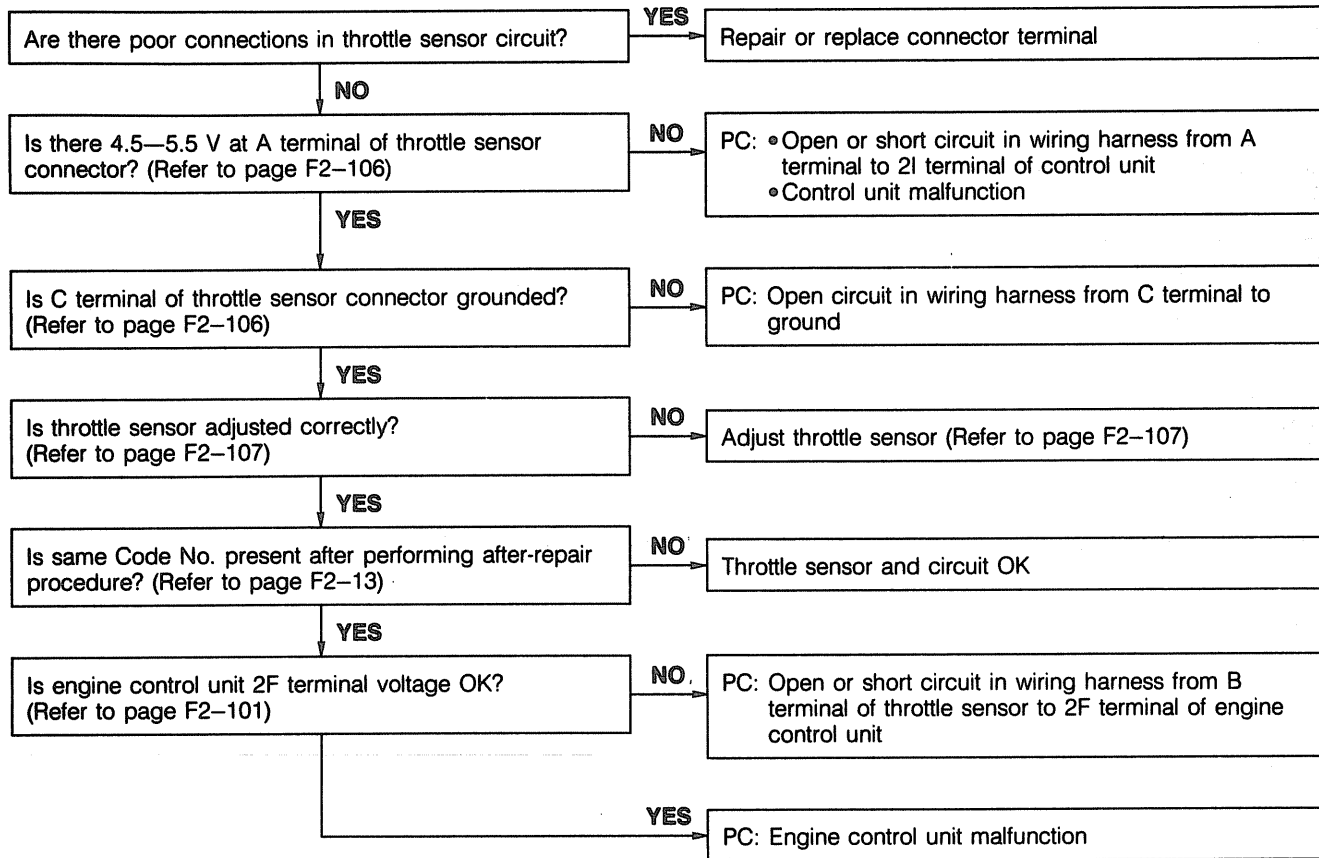
PC: Possible Cause



16U0F2-012

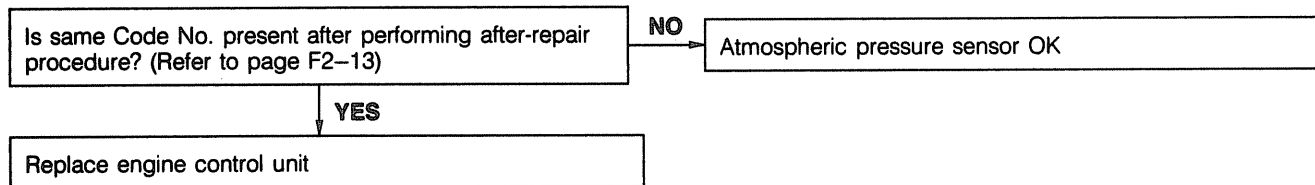
Code No.12 (Throttle sensor)

PC: Possible cause



16U0F2-013

Code No.14 (Atmospheric pressure sensor)



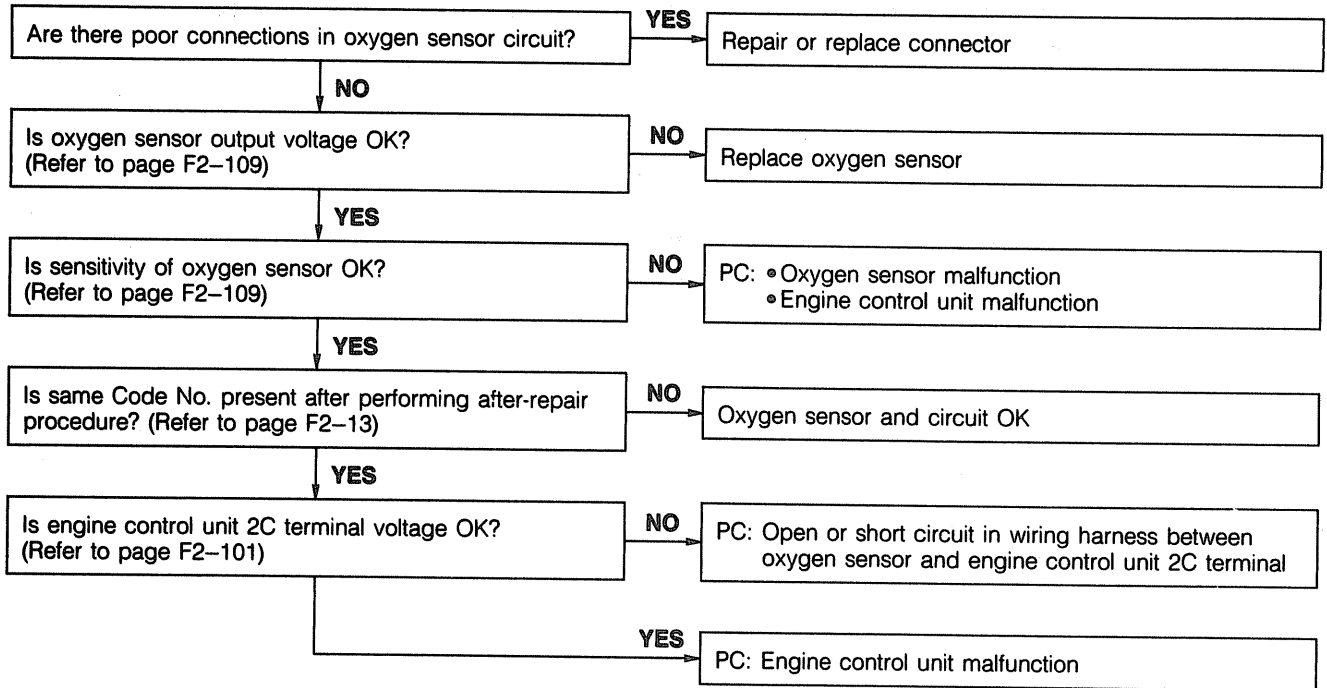
06U0F2-021

Code No.15 (Oxygen sensor)

PC: Possible Cause

Note

- When Codes No.15 and 17 are present at the same time, first perform the checking procedure for Code No.17. (Refer to page F2-27.)



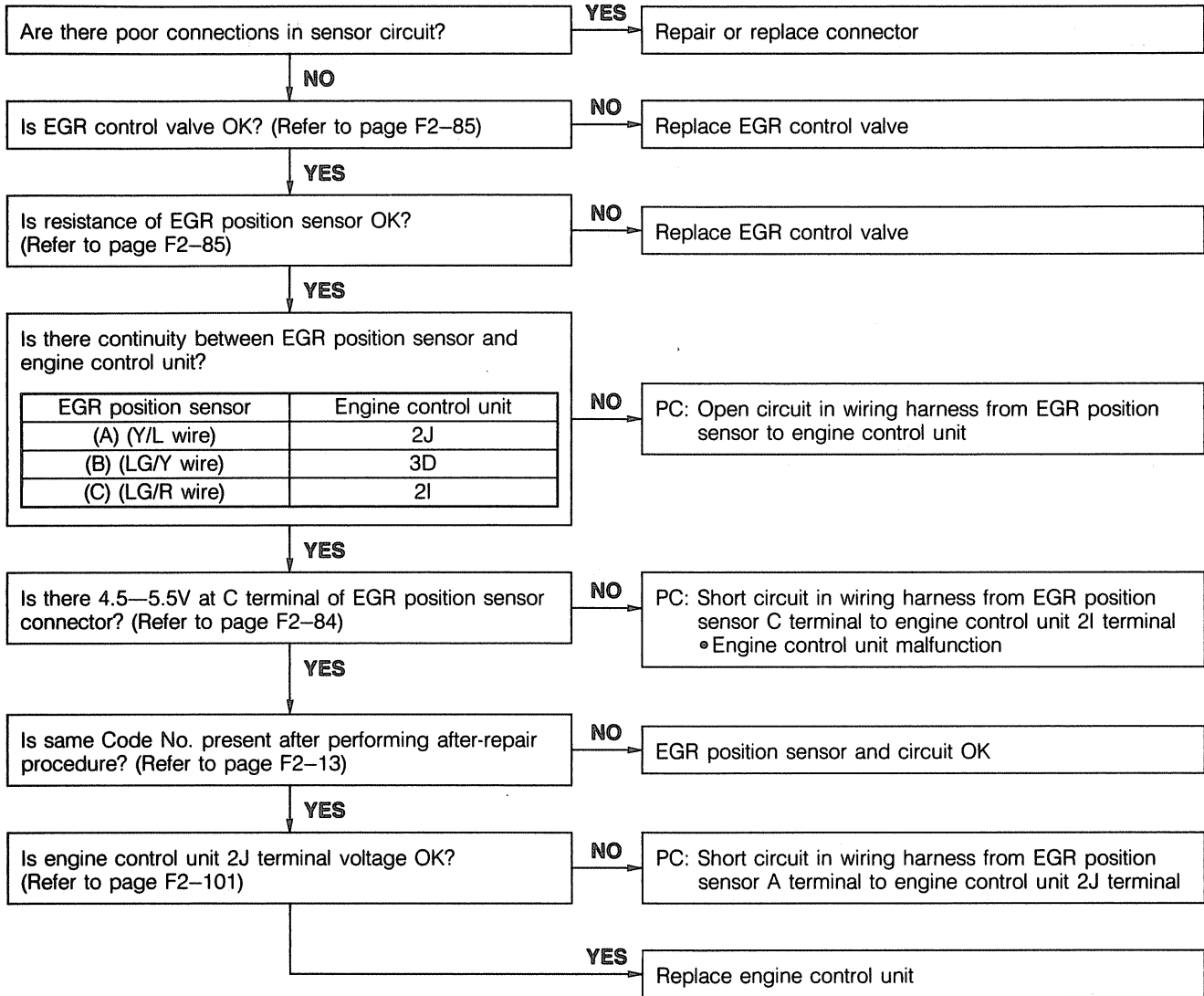
16U0F2-014

Code No.16 (EGR position sensor)

PC: Possible Cause

Note

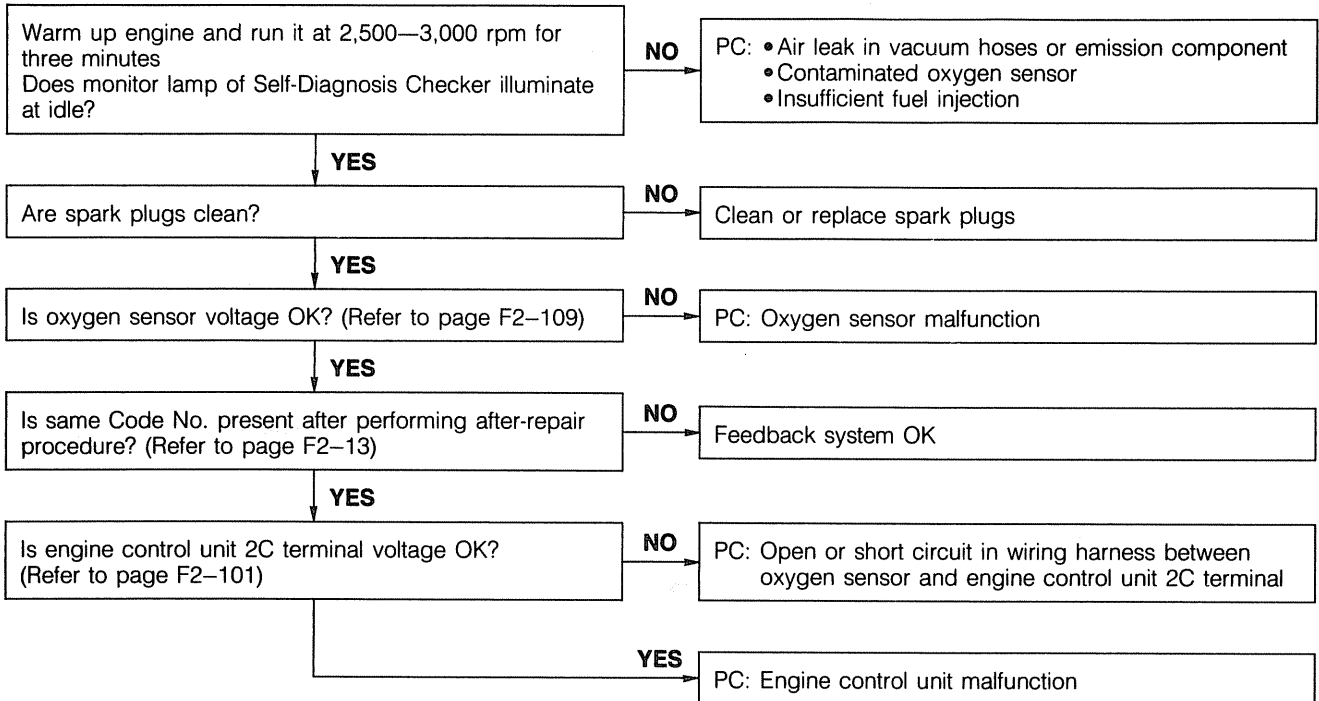
- Inspect the vacuum hose to the EGR control valve for air leakage, blockage and damage if MIL illuminates only during cruising.



16U0F2-015

Code No.17 (Feedback system)

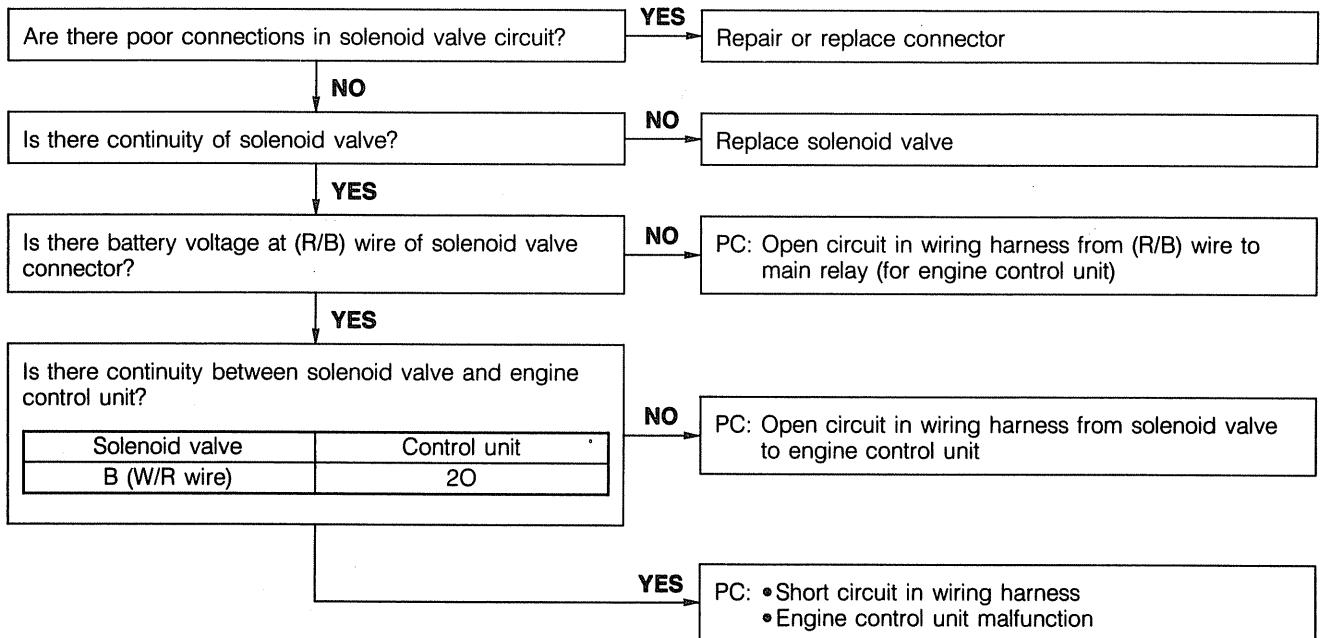
PC: Possible Cause



16U0F2-016

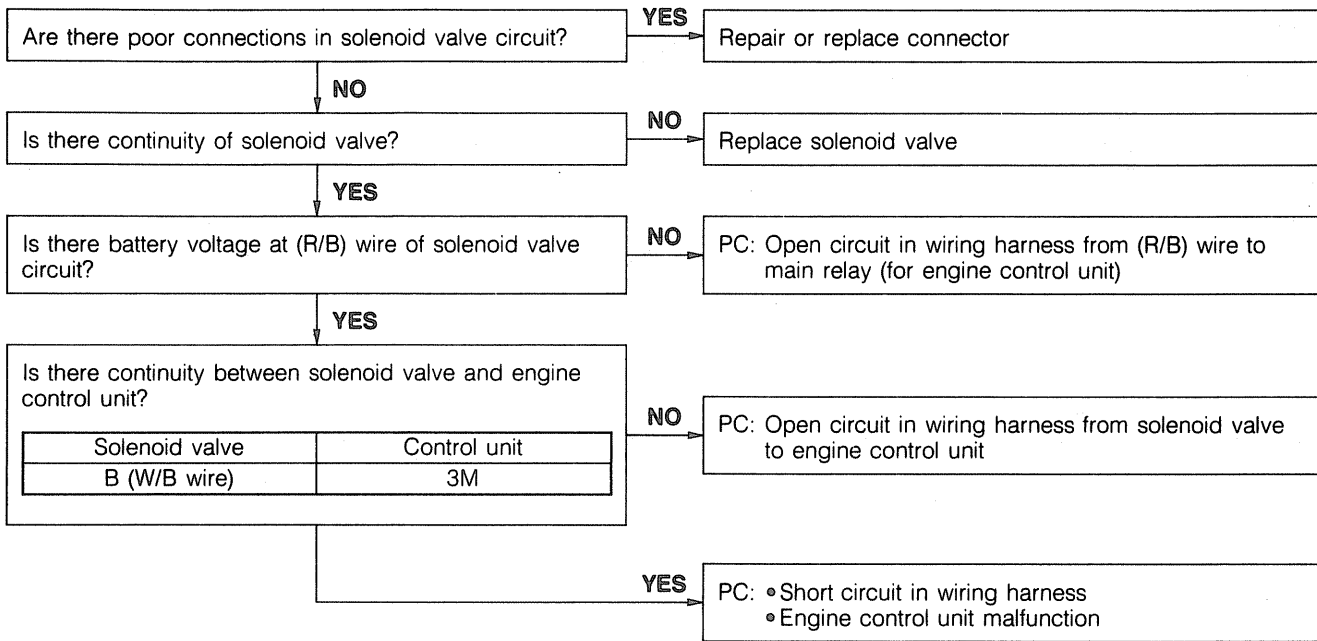
Code No.25 (Solenoid valve — Pressure regulator)

PC: Possible Cause



06U0F2-025

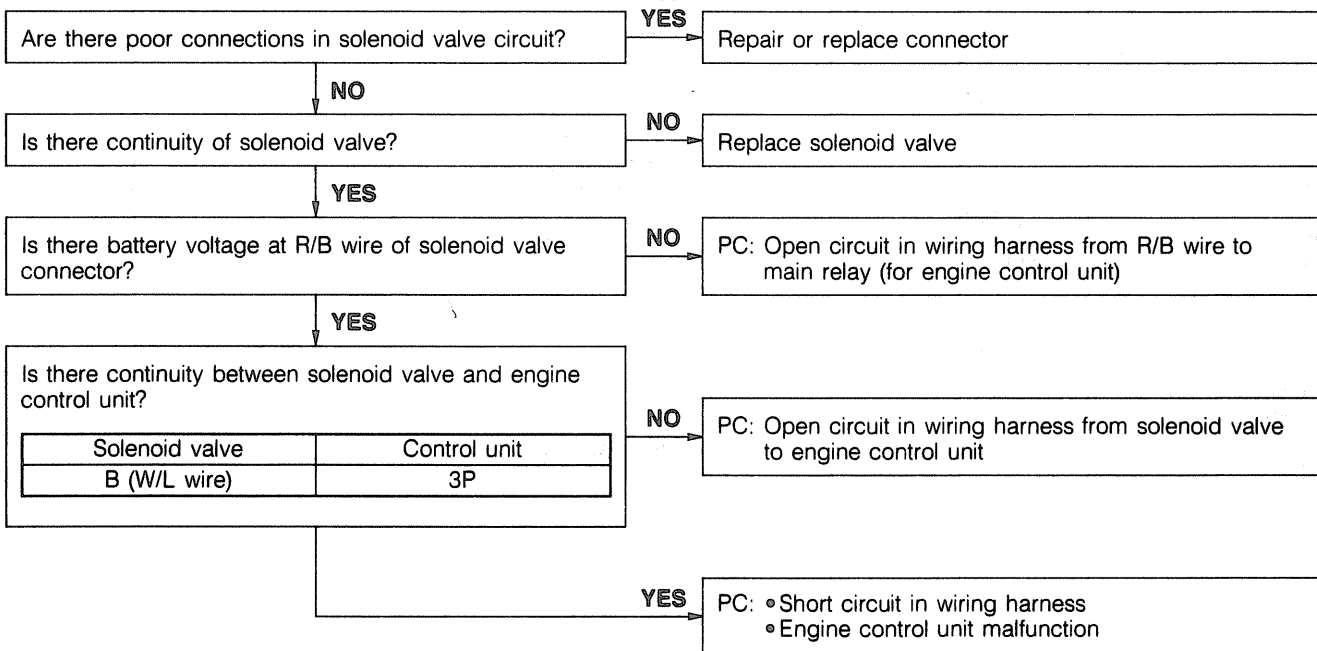
Code No.26 (Solenoid valve — Purge)



06U0F2-026

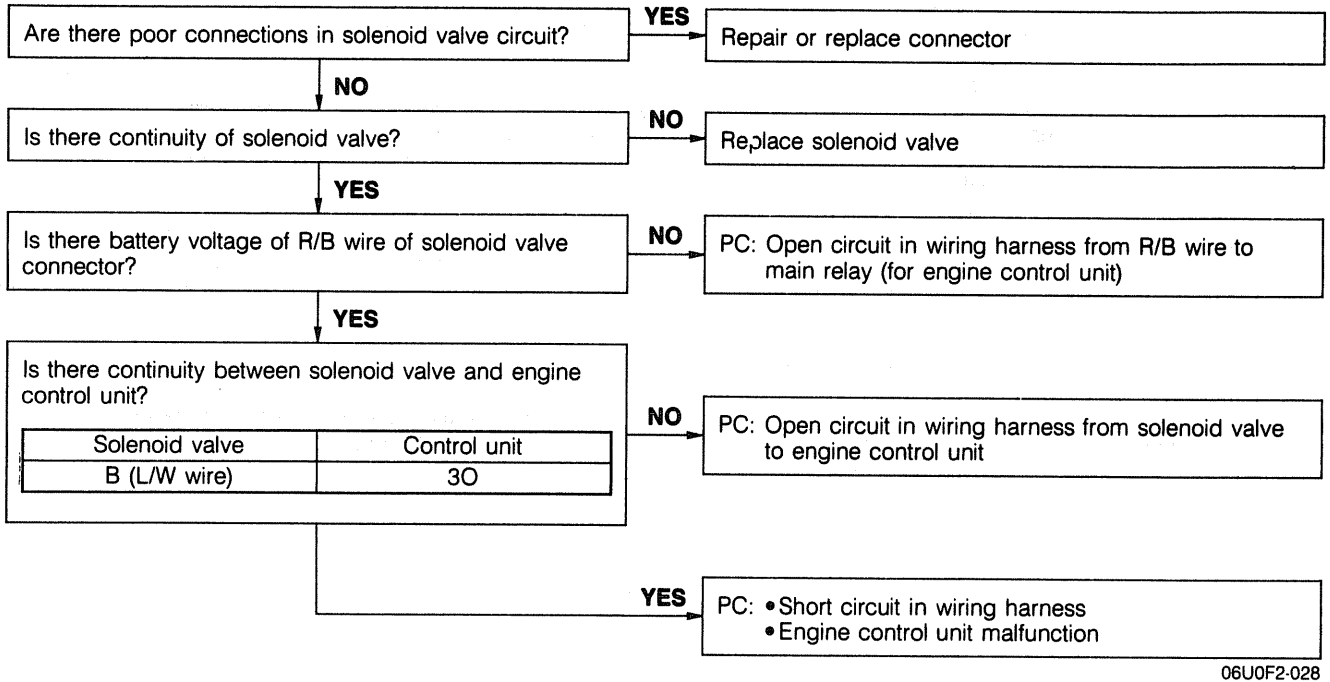
Code No.28 (Solenoid valve — EGR, vacuum side)

PC: Possible Cause



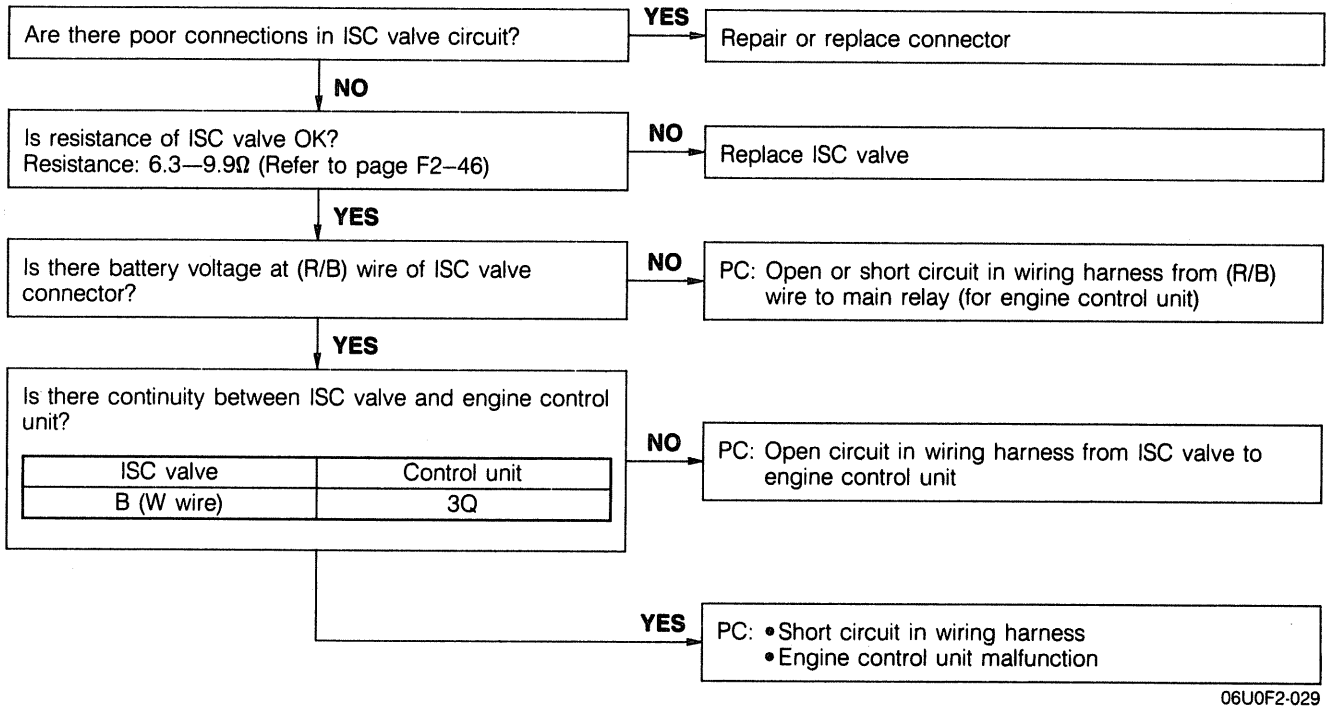
06U0F2-027

Code No.29 (Solenoid valve — EGR, vent side)

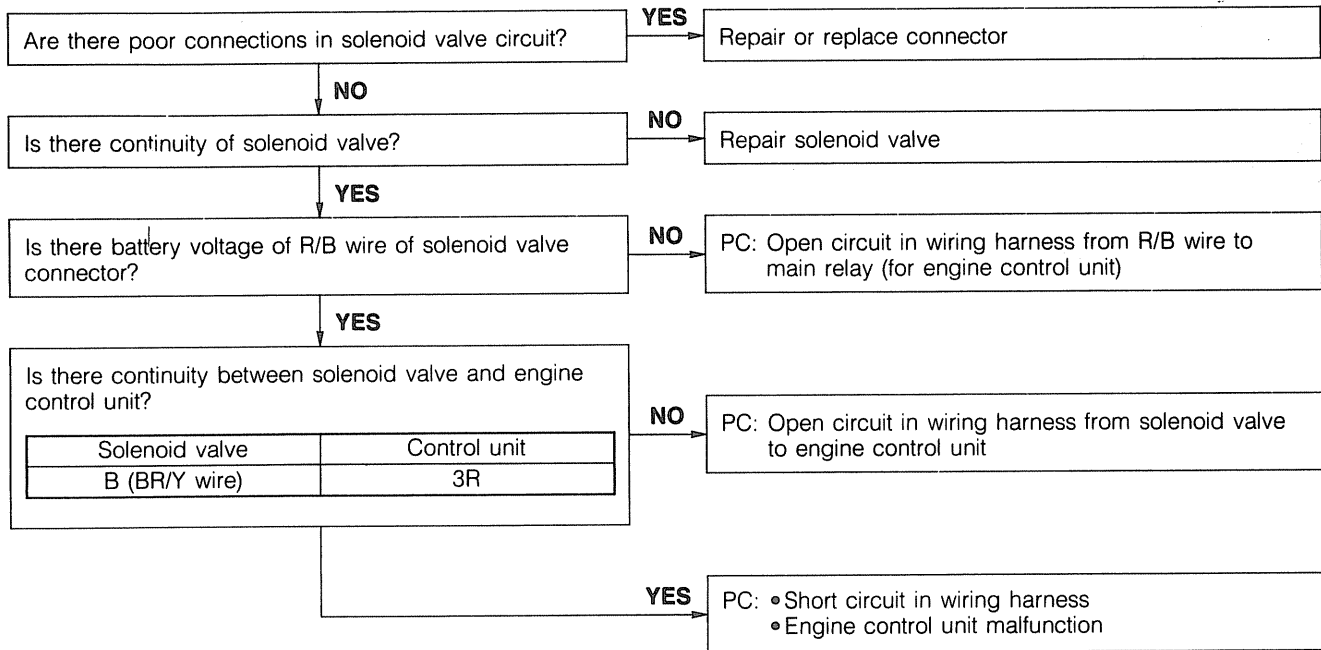


Code No.34 (ISC valve)

PC: Possible Cause



Code No.42 (Solenoid valve — Waste gate)

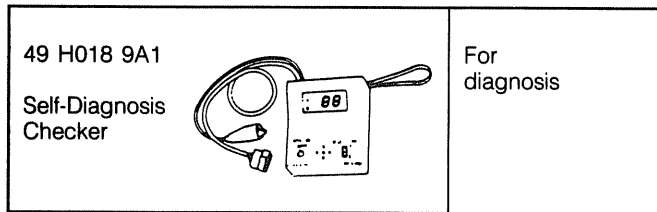


06U0F2-030

SWITCH MONITOR FUNCTION

PREPARATION

SST

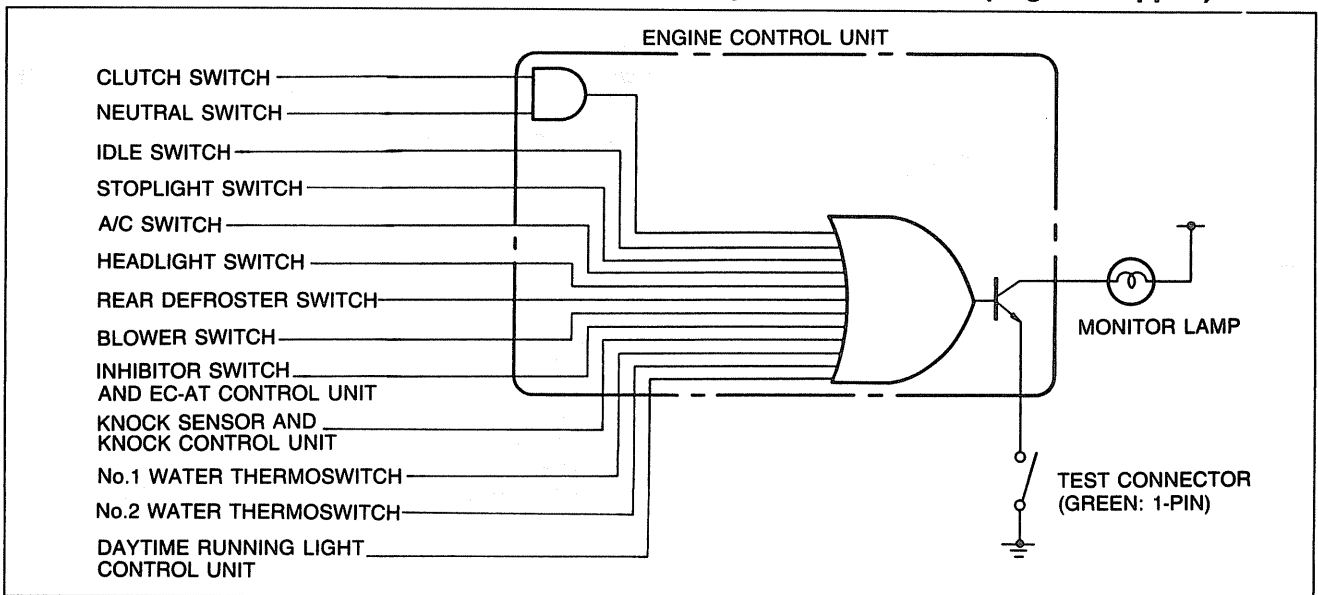


06U0F2-031

Individual switches can be monitored by the SST.

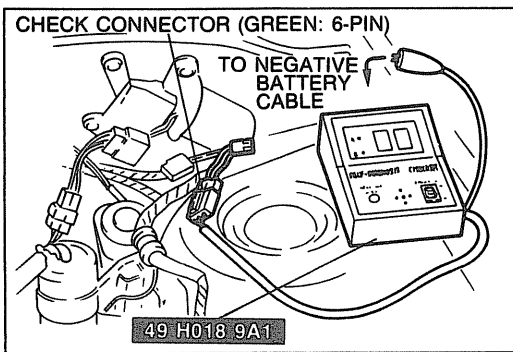
Note

- The test connector must be grounded and the ignition switch ON (engine stopped).

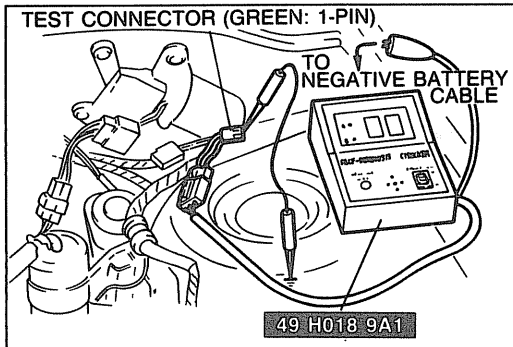


06U0F2-032

Switch	Self-Diagnosis Checker (Monitor lamp)		Remarks
	Light ON	Light OFF	
Clutch switch	Pedal released	Pedal depressed	Gear: IN
Neutral switch	In gear	Neutral	Clutch pedal released
Idle switch	Pedal depressed	Pedal released	—
Stoplight switch (MTX)	Pedal depressed	Pedal released	—
A/C switch	ON	OFF	Blower motor position: "1" position
Headlight switch	ON	OFF	—
Rear defroster switch	ON	OFF	—
Blower switch	ON	OFF	Blower motor position: "3" or "4" position
Inhibitor switch and EC-AT control unit	D, 1, 2, and R ranges	P and N ranges	—
No.1 water thermoswitch (Electrical fan)	Check connector (for electrical fan) (B/L) terminal grounded	Check connector (for electrical fan) (B/L) terminal not grounded	While fan not operating
Knock sensor and knock control unit	While tapping engine hanger	—	With test connector ground
Daytime running light control unit (Canada only)	Parking brake lever released	Parking brake lever pulled up	—
No.2 water thermoswitch (Electrical fan) (ATX)	Check connector (for electrical fan) (L/R) terminal grounded	Check connector (for electrical fan) (L/R) terminal not grounded	While fan not operating



86U04A-034



86U04A-035

INSPECTION PROCEDURE

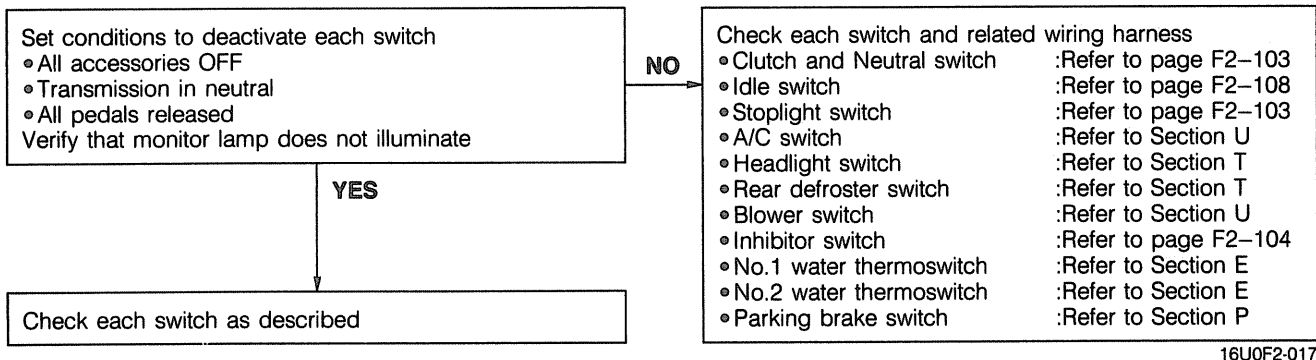
1. Warm up the engine to normal operating temperature and stop it.
2. Connect the SST to the check connector (Green: 6-pin) and the negative battery terminal.

3. Connect a jumper wire between the test connector (Green: 1-pin) and a ground.
4. Turn the ignition switch ON. Check if monitor lamp illuminates when each switch is made to function as described below.

Caution

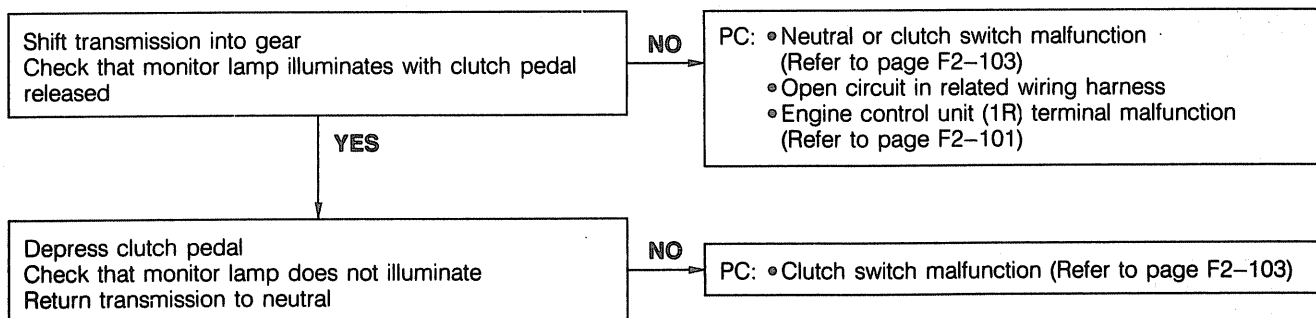
- If any one of the switches is activated, the monitor lamp will stay on.
- Do not start the engine.

Procedure



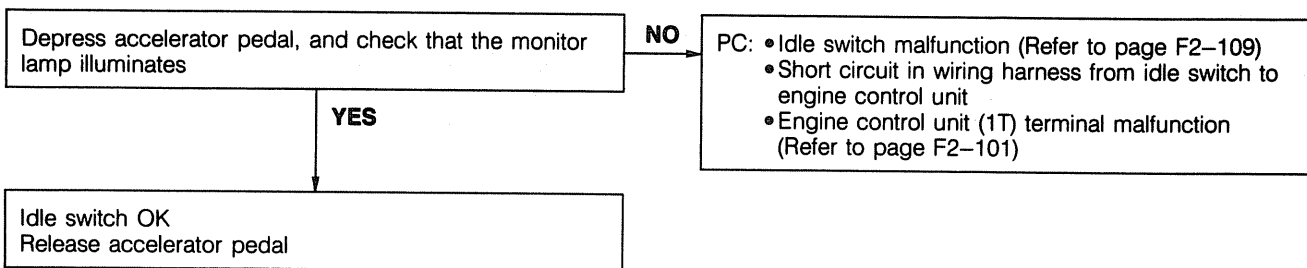
16U0F2-017

Neutral and Clutch switch (MTX)



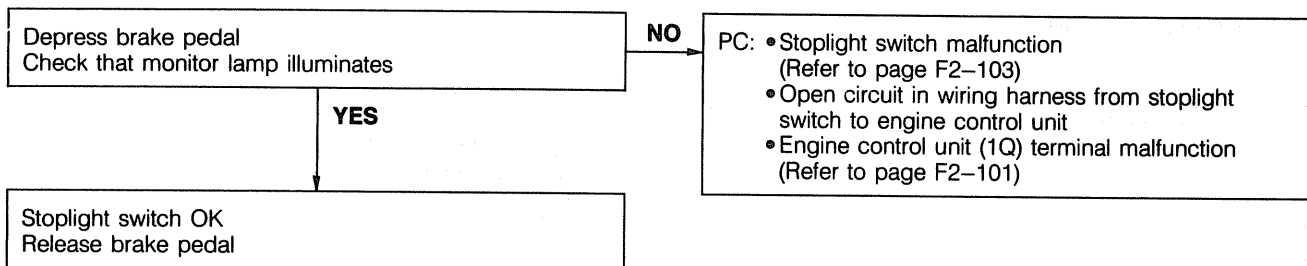
16U0F2-018

Idle switch



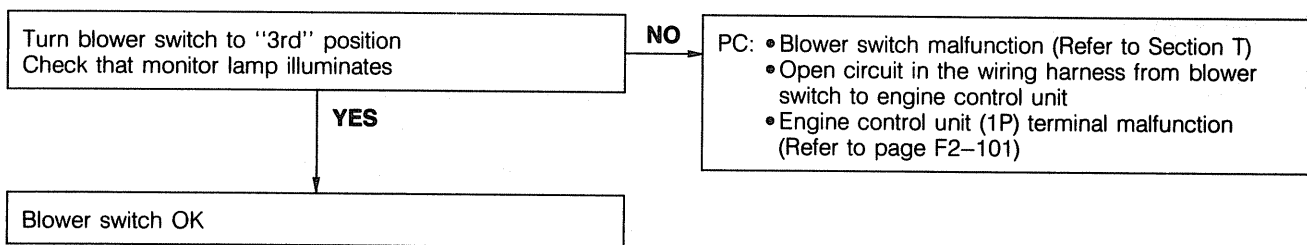
16U0F2-019

Stoplight switch (MTX)



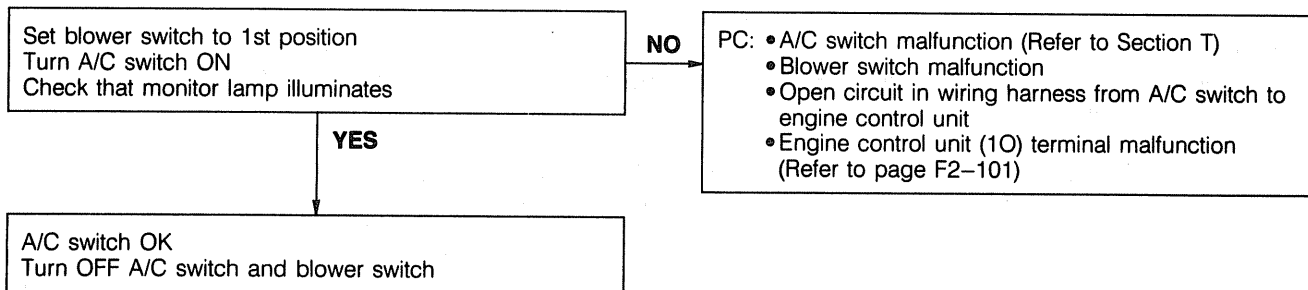
16U0F2-020

Blower switch



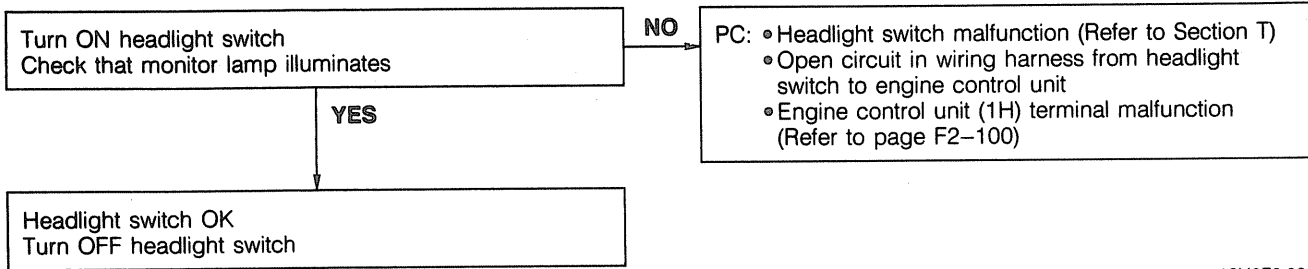
16U0F2-021

A/C switch



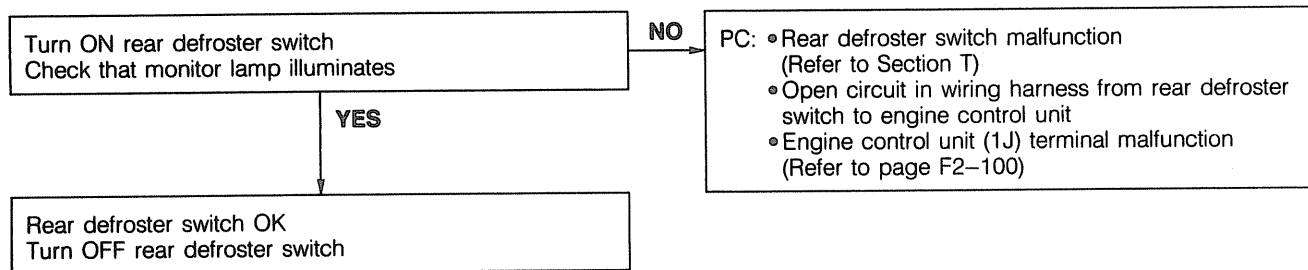
16U0F2-022

Headlight switch



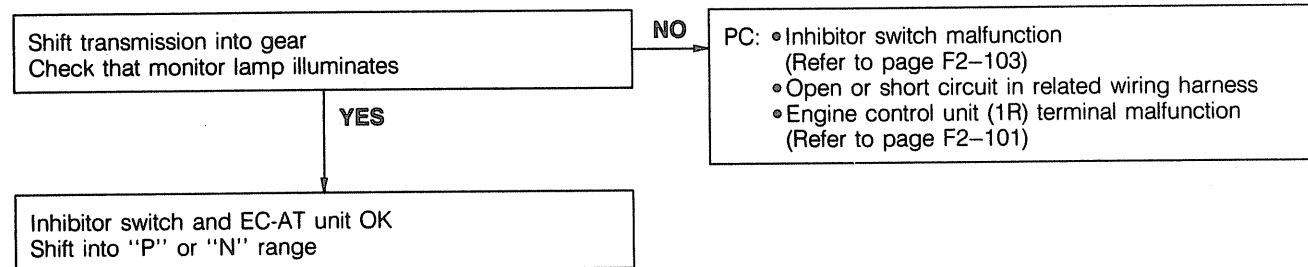
16U0F2-023

Rear defroster switch



16U0F2-024

Inhibitor switch (ATX)

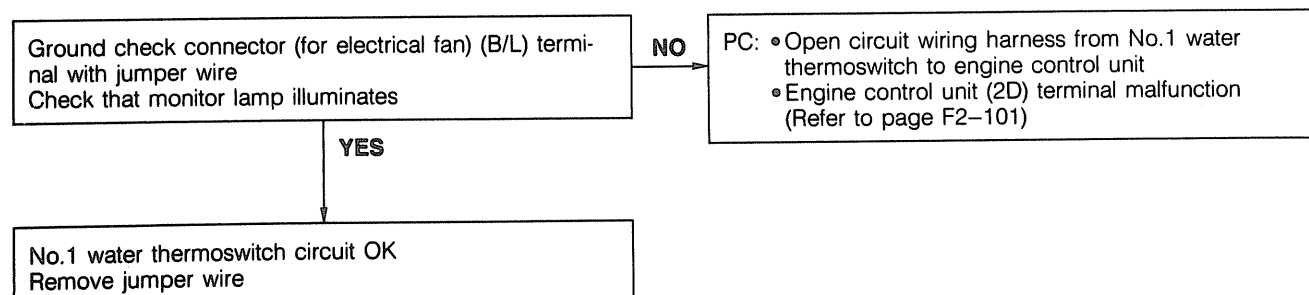


16U0F2-025

No.1 water thermostwitch circuit (not included in switch inspection)

Warning

- The electrical fan operates when the check connector (for electrical fan) (B/L) terminal is grounded. Use caution.

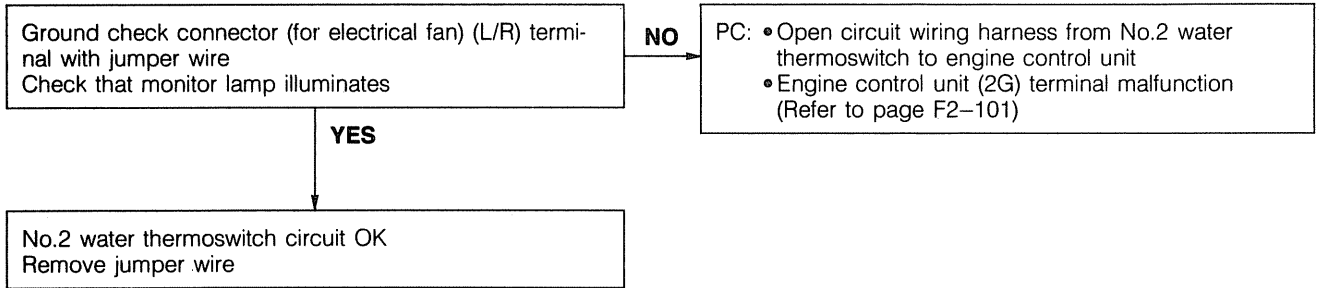


16U0F2-026

No.2 water thermostwitch circuit (not included in switch inspection) (ATX)

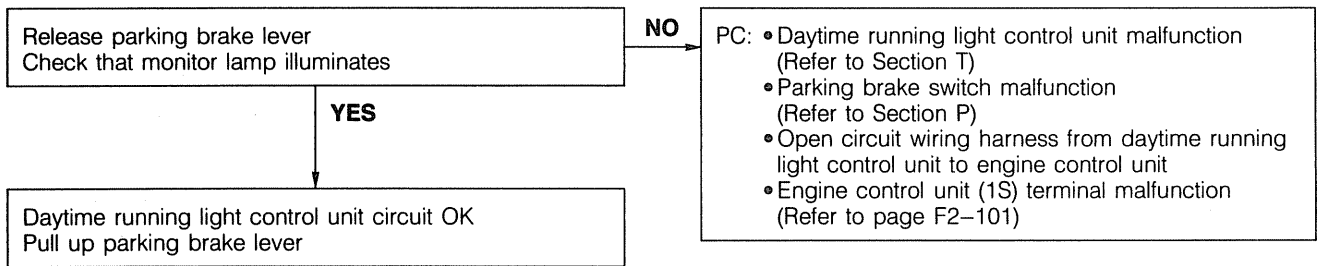
Warning

- The electrical fan operates when the check connector (for electrical fan) (L/R) terminal is grounded. Use caution.



16U0F2-027

Daytime running light control unit (Canada only)



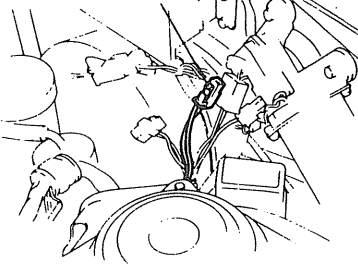
16U0F2-028

Idle speed
Automatic
Control
Function

Engine Control Unit

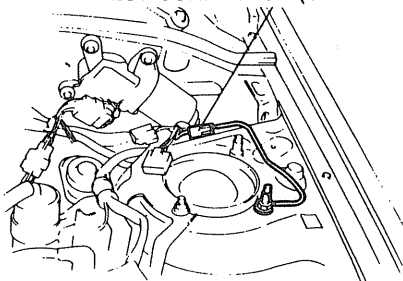
86U04A-045

CHECK CONNECTOR (WHITE)
(FOR TACHOMETER)

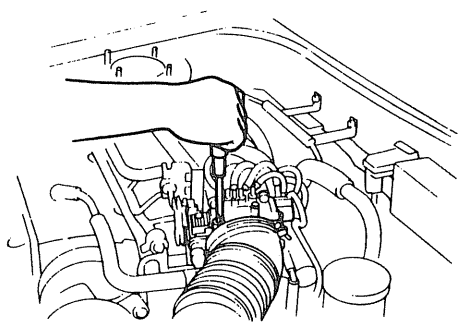


86U04A-046

TEST CONNECTOR (GREEN: 1-PIN)



86U04A-047



06U0F2-124

Idle mixture
Automatic
Control
Function

Engine Control Unit

86U04A-049

IDLE ADJUSTMENT

IDLE SPEED

Because the idle speed is controlled automatically by the engine control unit through the idle speed control (ISC) solenoid valve, usually it is not necessary to check and adjust the idle speed.

However, the idle speed should be adjusted when rough idling occurs when the test connector (Green: 1-pin) is grounded.

Preparation

- 1) Check the condition of the engine (plugs, leaks in hoses, etc.).
- 2) Make sure all accessories are OFF.
- 3) Warm up the engine and run it for **three minutes at 2,500—3,000 rpm** in neutral.
- 4) Check the initial ignition timing and adjust if necessary.

Inspection and Adjustment

1. Ground the test connector with a jumper wire.

2. Check that the idle speed is within specification.

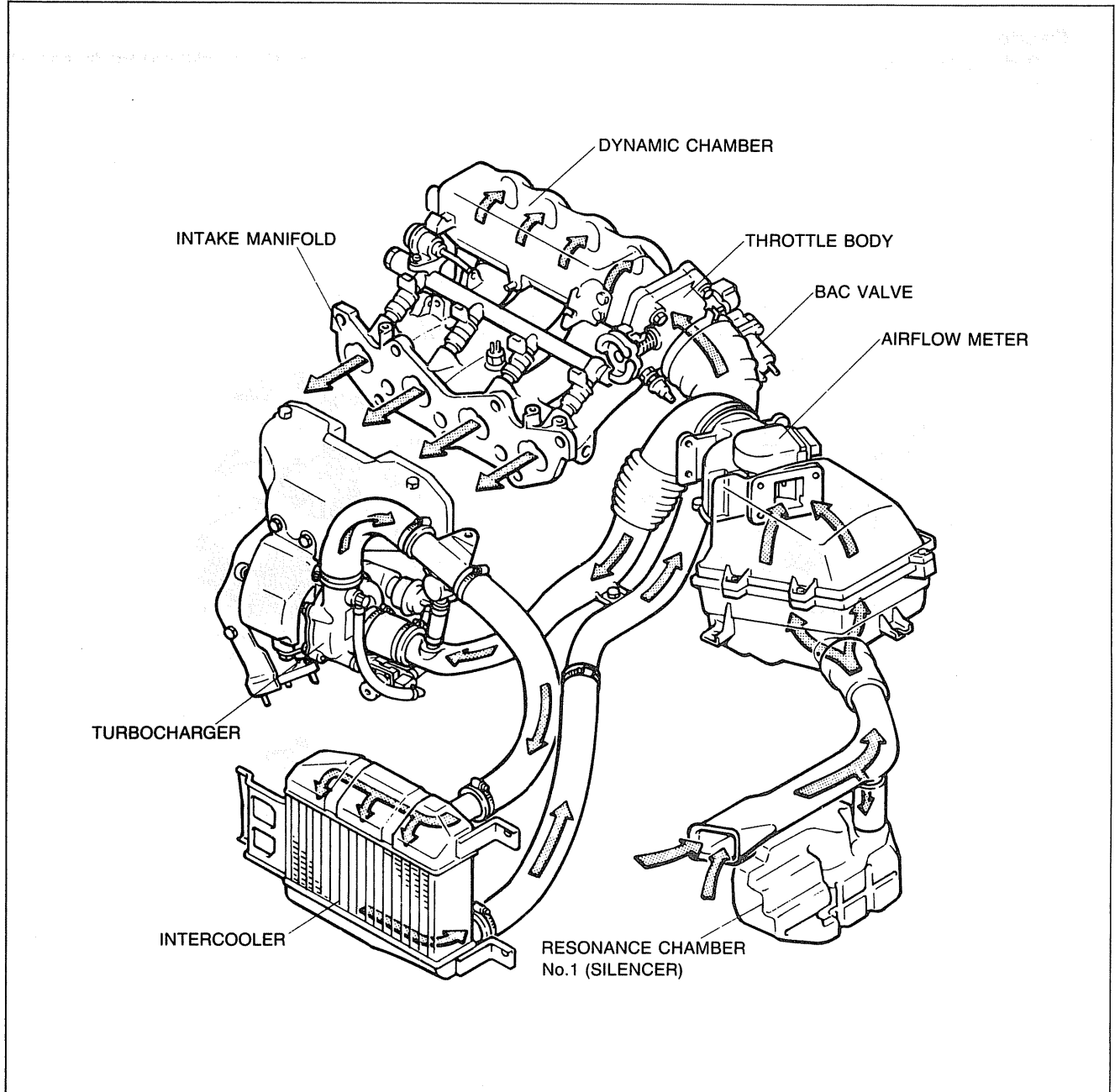
**Idle speed: 750 ± 25 rpm MTX: Neutral
ATX: P range**

3. If the idle speed is not within specification, adjust it by turning the air adjust screw.
4. After adjusting the idle speed, disconnect the jumper wire from the test connector.

IDLE MIXTURE

Because an automatic compensation function for air/fuel mixture is built into the engine control unit, it is not necessary to check and adjust the idle mixture.

INTAKE AIR SYSTEM



86U04B-153

This system controls the air required by the engine for operation. The system consists of the air duct, air cleaner, airflow meter, throttle body, dynamic chamber, and intake manifold.

COMPONENT DESCRIPTIONS

Component	Function	Remarks
Air cleaner	Filters air into throttle body	
Airflow meter	Detects amount of intake air; sends signal to control unit	Intake air thermosensor and fuel pump switch are integrated
Throttle sensor	Detects throttle valve opening angle; sends signal to control unit	Installed on throttle body
Throttle body	Controls intake air quantity	Integrated throttle sensor and idle switch

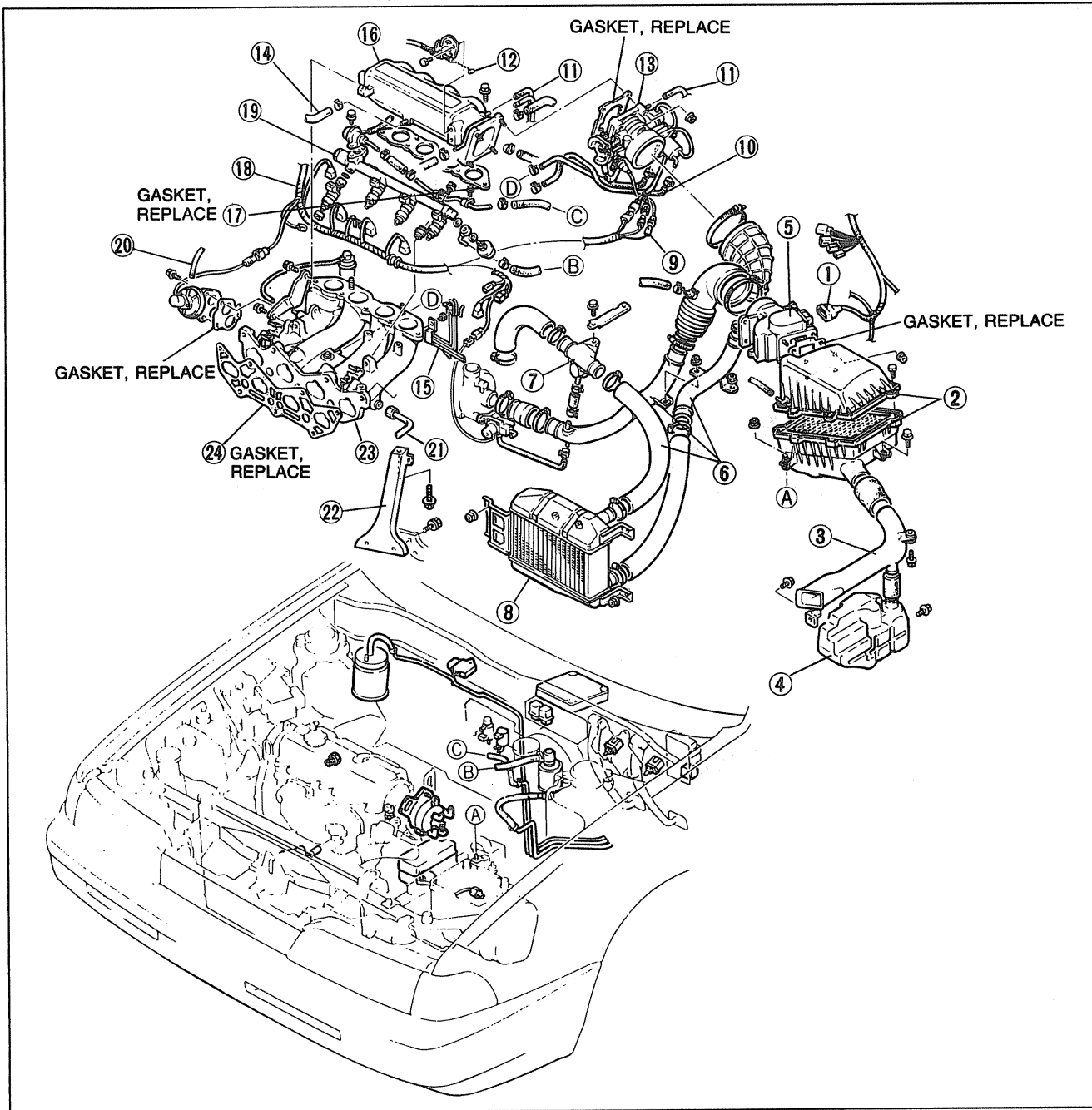
06U0F2-045

REMOVAL

Caution

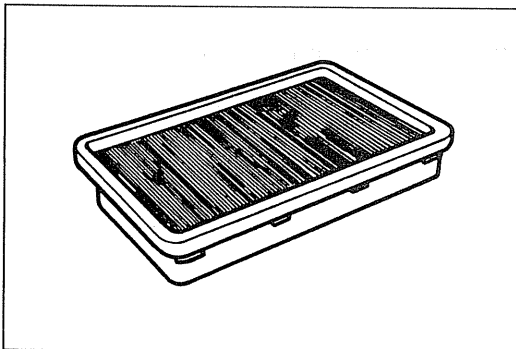
- Before removing the following parts, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page F2-60.)

Remove in the order shown in the figure.



16U0F2-029

- | | | |
|----------------------------|--------------------------|-----------------------------|
| 1. Airflow meter connector | 9. Connectors | 17. Gasket |
| 2. Air cleaner | 10. Water hoses | 18. Wiring harness |
| 3. Air duct | 11. Vacuum hoses | 19. Delivery pipe assembly |
| 4. Resonance chamber No.1 | 12. Accelerator cable | 20. Vacuum hoses |
| 5. Airflow meter | 13. Throttle body | 21. EGR pipe |
| 6. Air hoses | 14. PCV hose | 22. Intake manifold bracket |
| 7. Air bypass valve | 15. Vacuum pipe assembly | 23. Intake manifold |
| 8. Intercooler | 16. Dynamic chamber | 24. Gasket |



69G04A-059

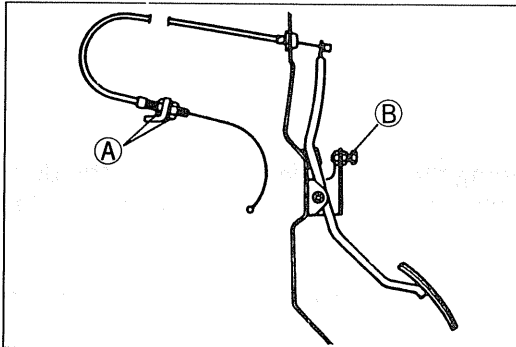
PARTS INSPECTION

Air Cleaner Element

1. Check the condition of the air cleaner element.
2. Replace, if necessary.

Caution

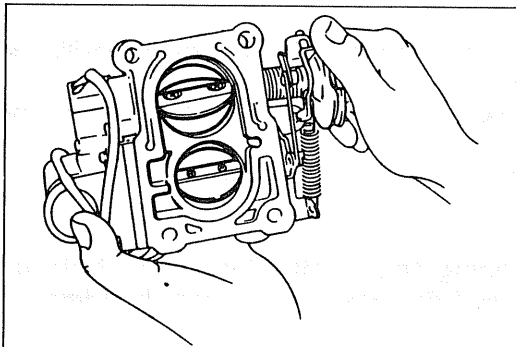
- Do not use the compressed air to clean the air cleaner element.



86U04A-053

Accelerator Cable

1. Inspect the deflection of the cable. If the deflection is not within **1—3mm (0.04—0.12 in)**, adjust by turning nuts A.
2. Depress the accelerator pedal to the floor and confirm that the throttle valve is fully opened. Adjust by turning bolt B if necessary.



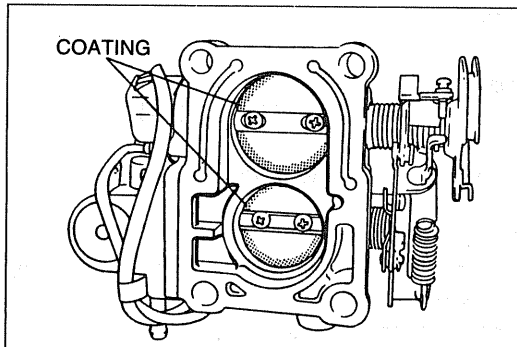
86U04A-054

Throttle Body

Note

- The No.2 throttle valve is preset at the factory to begin opening after the No.1 throttle valve has opened approx. 25 degrees (MTX) or 10 degrees (ATX).

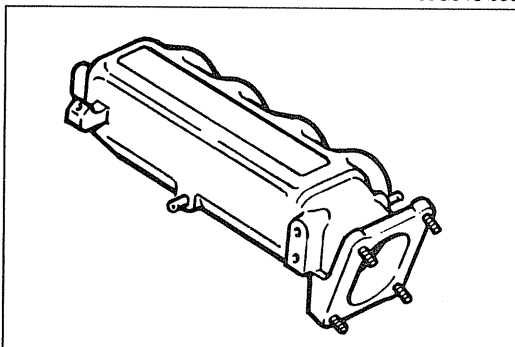
1. Check that the No.1 and No.2 throttle valves move smoothly when the throttle lever is moved from fully closed to fully open.
2. Replace, if necessary.



69G04C-050

Caution

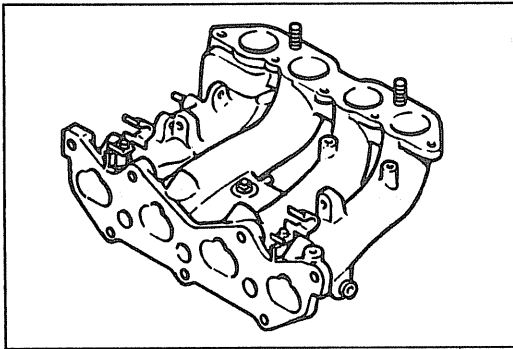
- Do not remove the thin sealing coating from the throttle valve or bore.



69G04A-062

Dynamic Chamber

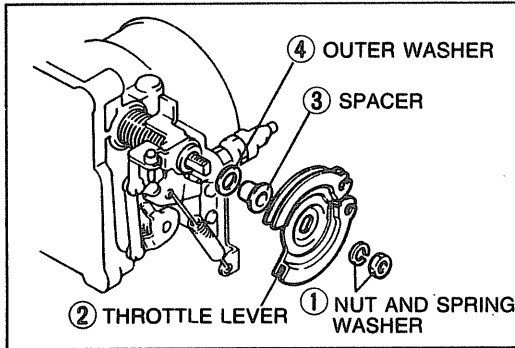
1. Visually check the dynamic chamber for damage.
2. Replace, if necessary.



69G04A-064

Intake Manifold

1. Visually check the intake manifold for damage.
2. Replace, if necessary.



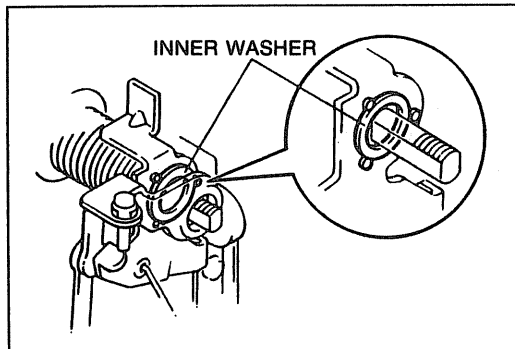
69G04C-130

REPLACEMENT Throttle Lever Removal

Caution

- When loosening the throttle lever nut, hold the throttle valves fully open to prevent damaging the idle switch.

Remove the throttle lever in the sequence shown in the figure.



69G04C-131

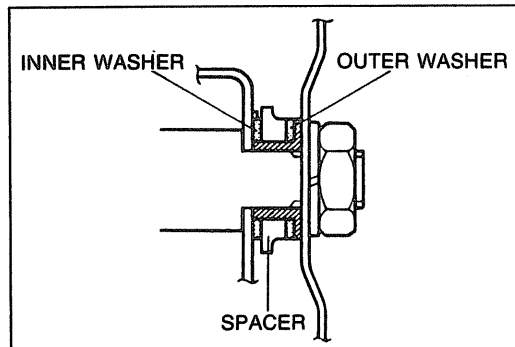
Installation

1. Check that the inner washer is in the proper position as shown in the figure.
2. Assemble the spacer and outer washer and install them onto the throttle shaft.
3. Install the throttle lever onto the throttle shaft.

Caution

- When tightening the throttle lever nut, hold the throttle valves fully closed to prevent bending the stopper lever.

4. Tighten the throttle lever nut.



16U0F2-030

Tightening torque:

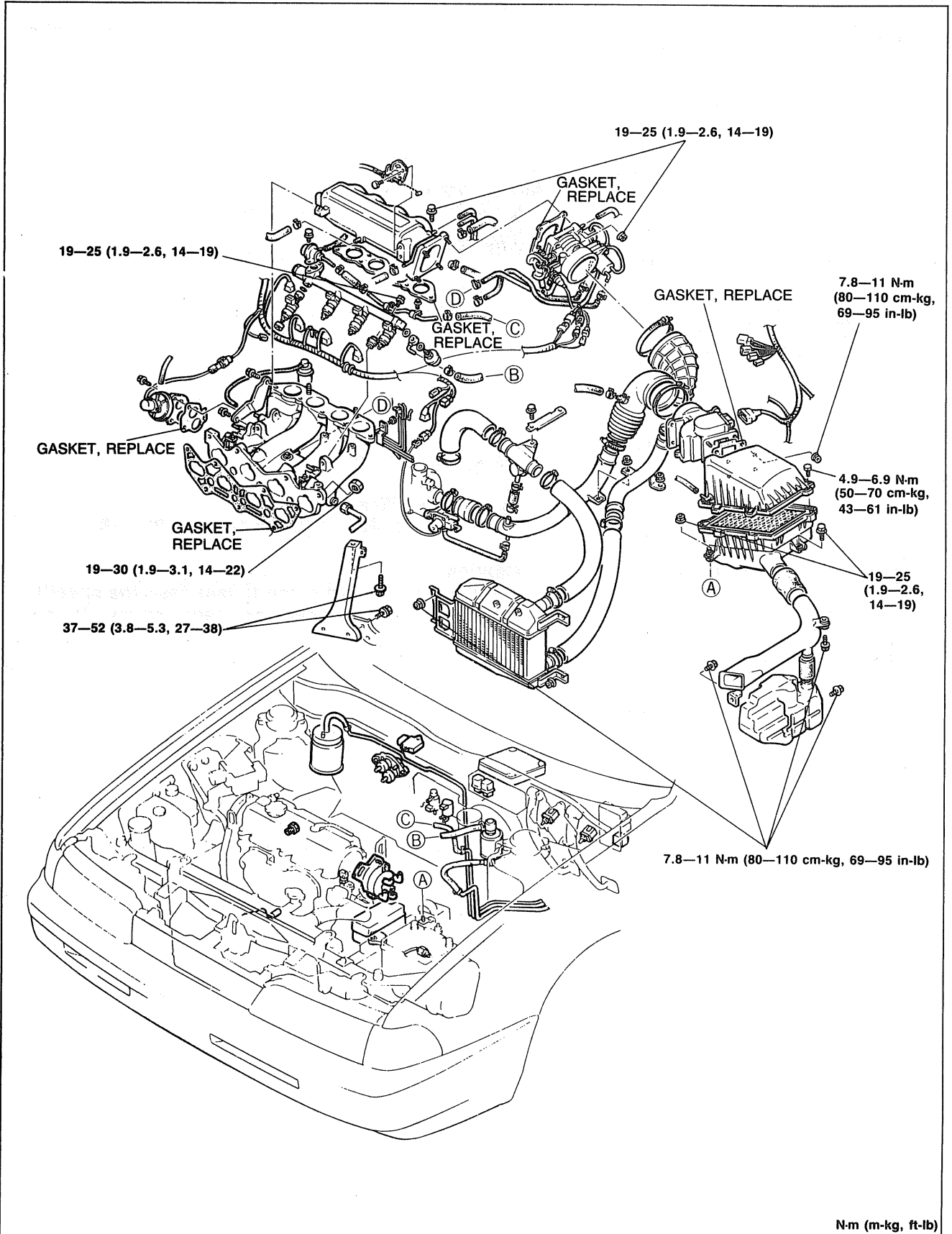
16—23 N·m (1.6—2.3 m·kg, 12—17 ft·lb)

5. Check that the inner and outer washer and spacer are assembled correctly as shown.
6. Check that the No.1 and No.2 throttle valves move smoothly and that the No.2 throttle valve is closed completely when the No.1 throttle valve is closed.
7. Check the operation of the idle switch.
(Refer to page F2-108.)

INSTALLATION

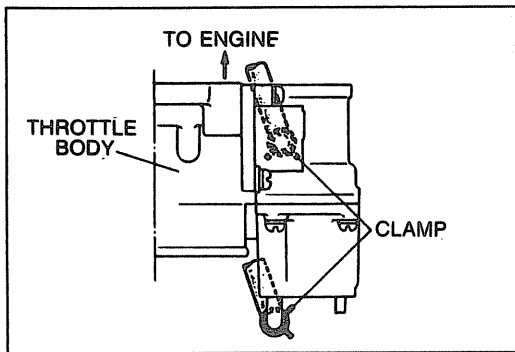
Install in the reverse order of removal, referring to **Installation Note**.

Torque Specifications



N-m (m-kg, ft-lb)

16U0F2-031



86U04A-056

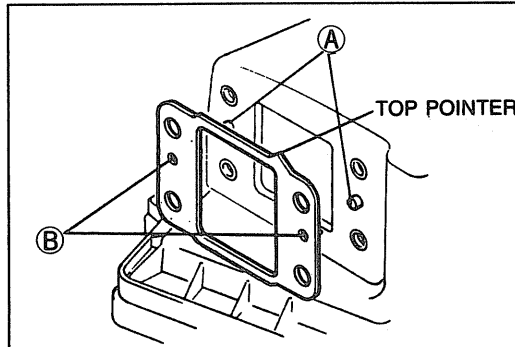
Installation Note

Water hose spring clamps

Face the clamp end as shown in the figure.

Gasket

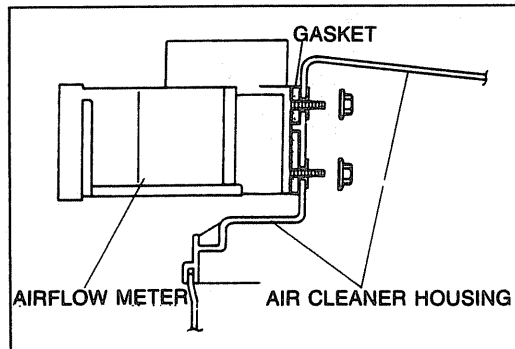
Use new gaskets at the intake manifold, dynamic chamber, and throttle body.



16U0F2-073

Airflow meter

1. Mount the gasket onto the air cleaner housing, being sure that holes (B) are fit over pins (A).
2. Make sure the top pointer of the gasket faces upward.



16U0F2-074

3. Install the airflow meter.

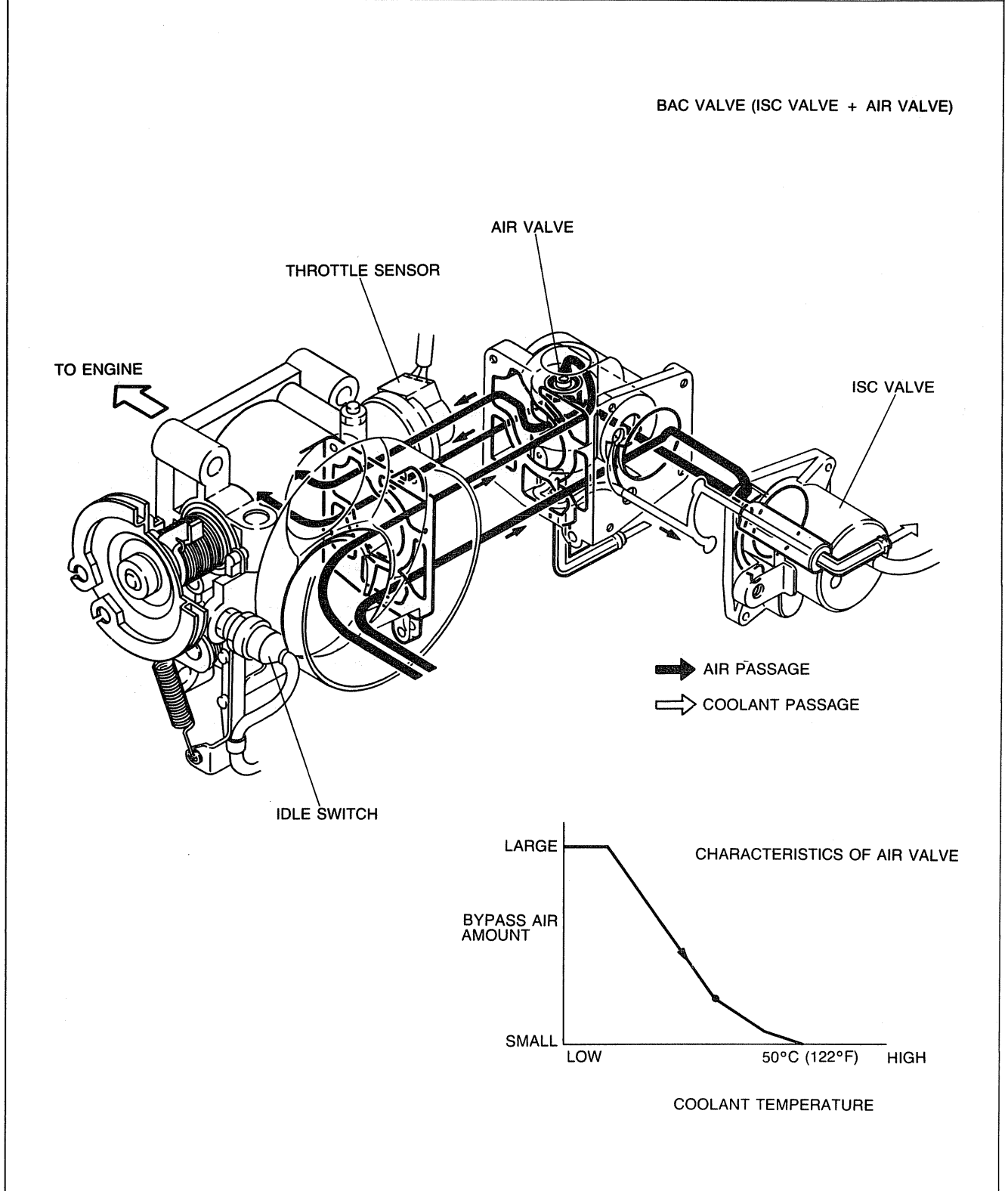
Torque specification:

7.8—11 N·m (80—110 cm·kg, 69—95 in·lb)

Caution

- If the nuts are tightened to less than the specified torque, they may loosen and cause engine damage.

IDLE SPEED CONTROL (ISC) SYSTEM



86U04A-057

To improve idle smoothness, the ISC system controls the intake air amount by regulating the bypass air amount that passes through the throttle body. This system consists of the BAC valve and the control system.

The BAC valve consists of the air valve which functions only during cold engine conditions (**below 50°C [122°F]**) and the ISC valve which works throughout the entire engine speed range.

COMPONENT DESCRIPTIONS

Component	Function	Remarks
A/C switch	Detects A/C operation; sends signal to control unit	
Air valve	When cold, supplies bypass air into dynamic chamber	<ul style="list-style-type: none"> • Engine speed increased to shorten warm-up period • Thermo wax type • Installed in BAC valve
Blower switch	Detects blower motor operation; sends signal to control unit	"3" or "4" position
Clutch switch (MTX)	Detects in-gear condition; sends signal to control unit	Switch ON when clutch pedal released
Engine control unit	Detects signals from input sensors and switches; controls solenoid valve (Idle speed control)	
Idle switch	Detects when throttle valve fully closed; sends signal to control unit	Installed on throttle body
Inhibitor switch (ATX)	Detects in-gear condition; sends signal to EC-AT control unit	Switch ON in "N" or "P" range
ISC valve	Controls bypass air amount	<ul style="list-style-type: none"> • Controlled by duty signal from control unit • With integrated air valve • Works idle-up
Ne rotor and pick-up	Detects crank angle at 30° intervals; sends signal to control unit	Engine speed signal
Neutral switch (MTX)	Detects in-gear condition; sends signal to control unit	Switch ON when in-gear
No.1 water thermostwitch (Electrical fan)	Detects electrical fan operation (low); sends signal to control unit	Switch ON above 97° (207°F)
No.2 water thermostwitch (Electrical fan) (ATX)	Detects electrical fan operation (high); sends signal to control unit	Switch ON above 108°C (226°F)
P/S pressure switch	Detects P/S operation; sends signal to control unit	P/S: ON when steering wheel turned right or left
Test connector	For Self-Diagnosis Checker and idle speed adjustment	1-pin connector (Green)
Throttle sensor	Detects throttle valve opening angle; sends signal to control unit	Installed on throttle body
Rear window defroster switch	Detects rear window defroster operation; sends signal to control unit	

16U0F2-032

TROUBLESHOOTING

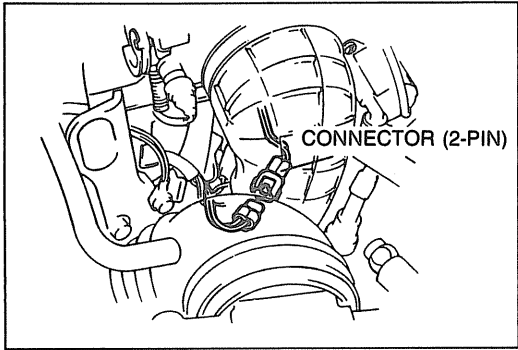
Check the condition of the wiring harness and connectors before checking the sensors or switches.

Note

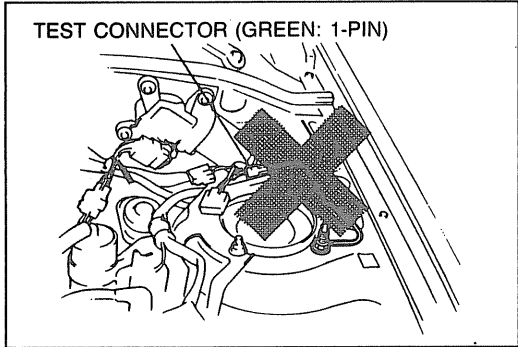
- **Make the system inspection first. If no problem is found, continue with the next system inspection of the Troubleshooting Guide. (Refer to pages F2-10 and 11.)**

Symptom	Possible cause Page	Air valve	ISC valve	Engine control unit terminal							System inspection
				1J	1N	1I	1P	2D	2G (ATX)	3Q	
				F2-46	F2-46	F2-100	F2-100	F2-100	F2-100	F2-101	
Engine stalls	While warming up	4	1			2				3	
	After warming up		1	5	2	7	4	3	6	8	
Rough idle	While warming up	5	2			3				4	1
	After warming up		2	6	3	8	5	4	7	9	1
High idle speed after warming up		7	2	6	3	8	5	4	7	9	1
Runs rough on deceleration			2			3				4	1
Afterburn in exhaust system		5	2			3				4	1

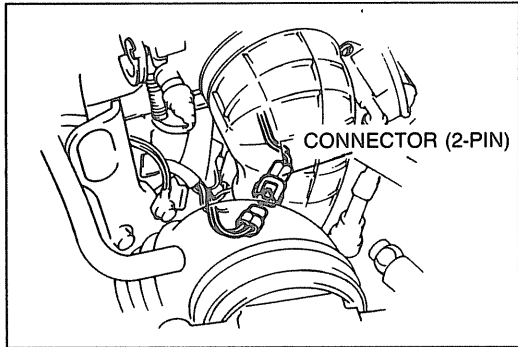
16U0F2-033



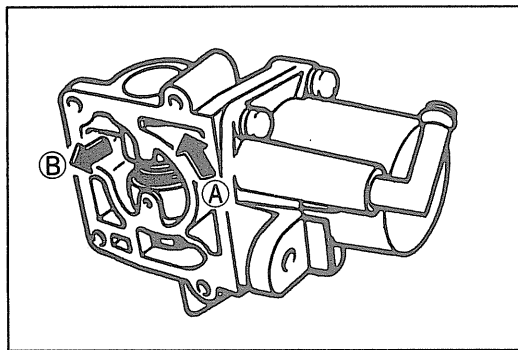
86U04B-036



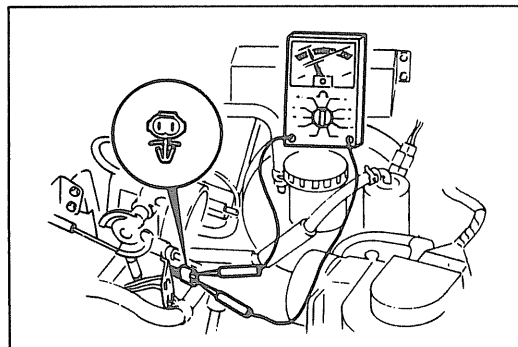
16U0F2-034



16U0F2-035



86U04B-037



86U04A-064

System Inspection (Air valve)

1. Disconnect the ISC valve connector when the engine is cold and idling.
2. Note the engine speed and reconnect the connector.
3. Warm up the engine to the normal operating temperature and disconnect the connector again.
4. Check that the engine speed is lower when the connector is disconnected warm than when it is disconnected when cold.

(ISC valve)

1. Connect the ISC valve connector.

Note

- Make sure that the test connector is not grounded and that the idle speed is set to specification.

2. Again disconnect the ISC valve connector with the engine is at normal operating temperature.
3. Check that the engine speed decreases.
4. Reconnect the ISC valve connector.

BAC Valve

Air valve

1. Remove the BAC valve from the throttle body.
2. Blow air through the valve from port A and check that air comes out of port B when the BAC valve is cold.
3. If not correct, replace the BAC valve.

Note

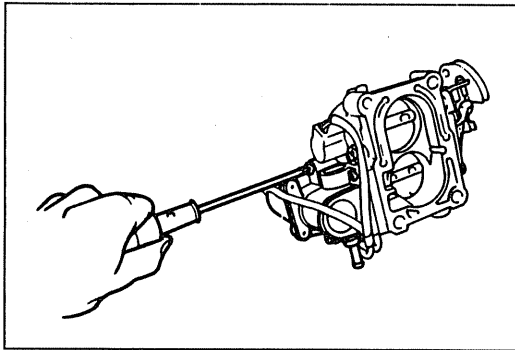
- Refer to "Installation" on this page for the BAC valve installation.

ISC valve

1. Disconnect the ISC valve connector.
2. Connect an ohmmeter to the terminals of the ISC valve.
3. Check the resistance.

Resistance (normal operating temperature): 6.3—9.9Ω

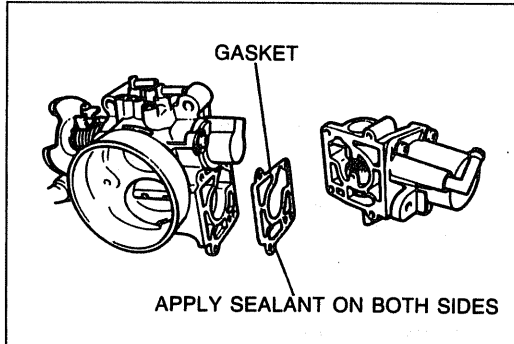
4. If not correct, replace the BAC valve.



69G04C-070

Removal

1. Remove the screws.
2. Remove the BAC valve from the throttle body.



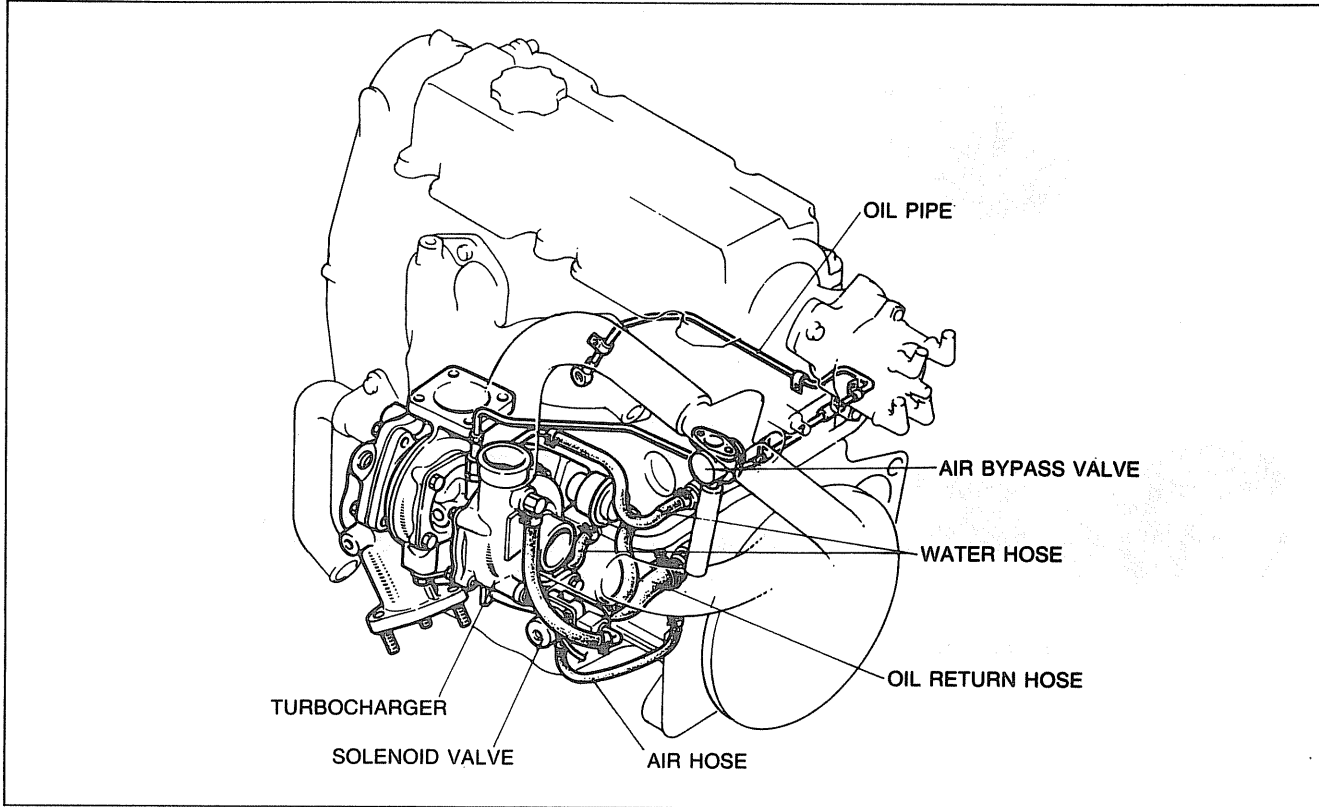
69G04C-071

Installation**Caution**

- Use a new gasket.

1. Remove any dirt or old sealant from the contact surfaces.
2. Apply sealant to both sides of the gasket.
3. Tighten the screws.

TURBOCHARGING SYSTEM



86U04B-038

This system utilizes the energy of the exhaust gas to pressurize the intake air. It therefore supplies more than the normal amount of air into the combustion chamber. As a result of the more fully charged combustion chamber, higher output and higher torque can be obtained by a turbocharged engine than that of a comparable non-turbocharged engine.

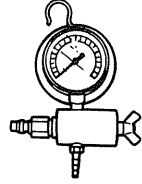
If knocking occurs during high-boost condition, the maximum boost is reduced by the solenoid valve to prevent possible engine damage.

COMPONENT DESCRIPTIONS

Component	Function	Remarks
Air bypass valve	Bypasses compressed air from after turbocharger to before turbocharger during deceleration; prevents noise	
Engine control unit	Detects signals from input sensors; controls solenoid valve (waste gate) operation	
Intake air thermosensor	Detects intake air temperature; sends signal to control unit	Installed in airflow meter
Intercooler	Reduces compressed air temperature from turbocharger	
Knock control unit	Receives knock signal from knock sensor; sends signal to control unit	
Knock sensor	Detects engine knocking; sends signal to knock control unit	
Solenoid valve (Waste gate)	Controls turbocharger boost pressure applied to actuator	
Turbocharger	Pressurizes intake air utilizing exhaust gas flow	Integrated solenoid valve (waste gate)

06U0F2-051

PREPARATION SST

49 H080 740 Pressure tester		For inspection of waste gate actuator
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06U0F2-052

TROUBLESHOOTING

Check the condition of the wiring harness and connectors before checking sensors or switches.

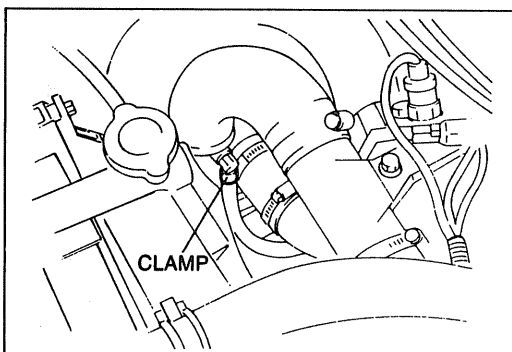
Symptom	Possible cause					
	Turbocharger	Air bypass valve	Intercooler	Boost pressure	Waste gate valve	Overboost warning
	Page					
	F2-50	F2-50	F2-50	F2-49	F2-50	F2-50
Poor acceleration, hesitation or lack of power	4	3	6	1	2	5
Excessive oil consumption	1					
Knocking	3			2	1	
Abnormal noise or vibration	2	1				

06U0F2-053

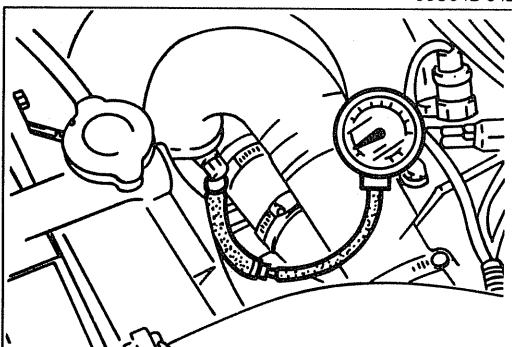
OPERATION NOTE

1. Do not accelerate suddenly or operate at full throttle immediately after starting a cold engine. Allow the engine to reach normal operating temperature before using full power.
2. Run the engine at idle for **at least 30 seconds** after heavy-load or high-speed driving before stopping.
3. If there is a sudden drop in power while driving, it is possible that there is a fault related to the turbocharger. Before shutting the engine off, immediately reduce speed and drive at the lowest possible engine speed.

06U0F2-054



86U04B-042



06U0F2-055

SERVICE NOTE

Attachment of Hoses

To prevent the hoses from becoming disconnected due to boost pressure, be sure to attach them securely with the spring clamps.

Overboost Warning Buzzer

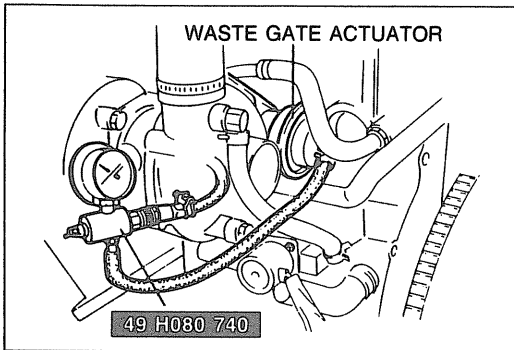
The warning buzzer indicates a possible fault of either the wastegate, actuator, or solenoid valve (wastegate). These components must be checked if the buzzer sounds.

TURBOCHARGER BOOST PRESSURE

1. Be sure the engine is cool.
2. Disconnect hose from the solenoid valve and connect the pressure gauge as shown.
3. Warm up the engine to normal operating temperature.
4. Increase the engine speed to **4,000 rpm** and check that the boost pressure is within specification.

Specification:

Above 0 kPa (0 kg/cm², 0 psi) (any positive pressure)



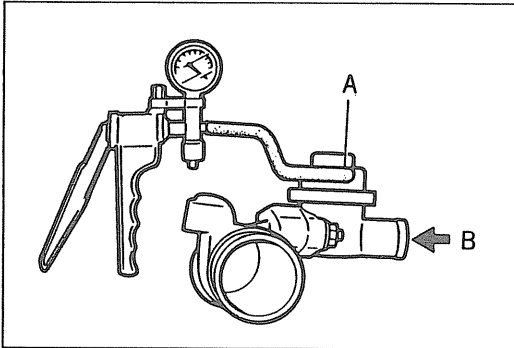
86U04B-044

WASTE GATE

1. Be sure the engine is cool.
2. Remove the exhaust manifold insulator and side insulator.
3. Remove the hose (connected to actuator) and connect the **SST** as shown.
4. Apply **58.9 kPa (0.6 kg/cm², 8.5 psi)** of compressed air.
5. Check that the rod moves when disconnecting and reconnecting the hose supplying the compressed air.

Caution

- Do not apply compressed air over **98 kPa (1.0 kg/cm², 14 psi)**.

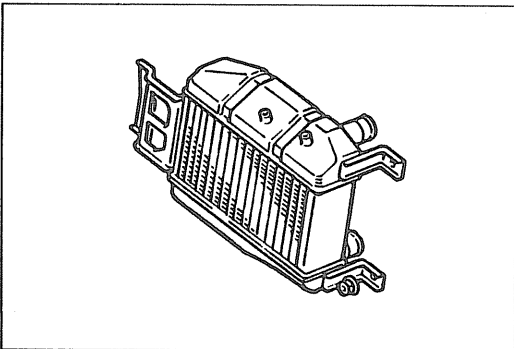


86U04B-045

AIR BYPASS VALVE

1. Remove the air bypass valve.
2. Connect a vacuum pump to port A of the valve.
3. Apply vacuum and blow from port B.
4. Check that air flows at the specified vacuum.
5. If not correct, replace the air bypass valve.

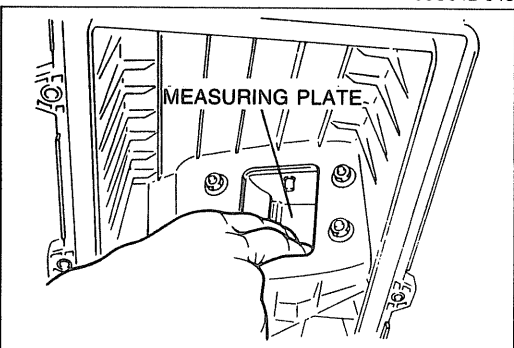
Vacuum: 250—400 mmHg (9.8—15.7 inHg)



86U04B-046

INTERCOOLER

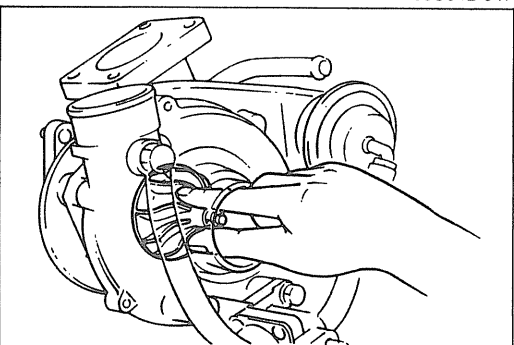
1. Remove the intercooler.
2. Inspect it for cracks, restriction, or damage.
3. Replace if necessary.



86U04B-047

OVERBOOST WARNING

1. Start the engine and run it at **2,000 rpm**.
2. Lift the air cleaner upper case, and push the measuring plate open fully.
3. Check that the warning buzzer sounds and the engine speed drops or engine stalls.

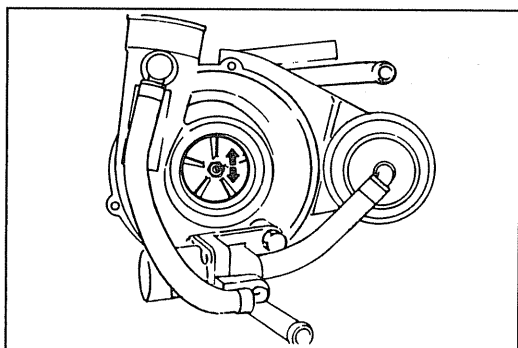


86U04B-048

TURBOCHARGER

Inspection of Compressor Wheel Assembly

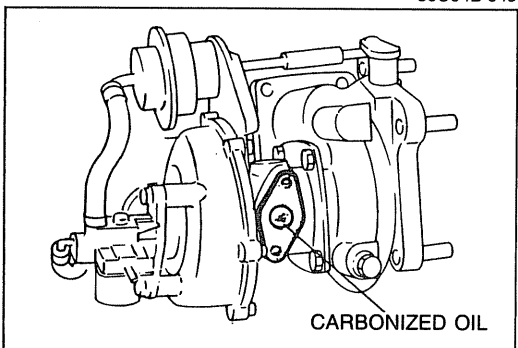
1. Be sure the engine is cool.
2. Remove the air hose.
3. Check that the wheel assembly turns smoothly.
4. If there is excessive load or noise, replace the turbocharger.



86U04B-049

Inspection of Turbine Wheel Deflection

1. Be sure the engine is cool.
2. Remove the air hose.
3. Check that the wheel does not touch the compressor housing.
4. If the wheel touches the housing, replace the turbocharger.

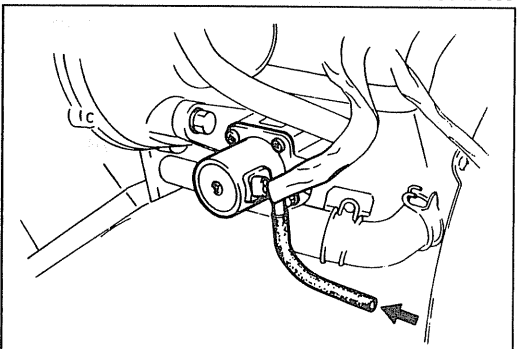


CARBONIZED OIL

86U04B-050

Inspection of Oil Passage

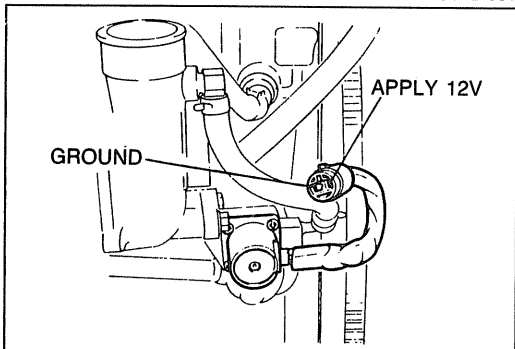
1. Be sure the engine is cool.
2. Remove the oil return pipe.
3. Check that carbonized oil is not blocking the oil passage in the turbocharger or the oil return pipe.
4. Replace the turbocharger and return pipe if necessary.



86U04B-051

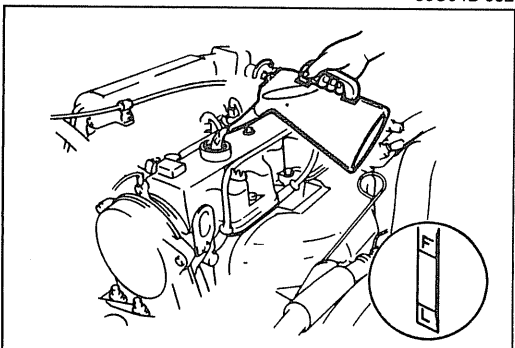
Inspection of Solenoid Valve

1. Disconnect the small air tube from the air hose.
2. Disconnect the solenoid valve connector.
3. Blow through the air tube and check that the air does not flow.
4. If not correct, replace the solenoid valve and turbocharger as an assembly.



86U04B-052

5. Apply **12V** to the solenoid valve as shown.
6. Blow through the air tube and check the air passes.
7. If not correct, replace the solenoid valve and turbocharger as an assembly.

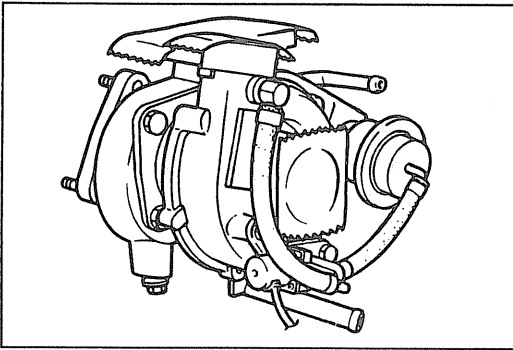


86U04B-053

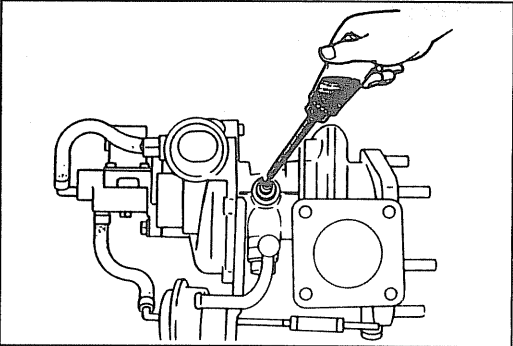
Removal / Installation

Precaution

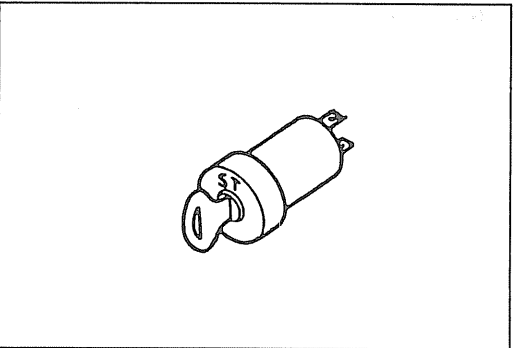
1. When replacing the turbocharger, always check the engine oil level and quality, as well as the oil pipe leading to the turbocharger and the oil return pipe. Replace, if necessary.



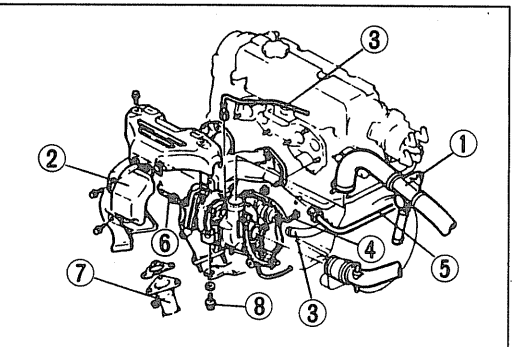
86U04B-054



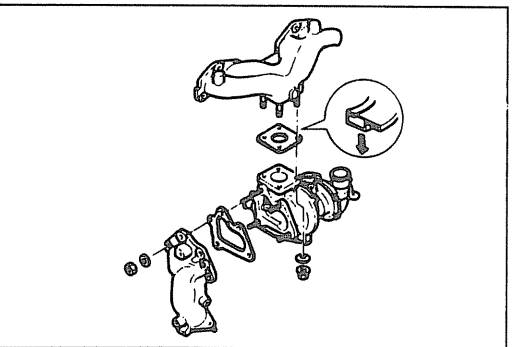
86U04B-055



86U04B-056



86U04B-057



86U04B-058

2. Be careful of the following when removing, installing, and handling the turbocharger.

- (1) Do not drop the turbocharger.
- (2) Do not use actuator rod to carry the turbocharger
- (3) Put the turbocharger with the turbine shaft horizontal.
- (4) Do not bend the actuator mounting or rod.
- (5) Cover the intake, exhaust, and oil passages to prevent dirt or other material from entering.

3. When reinstalling the turbocharger, perform the following:

- (1) Remove all the gaskets and sealant.
- (2) Use new gaskets.
- (3) Supply **25 cc (1.5 cu in)** of oil in the oil passage of the turbocharger.

4. After replacing the turbocharger, perform the following:

- (1) Disconnect the connector from the igniter.
- (2) Crank the engine for **20 seconds**.
- (3) Reconnect the connector.
- (4) Start the engine and run at idle for **30 seconds**.
- (5) Stop the engine and disconnect the negative battery cable and depress the brake pedal for at least 5 seconds to cancel the malfunction code.

Removal of turbocharger

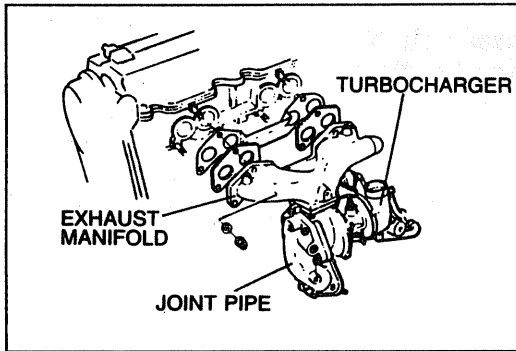
1. Cool the engine and drain the engine coolant.

2. Remove the parts in the order below.

- 1) Air hoses and air bypass valve
- 2) Insulators
- 3) Oil pipe and oil return hose from turbocharger
- 4) Water hoses from water pipe
- 5) EGR pipe from exhaust manifold
- 6) Oxygen sensor
- 7) Front pipe
- 8) Bolt

3. Remove the turbocharger and exhaust manifold as an assembly.

4. Disassemble the exhaust manifold and turbocharger.



06U0F2-127

Installation

1. Assemble the exhaust manifold and turbocharger.

Tightening torque:

Exhaust manifold — turbocharger;
 34—46 N·m (3.5—4.7 m·kg, 25—34 ft·lb)

Turbocharger — joint pipe
 37—63 N·m (3.8—6.4 m·kg, 27—46 ft·lb)

Turbocharger — turbocharger bracket
 31—41 N·m (3.2—4.2 m·kg, 23—30 ft·lb)

Caution

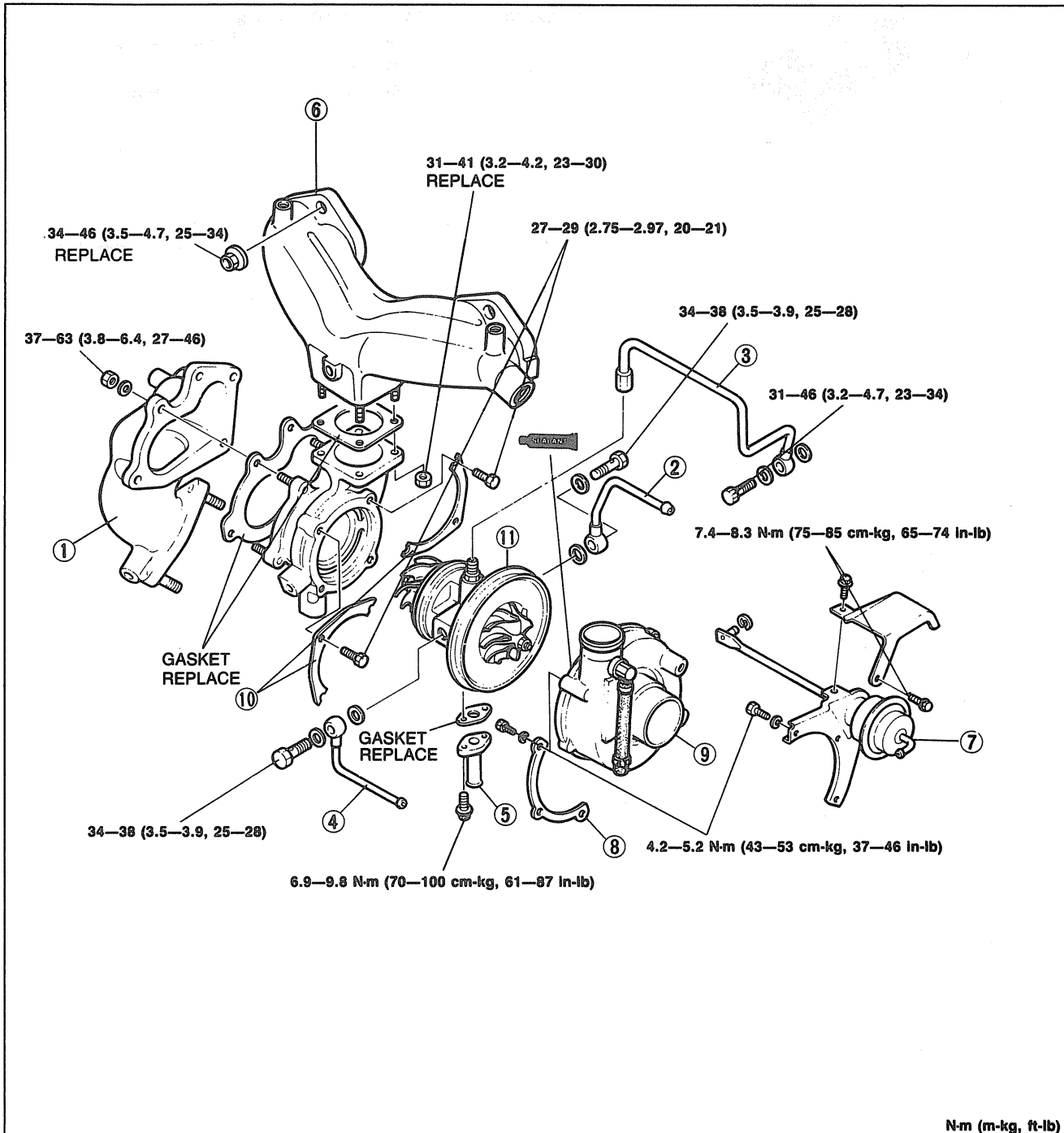
- Replace gasket if bent or cracked.
- Use the specified nut to mount the turbocharger.

2. Install parts in the reverse order of removal.

86U04B-060

Replacement

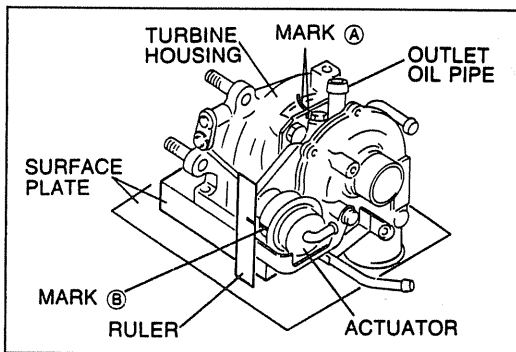
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Assemble in the reverse order of disassembly, referring to **Assembly Note**.
3. Perform "System Operation" check to verify turbocharger operation.



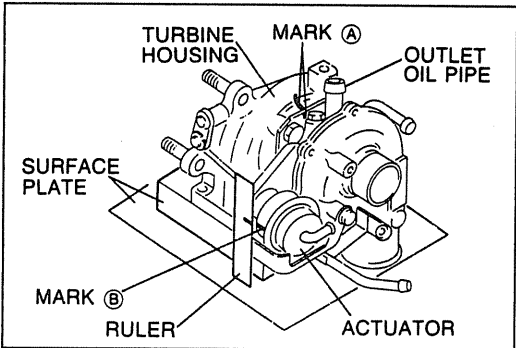
N-m (m-kg, ft-lb)

16U0F2-036

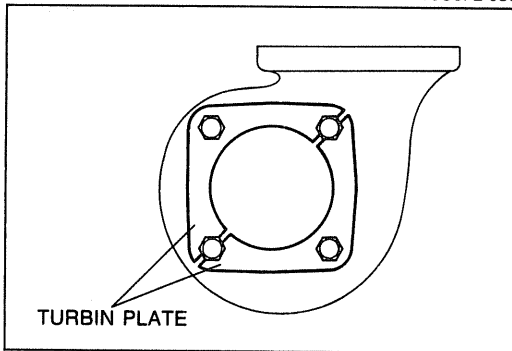
- | | |
|----------------------------------|--------------------------------|
| 1. Exhaust joint pipe | 8. Compressor plate |
| 2. Water pipe | Assembly Note page F2-55 |
| 3. Inlet oil pipe | 9. Compressor housing |
| 4. Water pipe | Assembly Note..... F2-55 |
| 5. Outlet oil pipe | 10. Turbine plates |
| 6. Exhaust manifold | Assembly Note..... F2-55 |
| 7. Wastegate actuator | 11. Bearing assembly |
| Disassembly Note..... page F2-55 | Assembly Note..... F2-55 |
| Assembly Note page F2-56 | |



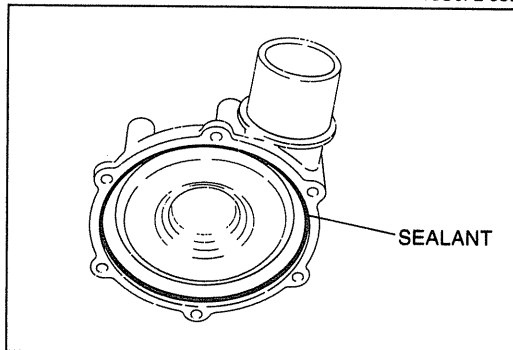
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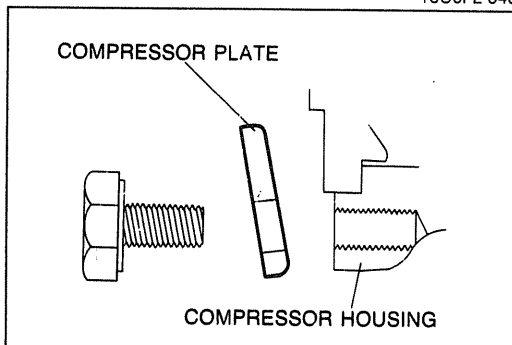
16U0F2-038



16U0F2-039



16U0F2-040



16U0F2-041

Disassembly Note

1. Mark the turbine plate and the turbine housing (A) parallel to the outlet oil pipe as shown in the illustration.
2. Place the turbocharger on a surface plate and mark the wastegate actuator (B) using a ruler as shown.

Assembly Note

Bearing assembly

1. Install the bearing assembly to the turbine housing with the outlet oil pipe parallel to mark (A).
2. Install the wastegate actuator and adjust it to the proper position (mark B).

Turbine plate

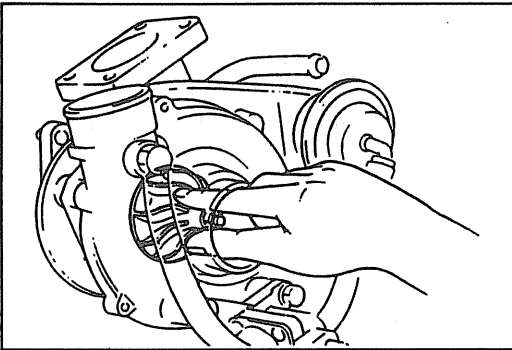
1. Install the turbine plates as shown to prevent heat distortion.

Compressor plate

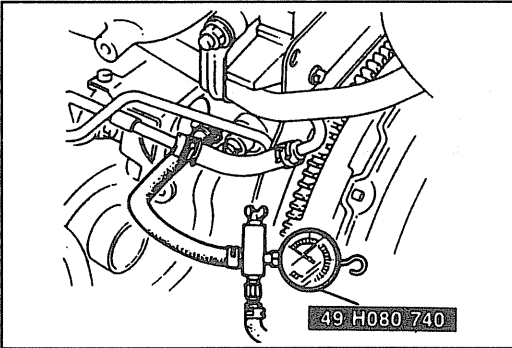
1. Install the compressor plates with the rounded edge against the compressor housing.

Compressor housing

1. Remove all sealant from the compressor housing and apply a thin bead of new sealant as shown.



16U0F2-042



16U0F2-043

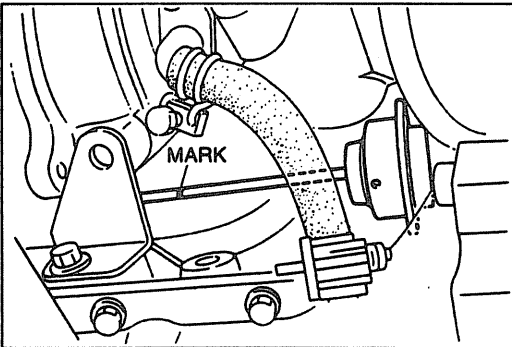
System Operation

1. Verify that the compressor wheel turns smoothly.
2. If not, reassemble the turbocharger.
3. Install the turbocharger and reinstall all removed hoses.

4. Start the engine and check for oil leakage, water leakage, and air leakage.
5. Stop the engine and remove the hose from the wastegate actuator.
6. Connect the **SST** to the actuator.

7. Raise the front of the vehicle and support it on safety stands.

16U0F2-044



16U0F2-045

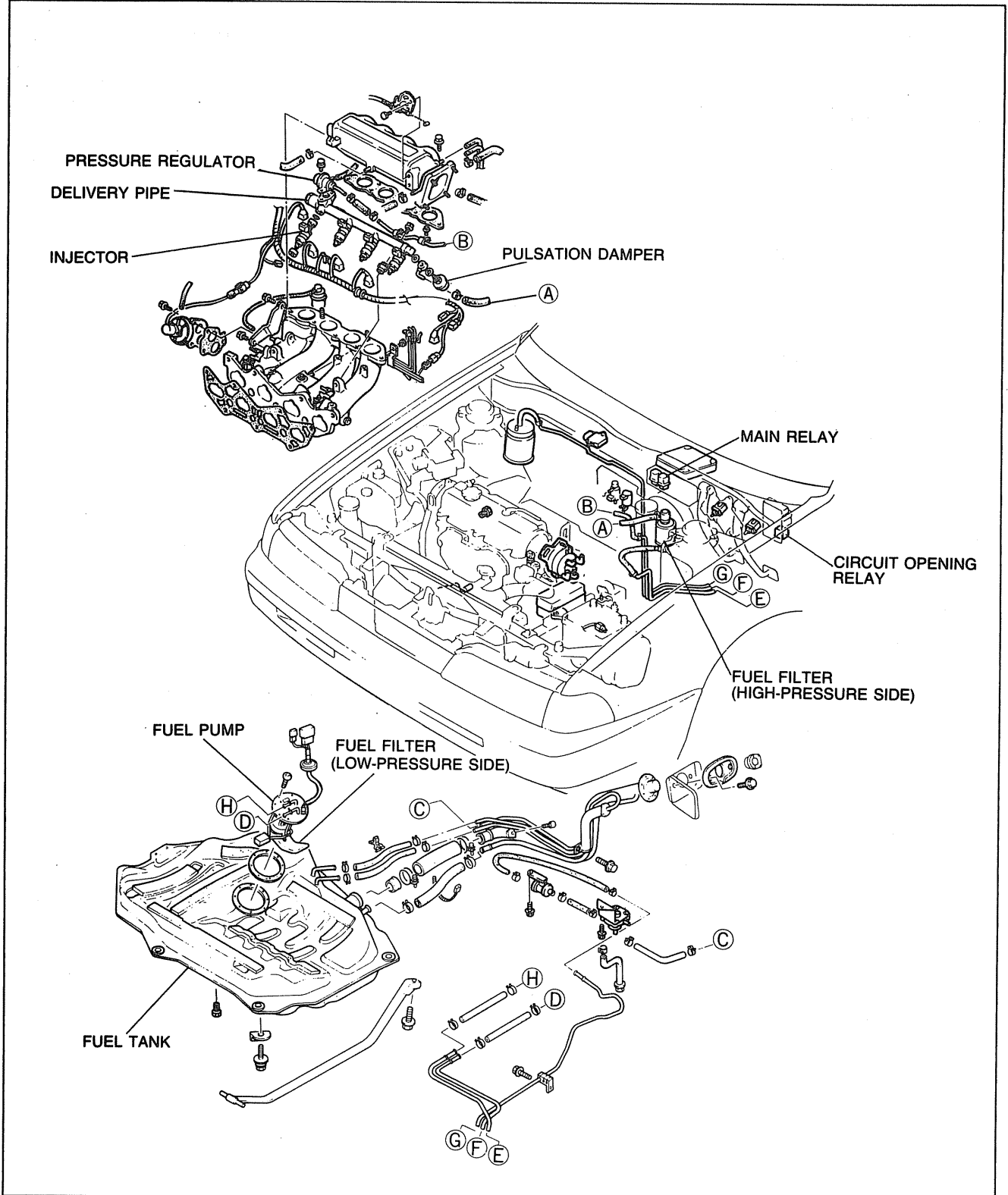
8. Mark the actuator rod to check its movement.

Caution

- Do not apply compressed air over 98 kPa (1.0 kg/cm², 14 psi).

9. Adjust the compressed air pressure to 58.9 kPa (0.6 kg/cm², 14 psi).
10. Verify that the rod moves when applying and releasing air pressure.

FUEL SYSTEM



06U0F2-125

This system supplies the fuel necessary for combustion at a constant pressure to the injectors. Fuel is metered and injected into the intake manifold according to the injection control signals from the engine control unit. It consists of the fuel pump, fuel filters, delivery pipe, pulsation damper, pressure regulator, injectors, fuel pump switch (incorporated in the airflow meter), and the circuit opening relay. The fuel pump is mounted in the fuel tank to minimize the operating noise of the fuel pump. The injectors are directly supplied with battery voltage through the main relay.

COMPONENT DESCRIPTIONS

Component	Function	Remarks
Airflow meter	Detects amount of intake air; sends signal to control unit	Intake air thermosensor and fuel pump switch are integrated
Atmospheric pressure sensor	Detects atmospheric pressure; sends signal to control unit	
Circuit opening relay	Voltage for fuel pump while engine running	
Clutch switch (MTX)	Detects in-gear condition; sends signal to control unit	Switch ON when clutch pedal released
EC-AT control unit (ATX)	Detects N or P range; sends signal to control unit	
Engine control unit	Detects signals from input sensors and switches; controls injector operation	
Fuel filter	Filters particles from fuel	
Fuel pump	Provides fuel to injectors	<ul style="list-style-type: none"> • Operates while engine running • Installed in fuel tank
Fuel pump control unit	Detects signal from transfer pump switch; controls operation of transfer pump	
G rotor and pick-up	Detects No.1 and No.4 cylinders TDC; sends signal to control unit	For determining fuel injection timing and ignition timing
Idle switch	Detects when throttle valve fully closed; sends signal to control unit	Installed on throttle body
Ignition switch (ST position)	Sends engine cranking signal to control unit	
Inhibitor switch (ATX)	Detects in-gear condition; sends signal to EC-AT control unit	Switch ON in "N" or "P" range
Injector	Injects fuel into intake port	<ul style="list-style-type: none"> • Controlled by signals from control unit • High-ohmic injector
Intake air thermosensor	Detects intake air temperature; sends signal to control unit	Installed in airflow meter
Main relay	Supplies electric current to injectors and control unit	
Ne rotor and pick-up	Detects crank angle at 30° intervals; sends signal to control unit	Engine speed signal
Neutral switch (MTX)	Detects in-gear condition; sends signal to control unit	Switch ON when in-gear
Oxygen sensor	Detects Oxygen concentration; sends signal to control unit	Zirconia ceramic and platinum coating
Pressure regulator	Adjusts fuel pressure supplied to injectors	
Pulsation damper	Absorbs fuel pulsation	
Throttle sensor	Detects throttle valve opening angle; sends signal to control unit	Installed on throttle body
Water thermosensor	Detects coolant temperature; sends signal to control unit	

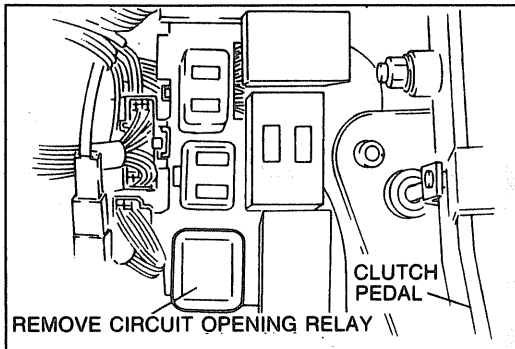
16U0F2-075

TROUBLESHOOTING

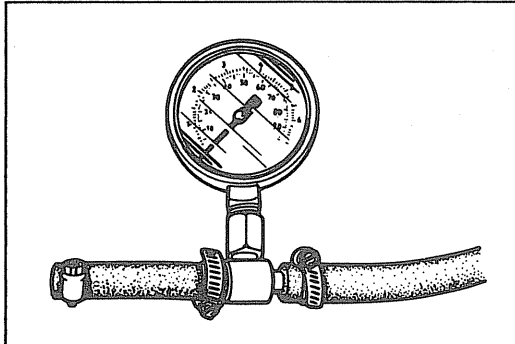
Check the condition of the wiring harness and connectors before checking the sensors or switches.

Possible cause		Airflow meter	Oxygen sensor	Throttle sensor	Water thermostat sensor	Fuel pump	Injector	Fuel pressure	Engine control unit terminal		
									1C	3T	3U,3V
									F2-106	F2-109	F2-106
Symptom		F2-106	F2-109	F2-106	F2-108	F2-66	F2-68	F2-61	F2-100	F2-102	F2-102
Hard start or won't start (Crank OK)					4	1	3		2		
Engine stalls	While warming up	4			3		2	1			5
	After warming up	1					3	2			4
Rough idle	While warming up	4			3		2	1			
	After warming up	1					3	2			
Poor acceleration, hesitation, or lack of power		1		3			4	2			
Runs rough on deceleration		1					3			2	
Afterburn on deceleration		1					2				
Poor fuel consumption		5	4		3		2	1			
Engine stalls or rough after hot starting		1					3	2			

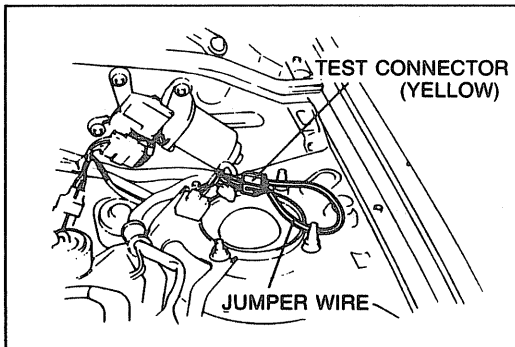
16U0F2-046



9BU0F2-076



9MU0F2-122



9MU0F2-123

PRECAUTION

Fuel Pressure Release and Servicing Fuel System

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

- a) Before disconnecting any fuel line, release the fuel pressure from the fuel system to reduce the possibility of injury or fire.
 1. Start the engine.
 2. Disconnect the circuit opening relay connector.
 3. After the engine stalls, turn off the ignition switch.
 4. Reconnect the circuit opening relay connector.

- b) Use a rag as protection from fuel spray when disconnecting the hoses.
Plug the hoses after removal.

- c) When inspecting the fuel system, use a suitable fuel pressure gauge.

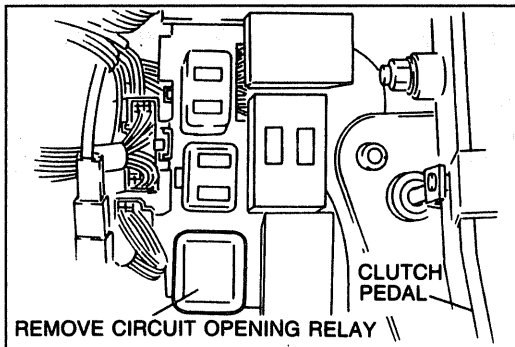
Caution

- Install hose clamps to secure the fuel pressure gauge to the fuel filter and the fuel main hose to prevent fuel leakage.

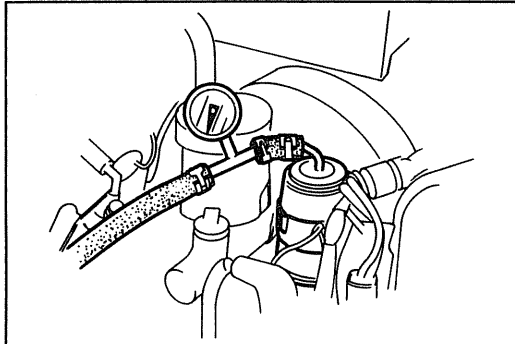
Priming Fuel System

After releasing the fuel system pressure for repairs or inspection the system must be primed to avoid excessive cranking when first starting the engine. Follow the steps below.

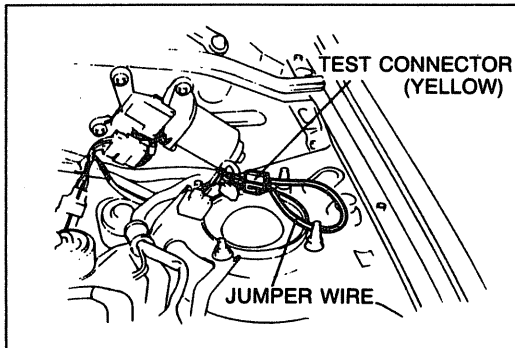
1. Connect the terminals of the test connector (Yellow: 2-pin) with a jumper wire.
2. Turn the ignition switch ON for approx. 10 sec. and check for fuel leaks.
3. Turn the ignition switch OFF and remove the jumper wire.



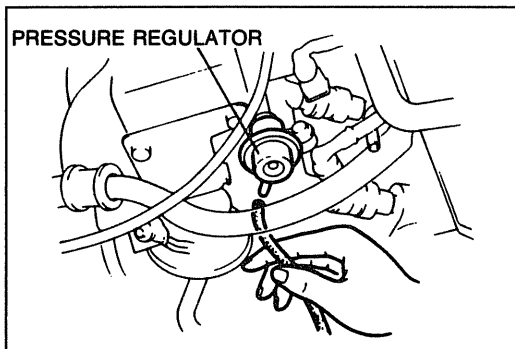
16U0F2-047



9MU0F2-125



16U0F2-048



06U0F2-060

FUEL PRESSURE

Warning

- Before performing the following operation, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page F2-60.)

1. Disconnect the negative battery terminal.
2. Install a fuel pressure gauge between the fuel filter and the fuel main hose. (Install clamps as shown.)
3. Connect the negative battery terminal.

4. Connect the terminals of the test connector (Yellow: 2-pin) with a jumper wire.
5. Turn the ignition switch ON.
6. Measure the fuel line pressure.

Fuel line pressure:

235—275 kPa (2.4—2.8 kg/cm², 34—40 psi)

Low pressure— Check fuel line and filter for clogging. Check fuel pump maximum pressure. (Refer to page F2-67.)

High pressure— Replace the pressure regulator. (Refer to page F2-72.)

7. Remove the jumper wire from the test connector.
8. Start the engine and run it at idle.
9. Disconnect the vacuum hose from the pressure regulator and plug it.
10. Measure the fuel line pressure at idle.

Fuel line pressure:

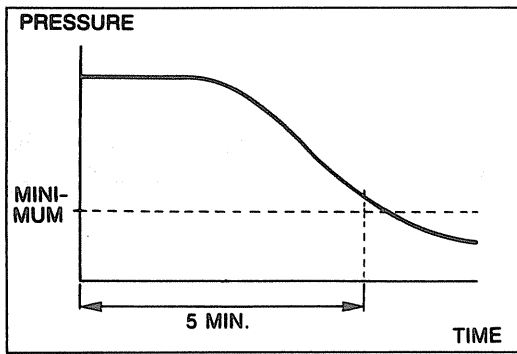
235—275 kPa (2.4—2.8 kg/cm², 34—40 psi)

11. Reconnect the vacuum hose to the pressure regulator.
12. Measure the fuel line pressure at idle.

Fuel line pressure:

186—226 kPa (1.9—2.3 kg/cm², 27—33 psi)

13. If not as specified, check the vacuum hose to the pressure regulator. If the vacuum hose is OK, replace the pressure regulator.



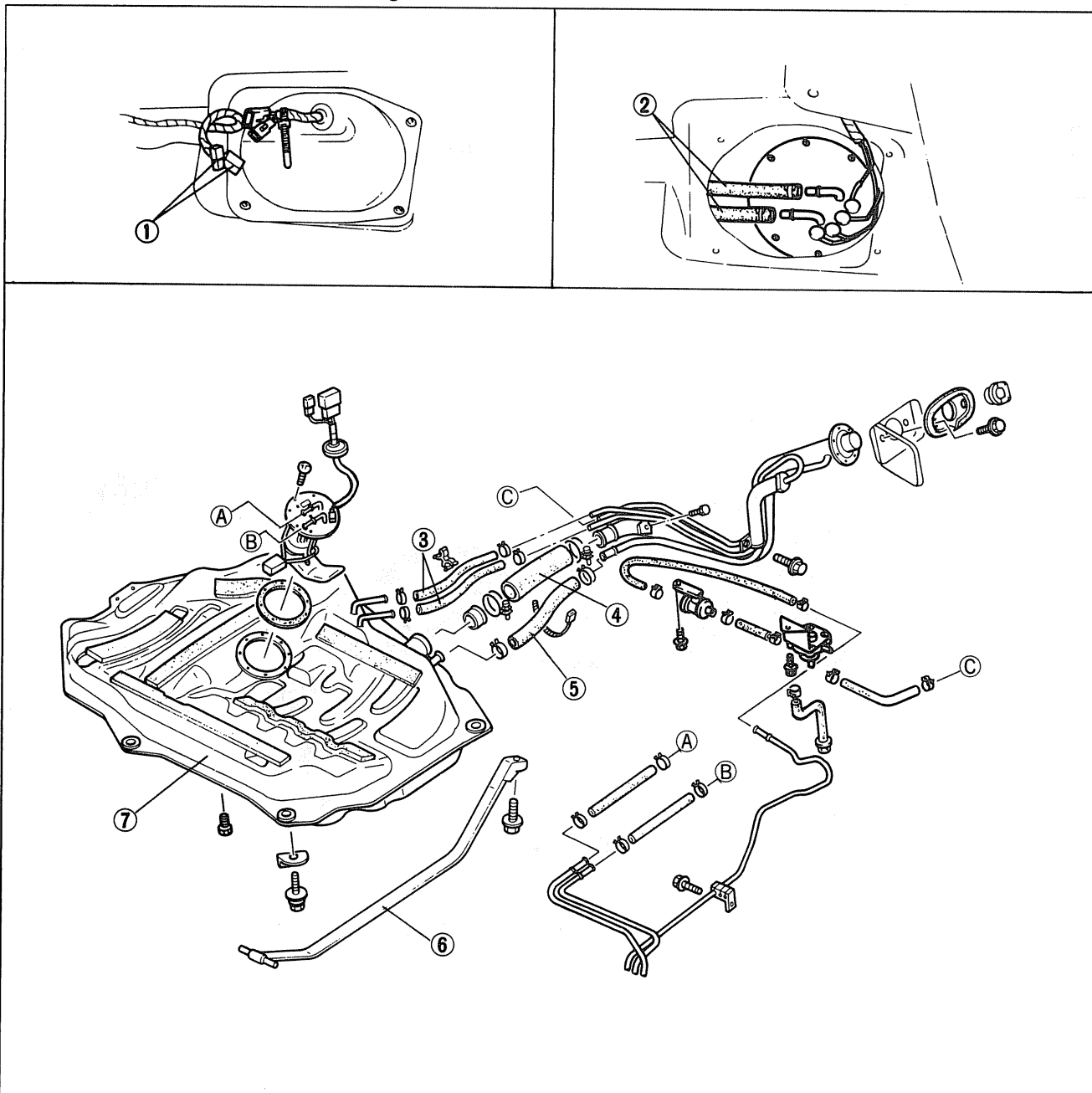
14. Stop the engine and check that the fuel pressure remains **above 21 psi (1.5 kg/cm², 147 kPa)** for **5 min.** after the engine is turned off.
15. If not as specified, check the following.
 - Fuel pump hold pressure (Refer to page F2-66.)
 - Pressure regulator hold pressure (Refer to page F2-72.)
 - Injector fuel leakage (Refer to page F2-70.)

**FUEL TANK
Removal**

Caution

- Before performing the following procedure, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page F2-60.)
- When removing the fuel tank, keep sparks, cigarettes, and open flames away from the fuel tank.

Remove in the order shown in the figure.

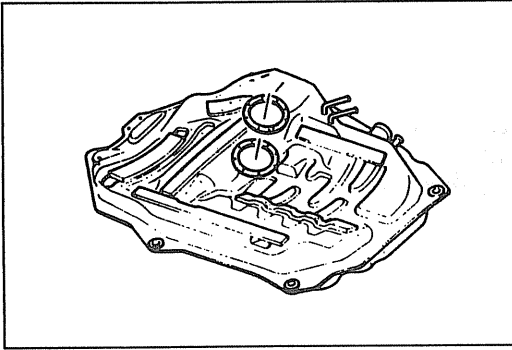


16U0F2-050

Note

- Drain the fuel from the fuel tank before removing the tank.

- | | |
|-------------------------|--------------------|
| 1. Fuel pump connectors | 5. Breather hose |
| 2. Fuel hoses | 6. Fuel tank strap |
| 3. Evaporative hoses | 7. Fuel tank |
| 4. Fuel filler hose | |



86U04A-118

Inspection

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

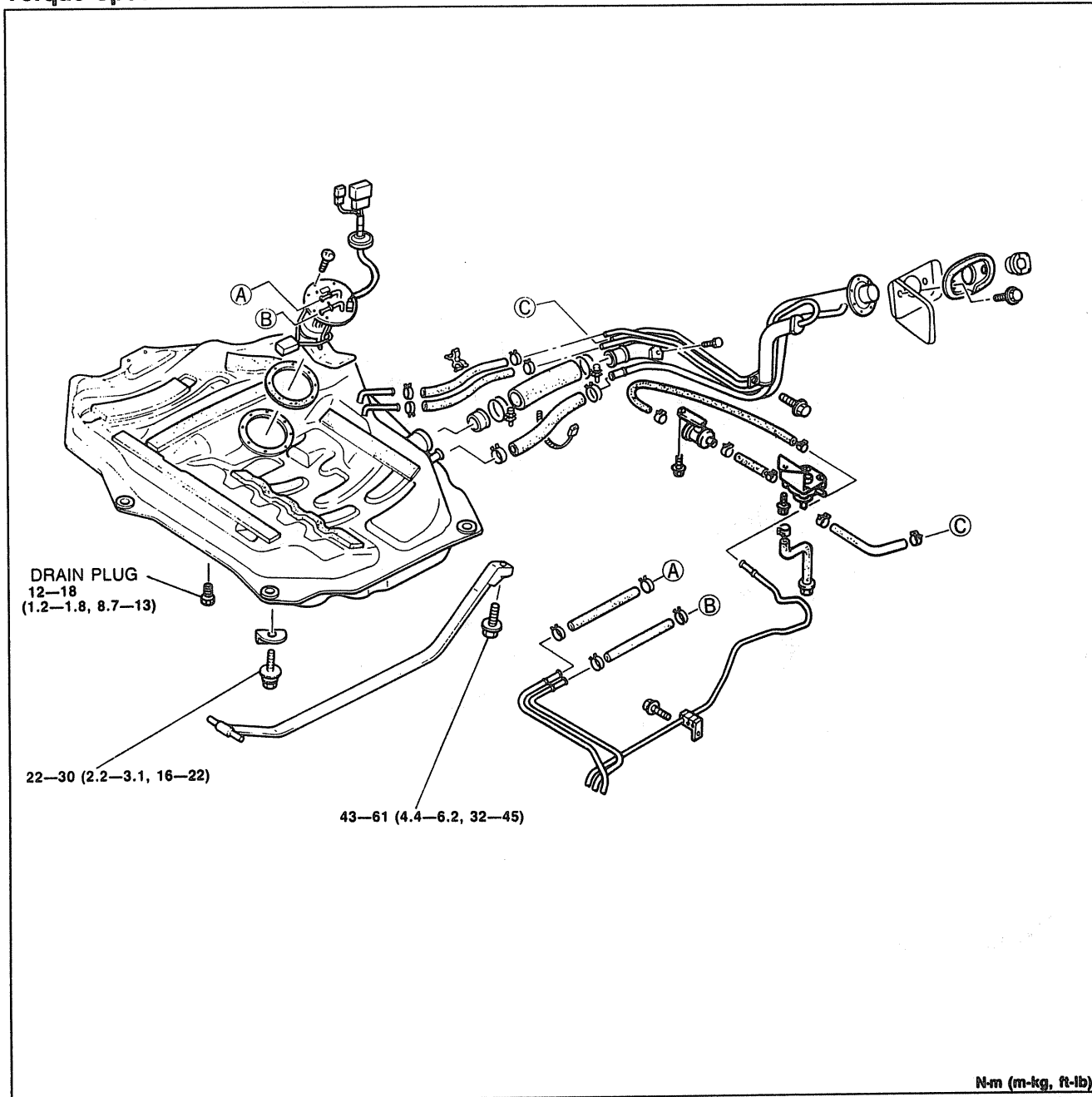
Warning

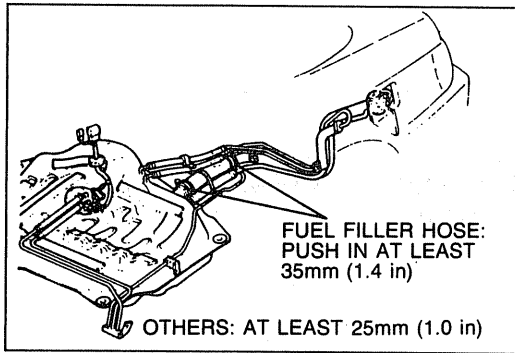
- Before repairing, clean the fuel tank thoroughly with steam to sufficiently remove all explosive gas.

Installation

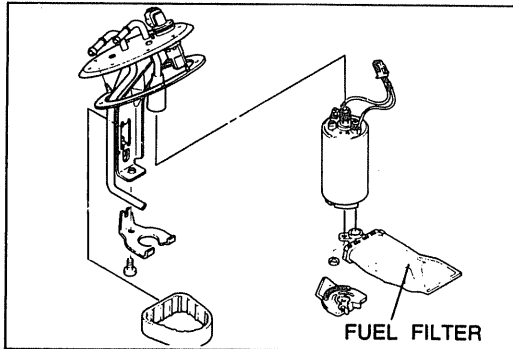
Install in the reverse order of removal, referring to **Installation Note**.

Torque Specifications

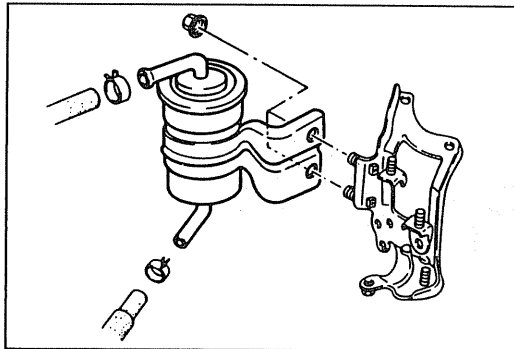




16U0F2-076



16U0F2-052



06U0F2-065

Installation note

Hoses

1. Push the hose ends of the main fuel hose, fuel return hose and evaporation hoses onto the fuel tank fittings **at least 25mm (1.0 in)**.
2. Push the fuel filler hose ends onto the fuel tank pipe and filler pipe **at least 35mm (1.4 in)**.

FUEL FILTER

Low-pressure Side

Refer to page F2-68.

High-pressure Side

The fuel filter must be replaced at the intervals outlined in the maintenance schedule.

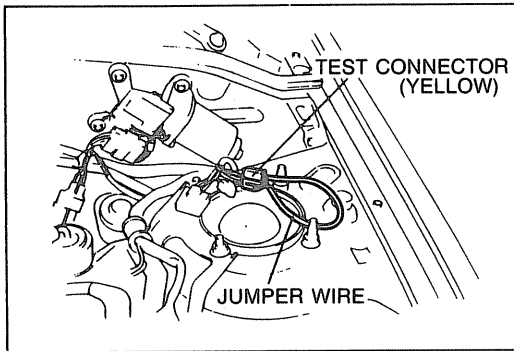
Warning

- **Always work away from sparks or open flames.**

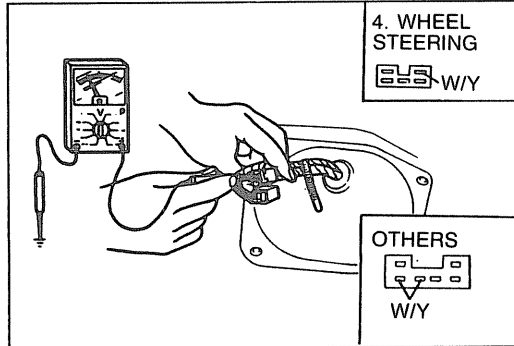
1. Disconnect the fuel hoses from the fuel filter.
2. Remove the fuel filter and the bracket.
3. Install a new filter and the bracket.
4. Connect the fuel hoses.

Note

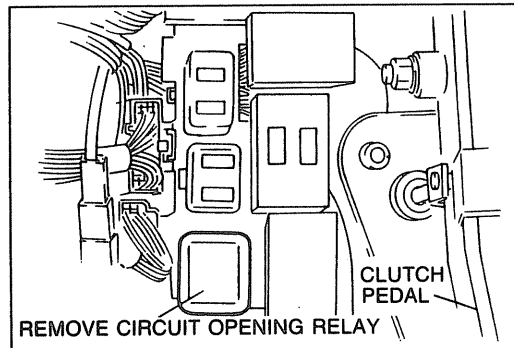
- **When installing the filter, push the fuel hoses fully onto the fuel filter and secure the hoses with spring clamps.**



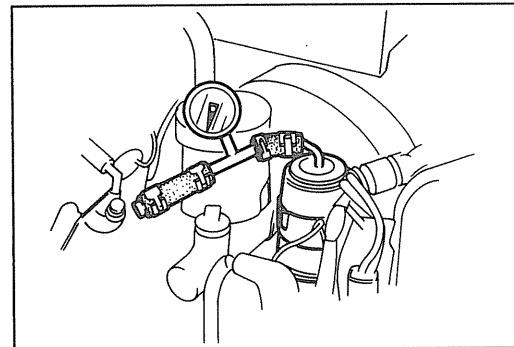
86U04A-079



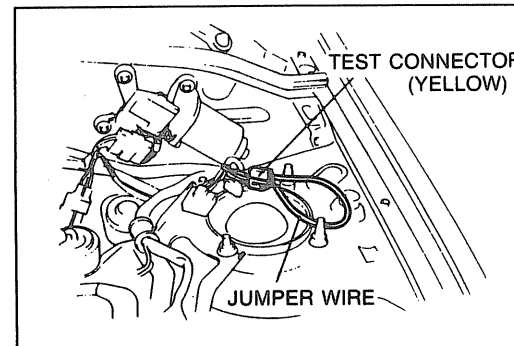
06U0F2-066



16U0F2-053



9MU0F2-138



9MU0F2-139

FUEL PUMP

Operation Test

1. Connect a jumper wire to the test connector (Yellow).
2. Remove the fuel filler cap.
3. Turn the ignition switch ON.
4. Listen for operational sound of the fuel pump at the filler inlet.
5. Install the fuel filler cap.

6. If no sound is heard, check the voltage at the fuel pump connector (W/Y wire and a ground).

Voltage: 12V

7. If the voltage is normal, replace the fuel pump.
8. If not correct, check the circuit opening relay (Refer to page F2-94) and its circuits.
9. Disconnect the jumper wire.

Hold Pressure

Only if fuel system pressure drop is not as specified, check fuel pressure drop for fuel pump.

Warning

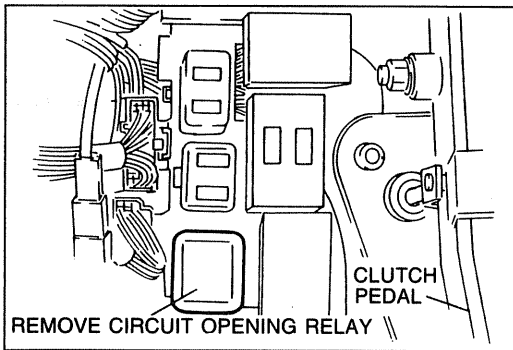
- Before performing the following operation, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page F2-60.)

1. Disconnect the negative battery terminal.
2. Install a fuel pressure gauge to the outlet of the fuel filter and plug the outlet of the fuel pressure gauge as shown. (Install clamps as shown.)
3. Connect the negative battery terminal.

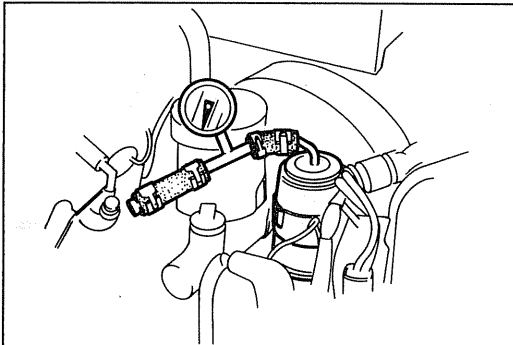
4. Connect the terminals of the test connector (Yellow: 2-pin) with a jumper wire.
5. Turn the ignition switch ON for **10 seconds** to operate the fuel pump.
6. Turn the ignition switch OFF and disconnect the jumper wire.
7. Observe the fuel pressure **after 5 minutes**.

Fuel pressure: More than 343 kPa (3.5 kg/cm², 50 psi)

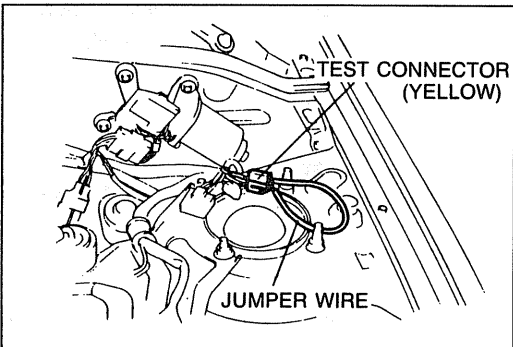
8. If not as specified, replace the fuel pump.



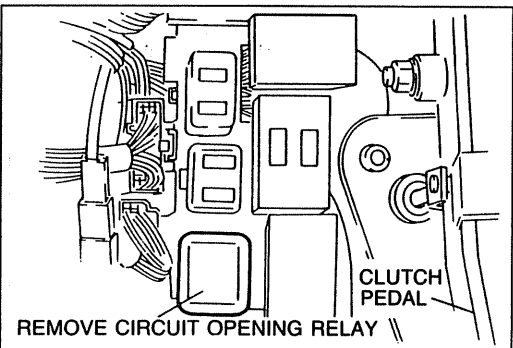
16U0F2-054



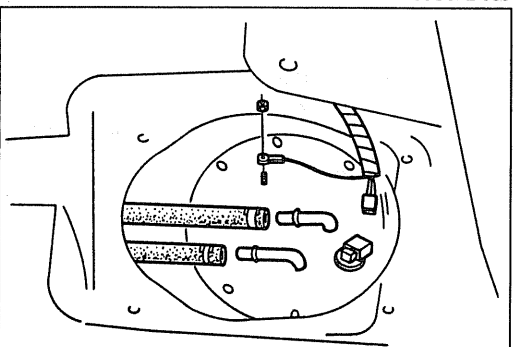
9MU0F2-141



06U0F2-128



06U0F2-069



06U0F2-070

Fuel Pump Maximum Pressure

Warning

- Before performing the following operation, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page F2-60.)

1. Disconnect the negative battery terminal.
2. Install a fuel pressure gauge to the outlet of the fuel filter and plug the outlet of the fuel pressure gauge as shown.(Install clamps as shown.)
3. Connect the negative battery terminal.

4. Connect the terminals of the test connector (Yellow: 2-pin) with a jumper wire.
5. Turn the ignition switch ON to operate the fuel pump.
6. Measure the fuel pump maximum pressure.

Fuel pump maximum pressure:

441—588 kPa (4.5—6.0 kg/cm², 64—85 psi)

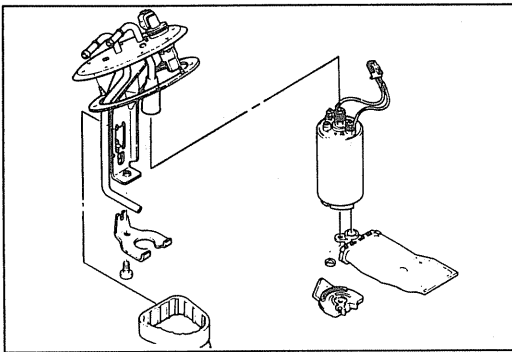
7. Turn the ignition switch OFF and disconnect the jumper wire.
8. If not as specified, replace the fuel pump.

Replacement

Warning

- Before performing the following procedure, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page F2-57.)
- When servicing the fuel system, keep sparks, cigarettes, and open flames away from the fuel.

1. Remove the rear seat and disconnect the fuel pump connector.
2. Remove the service hole cover.
3. Disconnect the fuel hoses.
4. Remove the fuel pump and fuel tank gauge assembly.



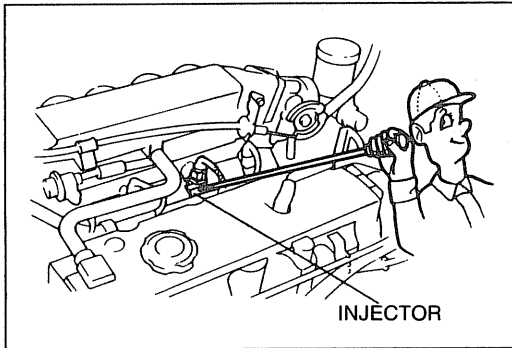
86U04A-102

5. Replace the fuel pump.

Caution

- Secure the fuel pump terminals and fuel hoses securely.

6. Install in the reverse order of removal.



86U04A-084

INJECTOR

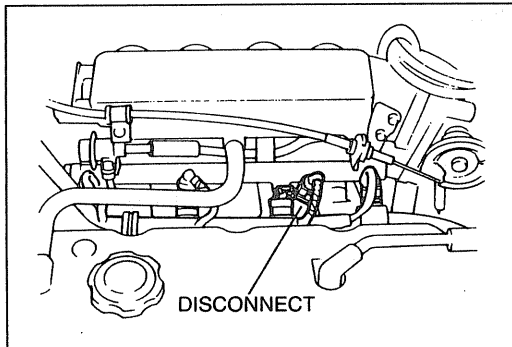
On-vehicle Inspection

Engine does not start

Perform "Quick Inspection for Electrical Signal" below.

Engine runs

1. Warm up the engine and run it at idle.
2. Listen for operational sound of the injector with a screwdriver or a sound scope.



86U04A-085

3. Disconnect the connector from each injector respectively.
4. Check that the engine speed decreases about **100—200 rpm** each time.

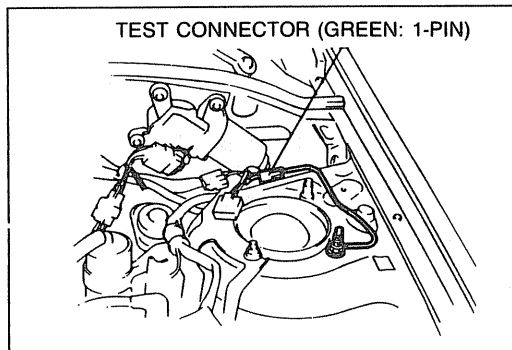
5. If not correct, check the following:

No operating sound and no speed drop

Perform "Quick Inspection for Electrical Signal" below.

No speed drop only

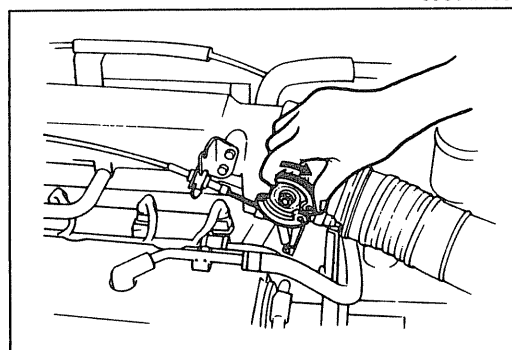
- Injector resistance
- Injection volume of injector



86U04A-086

Quick Inspection for Electrical Signal

1. Ground the test connector (Green: 1-pin) with a jumper wire.



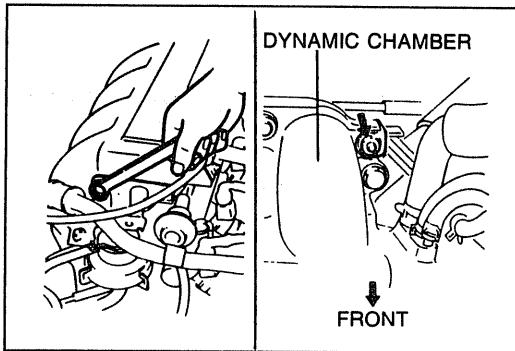
16U0F2-077

2. Turn the ignition switch ON.

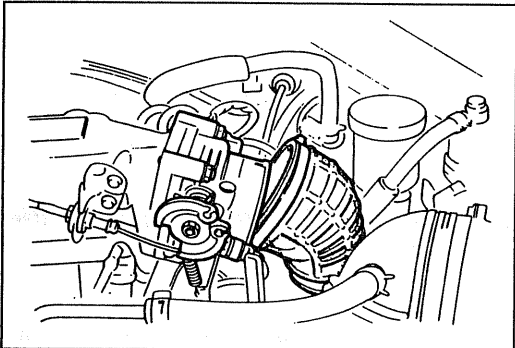
3. Open the throttle valve and check for a "click" at the injector with a screwdriver or sound scope as it is opened.

4. If nothing is heard, check the injector wiring circuit.

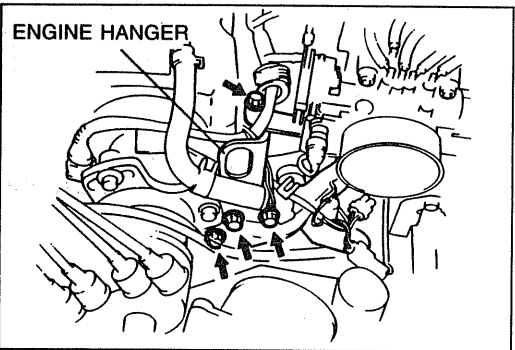
5. If nothing is heard at all injectors, check the main relay (Refer to page F2-91) and circuit.



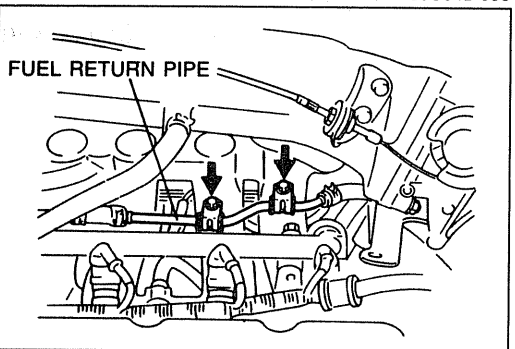
06U0F2-072



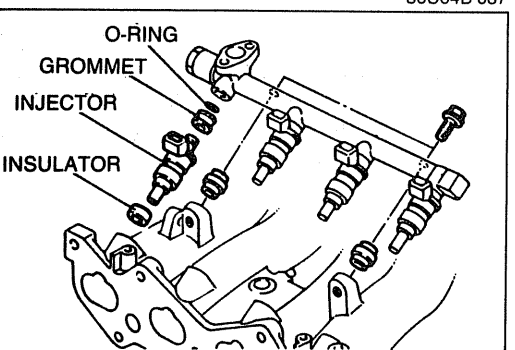
86U04B-085



86U04B-086



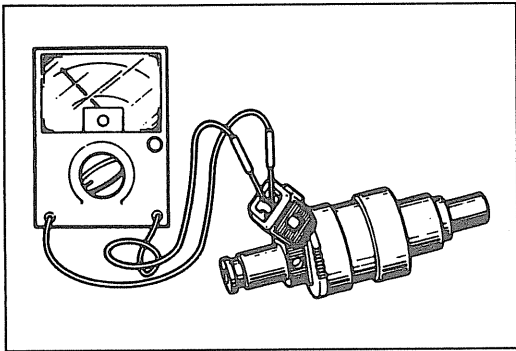
86U04B-087



06U0F2-073

Removal

1. Remove the wiring harness bracket.
2. Disconnect the vacuum pipe mounting bolts.
3. Disconnect the air hose from the throttle body.
4. Remove the engine hanger.
5. Remove the dynamic chamber mounting bolts and nuts.
6. Lift the dynamic chamber.
7. Disconnect the fuel return pipe bracket from the intake manifold.
8. Disconnect the injector connectors.
9. Remove the delivery pipe along with the pressure regulator and pulsation damper.
10. Remove the grommets, injectors, and insulators.



16U0F2-055

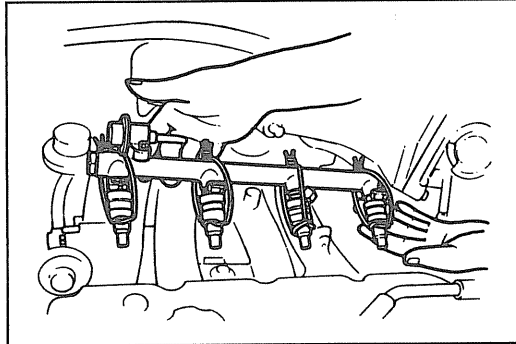
Inspection

There are 3 inspections which must be performed for the injectors.

Resistance

1. Remove the injectors from the engine.
(Refer to page F2-69.)
2. Check the resistance of each injector with an ohmmeter.
3. If not correct, replace the injector.

Resistance: 12—16Ω



16U0F2-056

Fuel leakage test

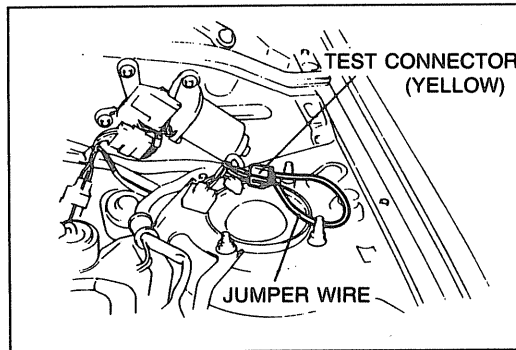
1. Lift the dynamic chamber upward.
2. Remove the injectors and delivery pipe.
(Refer to page F2-69.)
3. Affix the injectors to the delivery pipe with wire.

Caution

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

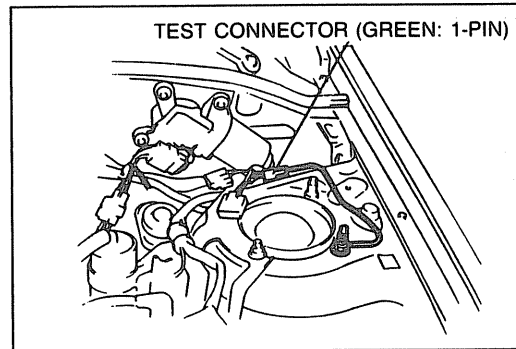
Warning

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



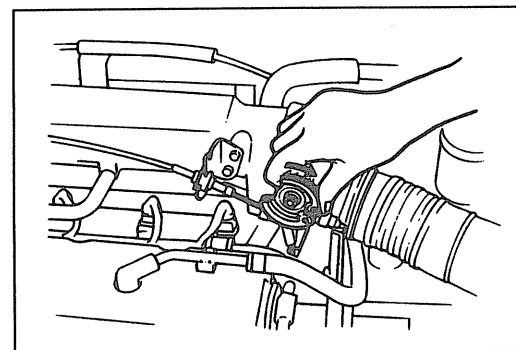
06U0F2-076

4. Connect the terminals of the fuel pump test connector with a jumper wire. Turn the ignition switch ON.



06U0F2-077

5. Cover the injector nozzles with a rag.
6. Ground the test connector (Green: 1-pin) with a jumper wire.

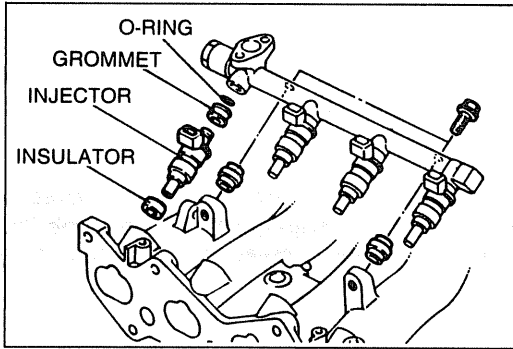


06U0F2-078

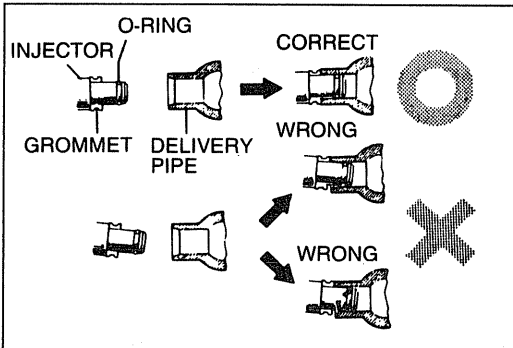
7. Open the throttle valve and release the air in the injectors.
8. Clean the nozzles.
9. Check that no fuel leaks from the injector nozzles.

Note

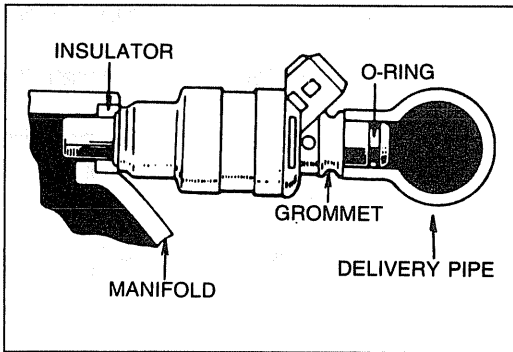
- After 1 minute a drop of fuel from the injector is acceptable.



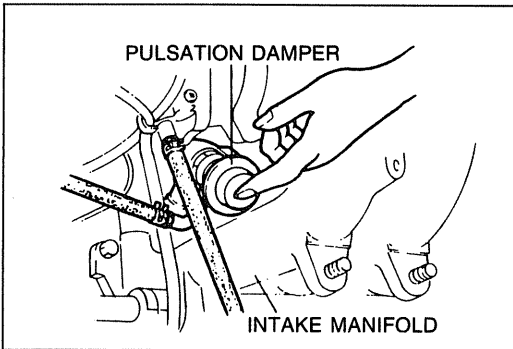
06U0F2-079



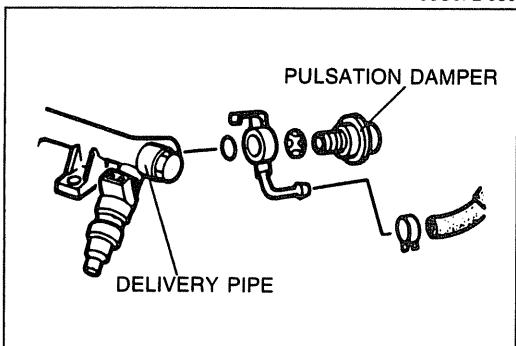
86U04A-108



86U04A-109



06U0F2-080



16U0F2-057

Installation

1. Install in the reverse order of removal, referring to **Installation Note**.

Tightening torque:

- Delivery pipe**
- Dynamic chamber**
- Engine hanger**

19—25 N·m
(1.9—2.6 m·kg, 14—19 ft·lb)

Installation note

Injector

1. Use new O-rings.
2. Apply a small amount of engine oil to the O-rings when installing.

3. Install the injectors and the injector insulators.

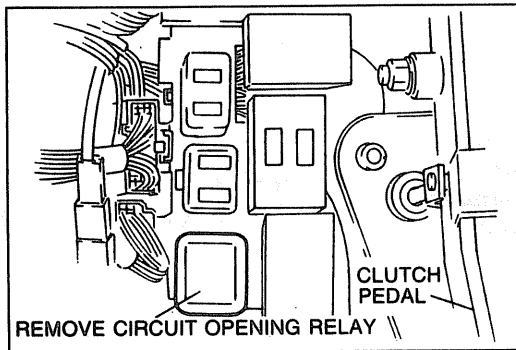
PULSATION DAMPER

Inspection

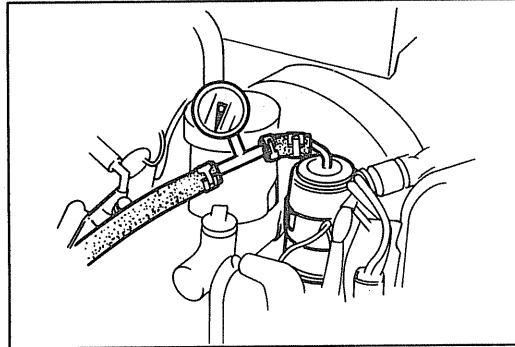
1. Run the engine at idle.
2. Place a finger on the screw of the pulsation damper head.
3. Check that pulsation is felt.

Replacement

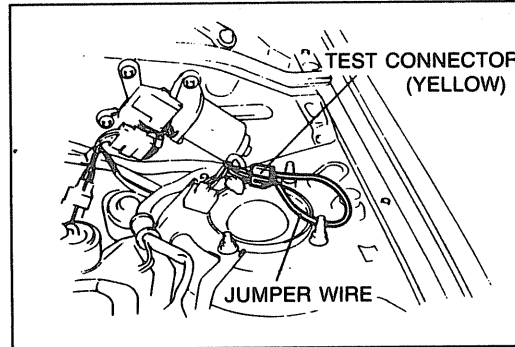
1. Perform steps 1 to 7 of removal procedure for the injectors. (Refer to page F2-69.)
2. Remove the pulsation damper.
3. Install in the reverse order of removal.



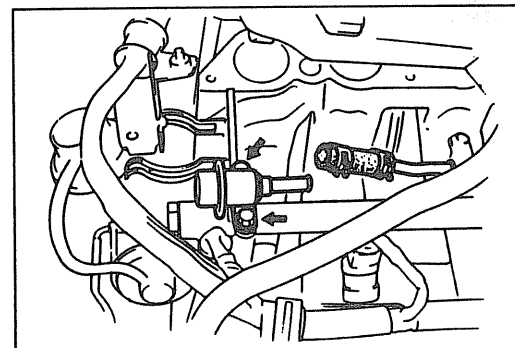
16U0F2-058



9MU0F2-158



06U0F2-083



16U0F2-059

PRESSURE REGULATOR

Hold Pressure

Only if fuel system pressure drop is not as specified and fuel pump pressure drop is as specified

Warning

- Before performing the following operation, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page F2-60.)

1. Disconnect the negative battery terminal.
2. Install a fuel pressure gauge between the fuel filter and the fuel main hose. (Install clamps as shown.)
3. Connect the negative battery terminal.

4. Connect the terminals of the test connector (Yellow: 2-pin) with a jumper wire.
5. Turn the ignition switch ON for 10 seconds to operate the fuel pump.
6. Turn the ignition switch OFF and disconnect the jumper wire.
7. Plug the fuel return hose from the pressure regulator.
8. Observe the fuel pressure for 5 minutes.

Fuel pressure: More than 147 kPa (1.5 kg/cm², 21 psi)

9. If as specified, replace the pressure regulator.

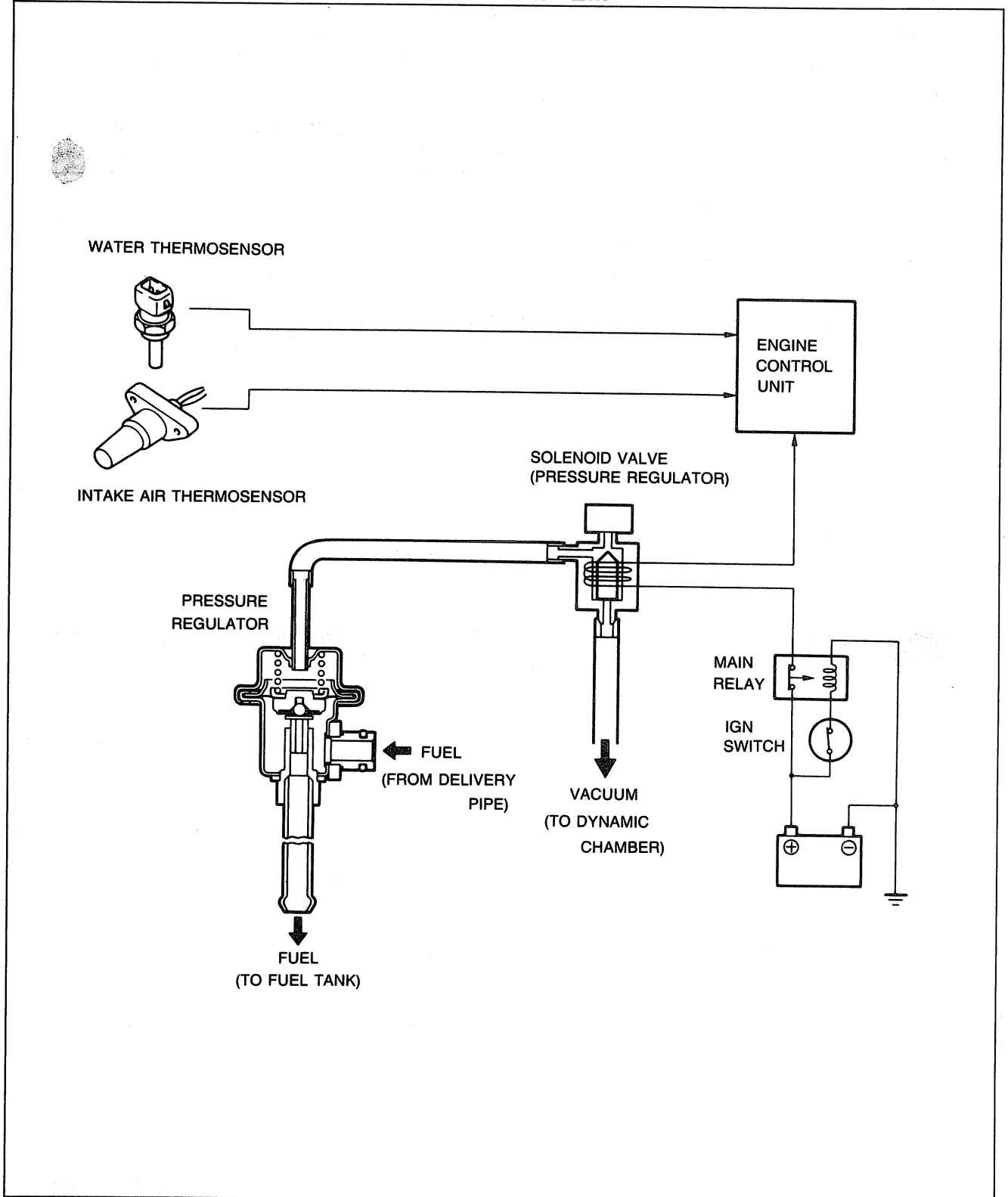
Replacement

1. Perform steps 1 to 8 of removal procedure for the injector. (Refer to page F2-69.)
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the pressure regulator.
4. Install in the reverse order of removal.

Tightening torque:

7.8—11 N·m (80—110 cm·kg, 69—95 in·lb)

PRESSURE REGULATOR CONTROL SYSTEM



06U0F2-089

To prevent percolation of the fuel during idle after the engine is restarted, vacuum is cut to the pressure regulator, increasing the fuel pressure.

Specified time: Approx. 120 sec.

Operating condition: Coolant temperature — above 70°C (158°F)

Intake air temperature — above 20°C (68°F)

COMPONENT DESCRIPTIONS

Component	Function	Remarks
Engine control unit	Detects signals from input sensors and switches; controls solenoid valve (Pressure regulator control)	
Ignition switch (ST position)	Sends engine cranking signal to control unit	
Intake air thermosensor	Detects intake air temperature; sends signal to control unit	Installed in airflow meter
Ne rotor and pick-up	Detects crank angle at 30° intervals; sends signal to control unit	Engine speed signal
Pressure regulator	Adjusts fuel pressure supplied to injectors	
Solenoid valve (Pressure regulator control)	Controls vacuum line to pressure regulator	Closes vacuum line when hot
Throttle sensor	Detects throttle valve opening angle; sends signal to control unit	Installed on throttle body
Water thermosensor	Detects coolant temperature; sends signal to control unit	

06U0F2-090

TROUBLESHOOTING

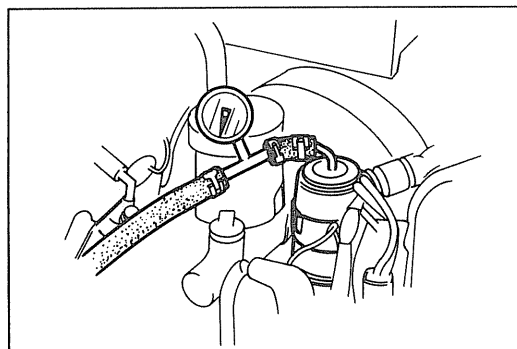
Check the condition of the wiring harness and connections before checking the sensors or switches below.

Note

- Make the system inspection first. If no problem is found, continue with the next system inspection of the Troubleshooting Guide. (Refer to pages F2-10 and 11.)

Possible cause	Solenoid valve (Pressure regulator control)	Water thermosensor	Intake air thermosensor (Airflow meter)	Throttle sensor	Engine control unit terminal	System inspection
					3M	
Symptom	F2-75	F2-108	F2-105	F2-106	F2-102	F2-74
Engine stalls or rough after hot starting	2	3	4	5	6	1

16U0F2-061



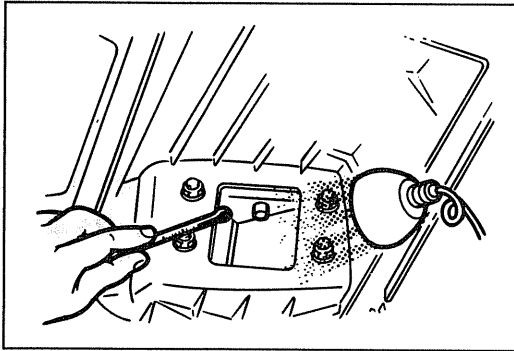
16U0F2-062

System Inspection

Warning

- Before performing the following operation, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page F2-60.)

1. Disconnect the negative battery terminal.
2. Install a fuel pressure gauge between the fuel filter and the fuel main hose. (Install clamps as shown.)
3. Connect the negative battery terminal.



06U0F2-093

Operating time	Fuel line pressure kPa (kg/cm ² , psi)
After starting: for 120 sec.	235—275 (2.4—2.8, 34—40)
After 120 sec.	186—226 (1.9—2.3, 27—33)

06U0F2-094

4. Start the engine.
5. Warm up the engine to normal operating temperature and stop the engine.

Note

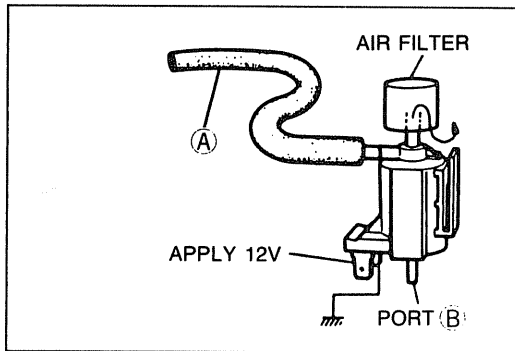
- **Radiator must be hot. (Above 70°C [158°F])**

6. Keep the hood closed and heat soak the engine compartment for **3—5 min.** (Intake air thermosensor in airflow meter must be **more than 30°C [86°F]**. If this temperature cannot be obtained, lift the air cleaner upper cover and heat the intake air thermosensor to **more than 30°C [86°F]**.)
7. Restart the engine.
8. Check the fuel line pressure and operating times as shown in the chart.

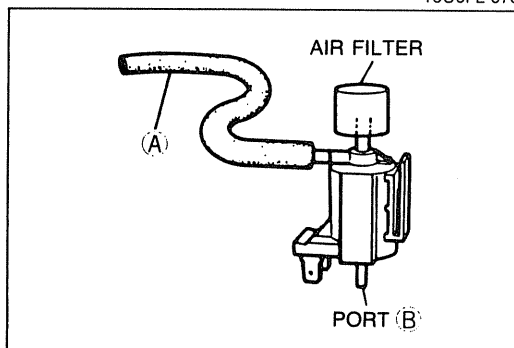
Vacuum Hose Inspection

1. Check the vacuum hoses from the engine to the solenoid valve and from the solenoid valve to pressure regulator. Replace the hoses, if necessary.

06U0F2-095



16U0F2-078

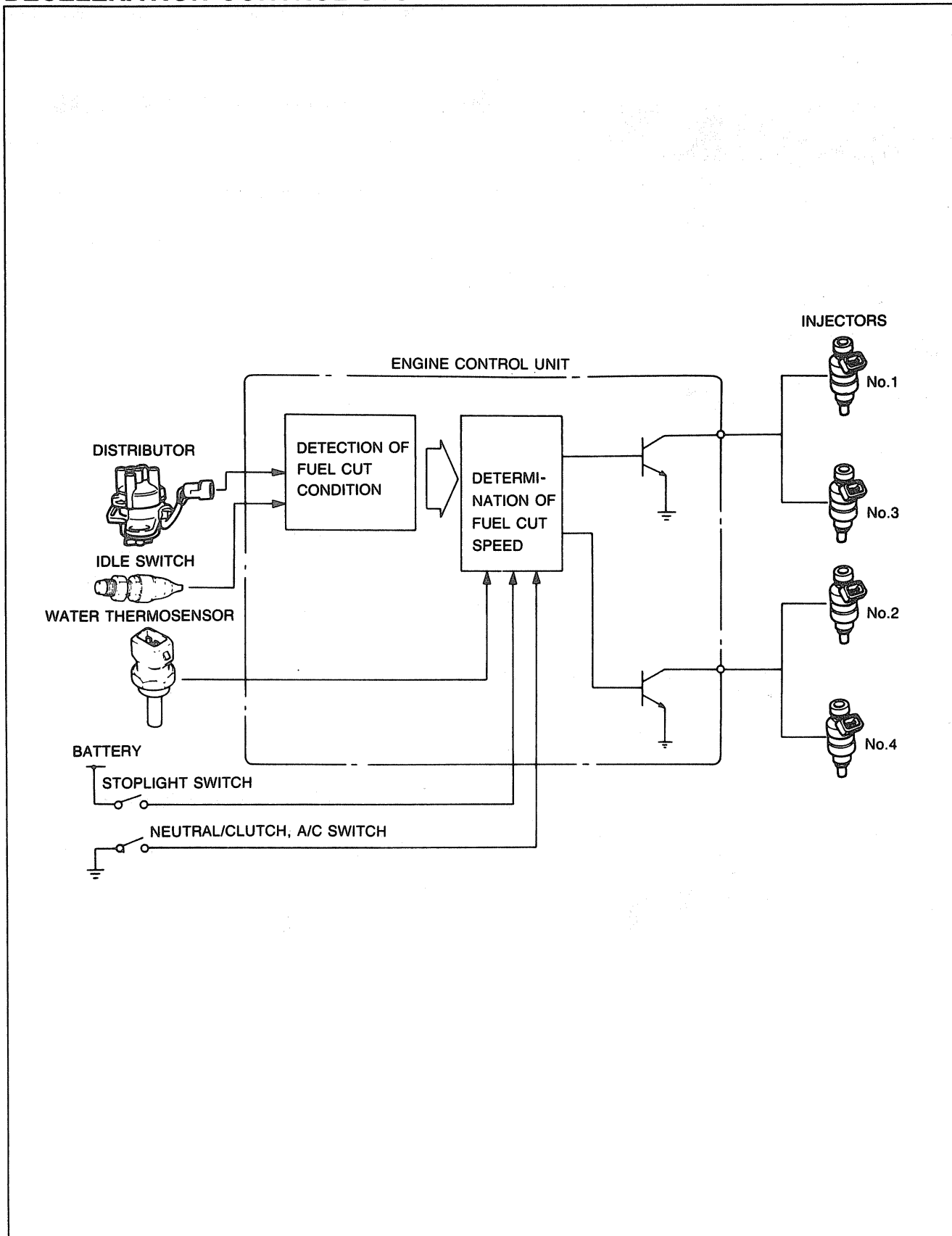


16U0F2-079

Solenoid Valve (Pressure Regulator Control) Inspection

1. Disconnect the vacuum hose from the solenoid valve and vacuum pipe.
2. Blow through the solenoid valve from vacuum hose A.
3. Verify that air flows from port B.
4. Disconnect the solenoid valve connector.
5. Connect 12V and a ground to the terminals of the solenoid valve.
6. Blow through the solenoid valve from the vacuum hose A.
7. Verify that air flows from the valve air filter.

DECELERATION CONTROL SYSTEM



86U04A-121

The fuel cut system is provided as a deceleration control system. This system is to improve fuel economy.

COMPONENT DESCRIPTIONS

Component	Function	Remarks
Stoplight switch	Detects braking operation (deceleration); sends signal to control unit	
Clutch switch (MTX)	Detects in-gear condition; sends signal to control unit	Switch ON when clutch pedal released
EC-AT control unit (ATX)	Detects N or P range; sends signal to control unit	
Engine control unit	Detects signals from input sensors and switches; cuts fuel injection	
Idle switch	Detects when throttle valve fully closed; sends signal to control unit	Installed on throttle body
Inhibitor switch (ATX)	Detects in-gear condition; sends signal to EC-AT control unit	Switch ON in "N" or "P" range
Ne rotor and pick-up	Detects crank angle at 30° intervals; sends signal to control unit	Engine speed signal
Neutral switch (MTX)	Detects in-gear condition; sends signal to control unit	Switch ON when in-gear
Water thermosensor	Detects coolant temperature; sends signal to control unit	

06U0F2-096

TROUBLESHOOTING

Check the condition of the wiring harness and connectors before checking the sensor or switches below.

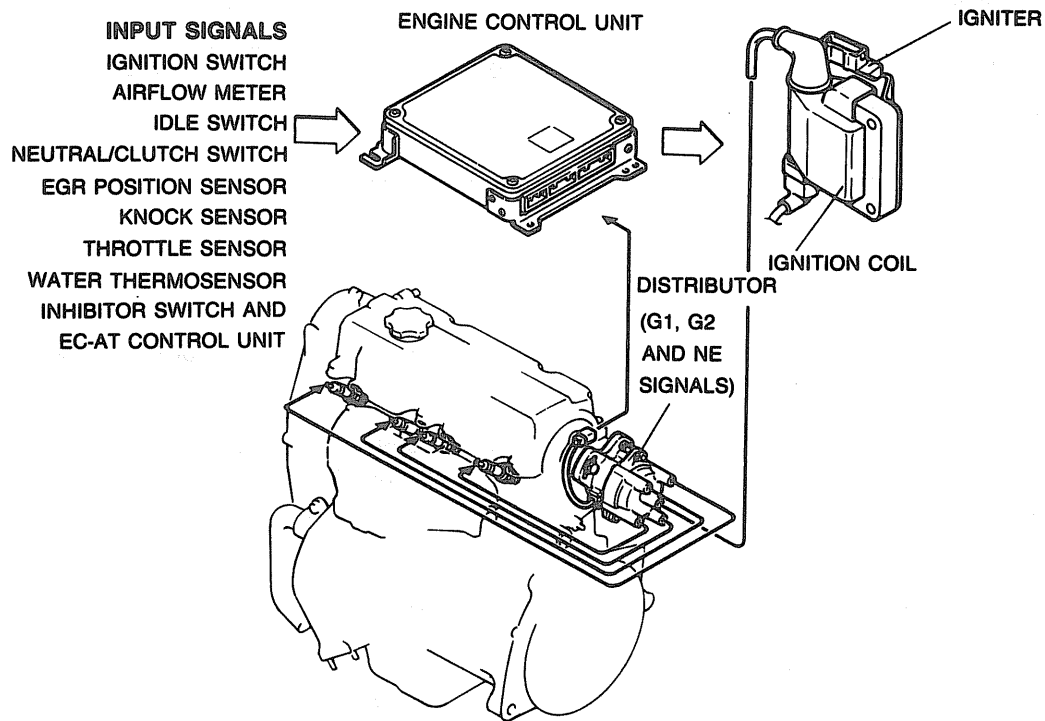
Note

- **Make the system inspection first. If no problem is found, continue with the next system inspection of the Troubleshooting Guide. (Refer to pages F2-10 and 11.)**

Possible cause	Water thermosensor	Engine control unit
		3U, 3V
Page	F2-108	F2-102
Checking order	2	1

16U0F2-063

ELECTRONIC SPARK ADVANCE (ESA) CONTROL SYSTEM



86U04B-098

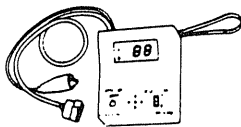
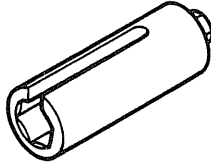
This system electronically controls the ignition timing to obtain better engine performance. The best ignition timing is determined and set within the engine control unit based on signals from the various sensors and switches.

COMPONENT DESCRIPTIONS

Component	Function	Remarks
Airflow meter	Detects amount of intake air; sends signal to control unit	Intake air temp sensor and fuel pump switch are integrated
Clutch switch (MTX)	Detects in-gear condition; sends signal to control unit	Switch ON when clutch pedal released
Distributor	Has Ne and G rotor	
EGR position sensor	Detects EGR control valve lift amount; sends signal to control unit	Variable resistor
Engine control unit	Detects signals from input sensors and switches; decides the best ignition timing	
G rotor and pick-up	Detects No.1 and No.4 cylinders TDC; sends signal to control unit	For determining fuel injection timing and ignition timing
Idle switch	Detects when throttle valve fully closed; sends signal to control unit	Installed on throttle body
Igniter	Receives spark signal from control unit and generates high voltage to ignition coil	
Ignition switch (ST position)	Sends engine cranking signal to control unit	
Main relay	Supplies electric current to injectors and control unit	
Ne rotor and pick-up	Detects crank angle at 30° intervals; sends signal to control unit	Engine speed signal
Neutral switch (MTX)	Detects in-gear condition; sends signal to control unit	Switch ON when in-gear
Knock control unit	Receives knock signal from knock sensor; sends signal to control unit	
Knock sensor	Detects engine knocking; sends signal to knock control unit	
EC-AT control unit (ATX)	Detects N or P range; sends signal to control unit	
Inhibitor switch (ATX)	Detects in-gear condition; sends signal to EC-AT control unit	Switch ON in "N" or "P" range
Throttle sensor	Detects throttle valve opening angle; sends signal to control unit	Installed on throttle body
Water thermosensor	Detects coolant temperature; sends signal to control unit	

06U0F2-098

PREPARATION
SST

<p>49 H018 9A1 Engine Signal Monitor</p> 	<p>For inspection of knock control system</p>	<p>49 H018 001 Knock sensor wrench</p> 	<p>For replacement of knock sensor</p>
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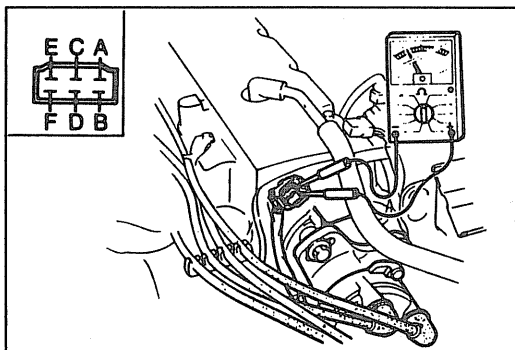
06U0F2-099

TROUBLESHOOTING

Check the condition of the wiring harness and connectors before checking sensors or switches.

Symptom	Possible cause	Distributor	Igniter	Engine control unit terminal	Knock control system
				3E, 3F, 3G, and 3H	
	Page	F2-80	Refer to Section G	F2-102	F2-80
Hard start or won't start (Crank OK)		1	2	3	
Knocking					1

16U0F2-064



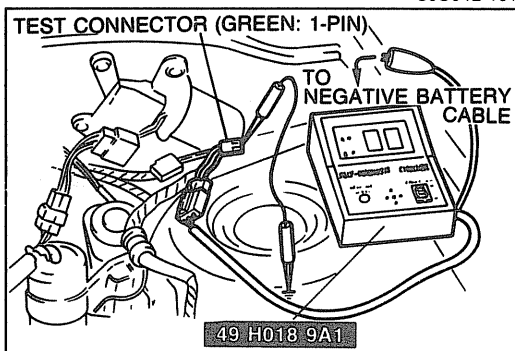
86U04B-101

Distributor

1. Disconnect the distributor connector.
2. Connect an ohmmeter to the terminals of the distributor connector.
3. Check the resistance of the following.

Terminal	Resistance (at 20°C [68°F])
A—B	210—260Ω
C—D	
E—F	

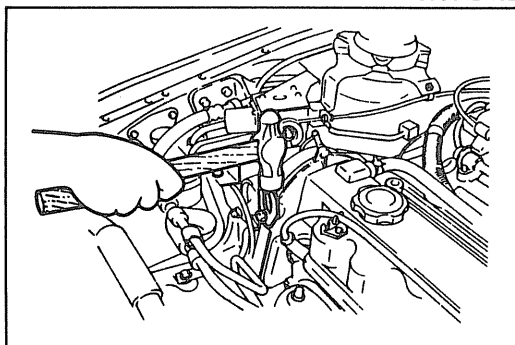
4. If not correct, replace the distributor.



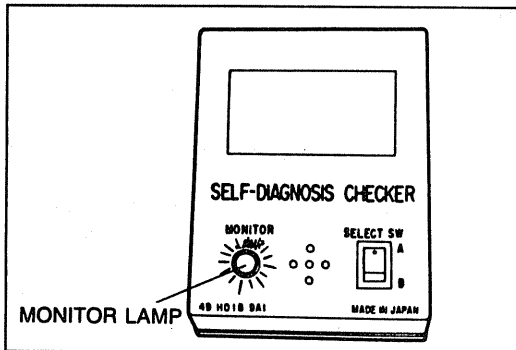
86U04B-102

Knock Control System

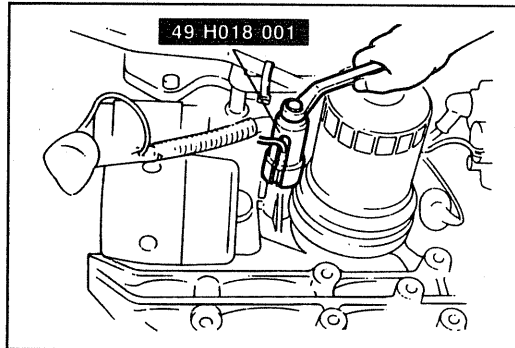
1. Connect the **SST** to the check connector.
2. Ground the test connector with a jumper wire.
3. Turn the ignition switch ON.



86U04B-103



86U04B-104



86U04B-184

5. If not correct, connect a good knock sensor to the vehicle wiring harness and ground it.
6. Perform step 4 again and judge the malfunctioning part as follows:

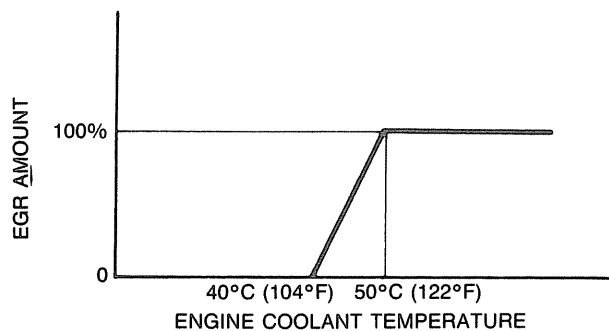
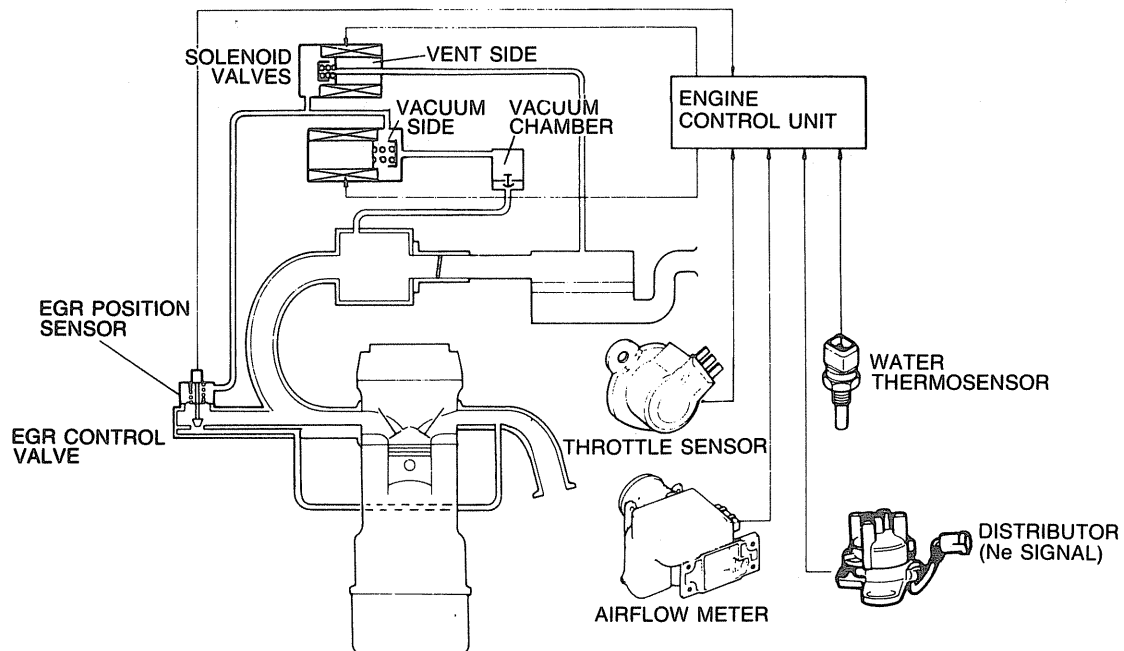
Monitor lamp flashes	Malfunction
YES	Knock sensor
NO	Knock control unit

7. Replace the malfunctioning part.

Knock Sensor Replacement

1. Disconnect the knock sensor connector.
2. Lift the vehicle and remove the intake manifold bracket.
3. Remove the knock sensor with the **SST**.
4. Install the knock sensor in the reverse order of removal.

EXHAUST GAS RECIRCULATION (EGR) SYSTEM



06U0F2-101

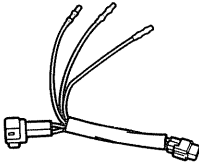
This system introduces exhaust gas into the intake manifold to reduce NOx in the exhaust gas. It operates depending on the throttle valve opening, driving condition, engine coolant temperature (**above 40°C [104°F]**).

COMPONENT DESCRIPTION

Component	Function	Remarks
Airflow meter	Detects amount of intake air; sends signal to control unit	Intake air thermosensor and fuel pump switch are integrated
Distributor	Has Ne and G rotors	
EGR control valve	Recirculates portion of exhaust gas	
EGR position sensor	Detects EGR control valve lift amount; sends signal to control unit	Variable resistor
Engine control unit	Detects signals from input sensors and switches; operates solenoid valves (vent or vacuum side)	
Ne rotor and pick-up	Detects crank angle at 30° intervals; sends signal to control unit	Engine speed signal
Solenoid valve (EGR)	Controls vacuum to EGR control valve	Vent side: controls vent line Vacuum side: controls vacuum line
Throttle sensor	Detects throttle valve opening angle; sends signal to control unit	Installed on throttle body
Vacuum chamber	Stores vacuum led to solenoid valve (EGR, vacuum side) under turbocharger boost condition	Integrated check valve
Water thermosensor	Detects coolant temperature; sends signal to control unit	

06U0F2-102

PREPARATION
SST

49 G018 901 Adapter harness		For inspection of EGR position sensor
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06U0F2-103

TROUBLESHOOTING

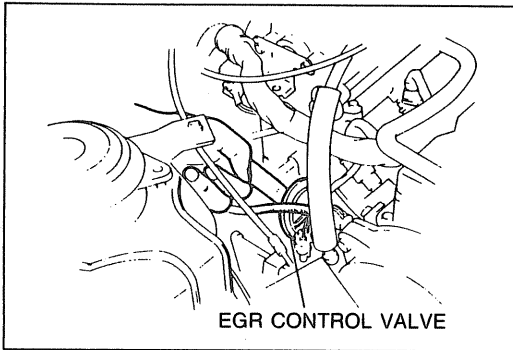
Check the condition of the wiring harness and connectors before checking sensors or switches.

Note

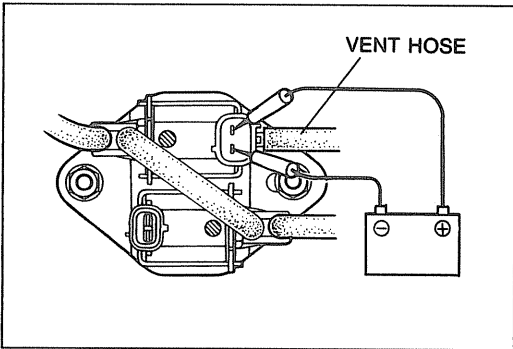
- Make the system inspection first. If no problem is found, continue with the next system inspection of the Troubleshooting Guide. (Refer to pages F2-10 and 11.)

Possible cause	Water thermo-sensor	EGR control valve	EGR position sensor	Solenoid valve		Throttle sensor	Vacuum chamber	Engine control unit terminal		System in-spection
				Vent	Vac.			2J	30, 3P	
Page	F2-108	F2-85	F2-84	F2-84		F2-106	F2-85	F2-101	F2-102	F2-84
Checking order	7	3	4	2		8	6	9	10	1

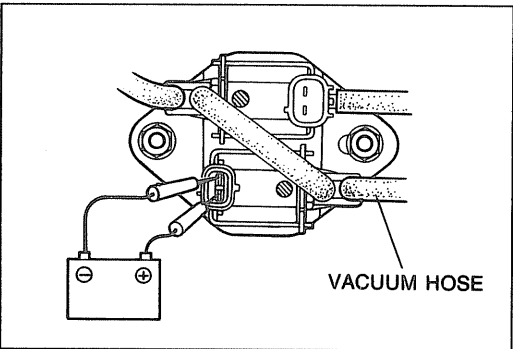
16U0F2-065



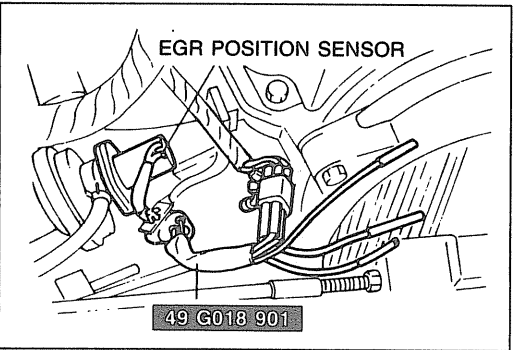
86U04B-108



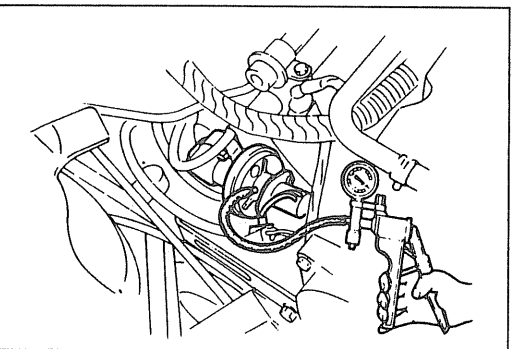
86U04B-109



86U04B-110



86U04B-111



86U04B-112

System Inspection

1. Start the engine.
2. Accelerate the engine and verify that the diaphragm of the EGR control valve does not move while the engine is still cold.
3. Warm up the engine to normal operating temperature and run it at idle.

Warning

- Be careful when checking the EGR control valve because the surrounding area is very hot.

4. Accelerate the engine and check that the diaphragm of the EGR control valve moves upward.

Solenoid Valve (EGR, Vent Side)

1. Disconnect the vacuum hoses.
2. Blow through the vent hose and make sure air flows.
3. Disconnect the solenoid valve connector.
4. Apply 12V and ground the valve as shown.
5. Blow through the vent hose and make sure air does not flow.
6. If not correct, replace the solenoid valves.

Solenoid valve (EGR, Vacuum Side)

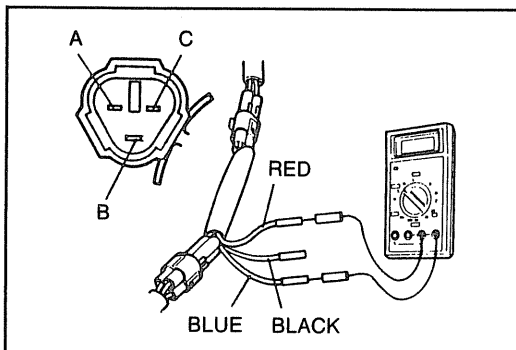
1. Disconnect the vacuum hoses.
2. Blow through the vacuum hose and make sure air does not flow.
3. Disconnect the solenoid valve connector.
4. Apply 12V and ground the valve as shown.
5. Blow through the vacuum hose and make sure air flows.
6. If not correct, replace the solenoid valves.

EGR Position Sensor

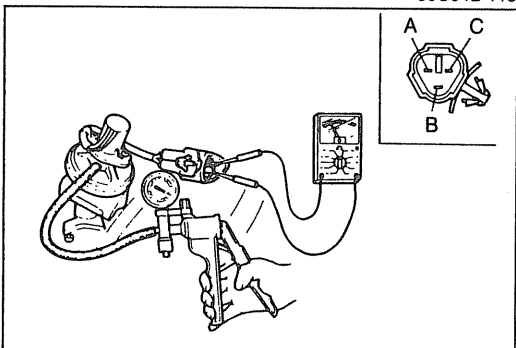
Inspection of output voltage

1. Disconnect the EGR position sensor connector.
2. Connect the SST between the EGR position sensor and wiring harness.

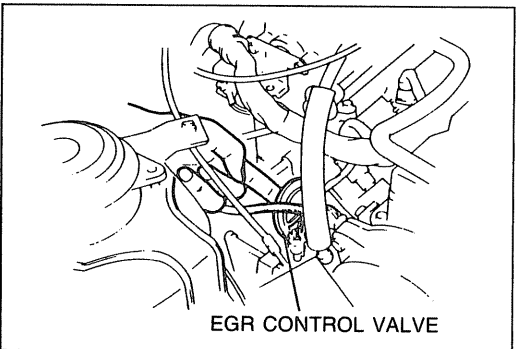
3. Disconnect the vacuum hose from the EGR control valve and connect the vacuum pump.
4. Turn the ignition switch ON.
5. Check voltage of each terminal in the conditions shown in the table.



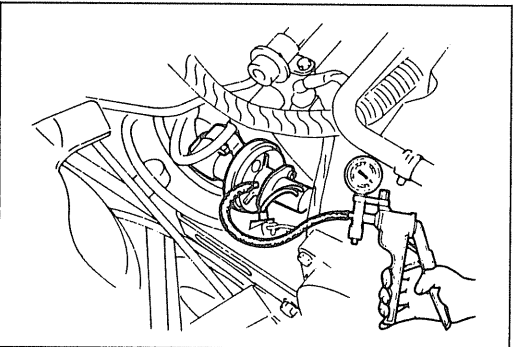
86U04B-113



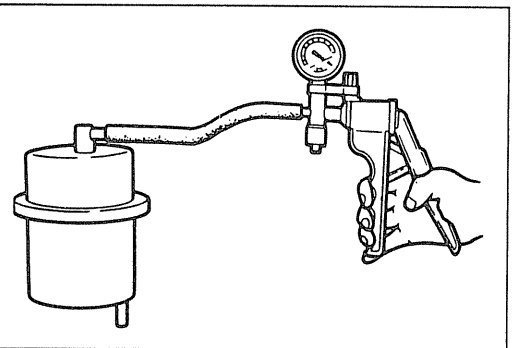
86U04B-114



86U04B-115



86U04B-116



86U04B-117

Terminal	SST wire color	Vacuum	
		0	120 mmHg (4.7 inHg)
C	Red	0.25—0.95V	Approx. 4.0V
B	Blue	Below 1.5V	
A	Black	4.5—5.5V	

- If not correct at A and B terminal, check the wiring harness and 2A and 2C terminals of the engine control unit.
- If not correct at C terminal, check the sensor resistance, then the wiring harness and the engine control unit 2F terminal.
- Disconnect the **SST** and reconnect the EGR position sensor connector.

Inspection of resistance

- Disconnect the EGR position sensor connector.
- Check as shown resistance between the terminals as shown.

Terminals	Resistance
A—B	5 kΩ
A—C	0.7—5 kΩ
B—C	0.7—5 kΩ

EGR Control Valve

- Manually actuate the valve by pushing on the diaphragm with finger.
- Check that the spring resistance is present and the diaphragm moves freely with no sticking or binding.

Note

- Before replacing the EGR control valve, check the intake air and control systems.

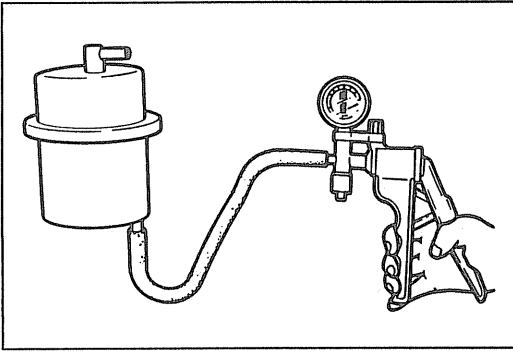
- Warm up the engine and run it at idle.
- Connect a vacuum pump to the valve and apply vacuum.
- Check that the engine runs roughly or stalls at more than the specified vacuum.

Specification: 40—60 mmHg (1.6—2.4 inHg)

- If not correct, replace the EGR control valve.

Vacuum Chamber

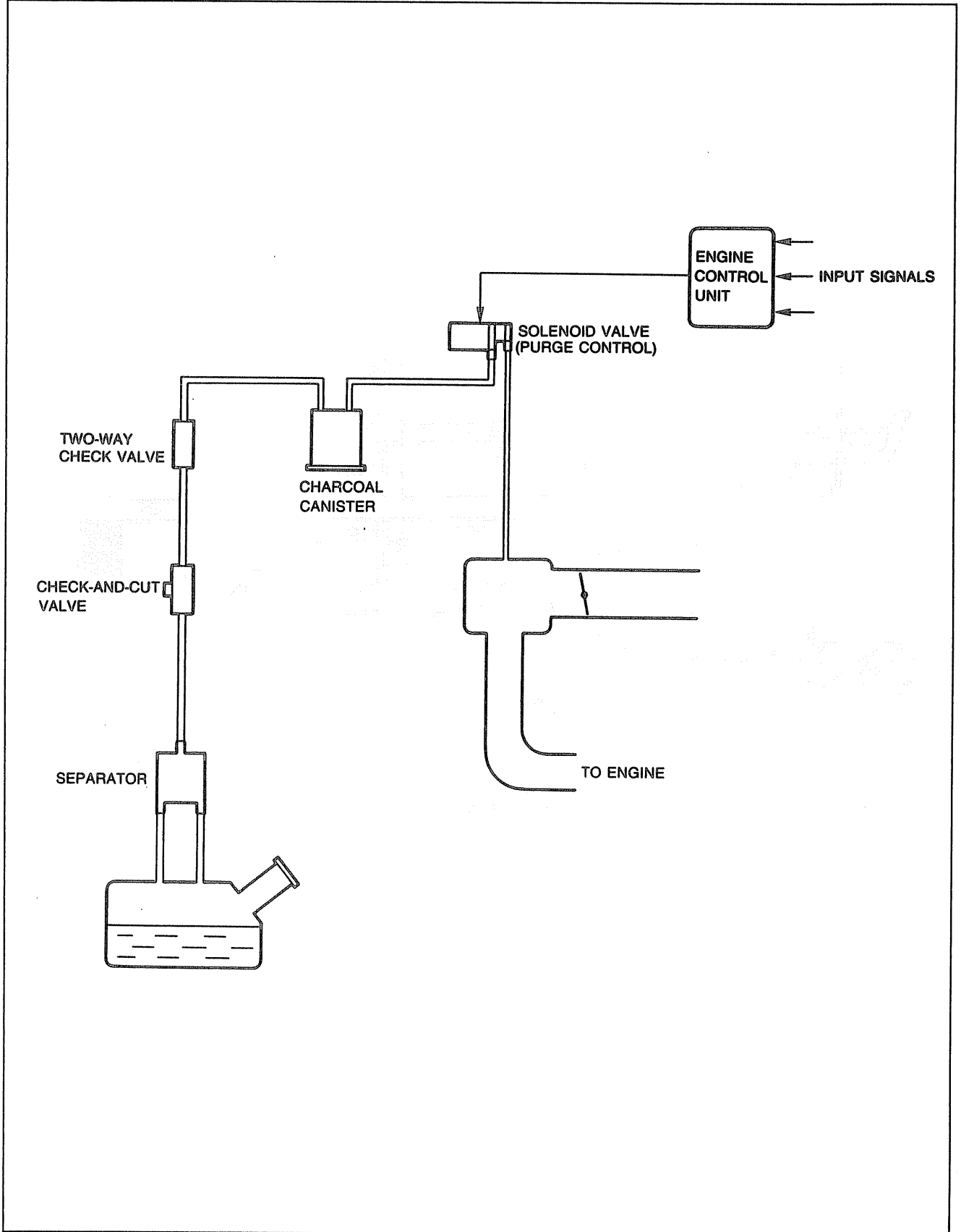
- Disconnect the vacuum hoses from the vacuum chamber, and remove it.
- Connect the vacuum pump to the vacuum chamber as shown.
- Apply vacuum and check that no vacuum is held.
- If not correct, replace the vacuum chamber.



86U04B-118

5. Connect the vacuum pump to the vacuum chamber as shown.
6. Apply vacuum and check that vacuum is held.
7. If not correct, replace the vacuum chamber.

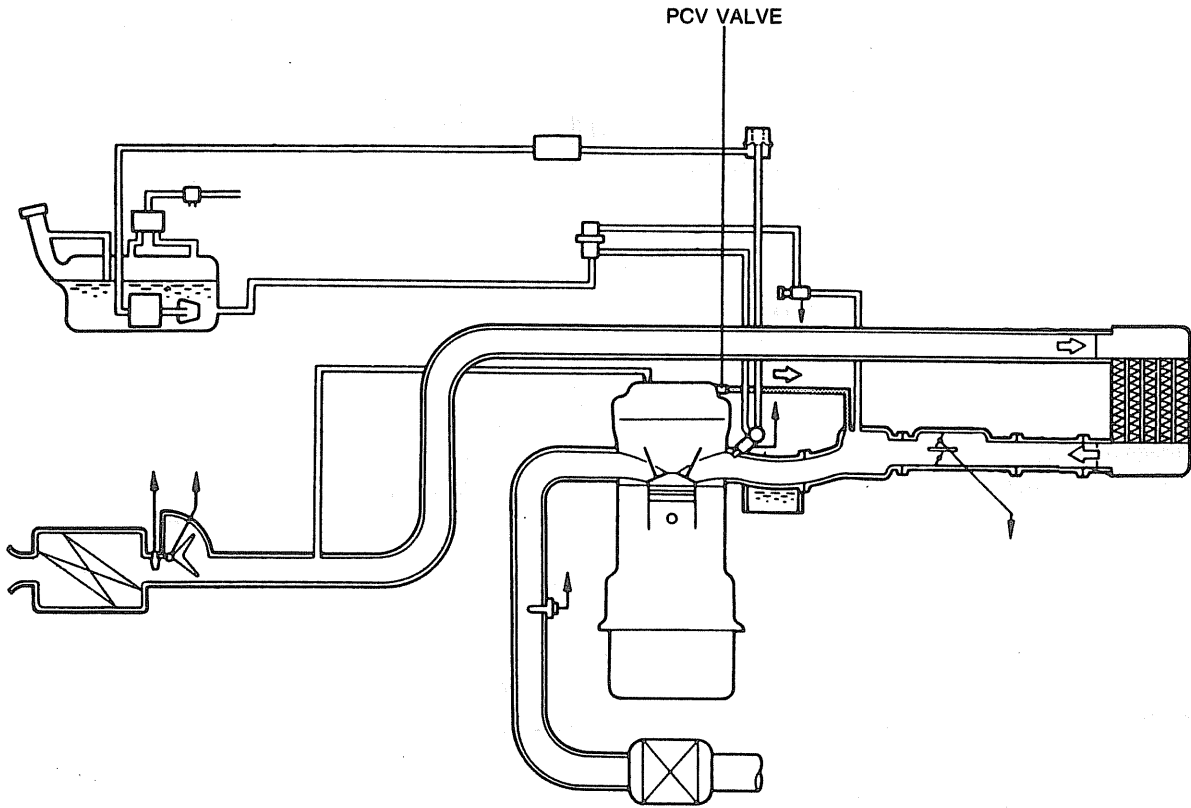
EVAPORATIVE EMISSION CONTROL SYSTEM



16U0F2-066

This system is the same as that of the non-turbo engine.
Refer to page F1-69 for servicing the system.

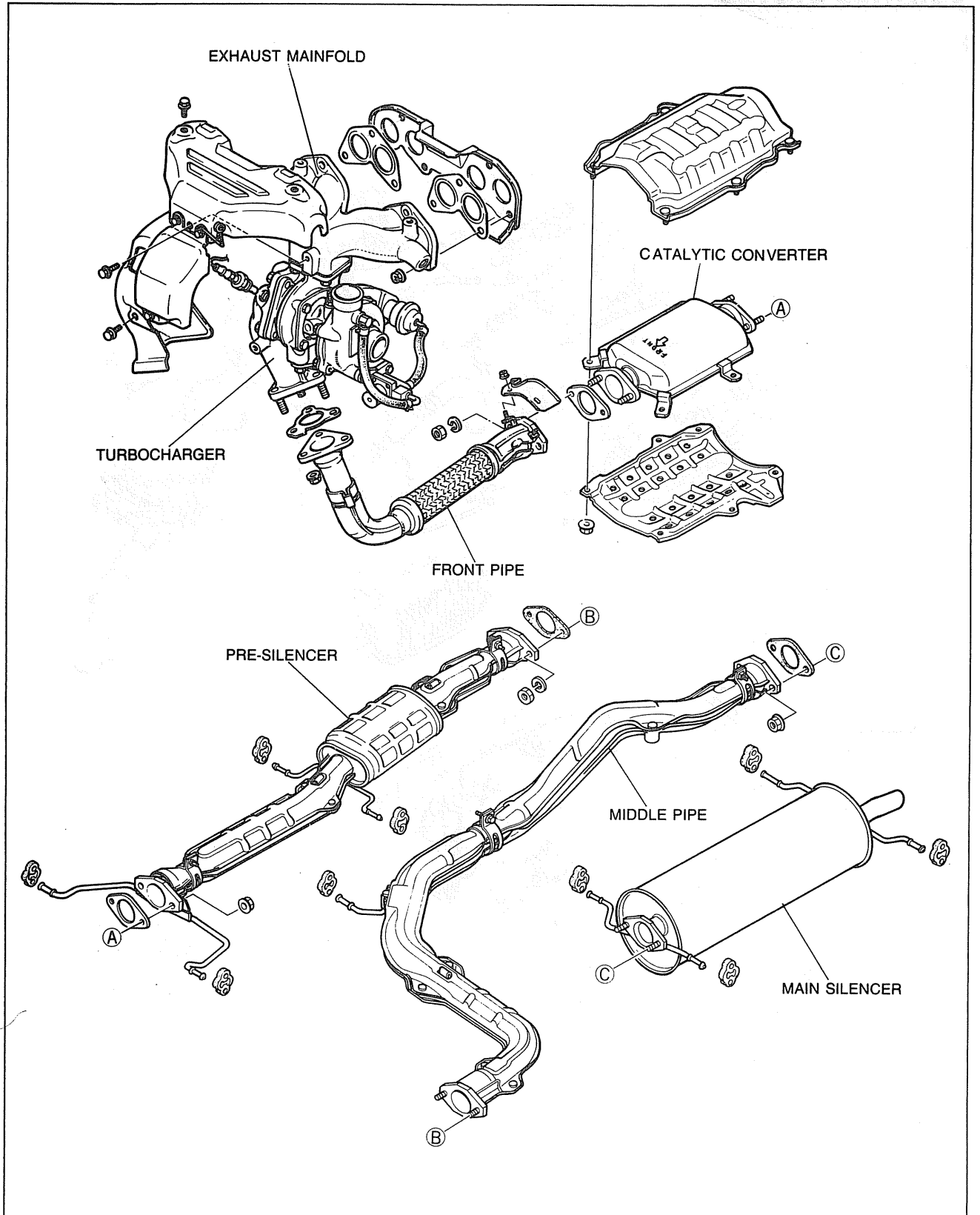
POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM



06U0F2-107

This system is the same as that of the non-turbo engine. Refer to page F1-73 for servicing the system.

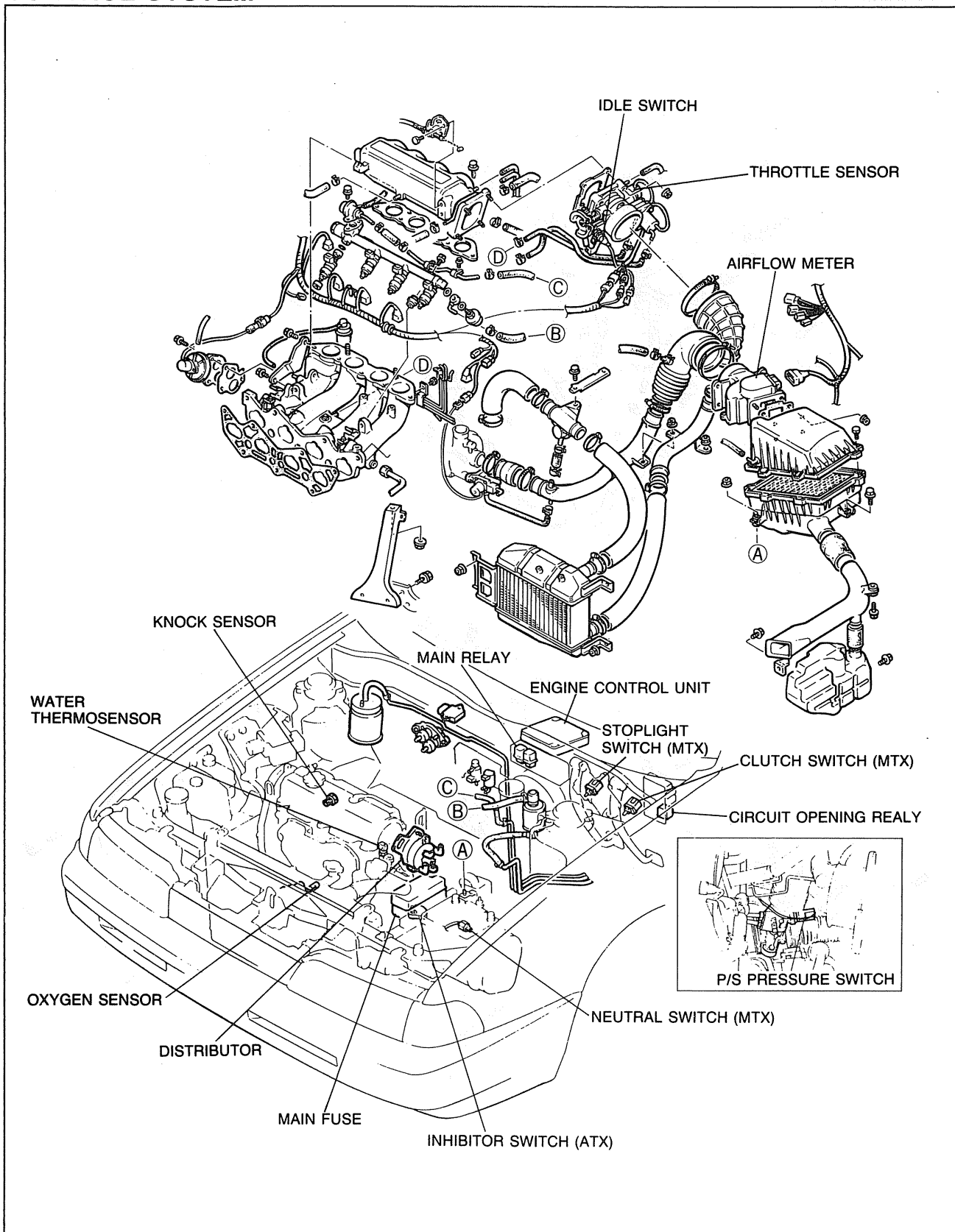
EXHAUST SYSTEM



06U0F2-108

The catalytic converter is used to reduce CO, HC and NO_x. The converter contains a compound of platinum and rhodium. It is a three-way catalyst type with a volume of **2,300 cc (140 cu in)**. This system is the same as that of the non-turbo engine. Refer to page F1-74 for servicing the system.

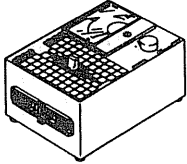
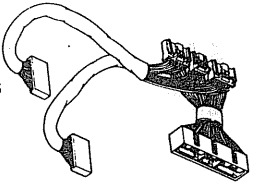
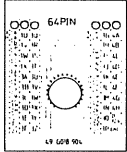
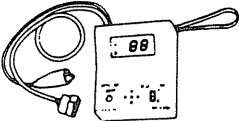
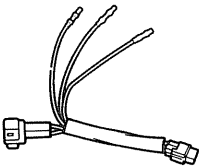
CONTROL SYSTEM



86U04B-123

The control system consists of the input devices and the control unit. The control unit controls the fuel injection amount (EGI), fuel injection pressure, bypass air amount, ignition timing, switch monitor function, and fail-safe function.

**PREPARATION
SST**

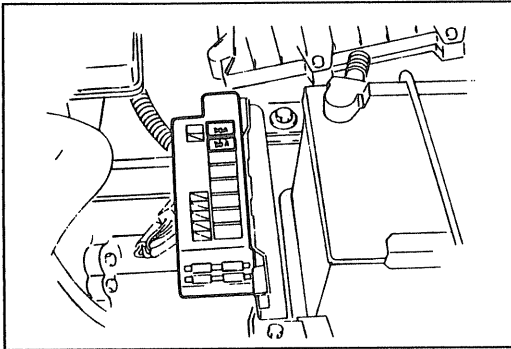
<p>49 9200 162 Engine Signal Monitor</p> 	<p>For inspection of engine control unit</p>	<p>49 G018 903 Adapter harness</p> 	<p>For inspection of engine control unit</p>
<p>49 G018 904 Sheet</p> 	<p>For inspection of engine control unit</p>	<p>49 H018 9A1 Self-Diagnosis Checker</p> 	<p>For inspection of oxygen sensor</p>
<p>49 G018 901 Adapter harness</p> 	<p>For inspection of throttle sensor</p>	<p style="text-align: right;">06U0F2:100</p>	

RELATIONSHIP CHART Output Devices and Input Devices

○: Related x: Not related

INPUT DEVICES	OUTPUT DEVICES										
	INJECTOR	FUEL INJECTION AMOUNT	FUEL INJECTION TIMING	BAC VALVE	AIR VALVE	ISC VALVE	SOLENOID VALVE (EGR Vent side)	SOLENOID VALVE (EGR Vacuum side)	SOLENOID VALVE (PURGE)	SOLENOID VALVE (PRESSURE REGULATOR)	SOLENOID VALVE (WASTEGATE)
TEST CONNECTOR	x	x	x	○	x	x	x	x	x	x	○
KNOCK SENSOR	x	x	x	x	x	x	x	x	○	○	
STOPLIGHT SWITCH	○	x	x	x	x	x	x	x	x	x	
EGR POSITION SENSOR	x	x	x	x	○	○	x	x	x	○	
ELECTRICAL LOAD	x	x	x	○	x	x	x	x	x	x	
P/S PRESSURE SWITCH	x	x	x	○	x	x	x	x	x	x	
A/C SWITCH	○	x	x	○	x	x	x	x	x	x	
IGNITION SWITCH (STA POSITION)	○	○	x	x	x	x	x	○	x	○	
INHIBITOR SWITCH and EC-AT CONTROL UNIT	○	x	x	○	x	x	○	x	x	○	
NEUTRAL AND CLUTCH SWITCH	○	x	x	○	x	x	○	x	x	○	
OXYGEN SENSOR	○	x	x	x	x	x	○	x	x	x	
ATMOSPHERIC PRESSURE SENSOR	○	x	x	○	x	x	○	x	x	x	
INTAKE AIR THERMOSENSOR	○	x	x	○	x	x	○	○	○	x	
WATER THERMOSENSOR	○	○	x	○	○	○	○	○	○	○	
IDLE SWITCH	○	○	x	○	○	○	x	x	x	○	
THROTTLE SENSOR	○	○	x	○	○	○	○	○	x	○	
AIRFLOW METER	○	x	x	x	○	○	○	x	○	○	
Ne SIGNAL	○	○	x	○	○	○	○	○	○	○	
G2 SIGNAL	x	○	x	x	x	x	x	x	x	○	
G1 SIGNAL	x	○	x	x	x	x	x	x	x	○	

ENGINE CONDITIONS		CRANKING (COLD ENGINE)	WARMING UP (DURING IDLE)	MEDIUM LOAD		ACCELERATION	HEAVY LOAD	DECELERATION	IDLE (THROTTLE VALVE FULLY CLOSED)	IGN: ON (ENGINE NOT RUNNING)	REMARKS	
				COLD	WARM							
OUTPUT DEVICES												
INJECTOR	INJECTION	Rich			Rich and lean	Rich		Fuel cut	Rich and lean	No injection		
	INJECTION TIMING	1 group (once per revolution)	2 group (once per two revolutions)						2 group (once per two revolutions)		Above 6,300 rpm: fuel cut	
BAC VALVE	AIR VALVE	Open*			Close						* Coolant temp: below 50°C (122°F)	
	ISC VALVE	Large amount of bypass air	Large amount of bypass air*	Small amount of bypass air						No bypass	* In extremely cold condition	
SOLENOID VALVE (EGR Vent side)		OFF (Duty value 0%) (Atmospheric pressure to EGR valve)			Operate [Duty values (EGR amount) change*]	OFF (Duty value 0%) (Atmospheric pressure to EGR valve)			Does not operate	* Depends on engine condition		
SOLENOID VALVE (EGR Vacuum side)		EGR cut OFF (No vacuum to EGR valve)				EGR cut OFF (No vacuum to EGR valve)						
SOLENOID VALVE (PURGE)		OFF (Purge cut)			Operate [Duty values (purge amount) change*]		OFF (Purge cut)			* Depends on engine condition		
SOLENOID VALVE (PRESSURE REGULATOR CONTROL)		OFF (Vacuum to pressure regulator)							After starting: ON* (Vacuum cut)	OFF	* During hot start only	
SOLENOID VALVE (WASTEGATE)		OFF (Boost pressure not released)		ON (Duty value 100%)		ON (Duty value changes)* (Boost pressure controlled)		OFF (Boost pressure not released)		OFF	* When knocking occurs	
IGNITER (ignition timing)		Fixed at BTDC 6°	Advanced: depends on engine condition			Retarded: depends on intensity of knocking		Advanced: depends on engine speed		-		

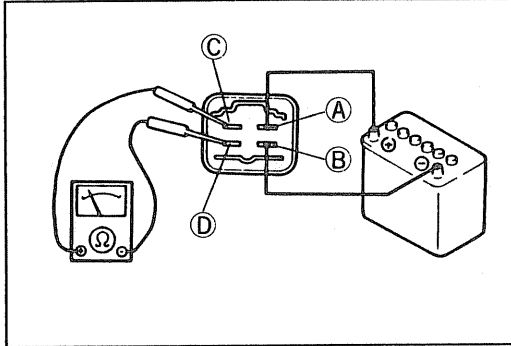


69G04A-161

EGI MAIN FUSE

Inspection

Check the continuity of EGI main fuse.



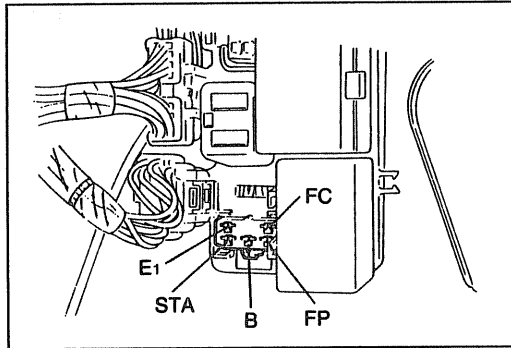
16U0F2-067

MAIN RELAY

Inspection

1. Check that a "clicking" sound is heard at the main relay when turning the ignition switch ON and OFF.
2. Apply 12V and a ground to (A) and (B) terminals of the main relay.
3. Check continuity at terminals using an ohmmeter.

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



16U0F2-068

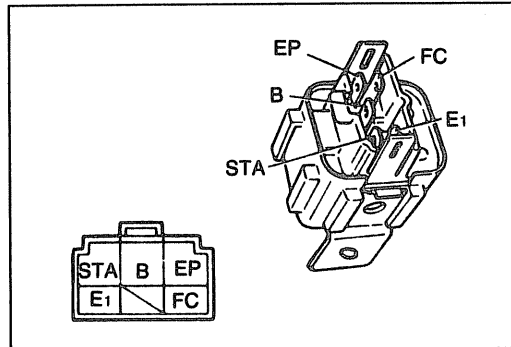
CIRCUIT OPENING RELAY

Inspection

Relay Circuit

1. Remove the circuit opening relay.
2. Check the circuit as described.

Terminal	Checking item	Correct result
Fp	Resistance	0.2—30Ω
Fc	Continuity (cranking)	∞
B	Voltage (Ign: ON)	Battery voltage
STA	Voltage (Cranking)	Approx. 9V
E1	Continuity	∞



06U0F2-129

Circuit Opening Relay

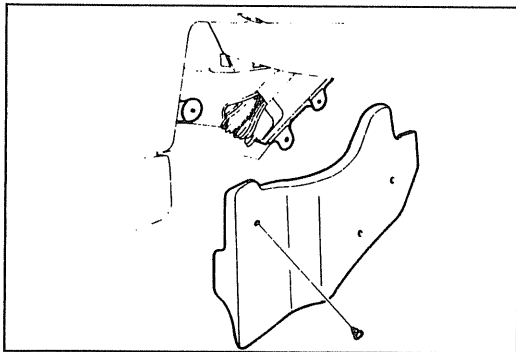
Apply 12V and a ground to the terminals below and check the circuit opening relay as described.

12V	Grounded	Correct result
STA	E1	B ↔ FP: Continuity
B	Fc	Fp: Battery voltage

Resistance

Check the resistance between the terminals using an ohmmeter.

Between terminals	Resistance (Ω)
STA ↔ E1	21—43
B ↔ Fc	109—226
B ↔ Fp	∞

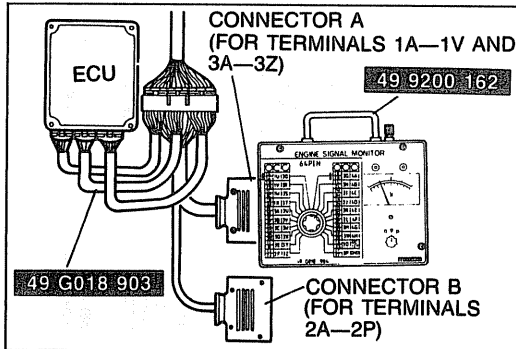


060UF2-111

ENGINE CONTROL UNIT

Inspection

1. Remove the front console cover of the passenger's side.

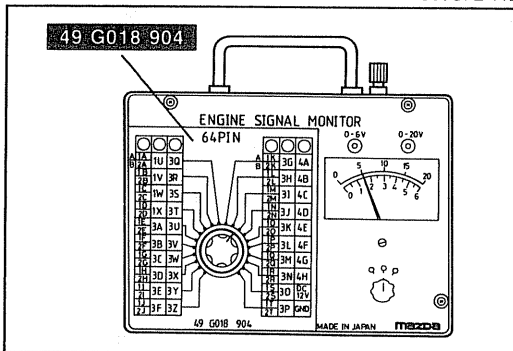


060UF2-112

2. Connect the **SST (Engine Signal Monitor)** between the engine control unit and the wiring harness using the **SST (Adapter)** as shown.

Note

- Use connector A of the Adapter to check the voltages at the terminals 1A through 1V and 3A through 3Z, and use connector B to check the voltages at the terminals 2A through 2P.

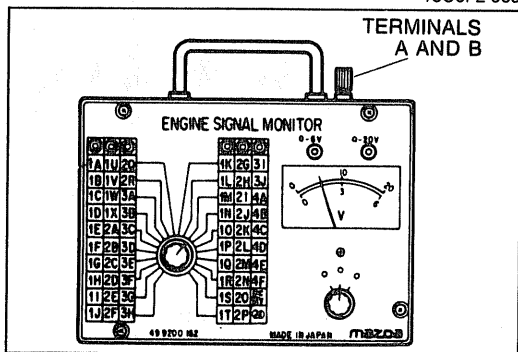


16U0F2-069

3. Place the **SST (Sheet)** on the **SST (Engine Signal Monitor)**.

4. Measure the voltage at each terminal.
(Refer to pages F2-100 to F2-102.)

5. If any engine control unit terminal voltage is incorrect, check the input or output device and related wiring.
If they are normal, replace the engine control unit.
(Refer to page F2-103.)

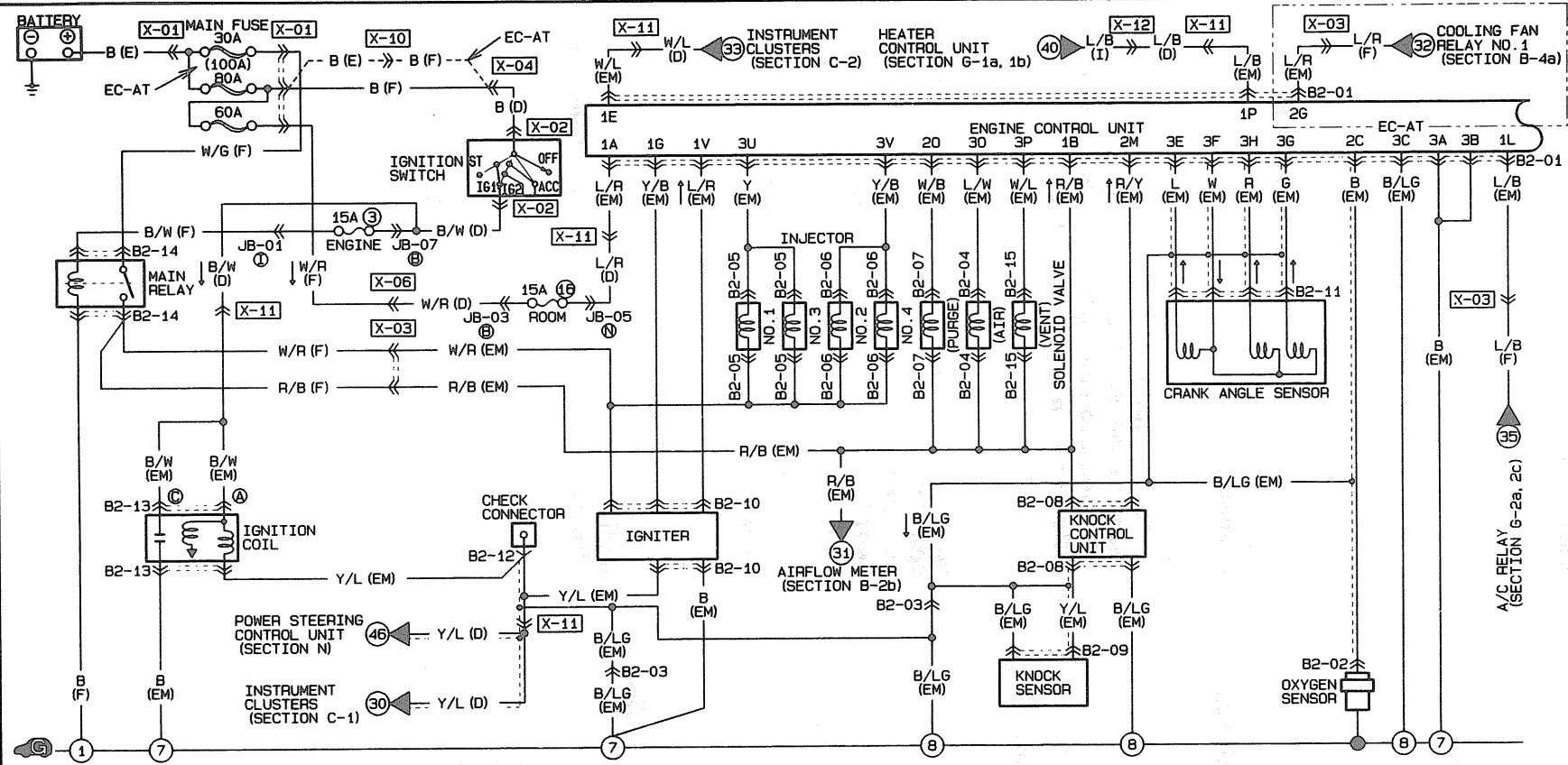


06U0F2-114

Caution

- Never apply voltage to SST terminals A and B.

TURBO ■ IGNITION SYSTEM ■ ENGINE CONTROL SYSTEM



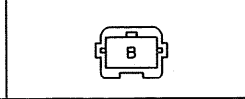
B2-01 ENGINE CONTROL UNIT (EM)

1U	1S	1G	1O	1M	1K	1I	1G	1E	1C	1A
B	G	W/G	G/B	Y/W	*	R/W	Y/B	W/L	B/Y	L/R
1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B
L/R	BR	LG/B	L/B	BR/R	L/B	B/L	W	LG/B	W/Y	R/B

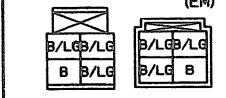
20	2M	2K	2I	2G	2E	2C	2A
W/B	R/Y	R	LG/R	L/R	Y/B	B	R/W
2P	2N	2L	2J	2H	2F	2D	2B
*	*	*	Y/L	*	LG/W	B/L	R/B

3Y	3M	3U	3S	3O	3Q	3M	3K	3I	3G	3E	3C	3A
*	*	Y	/	*	W	L/W	W/R	*	*	L	B/LG	B
3Z	3X	3V	3T	3R	3P	3N	3L	3J	3H	3F	3D	3B
*	*	Y/B	LG	BR/Y	W/L	*	Y/R	*	R	W	LG/Y	B

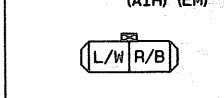
B2-02 OXYGEN SENSOR (EM)



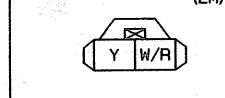
B2-03 JOINT CONNECTOR (EM)



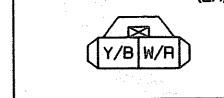
B2-04 SOLENOID VALVE (AIR) (EM)



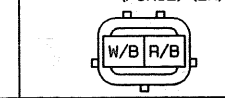
B2-05 INJECTOR NO. 1, 3 (EM)



B2-06 INJECTOR NO. 2, 4 (EM)



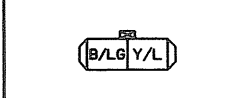
B2-07 SOLENOID VALVE (PURGE) (EM)



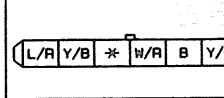
B2-08 KNOCK CONTROL UNIT (EM)



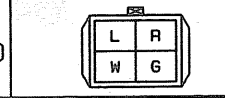
B2-09 KNOCK SENSOR (EM)



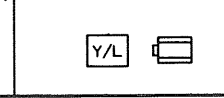
B2-10 IGNITER (EM)



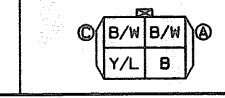
B2-11 CRANK ANGLE SENSOR (EM)



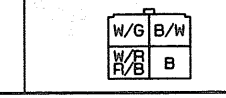
B2-12 CHECK CONNECTOR (EM)



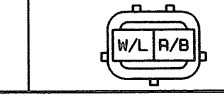
B2-13 IGNITION COIL (EM)



B2-14 MAIN RELAY (F)



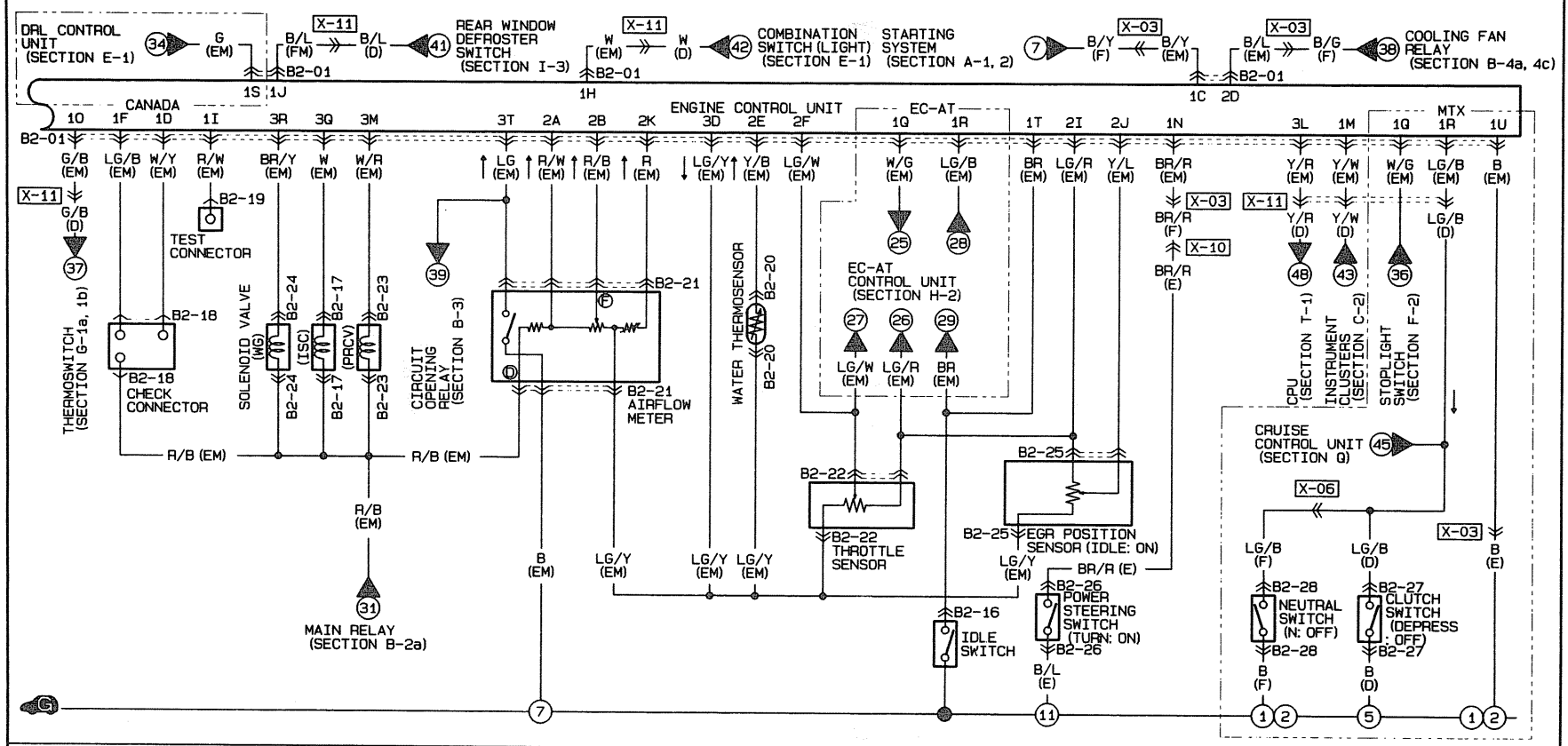
B2-15 SOLENOID VALVE (VENT) (EM)



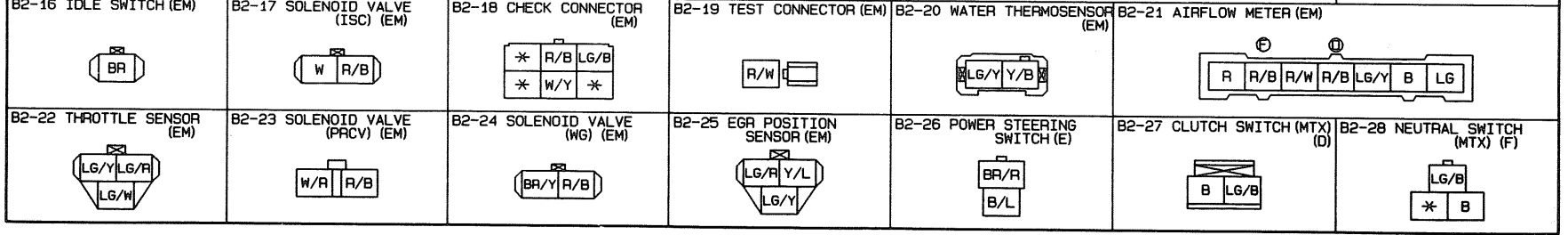
TURBO ENGINE CONTROL SYSTEM

CONTROL SYSTEM

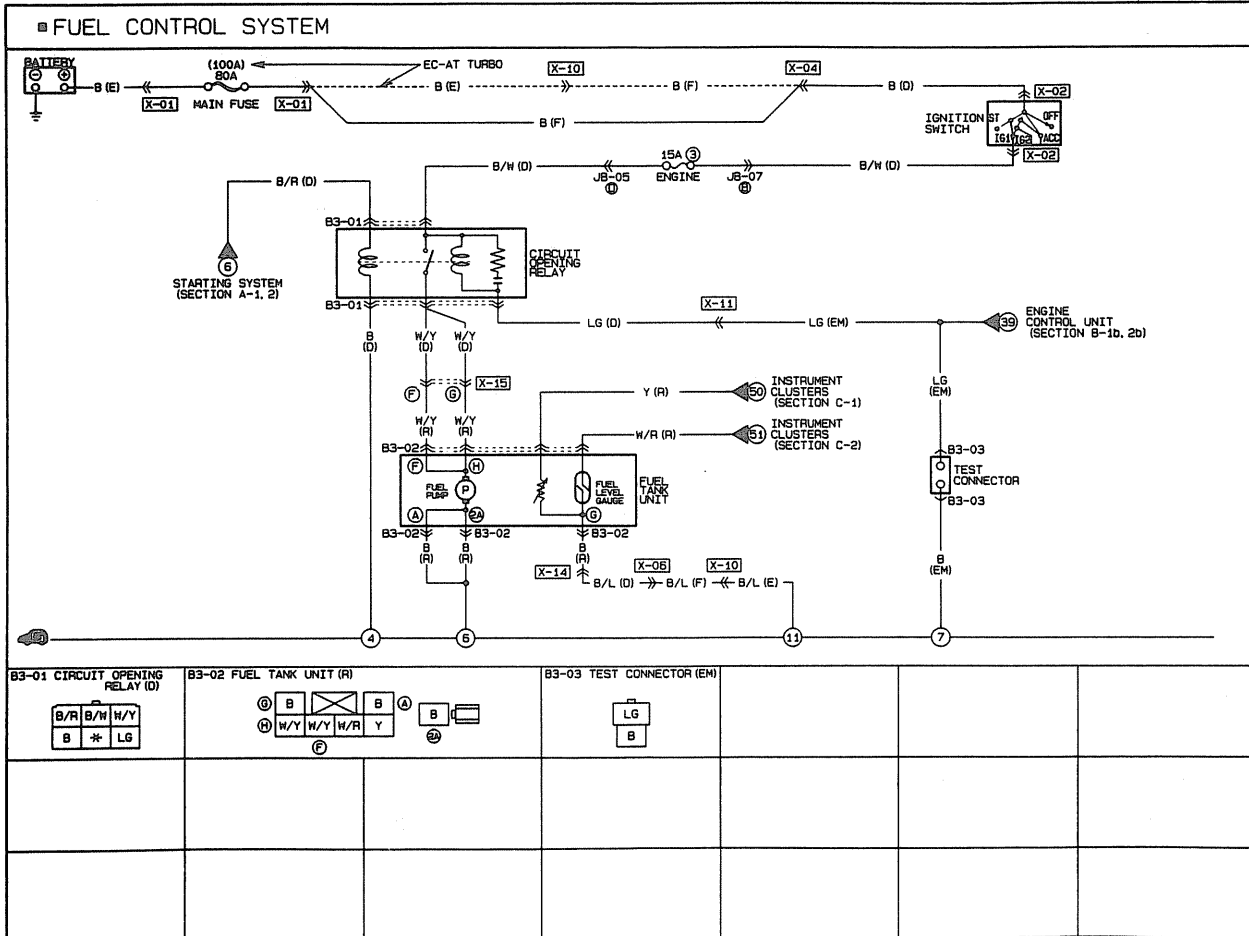
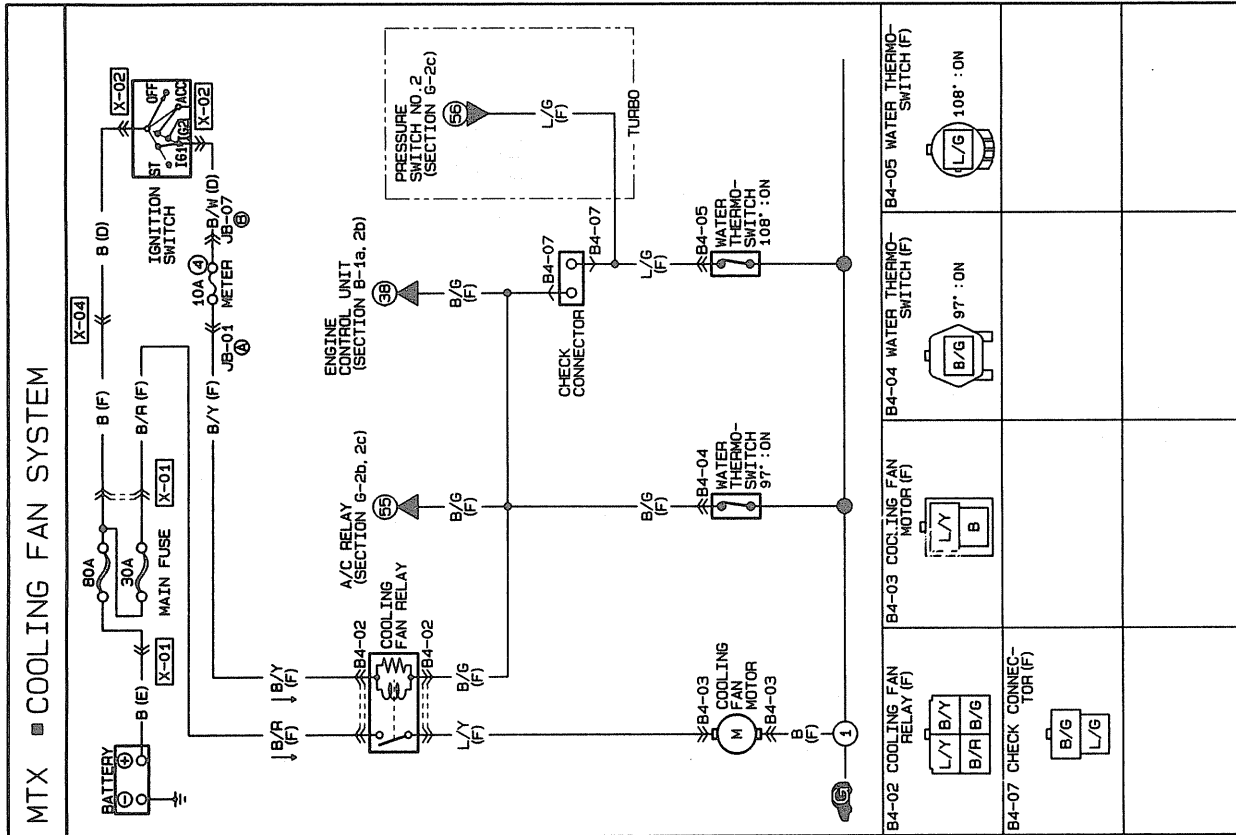
F2



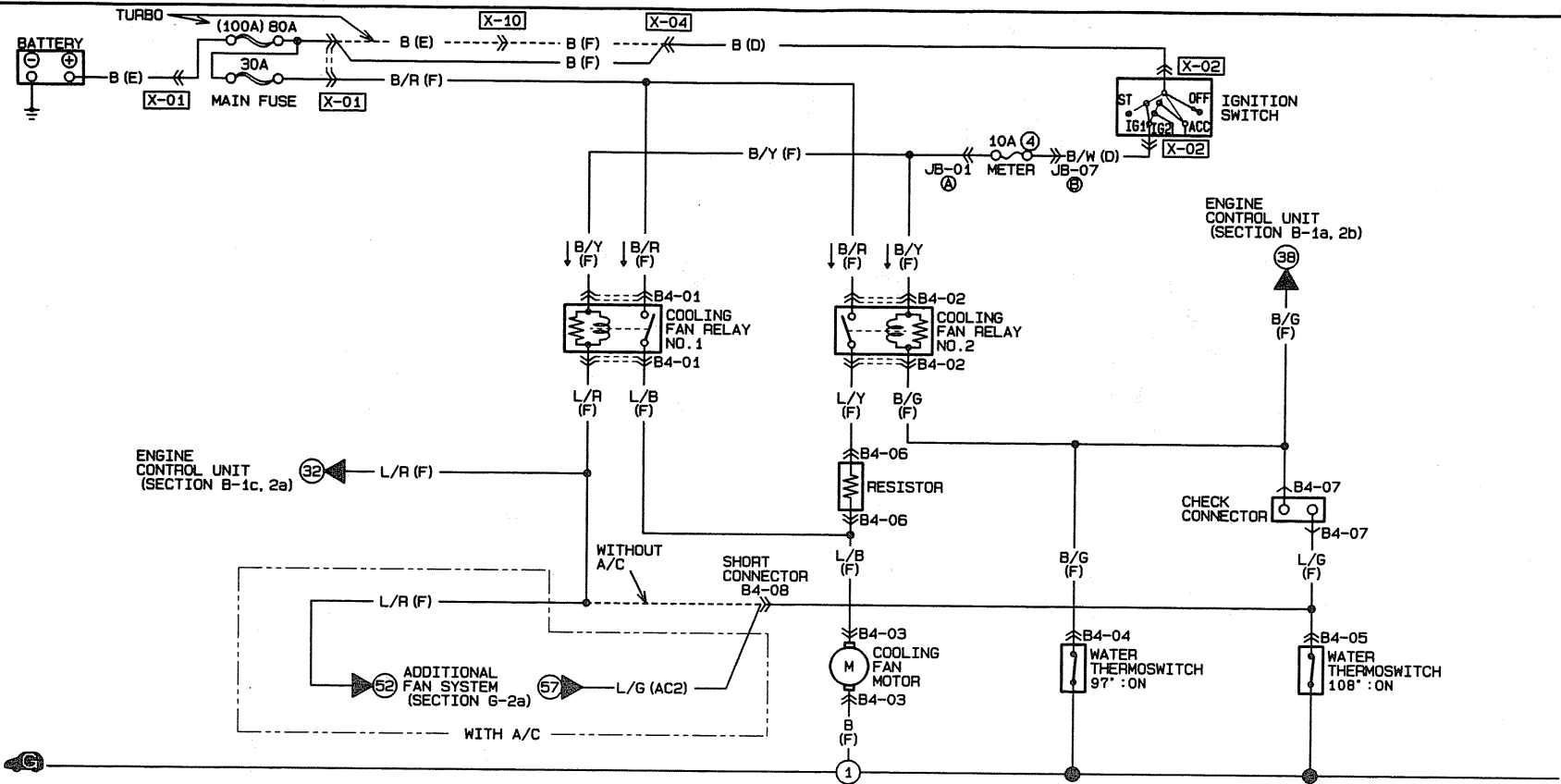
B2-01 ENGINE CONTROL UNIT (EM)										B2-03 JOINT CONNECTOR (EM)																									
1U	1S	1Q	1O	1M	1K	1I	1G	1E	1C	1A	20	2M	2K	2I	2G	2E	2C	2A	3Y	3H	3U	3S	3Q	3O	3M	3K	3I	3G	3E	3C	3A	B/LG/B/LG B/B/LG		B/LG/B/LG B/B/LG	
B	G	W/G	G/B	Y/W	*	R/W	Y/B	W/L	B/Y	L/R	W/B	R/Y	R	LG/R	L/R	Y/B	B	R/W	*	*	Y	*	W	L/W	W/R	*	*	G	L	B/LG	B				
L/R	BR	LG/B	L/B	BR/R	L/B	B/L	W	LG/B	W/Y	R/B	*	*	*	Y/L	*	LG/W	B/L	R/B	*	*	Y/B	LG	BR/Y	W/L	*	Y/R	*	R	W	LG/Y	B				
1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B	2P	2N	2L	2J	2H	2F	2D	2B	3Z	3X	3V	3T	3R	3P	3N	3L	3J	3H	3F	3D	3B				



Wiring diagram



EC-AT ■ COOLING FAN SYSTEM



B4-01 COOLING FAN RELAY NO. 1 (F) 	B4-02 COOLING FAN RELAY NO. 2 (F) 	B4-03 COOLING FAN MOTOR (F) 	B4-04 WATER THERMOSWITCH (F) 	B4-05 WATER THERMOSWITCH (F) 	B4-06 RESISTOR (F) 	B4-07 CHECK CONNECTOR (F)
B4-08 SHORT CONNECTOR WITHOUT A/C (F) 		WITH A/C (F) WITH A/C (AC2) 				

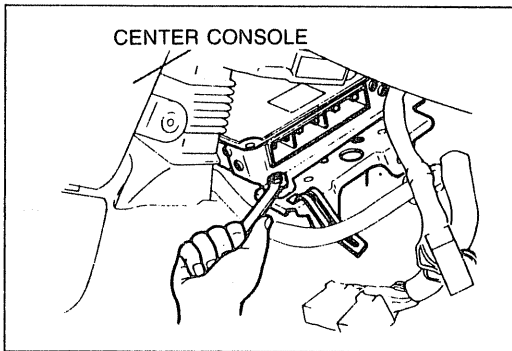
Terminal voltage

Terminal	Input	Output	Connected to	Voltage (After warming-up)		Remark
				IGN: ON	Idle	
1A	—	—	Battery	Battery voltage		For backup
1B	—	—	Main relay	Battery voltage		—
1C	○		Ign. switch [START] (MTX) Inhibitor switch (ATX)	Below 2.5V		While cranking: Battery voltage
1D		○	Self-Diagnosis Checker (Monitor lamp)	Test connect grounded <ul style="list-style-type: none"> For 3 sec. after ign. switch OFF→ON: Below 6.2V (lamp illuminates) After 3 sec.: Battery voltage (lamp does not illuminate) 	Test connector not grounded <ul style="list-style-type: none"> Lamp illuminates: Below 6.2V Lamp does not illuminate: Battery voltage Test connector grounded: Approx. 5V	Using Self-Diagnosis Checker
1E		○	Malfunction indicator lamp (MIL)	<ul style="list-style-type: none"> For 3 sec. after ign. switch OFF→ON: Below 4.8V (lamp illuminates) After 3 sec.: Battery voltage (lamp does not illuminate) 		<ul style="list-style-type: none"> Test connector grounded Lamp illuminates: Below 4.8V Lamp does not illuminate: Battery voltage
1F		○	Self-Diagnosis Checker (Code number)	<ul style="list-style-type: none"> For 3 sec. after ign. switch OFF→ON: Below 6.2V (Buzzer sounds) After 3 sec.: Battery voltage (Buzzer does not sound) 		<ul style="list-style-type: none"> Using Self-Diagnosis Checker and test connector grounded Buzzer sounds: Below 6.2V Buzzer does not sound: Battery voltage
1G		○	Igniter	0V	Approx. 0.6—0.8V	—
1H	○		Headlight switch	<ul style="list-style-type: none"> Headlight OFF: Below 1.5V Headlight ON : Battery voltage 		—
1I	○		Test connector	<ul style="list-style-type: none"> Test connector grounded: Below 1.5V Test connector not grounded: Above 10.5V 		Test connector: 1-pin, Green connector
1J	○		Rear window defroster switch	<ul style="list-style-type: none"> Switch OFF: Battery voltage Switch ON : Below 1.5V 		—
1K	—	—	—	—		—
1L		○	A/C relay	Battery voltage	<ul style="list-style-type: none"> A/C switch ON: Below 2.5V A/C switch OFF: Battery voltage 	Blower motor ON
1M	○		Vehicle speed switch	Batter voltage		Above 130 mph (210 km/h): Below 1.0V
1N	○		Power steering pressure switch	Above 10.5V	<ul style="list-style-type: none"> P/S ON: Below 1.5V P/S OFF: Above 10.5V 	—
1O			A/C switch	<ul style="list-style-type: none"> A/C switch ON : Below 1.5V A/C switch OFF: above 10.0V 		Blower motor ON
1P	○		Blower fan switch	<ul style="list-style-type: none"> Switch less than 2nd position: Battery voltage Switch 3rd or 4th position: Below 1.5V 		

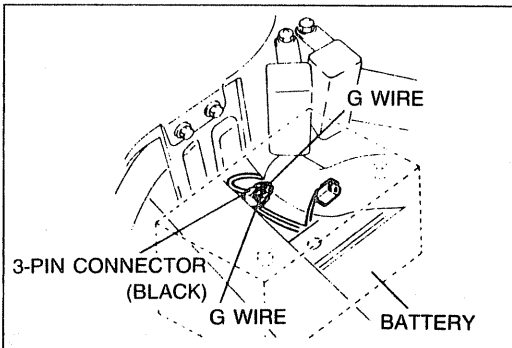
Terminal	Input	Output	Connected to	Voltage (After warming-up)		Remark
				IGN: ON	Idle	
1Q	○		Stoplight switch (MTX)	<ul style="list-style-type: none"> Brake pedal released: Below 3.6V Brake pedal depressed: Above 10.0V 		
			EC-AT control unit (ATX)	Below 1.5V		3-2, 2-1 shifting and throttle valve more than 5/8 open: Battery voltage
1R	○		Inhibitor switch through EC-AT unit	"N" or "P" range: below 2.5V Other ranges: Battery voltage		ATX
			Neutral and clutch switch	In-gear condition Clutch pedal depressed: below 0.5V Clutch pedal released: Battery voltage		MTX (Neutral: Below 0.5V)
1S	○		Daytime running light control unit (Canada only)	<ul style="list-style-type: none"> Parking brake lever pulled up: Battery voltage Parking brake lever released: Below 1.5V 		—
1T	○		Idle switch	<ul style="list-style-type: none"> Accelerator pedal released: Below 0.5V Accelerator pedal depressed: Above 7.7V 		—
1U	○		—	Constant below 1.5V		MTX
			—	Constant above 10.5V		ATX
1V	○		Igniter	Below 1.0V	0.1—1.8V	
2A	○		Airflow meter (Vc)	7—9V		—
2B	○		Airflow meter (Vs)	Approx. 1.7V	Approx. 3—5V	Increase engine speed: voltage increase
2C	○		Oxygen sensor	0V	0—1.0V	<ul style="list-style-type: none"> Cold engine at idle: 0V After warming-up Acceleration: 0.5V—1.0V Deceleration: 0—0.4V
2D	○		Electrical fan [Low] (No.1 water thermostat)	Battery voltage		Coolant temp.: Below 97°C (207°F)
		Below 1.5V		Coolant temp.: Above 97°C (207°F)		
2E	○		Water thermosensor	0.3—0.6V		Coolant temp.: 20°C (68°F): Approx. 2.5V
2F	○		Throttle sensor	Accelerator pedal released: Approx. 0.5V (depends on 21 terminal voltage)		Throttle valve fully open: 4.3V
2G	○		Electrical fan [High] (No.2 water thermostat) (ATX)	Battery voltage		Coolant temp.: Below 108°C (226°F)
		Below 1.5V		Coolant temp.: Above 108°C (226°F)		
2H	—	—	—	—		—
2I	—	—	Vref	4.5—5.5V		—
2J	○		ECR position sensor	0.25—0.95V		
2K	○		Airflow meter (Intake air thermostat)	Approx. 2.5V at 20°C (68°F)		—
2L	—	—	—	—		—
2M	○		Knock control unit	3.3—5.0V		Knocking: 1.3—2.6V
2N	—	—	—	—		—
2O		○	Solenoid valve (Purge control)	Battery voltage		—
2P	—	—	—	—		—
3A	—	—	Ground (E01)	0V		—

Terminal	Input	Output	Connected to	Voltage (After warming-up)		Remark
				IGN: ON	Idle	
3B	—	—	Ground (E02)	0V		—
3C	—	—	Ground (E1)	0V		—
3D	—	—	Ground (E2)	0V		—
3E	○		Distributor (Ne ⊕signal)	Approx. 0.6—0.8V		
3F	○		Distributor (Ne, G1, G2, ⊖ signal)	Approx. 0.6—0.8V		
3G	○		Distributor (G1 ⊕signal)	Approx. 0.6—0.8V		
3H	○		Distributor (G2 ⊕signal)	Approx. 0.6—0.8V		
3I	—	—	—	—		—
3J	—	—	—	—		—
3K	—	—	—	—		—
3L		○	Warning buzzer Overboost	Type A* ¹ : Approx. 0.08V Type B* ² : Approx. 12V		Buzzer sounds: Type A: 0V Type B: Below 1V
3M		○	Solenoid valve (Pres- sure regulator control)	For 120 sec. after ign. switch OFF → ON: Below 3.5V	For 120 sec. after starting: Below 3.5V	Coolant temp. above 70°C (158°F) and in- take air temp. above 20°C (63°F)
3N	—	—	—	—		—
3O		○	Solenoid valve (EGR-vent side)	Battery voltage		
3P		○	Solenoid valve (EGR-vacuum side)	Battery voltage		<ul style="list-style-type: none"> • Voltages change depending on driving condition (EGR amount) • Cold engine: battery voltage Engine coolant temp.-below 40°C (104°F)
3Q		○	ISC valve	Engine signal monitor green and red lamps flash		
3R		○	Solenoid valve (Waste gate)	Battery voltage		<ul style="list-style-type: none"> • Suddenly increase engine speed to above 4,500 rpm: Below 3.5V
3S	—	—	—	—		—
3T		○	Circuit opening relay	Battery voltage	Below 3.5V	
3U		○	Injector (No.1 and No.3)	Battery voltage	Battery voltage	* Engine signal monitor green and red lamps flash
3V		○	Injector (No.2 and No.4)			
3W	—	—	—	—		—
3X	—	—	—	—		—
3Y	—	—	—	—		—
3Z	—	—	—	—		—

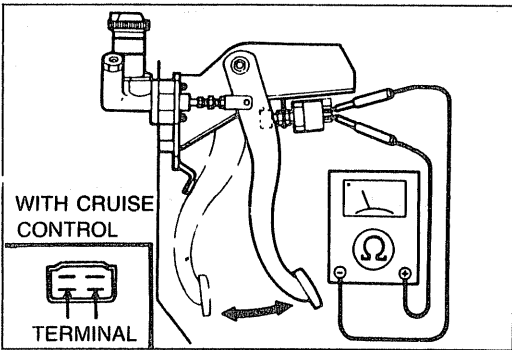
*¹ Type A: Manufacturer for CPU of body electrical system is "NEC".*² Type B: Manufacturer for CPU of body electrical system is "YAZAKI or U-shin".



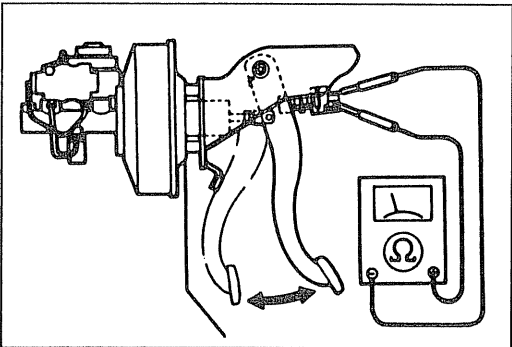
86U04A-174



06U0F2-117



16U0F2-070



16U0F2-071

Replacement

1. Disconnect the negative battery cable.
2. Remove the front console covers (right and left).
3. Disconnect the connectors from the control unit.
4. Replace the control unit.

NEUTRAL SWITCH (MTX)

Inspection

1. Disconnect the neutral switch connector.
2. Connect an ohmmeter to the switch.
3. Check continuity of the switch.

Transmission	Continuity
In neutral	Yes
In other ranges	No

4. After checking, connect the switch connector.

Note

- Refer to section J for replacement of the neutral switch.

CLUTCH SWITCH (MTX)

Inspection

1. Disconnect the clutch switch connector.
2. Connect an ohmmeter to the switch.
3. Check continuity of the switch.

Pedal	Continuity
Depressed	Yes
Released	No

4. After checking, connect the switch connector.

Note

- Refer to section T for replacement of the clutch switch.

STOPLIGHT SWITCH (MTX)

Inspection

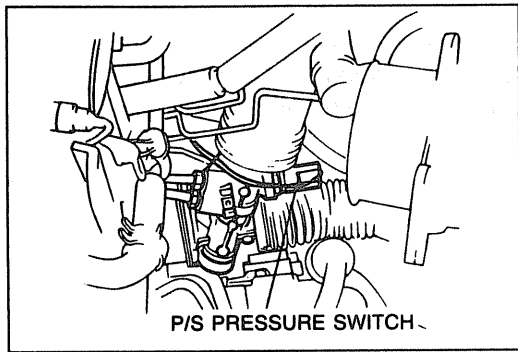
1. Disconnect the stoplight switch connector.
2. Connect an ohmmeter to the switch.
3. Check the continuity of the switch.

Pedal	Continuity
Depressed	Yes
Released	No

4. After checking, connect the switch connector.

Note

- Refer to section T for replacement of the stoplight switch.



06U0F2-120

P/S PRESSURE SWITCH

Inspection

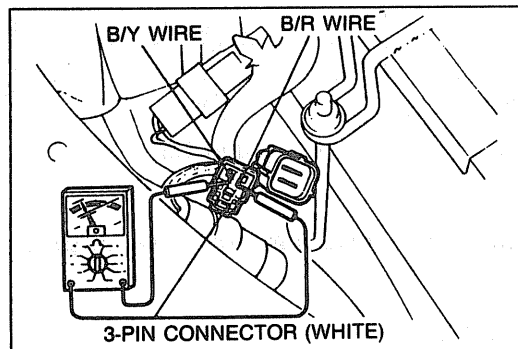
1. Disconnect the P/S pressure switch connector.
2. Connect an ohmmeter to the switch.
3. Start the engine. Check continuity of the switch while turning the steering wheel at idle.

P/S	Continuity
Turning	Yes
Not turning	No

4. Connect the switch connector after checking.

Note

- Refer to section N for replacement of the P/S pressure switch.



06U0F2-121

INHIBITOR SWITCH (ATX)

Inspection

1. Disconnect the inhibitor switch connector.
2. Connect an ohmmeter to the switch.
3. Check continuity of the switch.

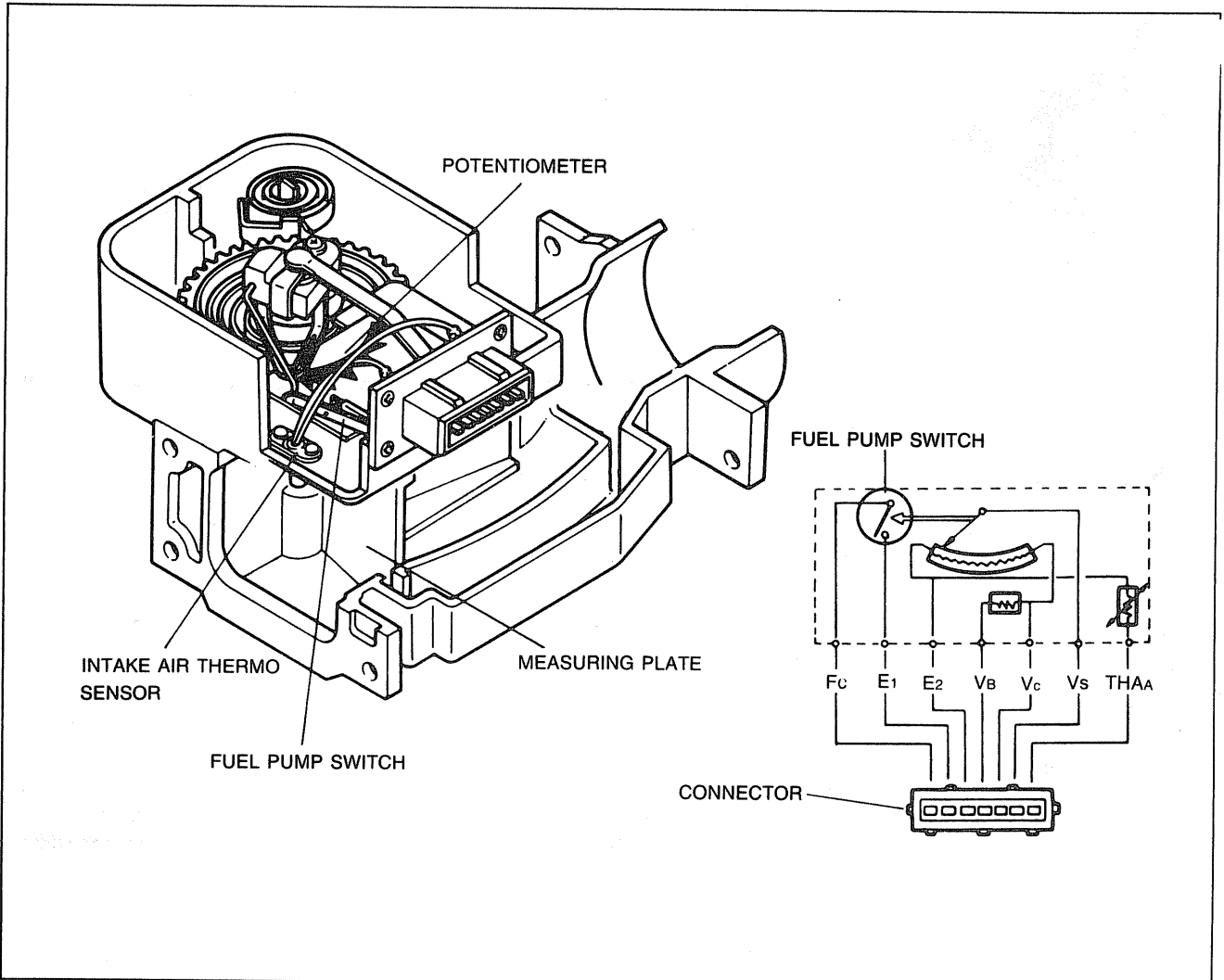
Position	Continuity
P and N ranges	Yes
Other ranges	No

4. Connect the switch connector after checking.

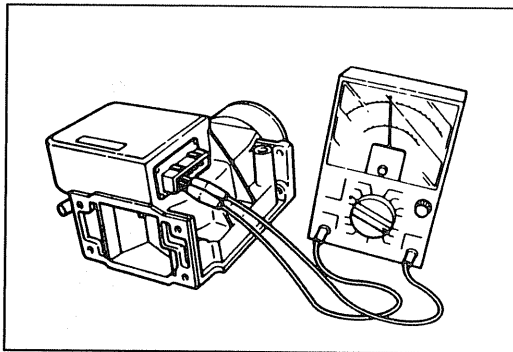
Note

- Refer to Section K for replacement of the inhibitor switch.

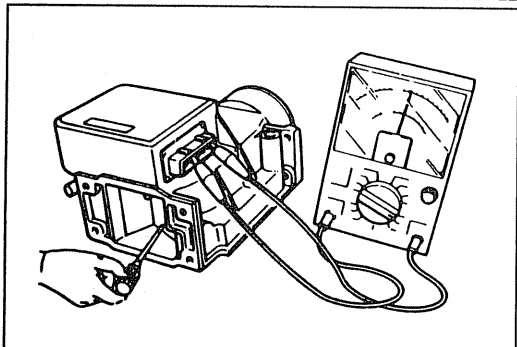
AIRFLOW METER



69G04C-100



06U0F2-122



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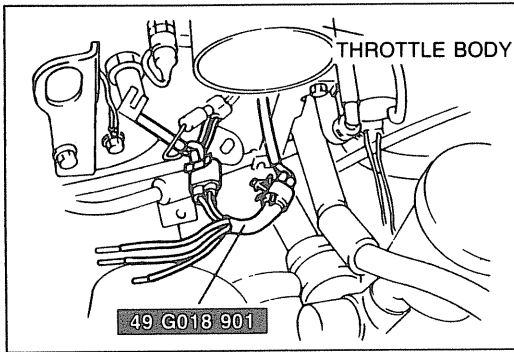
Inspection

1. Remove the airflow meter. (Refer to page F2-38)
2. Check the airflow meter body for cracks.
3. Verify that the measuring plate moves smoothly.
4. Disconnect the connector from the airflow meter.
5. Using an ohmmeter, check resistance between the terminals with the measuring plate fully closed and fully open.
6. Connect the connector to the airflow meter after inspecting.

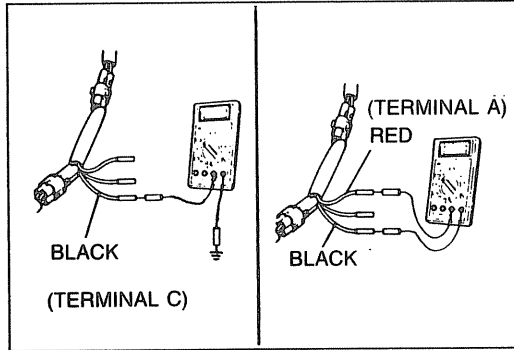
Terminal	Resistance (Ω)	
	Fully closed	Fully open
E2↔Vs	20-400	20-1,000
E2↔Vc	100-400	
E2↔Vb	200-400	
E2↔THA (Intake air thermo sensor)	-20°C (-4°F) 20°C (68°F) 60°C (140°F)	13.6-18.4 k Ω 2.21-2.69 k Ω 493-667 Ω
E1↔Fc	∞	0

Note

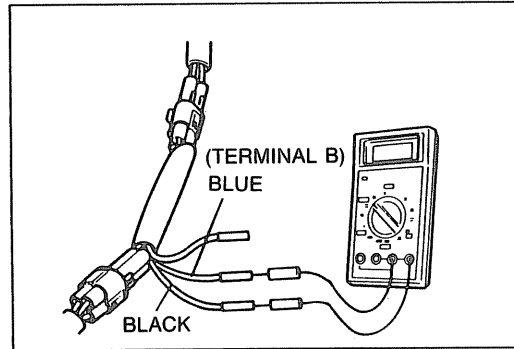
- Refer to page F2-38 for replacement of the airflow meter.



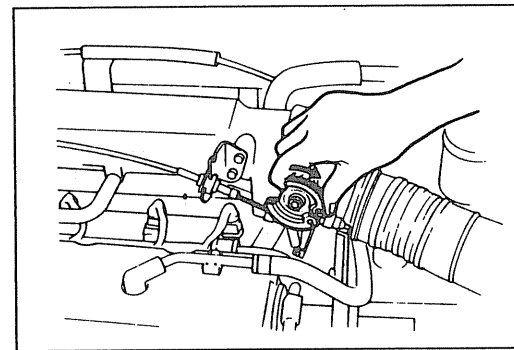
86U04A-183



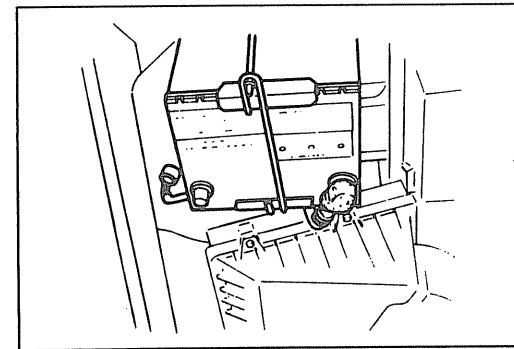
86U04A-184



86U04A-185



86U04A-186



96U04A-052

THROTTLE SENSOR

Caution

- Use a precision voltmeter with a scale of 0.01V to inspect or adjust the throttle sensor.

Inspection

1. Remove the air hose from the throttle body.
2. Disconnect the throttle sensor connector (3-pin).
3. Connect the **SST** between the throttle sensor and the wiring harness.
4. Turn the ignition switch ON.
5. Make sure that the throttle valve is fully closed.
6. Measure **BLACK** and **RED** wire voltages. Check that the voltages are as specified.

Specification:

- BLACK** wire — Approx. 0V
- RED** wire — 4.5—5.5V

7. If not correct, check the battery voltage and wiring harness. If these are OK, replace the engine control unit.
8. Record the **RED** wire voltage.

9. Check that **BLUE** wire voltage for the recorded **RED** wire voltage is as specified below.

Specification:

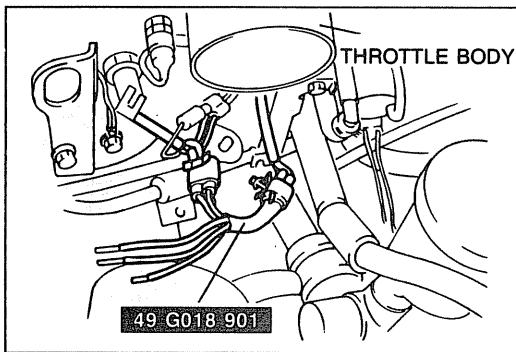
RED wire voltage (V)	BLUE wire voltage (V)	RED wire voltage (V)	BLUE wire voltage (V)
4.50—4.59	0.37—0.54	5.10—5.19	0.42—0.61
4.60—4.69	0.38—0.55	5.20—5.29	0.43—0.62
4.70—4.79	0.39—0.56	5.30—5.39	0.44—0.63
4.80—4.89	0.40—0.57	5.40—5.49	0.44—0.64
4.90—4.99	0.40—0.58	5.50	0.44—0.66
5.00—5.09	0.41—0.60		

10. Hold the throttle valve fully open.
11. Check that **BLUE** wire voltage for the recorded **RED** wire voltage is as specified.

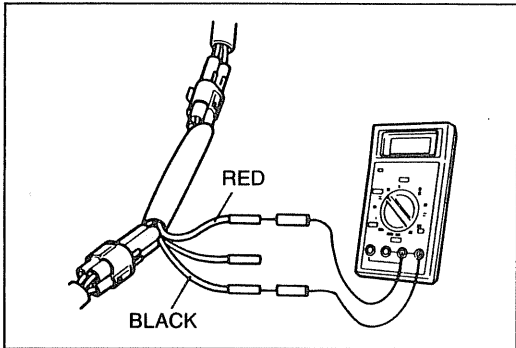
Specification:

RED wire voltage (V)	BLUE wire voltage (V)	RED wire voltage (V)	BLUE wire voltage (V)
4.50—4.59	3.58—4.23	5.10—5.19	4.05—4.79
4.60—4.69	3.66—4.32	5.20—5.29	4.13—4.88
4.70—4.79	3.74—4.41	5.30—5.39	4.21—4.98
4.80—4.89	3.82—4.51	5.40—5.49	4.29—5.07
4.90—4.99	3.90—4.60	5.50	4.29—5.17
5.00—5.09	3.97—4.70		

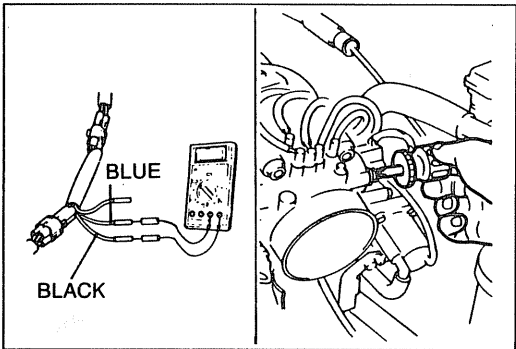
12. Check that **BLUE** wire voltage increases smoothly when opening the throttle valve from closed to fully open.
13. If not correct, replace the throttle sensor.
14. Turn the ignition OFF.
15. Disconnect the **SST** and reconnect the throttle sensor connector.
16. Disconnect the negative battery terminal and depress the brake pedal for at least 5 seconds to eliminate the control unit malfunction memory.



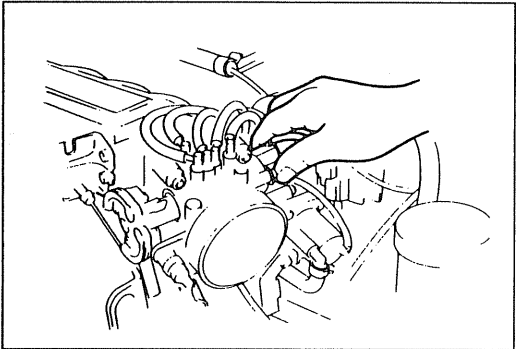
86U04A-188



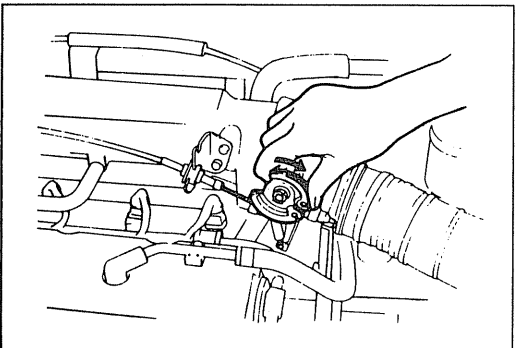
86U04A-189



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Adjustment

1. Remove the air hose from the throttle body.
2. Disconnect the throttle sensor connector (3-pin).
3. Connect the **SST** between the throttle sensor and the wiring harness.
4. Turn the ignition switch ON.
5. Make sure the throttle valve is fully closed.

6. Measure **RED** wire voltage and record it.

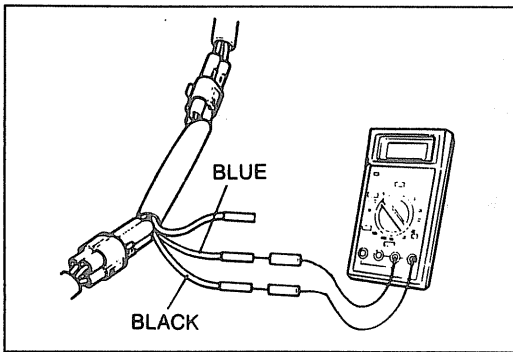
7. Change the voltmeter connection to the **BLUE** wire.
8. Loosen the throttle sensor mounting screws.

9. Turn the throttle sensor to adjust **BLUE** wire voltage within the range specified for the recorded **RED** wire voltage.

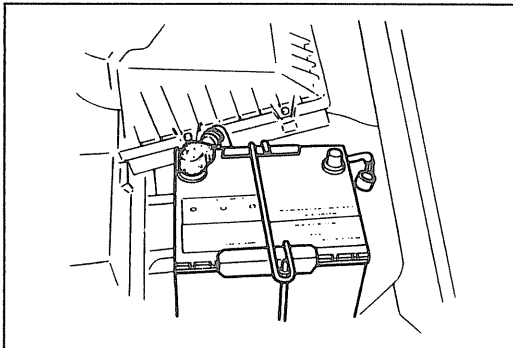
Specification:

RED wire voltage (V)	BLUE wire voltage (V)	RED wire voltage (V)	BLUE wire voltage (V)
4.50—4.59	0.37—0.54	5.10—5.19	0.42—0.61
4.60—4.69	0.38—0.55	5.20—5.29	0.43—0.62
4.70—4.79	0.39—0.56	5.30—5.39	0.44—0.63
4.80—4.89	0.40—0.57	5.40—5.49	0.44—0.64
4.90—4.99	0.40—0.58	5.50	0.44—0.66
5.00—5.09	0.41—0.60		

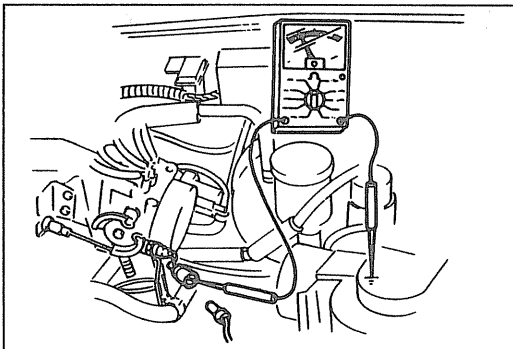
10. Tighten the throttle sensor mounting screws.
11. Recheck that **BLUE** wire voltage is within specification.
12. Hold the throttle valve fully open.



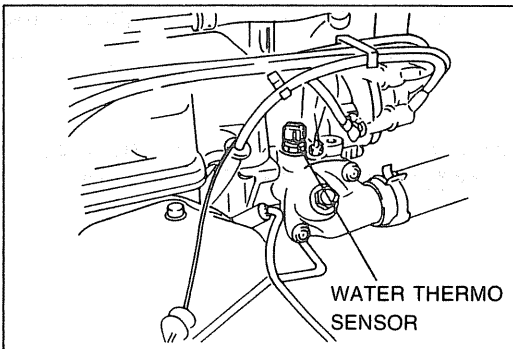
86U04A-193



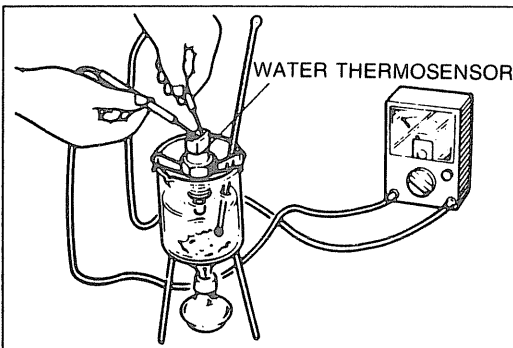
96U04A-053



86U04A-196



06U0F2-122



06U0F2-123

13. Check that **BLUE** wire voltage is within specification.

Specification:

RED wire voltage (V)	BLUE wire voltage (V)	RED wire voltage (V)	BLUE wire voltage (V)
4.50—4.59	3.58—4.23	5.10—5.19	4.05—4.79
4.60—4.69	3.66—4.32	5.20—5.29	4.13—4.88
4.70—4.79	3.74—4.41	5.30—5.39	4.21—4.98
4.80—4.89	3.82—4.51	5.40—5.49	4.29—5.07
4.90—4.99	3.90—4.60	5.50	4.29—5.17
5.00—5.09	3.97—4.70		

14. Check that **BLUE** wire voltage increases smoothly when opening the throttle valve from closed to fully open.

15. If not correct, replace the throttle sensor.

16. Turn the ignition OFF.

17. Disconnect the **SST** and reconnect the throttle sensor connector.

18. Disconnect the negative battery terminal and depress the brake pedal for at least 5 seconds to eliminate the control unit malfunction memory.

IDLE SWITCH

Inspection

1. Disconnect the idle switch connector (1-pin).

2. Check continuity between the switch and ground.

Throttle valve condition	Continuity
Fully closed	Yes*
Open	No

* Less than 30Ω is acceptable

3. If not correct, check condition of wiring harness of the idle switch. Replace the idle switch and throttle body as an assembly, if necessary.

WATER THERMOSENSOR

Inspection

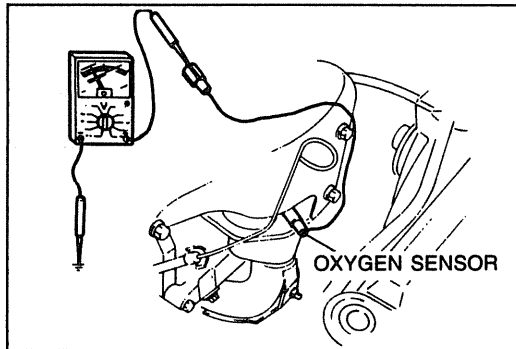
1. Remove the water thermostat sensor from the cylinder head.

2. Place the sensor in water with a thermometer and heat the water gradually.

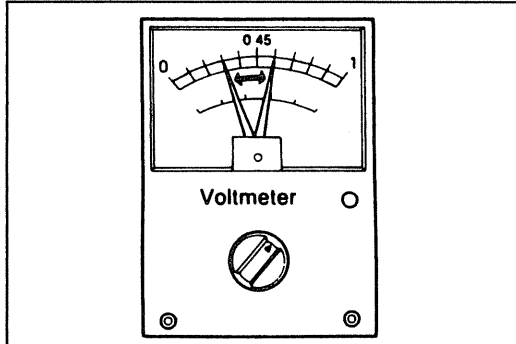
3. Check resistance of the sensor with an ohmmeter.

Coolant	Resistance
-20°C (-4°F)	14.6—17.8 kΩ
20°C (68°F)	2.2—2.7 kΩ
40°C (104°F)	1.0—1.3 kΩ
60°C (140°F)	500—650Ω
80°C (176°F)	290—350Ω

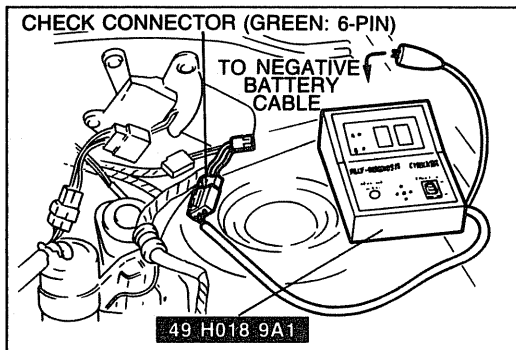
4. If not correct, replace the water thermostat sensor.



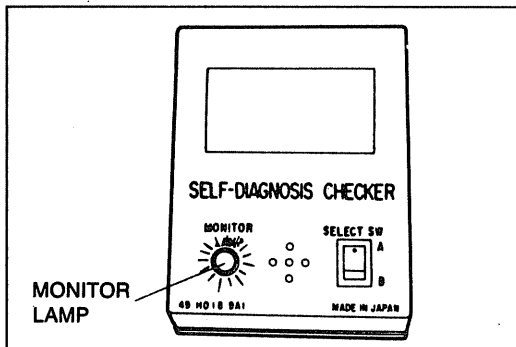
86U04A-205



16U0F2-081



86U04A-207



86U04A-208

OXYGEN SENSOR**Inspection of Output Voltage**

1. Warm up the engine and run it at idle.
2. Disconnect the oxygen sensor connector.
3. Connect a voltmeter between the oxygen sensor and ground.
4. Run the engine at **4,500 rpm** until the voltmeter indicates **approx. 0.7V**.
5. Increase and decrease the engine speed suddenly several times. Verify that when the speed is increased the meter reads between **0.5V—1.0V**, and when the speed is decreased it reads between **0V—0.4V**.
6. If not as specified, replace the oxygen sensor.

Inspection of Sensitivity

1. Warm up the engine to the normal operating temperature and run it at idle.
2. Connect the **SST** to the check connector.
3. Increase the engine speed to between **2,000 and 3,000 rpm**, and check that the monitor lamp flashes for 10 seconds.

Monitor lamp: Flashes ON and OFF more than 8 times/10 sec