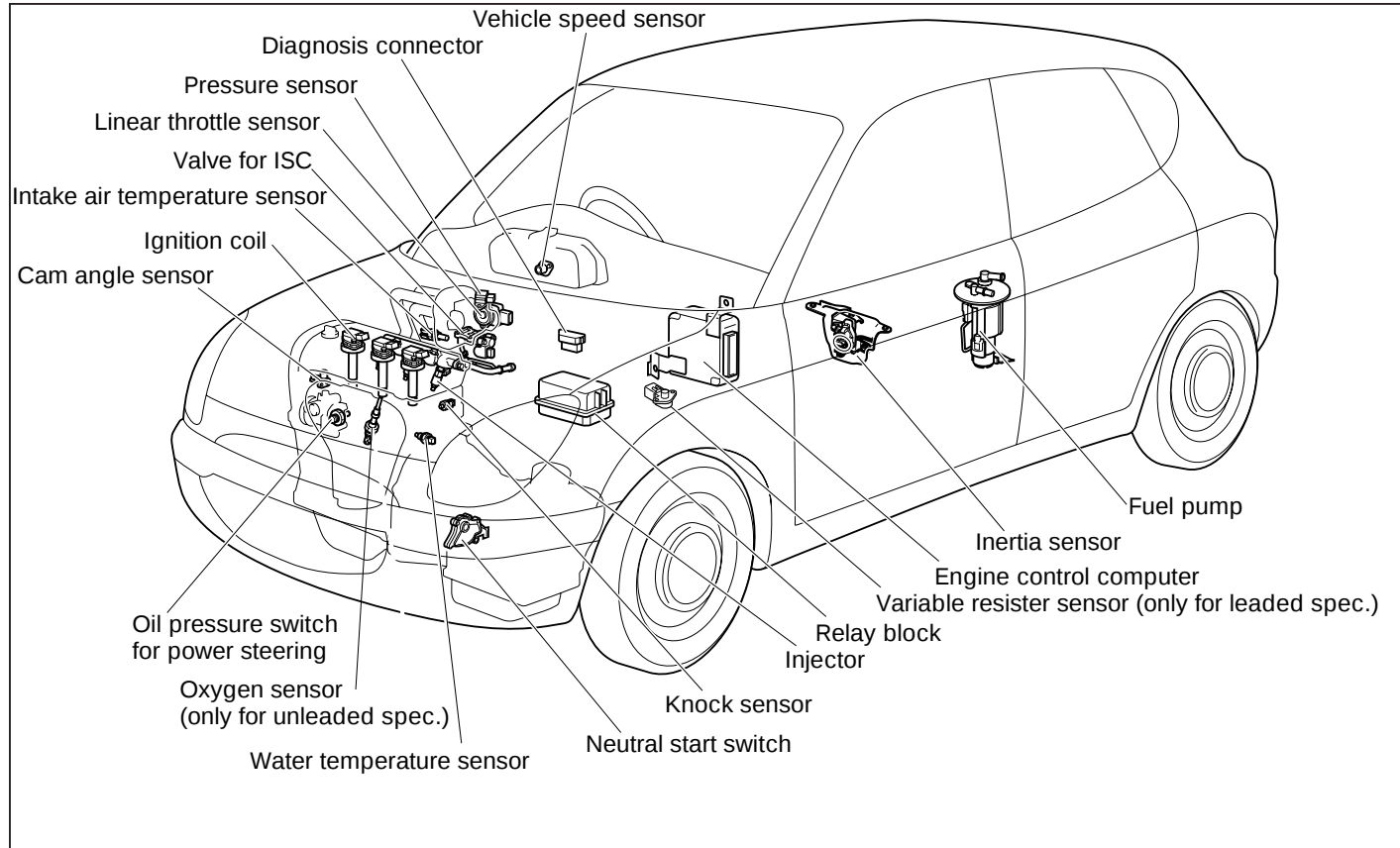


EFI SYSTEM

1. SYSTEM DESCRIPTION	EF- 2	5.12 DIAGNOSIS CODE NO. 51	EF-41
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1.2 SYSTEMATIC DIAGRAM	EF- 2	5.14 DIAGNOSIS CODE NO. 81	EF-45
1.3 DIAGNOSIS SYSTEM	EF- 3	5.15 DIAGNOSIS CODE NO. 83	EF-46
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5. 7 DIAGNOSIS CODE NO. 31	EF-32	9.1 DESCRIPTION	EF-56
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5.10 DIAGNOSIS CODE NO. 43	EF-37	11. TIGHTENING TORQUE	EF-58
5.11 DIAGNOSIS CODE NO. 44	EF-39		

1. SYSTEM DESCRIPTION

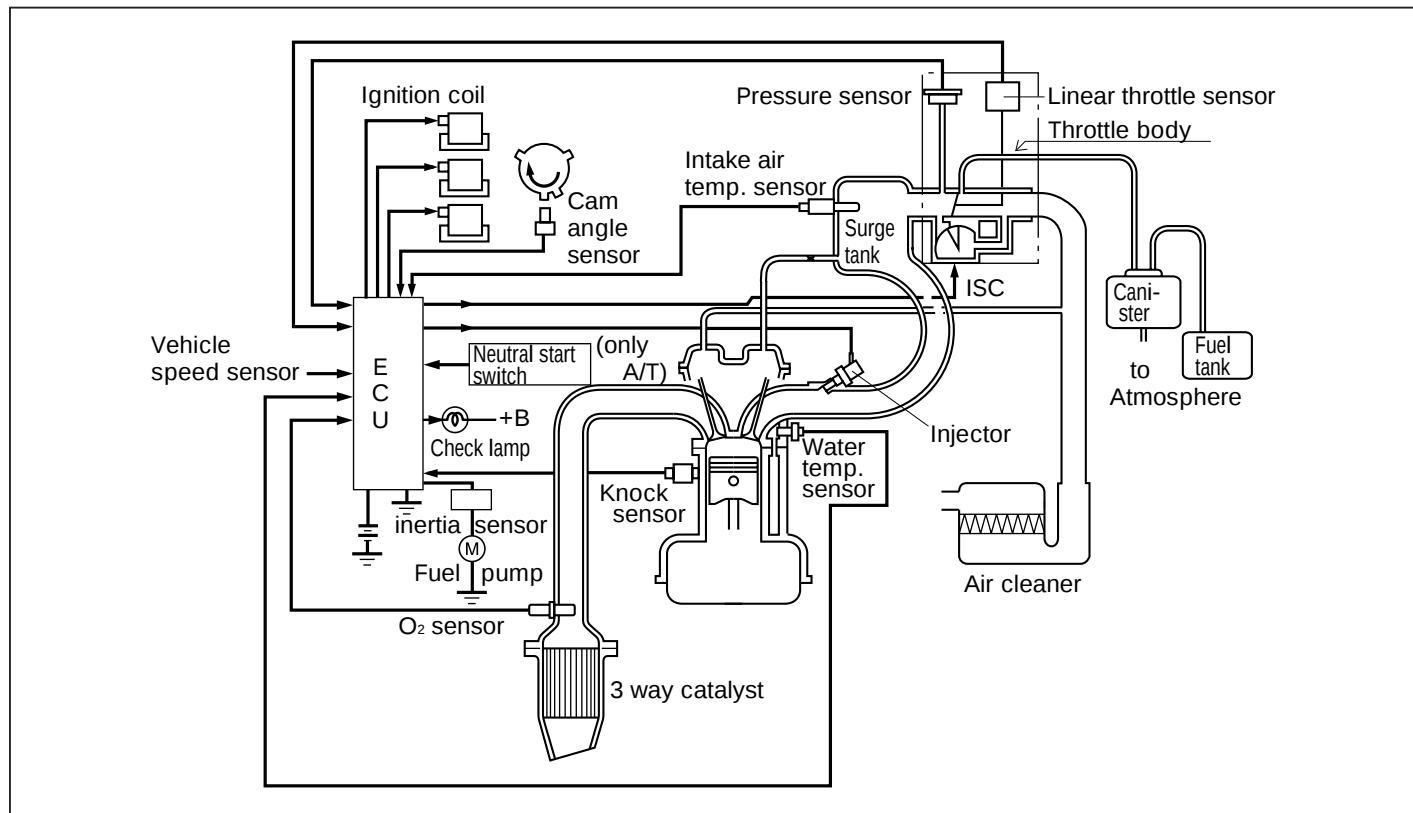
1.1 LOCATION OF ELECTRONIC CONTROL PARTS



MEF00002-00001

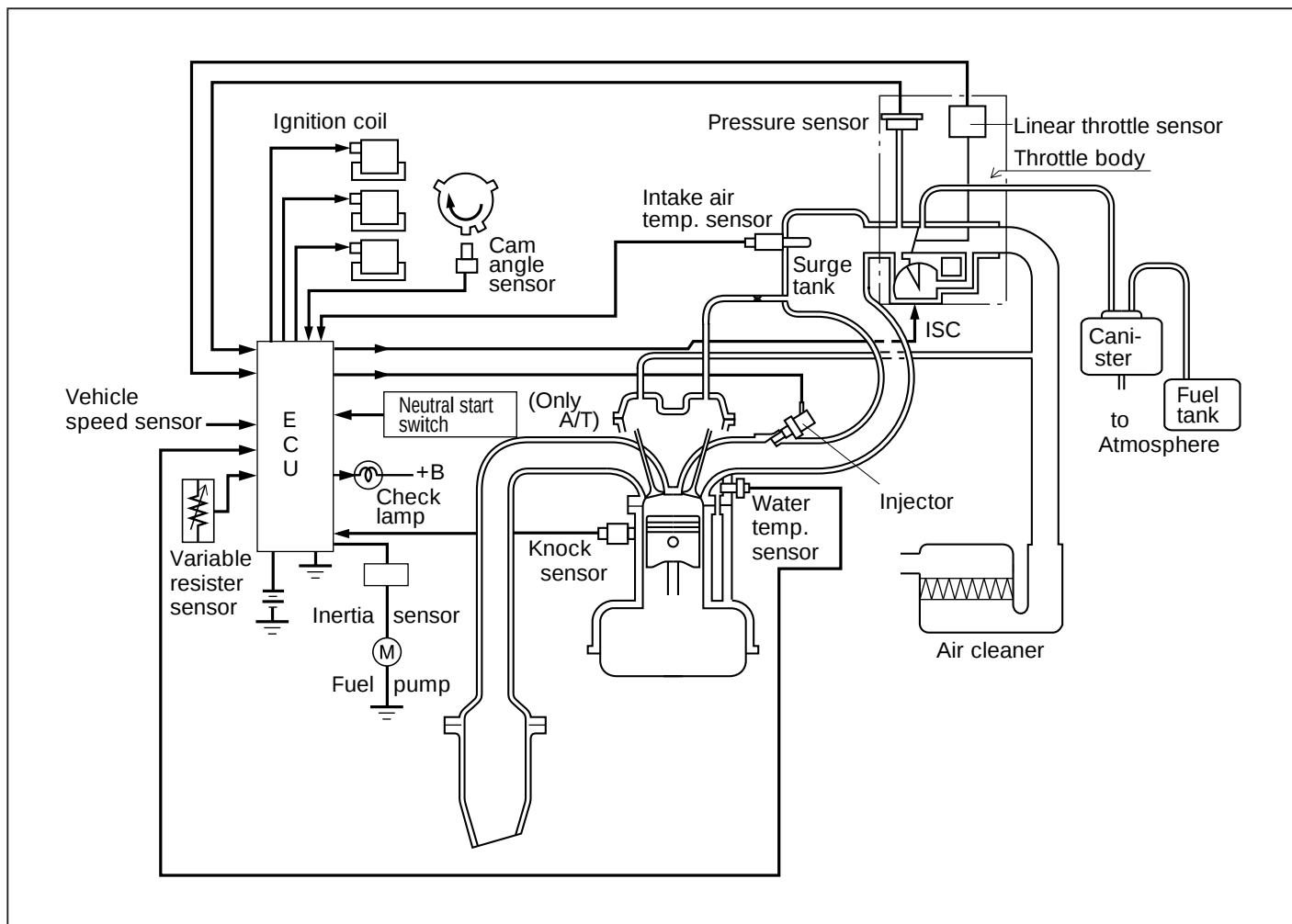
1.2 SYSTEMATIC DIAGRAM

1.2.1 SPECIFICATIONS OF SYSTEM FOR UNLEADED GASOLINE



MEF00003-00002

1.2.2 SPECIFICATIONS OF SYSTEM FOR LEADED GASOLINE



MEF00004-00003

1.3 DIAGNOSIS SYSTEM

DESCRIPTION

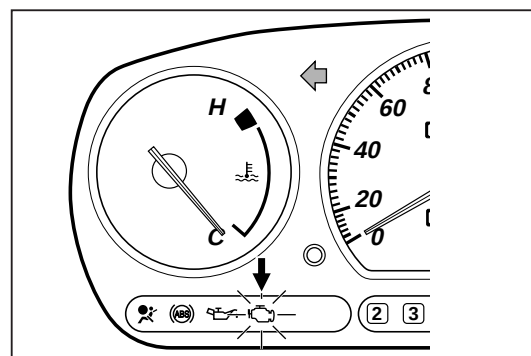
A self-diagnosis system is built in the ECU. If any abnormality should occur in the signal systems of various sensors, the self-diagnosis system memorizes the malfunction code number in the ECU. In respect to important abnormalities, the check engine lamp at the instrument panel goes on, thus warning the driver of the abnormality.

When the abnormality is cleared, the check engine lamp goes out.

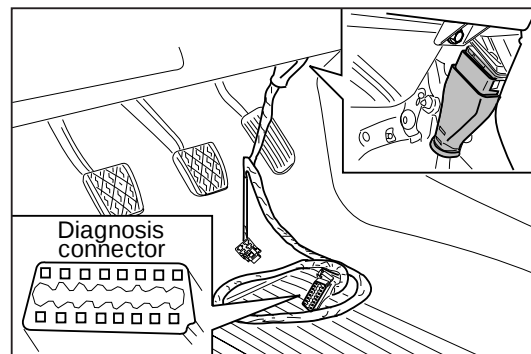
When the Test terminal of the diagnosis connector is connected with the earth terminal, the malfunction code number that has been memorized in the ECU will be indicated in a form of blinking of the check engine lamp in the instrument panel with the ignition switch turned "ON" position.

CHECK ENGINE LAMP

1. When the ignition switch is turned on, the check engine lamp goes on.
(The engine is under a stopped state.)
2. When the engine starts, the check engine lamp goes off.
If the check engine lamp remains illuminated, it indicates that the diagnosis system has detected system malfunction.



MEF00005-00004



MEF00006-00005

READING OUT OF DIAGNOSIS CODE

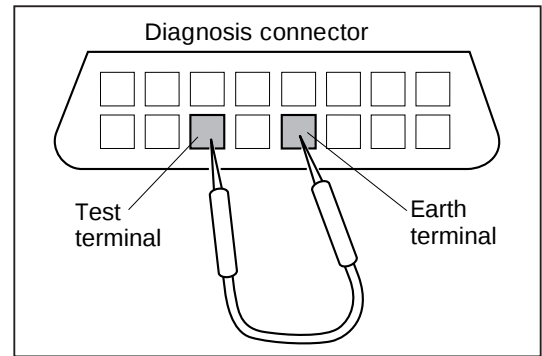
1. Initial conditions.
 - (1) Battery voltage of 11 volts or more.
 - (2) Throttle valve fully closed.
 - (3) All accessory switches turned OFF.
2. Reading out of diagnosis code by check engine lamp.
 - (1) Connect the terminal between the test terminal and the earth terminal with a jump wire as indicated in the illustration.
 - (2) Turn the ignition switch to the "ON" position. At this time, be careful not to start the engine.
 - (3) Read out the diagnosis code by observing the flashing number of the check engine lamp.

NOTE:

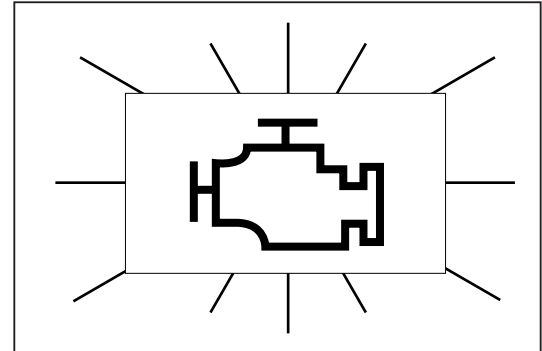
- When system malfunction was detected, go to page EF-21, "TROUBLE SHOOTING ACCORDING TO DIAGNOSIS SYSTEM".
- If the check engine lamp fails to blink, it is likely that the ECU is malfunctioning. Hence, proceed to the inspection of the diagnosis system circuit.

3. Reading out of diagnosis code with diagnosis tester (DS-21)

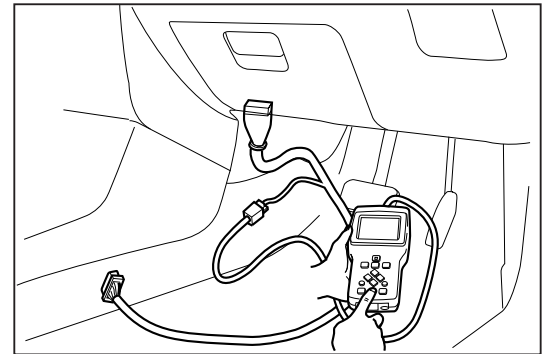
Connect the diagnosis tester (DS-21) to the exclusive connector provided in front of the driver's seat. Have the diagnosis code indicated by means of the "diagnosis check" function.



MEF00007-00006



MEF00008-00007



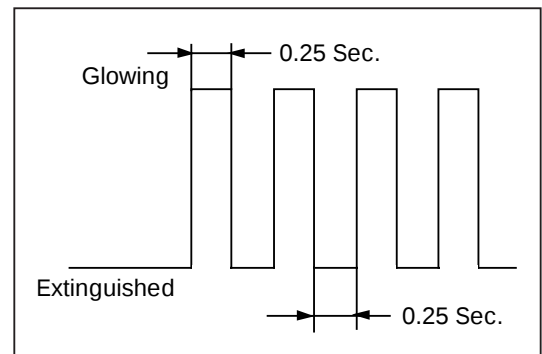
MEF00009-00008

EXPLANATION OF DIAGNOSIS CODES

1. Indication of normal code

The engine check lamp glows for 0.25 second, right after the ignition switch has been turned ON. After a lapse of 0.25 second, the check engine lamp again glows for 0.25 second.

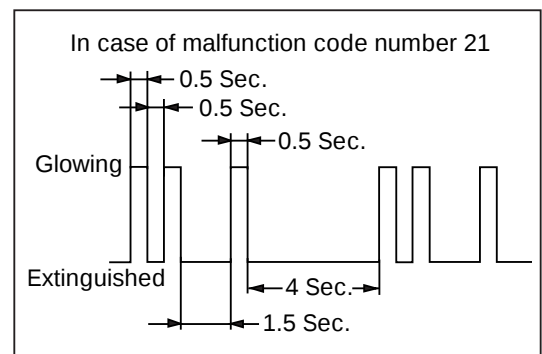
Then, this pattern will be repeated.



MEF00010-00009

2. Indication of malfunction code
 - (1) When a single malfunction code is indicated:

The diagnosis code is composed of two digits. These two numbers are indicated by blinking of the check engine lamp. Four seconds after the ignition switch has been turned ON, the check lamp indicates first the number of the tens digit of the diagnosis code by glowing the same times as the number. The lamp glows for 0.5 second each time and then it is extinguished for 0.5 second. After a pause of 1.5 seconds, the check lamp indicates the number of the units digit of the diagnosis code by glowing the same times as the number. The lamp glows for 0.5 second each time and then it is extinguished for 0.5 second. Then, this pattern will be repeated after a pause of 4 seconds.



MEF00011-00010

(2) When plural malfunction codes are indicated:

In cases where plural malfunction codes have been detected, the two-digit diagnosis codes are indicated in the sequence of the code number, starting from a smaller number. Each diagnosis code is indicated in the above described pattern. A pause of 2.5 seconds occurs between the outputs of respective diagnosis codes, thus separating one from the others. After all of the plural diagnosis codes that have been detected are indicated, the check engine lamp is extinguished for four seconds. Then, the detected plural diagnosis codes will be indicated again.

3. Canceling method of diagnosis code

(1) Erasure by disconnecting EFI fuse

To erase the diagnosis codes memorized in the ECU after malfunctions have been repaired, disconnect the EFI fuse from the relay block for at least 30 seconds with the ignition switch turned OFF.

[When ambient temperature is about 20°C.]

NOTE:

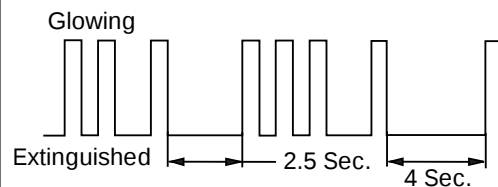
- After the diagnosis codes have been read, remove the SST at the check connector.
- It is possible to complete this erasing for approximately 30 seconds. In some cases, however, it may take longer.

Furthermore, the erasing can be made by disconnecting the circuit, such as the battery power supply and fusible link. In cases where the battery terminal is to be disconnected, record the radio channels in advance. After completion of the operation, set the radio channels the same as before.

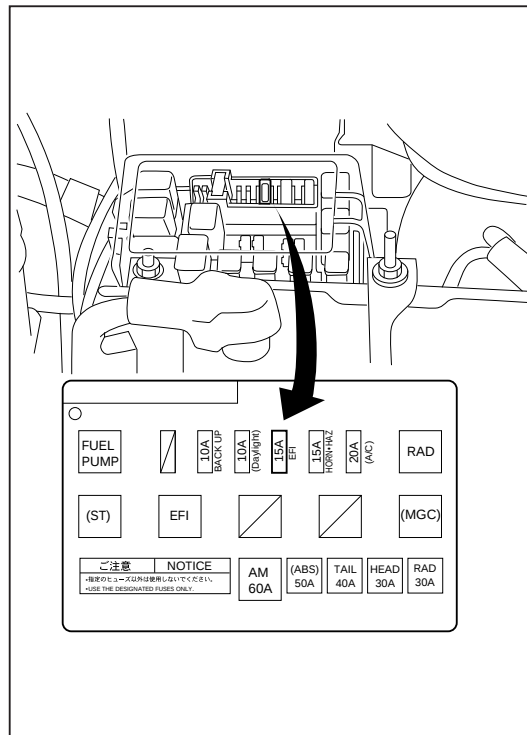
(2) Erasure by diagnosis tester (DS-21)

Connect the diagnosis tester (DS-21) to the exclusive connector provided in front of the driver's seat. Erase the diagnosis codes by the "malfunction code erasing function" of the "individual function."

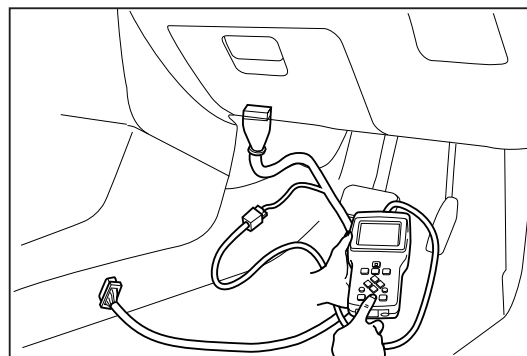
In case of malfunction code number 21 and 31



MEF00012-00011



MEF00013-00012



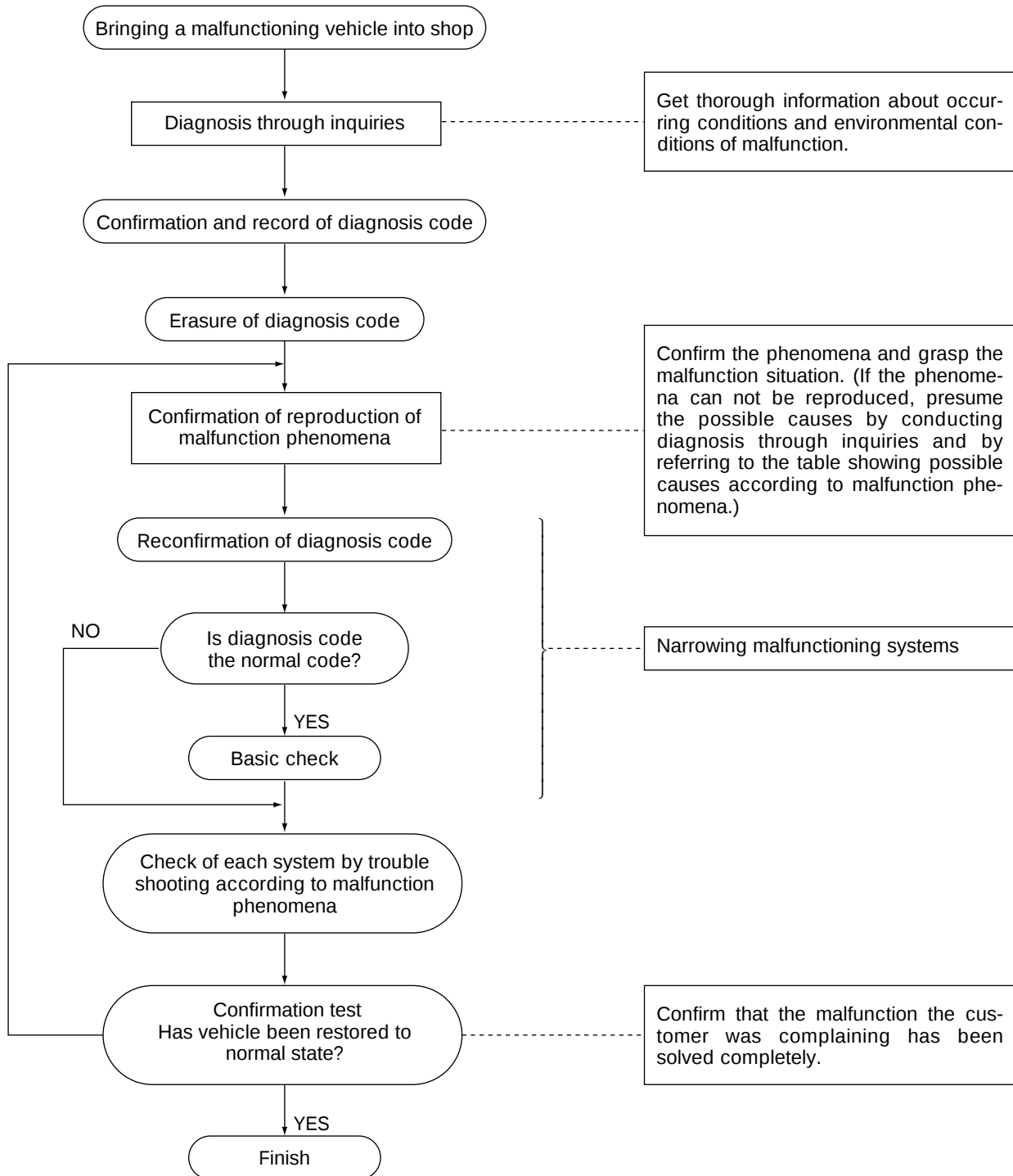
MEF00014-00013

1.4 SUMMARY OF TROUBLE SHOOTINGS

1.4.1 How to perform trouble shooting

The engine control system is provided with a diagnosis function which diagnoses malfunctioning sections. This function gives important clues in carrying out the trouble shooting. Please follow the following flow chart given below to grasp the malfunction phenomena. If you can not grasp the phenomena, assume the possible causes and carry out various checks to pinpoint the causes. In this way, you can perform systematic, effective repairs.

The diagnosis of this system is equipped with a battery backup function (a function whereby power is supplied for the diagnosis memory even when the ignition switch is turned OFF).



1.4.2 Diagnosis through inquiries

The diagnosis through inquiries is to collect information from the customer before confirming the malfunction phenomena. The diagnosis through inquiries proves to be very important clues in reproducing malfunction phenomena.

Since the information obtained by the diagnosis through inquiries is referred to during the trouble shooting, it is imperative to make an inquiry of the customer, centering on the items related to the malfunction, instead of simply carrying out the diagnosis through inquiries.

MEF00016-00000

1.4.3 Confirmation, record and erasure of diagnosis code

When the diagnosis abnormality code is indicated, confirm whether the malfunction took place in the system or is taking place now. Also it is necessary to check any relation between the code and the reproduced malfunction. For this purpose, the diagnosis code should be indicated twice; in other words before and after the confirmation of the phenomena.

MEF00017-00000

1.4.4 Confirmation of reproduction of malfunction phenomena

In carrying out the trouble shooting, it is imperative to reproduce the malfunction phenomena by creating conditions and environments similar to the situation where the malfunction took place, based on the information obtained by the diagnosis through inquiries. As for the phenomenon that is hard to be reproduced, it is most important to try to reproduce it patiently by applying external factors, such as vibration (moving wire harnesses or relays by hand), heat (applying hot wind) and water (giving humidity).

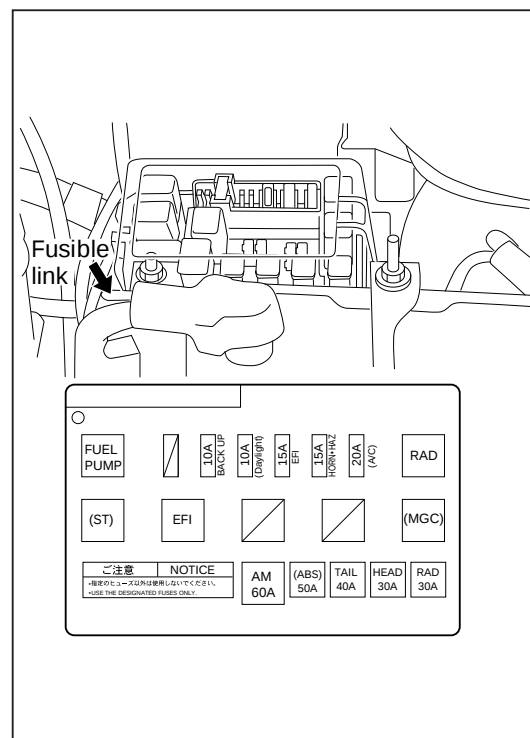
Moreover, if you presume sections (parts) which may have caused the malfunction, connect a tester, etc. to them and check to see if the malfunction takes place, you can evaluate whether the sections (parts) are functioning properly or not, too.

MEF00018-00000

1.4.5 Basic check

A. Hints for basic check

1. In most cases, engine troubles are attributable to systems other than the EFI system.
 - (1) Battery voltage, fuse blown or fusible link blown.
 - (2) Body earth.
 - (3) Fuel leakage, fuel filter clogged or fuel pump malfunctioning.
 - (4) Spark plugs faulty, ignition coil faulty, or ignition timing adjusted improperly.
 - (5) Admission of air.



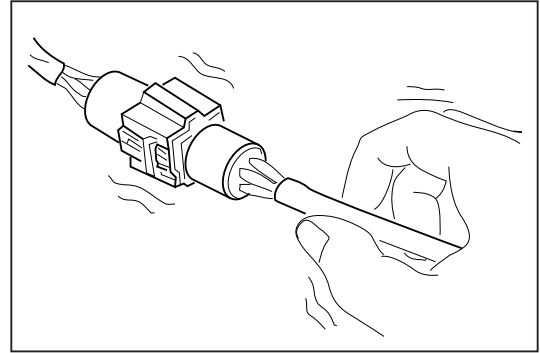
MEF00019-00014

2. Most of troubles related to the EFI system are merely caused by poor wire connections.

Ensure that connectors are connected securely.

Check connectors, being careful as to the following points.

- (1) Visually inspect that terminals are not bent.
- (2) Ensure that connectors are securely connected and locked.
- (3) Check to see if the malfunction phenomenon takes place when applying light vibration to the connector or the wire connected to the connector.



MEF00020-00015

B. Check to see if diagnosis detects malfunction code.

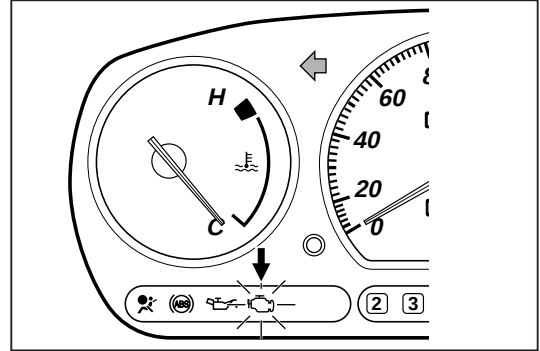
1. Check of diagnosis code.

When the engine starts, the check engine lamp in the combination meter remains illuminated. It indicates that the diagnosis has detected system malfunctions.

2. Read out the diagnosis code.

NOTE:

- See page EF-4.
- When system malfunction has been detected, proceed to page EF-21, "TROUBLE SHOOTING ACCORDING TO DIAGNOSIS SYSTEM".

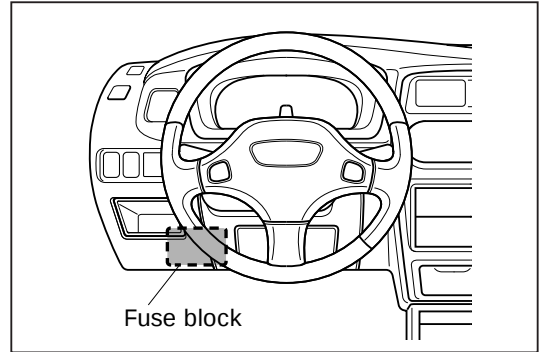


MEF00021-00016

C. Check of power supply circuit

1. Check the fuses and fusible link.

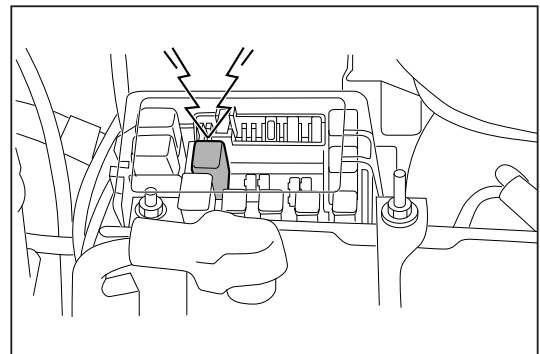
If the fuses are blown out, be sure to perform the trouble shooting.



MEF00022-00017

2. Check the EFI main relay.

- (a) Turn the ignition switch to the "ON" position. Check to see if the relay emits an operating sound.



MEF00023-00018

- (b) Remove the EFI main relay from the relay box.

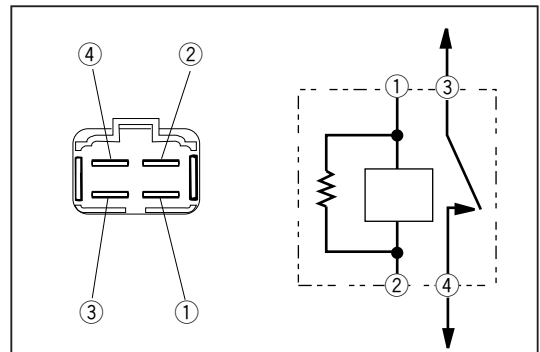
Check that there is continuity between the terminals 1 and 2.

Specified Resistance: 74 - 117 Ω

- (c) Check that there is continuity between the terminals 3 and 4 when a voltage of 12 V is applied across the terminals 1 and 2.

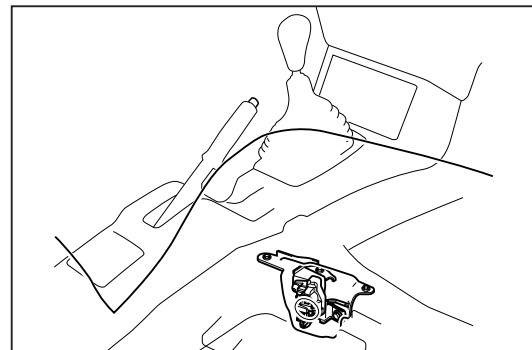
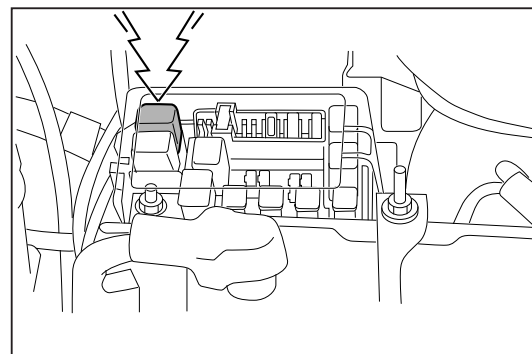
NOTE:

- Even when the trouble has not been solved by repairing the relay, check the wire harness.



MEF00024-00019

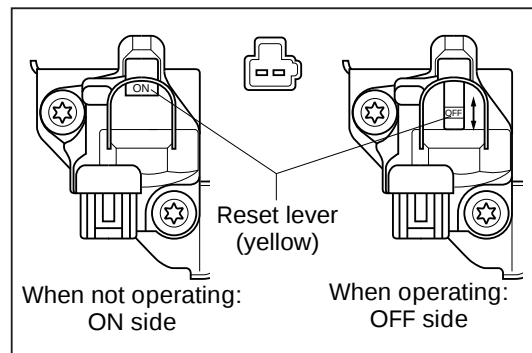
3. Check the fuel pump relay.
 - (a) When the ignition switch is set to the "ON" position, check to see if the relay emits an operating sound.
 - (b) Remove the fuel pump relay from the relay box. Check that there is continuity between the terminals 1 and 2.
Specified Resistance: 74 - 117 Ω
 - (c) Check that there is continuity between the terminals 3 and 4 when a voltage of 12 V is applied to across the terminals 1 and 2.
4. Check of inertia sensor for fuel cut. Check that the inertia sensor is functioning.
 - (a) Turn OFF the ignition switch.
 - (b) Slide the front seat (driver's seat) to the front fully.
 - (c) Turn over the cutout section of the carpet under the front seat (driver's seat). Take out the plug hole cover.



- (d) Check the reset lever (yellow one) for the operating state. Peep through the plug hole and check to see if the embossed letter "OFF" can be seen on the reset lever. If the "OFF" is seen, it means the inertia sensor is functioning. In other words, the power supply circuit is in a cut state.
To restore the power supply circuit, push up the reset lever and keep it in that state for at least one second.

WARNING:

- If there is any possibility of fuel leakage, never operate the reset lever.

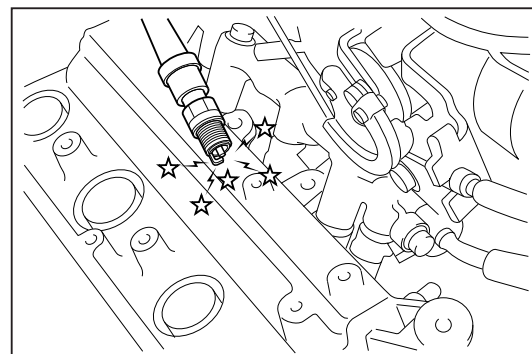


D. Inspection of ignition system

1. Spark check
 - (1) Connect the spark plug and harness to the ignition coil. Ground the plug to the cylinder head cover.
 - (2) Check to see if the spark is emitted at each spark plug while cranking the engine.

WARNING:

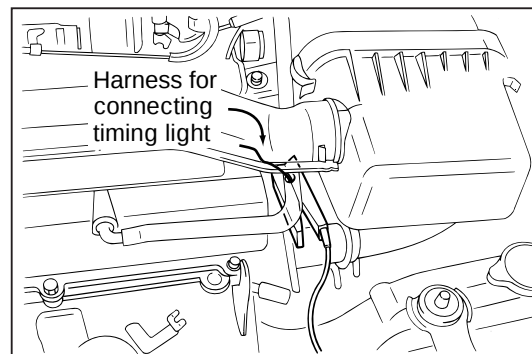
- Since there is the possibility that you may have strong shock during the spark check, never allow your body to contact the vehicle body.



2. After the engine has warmed up, install a timing light, as shown in the right figure.

NOTE:

- Use a timing light which is capable of detecting the primary voltage.

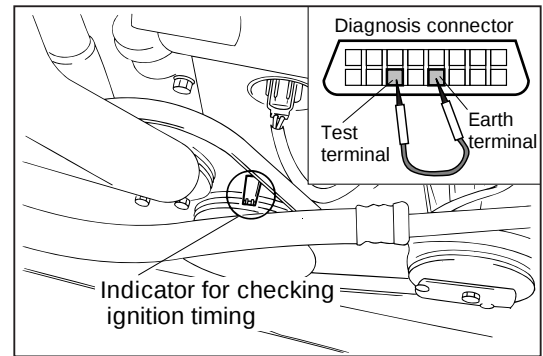


- Confirm that the timing mark of the crankshaft pulley is located within the width of the indicator of the timing belt cover.

Specified Value: $5^{\circ} \pm 2^{\circ}$ BTDC/ 850 rpm

NOTE:

- Connect the test terminal and the earth terminal with a jump wire of the diagnosis connector.



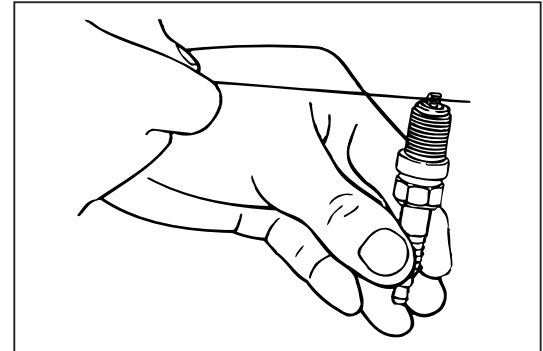
MEF00030-00025

- Remove the ignition coils and the spark plugs.
- Visually inspect the spark plug for electrode wear, thread or insulator damage.
- Measure the electrode gap, using a plug gap gauge.

Specified Value: 1.0 - 1.1 mm

NOTE:

- If the gap fails to conform to the specification, replace the plug.

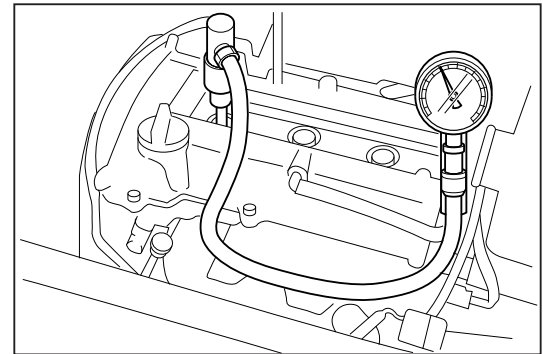


MEF00031-00026

E. Inspection of compression pressure

- Warm up the engine.
- With the IG switch turned OFF, remove all of the IG coils and spark plugs.
- Temporarily remove the main relay and fuel pump relay.
- Insert a compression gauge into the spark plug hole.
- Depress the accelerator pedal fully.
- While cranking the engine, measure the compression pressure.

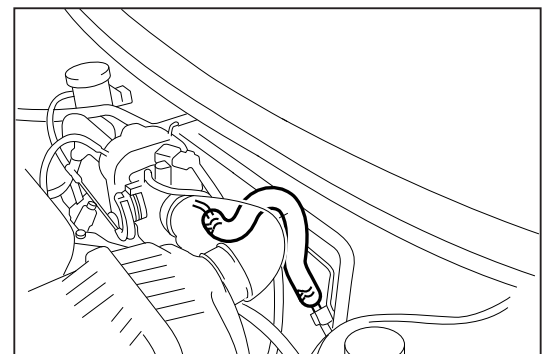
Minimum Value: 1579 - 1755 kPa
(400 rpm. Difference between cylinders is less than 147 kPa.)



MEF00032-00027

NOTE:

- Be sure to use a fully-charged battery. Also, the measurement should be performed in the shortest possible length of time.



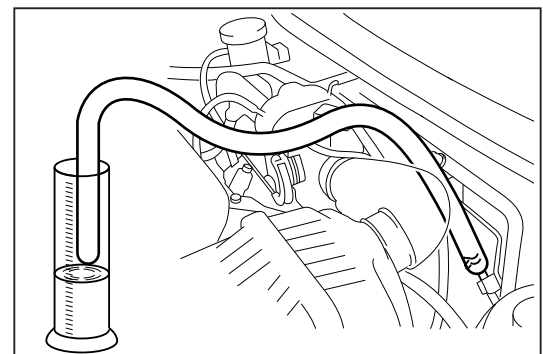
MEF00033-00028

F. Inspection of fuel flow

- Loosen the hose band at the fuel pipe. Then remove the fuel hose from the fuel pipe.
- Connect a suitable fuel hose (about 2 meter long) to the fuel pipe.
- Insert one end of the fuel hose in a measuring cylinder.

CAUTION:

- The fuel pressure of the fuel line is approximately 294 kPa. Hence, be sure to gradually remove the pipe so as to prevent fuel from splashing.
- Since the fuel will flow out, be certain to place a suitable container or cloth under the fuel pipe so that no fuel may get to the resin or rubber parts of the vehicle.



MEF00034-00029

4. Temporarily remove the fuel pump relay. Then, connect the terminal with a jump wire as illustration.
5. Turn the ignition switch to the "ON" position for 10 seconds. Then, turn off the ignition switch.
6. Measure the amount of fuel collected in the measuring cylinder.

Specified Amount of Fuel: 110 ml or more

NOTE:

- Check to see if leakage is present at the fuel lines. Also, check the fuel lines for deformation or choking.

G. Inspection of fuel pressure

1. Install a fuel pressure gauge between the delivery pipe and the main pipe.
2. Turn the ignition switch to the "ON" position.
3. Check to see if the fuel pressure conforms to the specified pressure.

Specified Value: 294 ± 5 kPa

NOTE:

- If the fuel pressure is less than the specification, check the fuel pump.

H. Inspection of fuel injectors

1. Using a sound scope, check to see if each injector emits an operating sound when the engine is being started or cranked.

NOTE:

- If a sound scope is not available, apply a screwdriver or the like to the injector. So you can feel an operating vibration.
- If the injector emits no operating sound, check the wiring or connectors. Then, perform the following procedure.

2. Disconnect the injector connector of the engine wire.
3. Remove the fuel delivery pipe. Then, remove the injectors.

NOTE:

- Be sure to place a cloth or the like so as to prevent fuel from splashing.

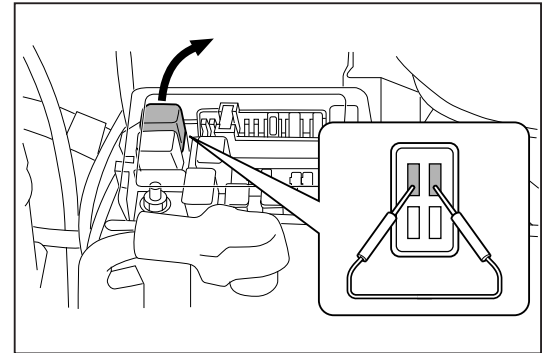
4. Measure the resistance between the terminals of each injector.

Specified Resistance: 12.5Ω (at 20°C)

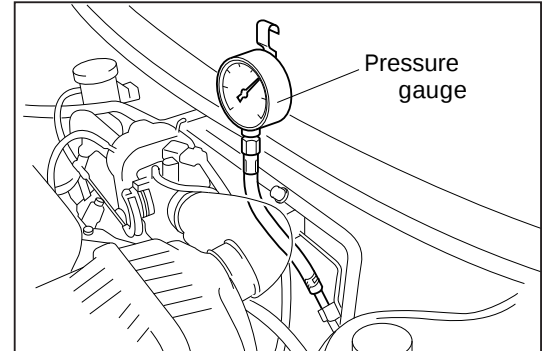
NOTE:

- If the resistance is not within the specification, replace the injector.
- If the resistance will conform to the specification, perform the following procedure.

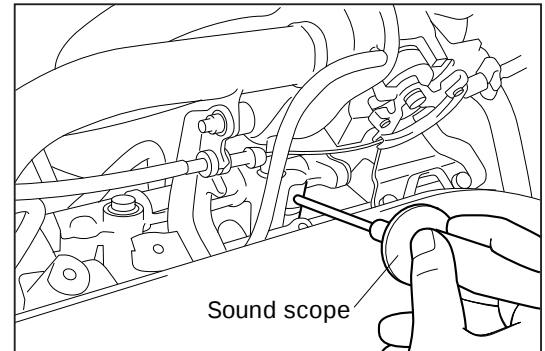
5. Remove the fuel pump relay.



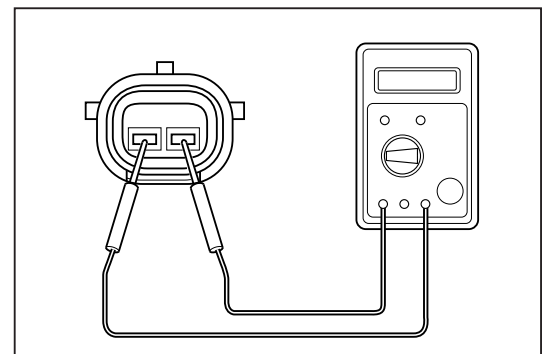
MEF00035-00030



MEF00036-00031

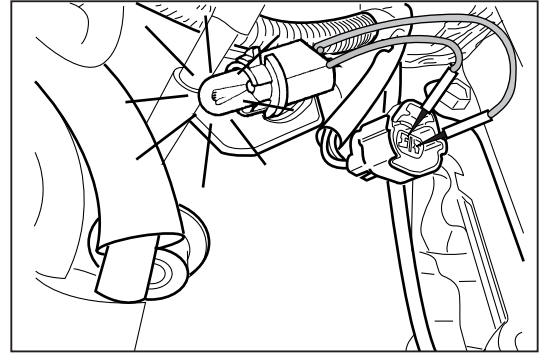


MEF00037-00032

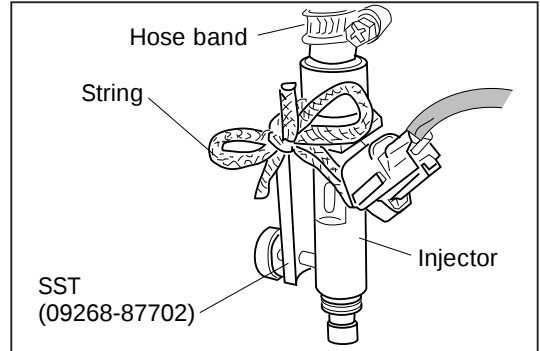


MEF00038-00033

6. Using a test lamp (12V 6W), check to see if the lamp will illuminate as illustration when the engine is being cranked. If not, check the wiring harness and ECU output.
7. Turn the ignition switch to the "OFF" position.



8. Using a suitable string or wire, connect the injector and the fuel delivery pipe, as indicated in the figure.
9. Connect the terminal with a jump wire as indicated in the uppermost illustration on page EF-11.
10. Insert the injector into the measuring cylinder.
11. Turn the ignition switch to the "ON" position.
12. Connect the SST wire to the battery terminal for 15 seconds.



WARNING:

- Be sure to use hose bands at the joint section between hoses and pipes, etc. so that the hose may not be disconnected unexpectedly.
- Utmost care must be exercised so that no spark may be emitted when connecting the SST to the battery. Furthermore, be sure to place the battery on the windward side and as far away as possible from the measuring cylinder. Moreover, never conduct this operation in a tightly-closed room.

13. Measure the amount of fuel collected in the measuring cylinder.

Specified Amount of Fuel: Approx. 35 - 43 ml
Variation Between Injectors: 5 ml or less

NOTE:

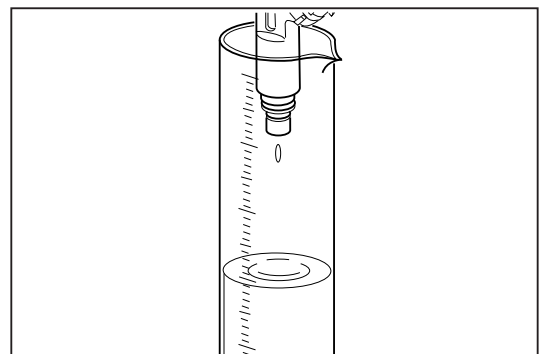
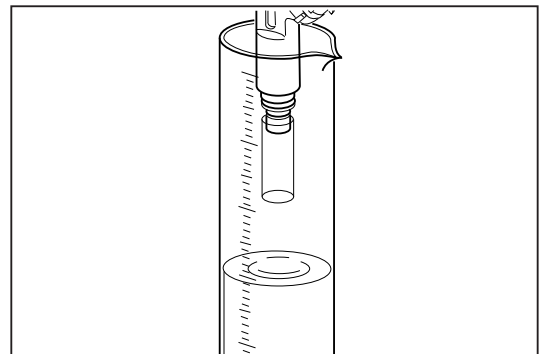
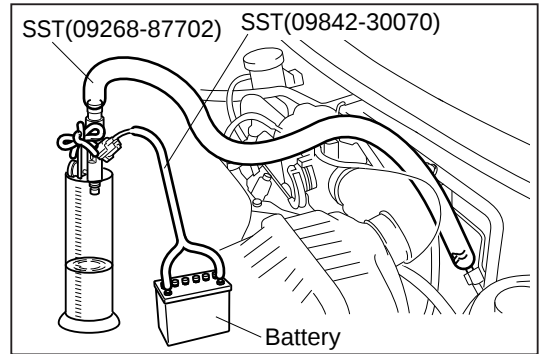
- Attach a suitable vinyl hose to the tip-end of the injector so as to prevent fuel from splashing.
- Conduct the measurement two or three times for each injector.
- Before the injector is pulled out, make certain to turn off the ignition switch.
- When removing the injector, use a suitable cloth or the like so as to prevent fuel from splashing.
- Prior to the test, perform air bleeding for the fuel hose.

14. Check to see if any fuel leakage is present from the injector nozzle, when the SST wire is removed from the battery terminal.

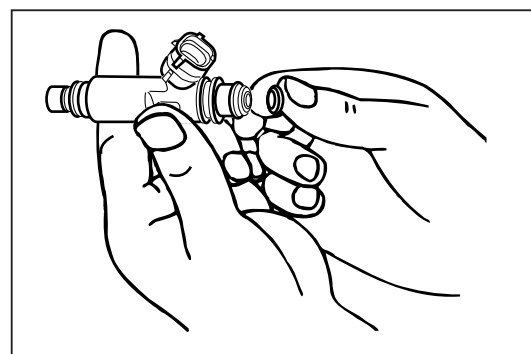
Specification: Less than one drop of fuel per minute

NOTE:

- If the leakage exceeds the specified value, replace the injector.

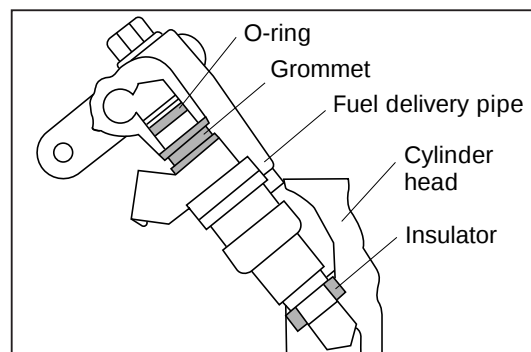


15. Turn OFF the ignition switch.
16. Install the injector grommet and O-ring to the injectors.
NOTE:
 - Install a new O-ring to the O-ring seal section.



MEF00044-00039

17. Install the injectors and the fuel delivery pipe.
NOTE:
 - After completion of the assembling, ensure that the injector can be turned smoothly by your hand, although there is a slight resistance due to friction.
 - Make sure that the connector of the injector is located at the outside of the engine and is directed in a horizontal direction.



MEF00045-00040

I. Inspection of idling revolution

1. Warm up the engine completely.

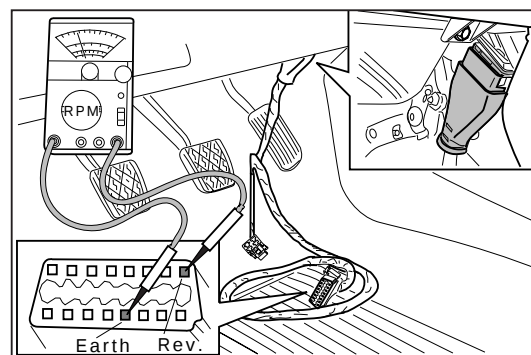
NOTE:

- Turn off the all electrical accessory switches.
- The transmission control lever should be in the N or P range.

2. Connect a tachometer to the tachometer terminal and the earth terminal at the diagnosis connector.
3. Check to see if the idling revolution conforms to the specification when the engine water temperature is higher than 80°C.

Specified Value:

	EC, General	AUS, ISRAEL, GCC
M/T	850 ± 50 rpm	900 ± 50 rpm
A/T	850 ± 50 rpm	900 ± 50 rpm



MEF00046-00041

NOTE:

- The engine revolution is given here for your reference during the check. It is not necessary to carry out the adjustment.

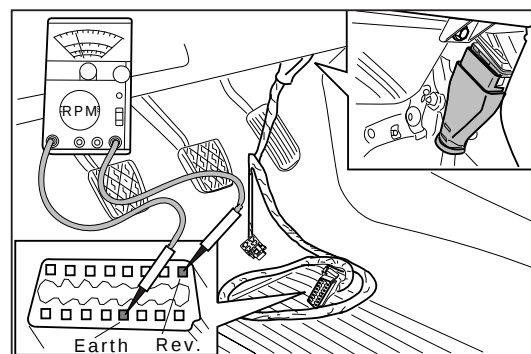
J. Inspection of rotary ISC valve.

1. Connect a tachometer to the terminal of the diagnosis connector.
2. Check to see is the fast idle revolution speed is within the reference value.

Reference Value: Around 1300 - 1900 rpm/25°C

NOTE:

- The fast idle revolution speed can not be adjusted to the specification. If the revolution speed will not conform to the reference value, perform the inspection of the auxiliary air system, following the procedure given below.

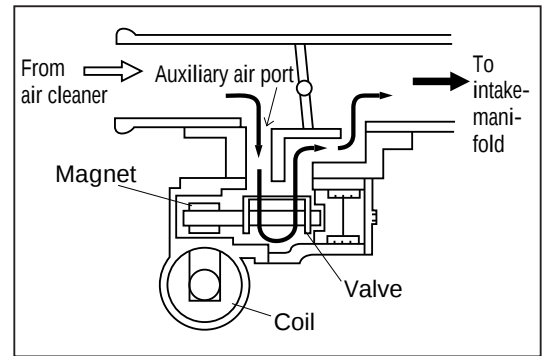


MEF00047-00042

3. Remove the air cleaner case from the cylinder head cover.
4. Start the engine. Check that there is air continuity at the auxiliary air port under the following conditions.
 - Apply your finger to the auxiliary air port. Ensure that the engine speed drops.

NOTE:

- If the auxiliary air system exhibits malfunction, replace the throttle body.



MEF00048-00043

K. Inspection of idle CO and HC concentrations

1. Specifications for unleaded gasoline

(1) Warm up the engine completely.

NOTE:

- Warm up the engine, until the fan motor starts to operate.

(2) Measure CO and HC concentrations at the idle speed.

Specified Value:

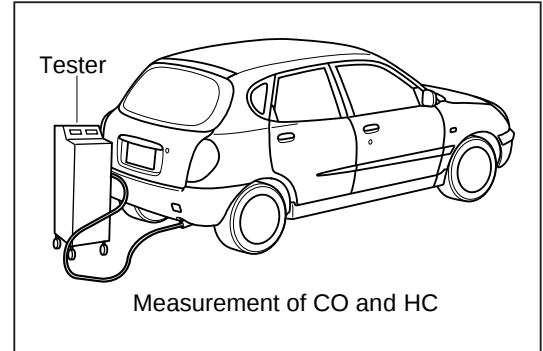
CO concentration: Not to exceed 0.5 %

HC concentration: Not to exceed 400 ppm

NOTE:

The CO and HC concentrations do not need to be adjusted, because the air-to-fuel ratio is controlled by the ECU.

In cases where the concentrations are not within the specification, perform the check of the feedback control described at page EF-27.



MEF00049-00044

2. Specifications for leaded gasoline

(1) Warm up the engine completely.

NOTE:

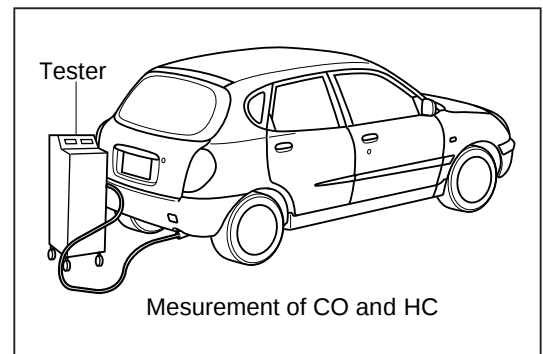
- Warm up the engine, until the fan motor starts to operate.

(2) Measure CO and HC concentrations at the idle speed.

Specified Value:

CO concentration: $1 \pm 0.5 \%$

HC concentration: Not to exceed 700 ppm

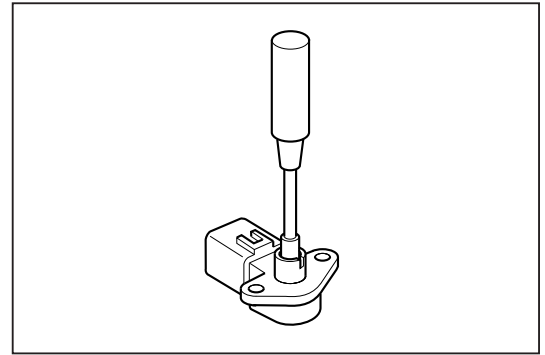


MEF00050-00045

- (3) In cases where the concentrations are not within the specification, adjust the rotor of the variable resistor sensor, using the SST.

If the concentration is above the specification, turn the rotor clockwise so that the concentration may become the specified value. Conversely if the concentration is below the specification, turn the rotor counterclockwise so that the concentration may become the specified value.

SST: 09243-87201-000



MEF00051-00046

NOTE:

- If the CO concentration will not change even when the rotor is turned, carry out the check of the variable resistor sensor explained at page EF-30.

1.5 CAUTION FOR IMMOBILIZER-EQUIPPED VEHICLE

1. The immobilizer system is formed by communication between the Immobilizer ECU and the EFI ECU by means of the rolling code. The rolling code will be automatically retained both in the immobilizer ECU and in the EFI ECU when the engine is started once with the key of the immobilizer system. The engine will not start if the rolling code in the immobilizer ECU and EFI ECU are not identical. Therefore, the engine will not start when using the EFI ECU which was mounted before on another vehicle with the immobilizer system without resetting the rolling code.
2. When the EFI ECU of a vehicle equipped with the immobilizer system was replaced, based on the results of the trouble shooting, and related troubles have been remedied, it is impossible, due to its construction, to confirm that the malfunction was caused by the former EFI ECU by installing the EFI ECU again. Incidentally, this confirmation is possible in the case of vehicles without the immobilizer system. Therefore, it is not necessary to install the former EFI ECU again to carry out the reconfirmation. In the case of vehicles without the immobilizer system, be sure to carry out this re-installation and reconfirmation.
3. In the case of vehicles equipped with the immobilizer system, once the engine is started for the confirmation test, etc. after the malfunction has been remedied, that EFI ECU can not be used for other vehicles with the immobilizer system, unless a measure is taken.

NOTE:

- When you would like to use each ECU of the vehicle concerned on vehicles equipped with other immobilizer system, initialize the ECU, using the diagnosis tester (DS-21), before removing the ECU from the vehicle. Then, remove the ECU and install it on another vehicle. If you perform the key registration, using the master key of this vehicle, each ECU can be used separately or as a set.
- When the EFI ECU is to be replaced with a new one, it is possible to start the engine by using the master key with the terminal T for immobilizer ECU of the diagnosis connector grounded with a jump wire.
- Please refer to Section BE of the service manual.

MEF00052-00000

2. PRECAUTIONS

1. When resistance or voltage measurement is conducted at the connector section, insert a measuring probe from the back of the connector, being very careful not to damage the harness of terminal connections.

In the case of water-proof type connector, a measurement is conducted at the connector section with the measuring probe put into contact with the terminal at the connection side of the connector. Be very careful not to apply excessive force to the terminal at the connector side.

As an alternative method, insert a male or female terminal into the connector terminal or connect an adequate attachment.

2. The fuel line at the high-pressure side is pressurized to a fuel pressure of about 250 kPa. Therefore, a large amount of gasoline flows out when parts of the fuel line are disconnected. Hence, take the following countermeasures.

WARNING

- Be sure to release the inner pressure of the fuel tank by removing the fuel filler cap in advance.

3. Tachometer connection

Connect the tachometer probe to the measuring terminal of the diagnosis connector.

CAUTION:

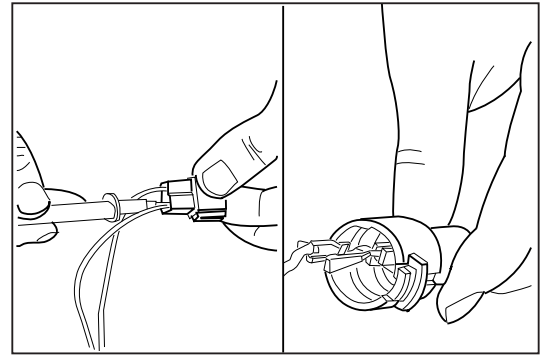
- This does not apply if your tachometer is a pick-up type.
- Never allow the tachometer probe to touch the ground, for it could result in damage to the ignitor and/or ignition coil.
- Some kinds of tachometers may not be suited for the ignition system of the vehicle. Therefore, ensure that your tachometer is compatible with the ignition system of the vehicle.

4. Precautions during oxygen sensor handling

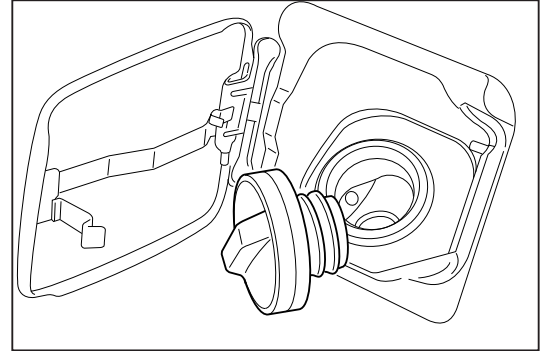
- (1) Do not drop the oxygen sensor or hit it to other objects.
- (2) Do not immerse the sensor in water or do not cool it by water.

5. Do not open the cover of the ECU proper.

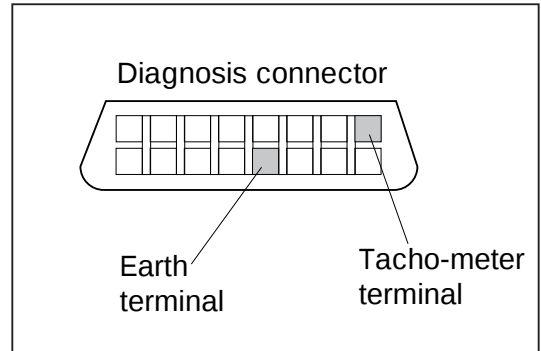
(Failure to observe this caution could cause ECU malfunction.)



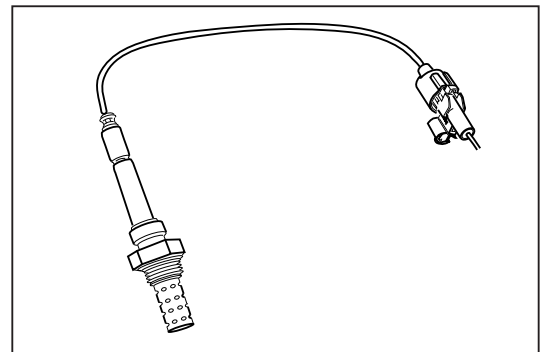
MEF00053-00047



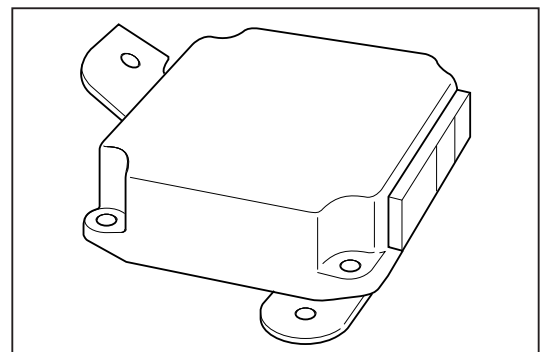
MEF00054-00048



MEF00055-00049



MEF00056-00050



MEF00057-00051

6. Before disconnecting or re-connecting the connector of the ECU proper of the EFI system, be sure to turn off the ignition switch and all accessory switches. Also, disconnect the battery ground cable from the battery negative terminal.

Failure to observe this caution could cause ECU malfunction.

7. Never apply strong impacts to the EFI parts. Pay utmost attention during the installation/removal. Especially, special caution must be exercised as to the handling of the ECU.

8. When installing the battery, care must be exercised not to mistake the battery polarity.

CAUTION:

- A battery of 12 volts for automotive use must be used.

9. When the voltage or resistance of the ECU is measured during the check, never touch terminals other than the specified terminals. Failure to observe this caution could cause ECU malfunction.

10. When the system is checked on a rainy day, be very careful not to allow water to get into connectors and/or terminals.

Also, when the engine compartment is washed, prevent water from getting to the EFI-related parts and wiring connectors.

11. Every EFI part should be replaced as an assembly.

12. When disconnecting or re-connecting the wiring connector, care must be exercised as to the following points.

(1) Carefully observe the shape of the lock prior to the disconnection/connection.

(2) Release the lock. Then, disconnect the connector.

NOTE:

- When disconnecting the connector, be sure to hold the connector holder, not to pull the wire.

(3) Insert the connector, until the lock is engaged completely.

(4) Be sure to keep the number of disconnection/re-connection of the connector at a minimum level.

13. When the vehicle is equipped with wireless installation (HAM, CB, etc.)

The ECU has been so designed that it is resistant to external influence.

However, if a vehicle is equipped with a CB wireless installation and so forth (even if its output is only 10 W), it may affect the ECU adversely. Therefore, observe the following precautions.

(1) Install an antenna at a place as far away as possible from the ECU.

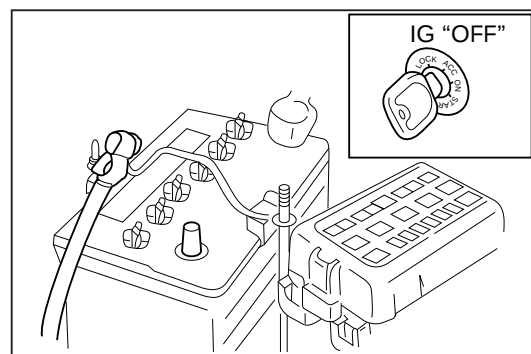
The ECU is installed under the instrument panel.

Therefore, the antenna should be installed at the rear of the vehicle.

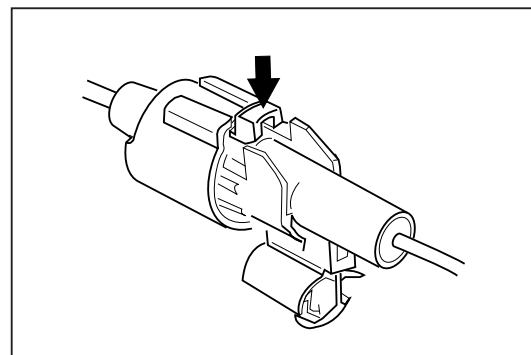
(2) The antenna cord should be kept at least 20 cm away from the engine wire. Never wind the antenna cord together with the engine wire with tapes.

(3) Adjust the antenna output correctly.

(4) Never install a wireless installation with a high output on the vehicle.



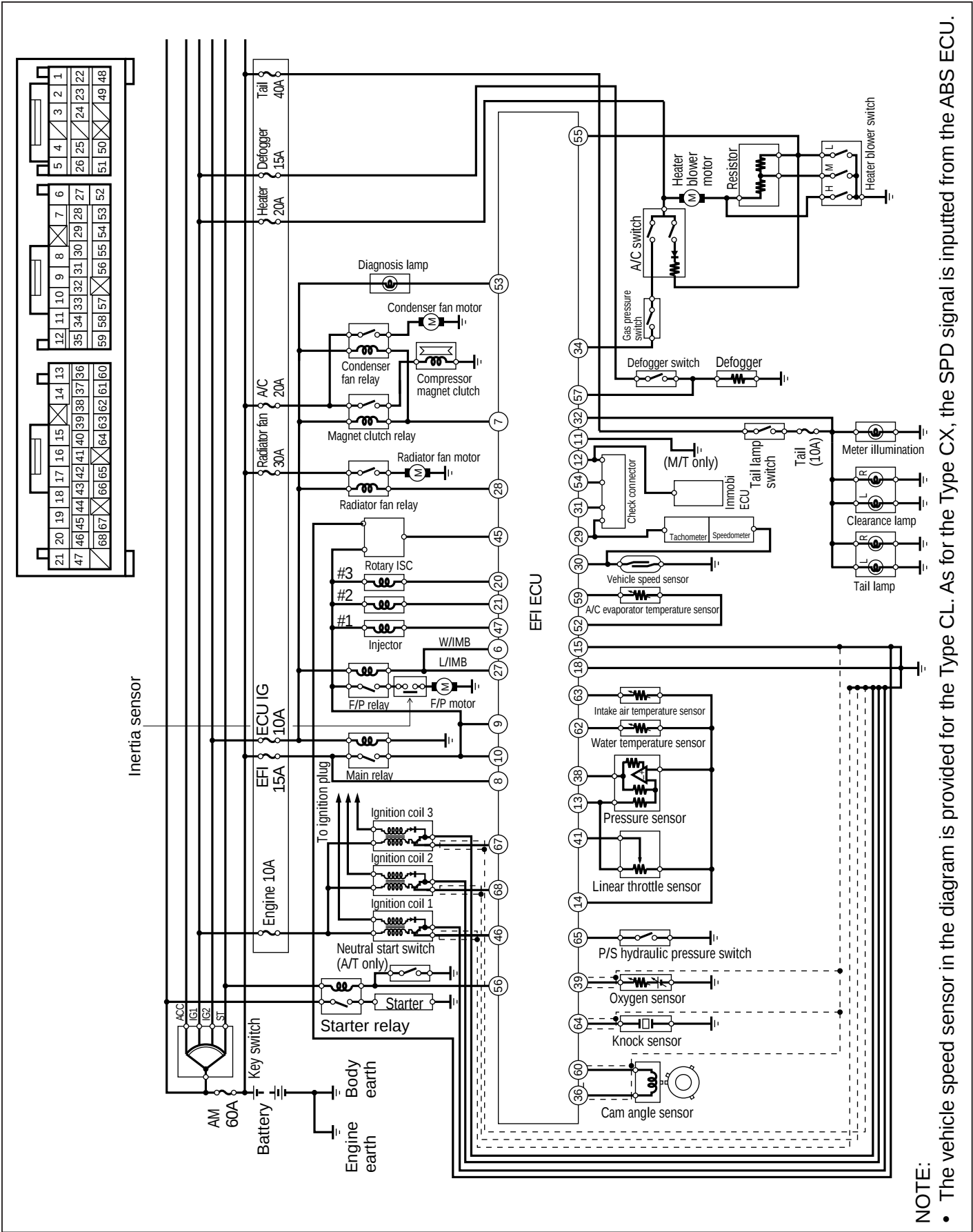
MEF00058-00052



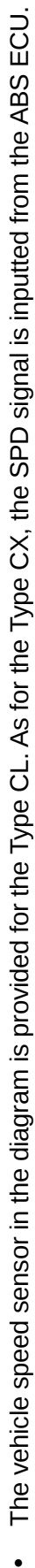
MEF00059-00053

3. WIRING DIAGRAM

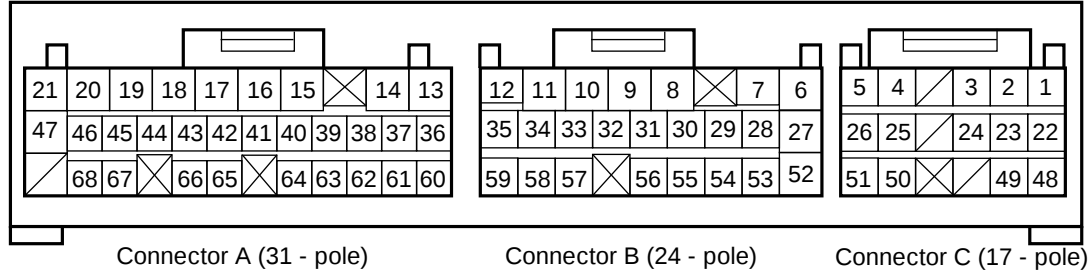
3.1 SPECIFICATIONS OF SYSTEM FOR UNLEADED GASOLINE



MEF00062-00055



4. ARRANGEMENT OF EFI ECU TERMINAL



MEF00063-00056

CONNECTOR A

No.		Contents of connection	No.		Contents of connection
13	VC	Pressure sensor power supply	43	—	
14	E2	Sensor ground	44	—	
15	E1	Sensor system ground	45	ISC	Rotary ISC
16	—		46	IG1	Ignition signal (#1 cylinder)
17	—		47	#10	Injector (#1 cylinder)
18	E01	Power supply system ground	60	N—	Cam angle sensor (—)
19	—		61	—	
20	#30	Injector (#3 cylinder)	62	THW	Coolant temperature sensor
21	#20	Injector (#2 cylinder)	63	THA	Intake air temperature sensor
36	N+	Cam angle sensor (+)	64	KNK	Knock sensor
37	—		65	PST	P/S Pressure switch
38	PiM	Pressure sensor signal	66	—	
39	OX	Oxygen sensor / Variable resistor sensor	67	IG3	Ignition signal (#3 cylinder)
40	—		68	IG2	Ignition signal (#2 cylinder)
41	VTH	Linear throttle sensor	—	—	
42	—		—	—	

MEF00064-00000

CONNECTOR B

No.		Contents of connection	No.		Contents of connection
6	FC1	Fuel pump relay (With IMB.)	32	H/L	Tail lamp switch
7	MGC	A/C Magnet clutch relay	33	—	
8	BAT	Memory back-up supply	34	ACSW	A/C switch
9	+B2	Power supply	35	—	
10	+B1	Power supply	52	E21	Sensor ground
11	SEL	Map constant switch signal (Only for M/T)	53	W	Check engine lamp
12	SIO	Diagnosis tester	54	VF	VF monitor terminal
27	FC2	Fuel pump relay (Without IMB.)	55	BLW	Heater blower switch
28	RFAN	Radiator fan relay	56	A/T	Neutral start switch
29	REV	Engine speed signal	57	DEF	Defogger switch
30	SPD	Vehicle speed sensor	58	—	
31	T	Test terminal	59	ACEV	A/C Evaporator temp. sensor

MEF00065-00000

CONNECTOR C

No.		Contents of connection	No.		Contents of connection
1	—		24	—	
2	—		25	—	
3	—		26	—	
4	—		48	—	
5	—		49	—	
22	—		50	VCO	Variable resistor sensor power supply
23	—		51	E20	sensor ground

MEF00066-00000

5. TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

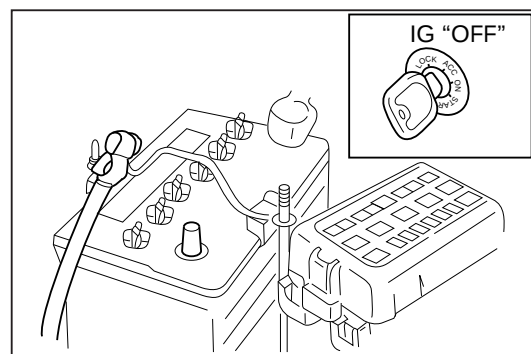
5.1 PREPARATION OF TROUBLE SHOOTING WITH SST

The EFI unit can be checked by measuring the resistance or voltage at the SST terminals.

1. Disconnect the battery ground cable from the negative (–) terminal of the battery.

CAUTION:

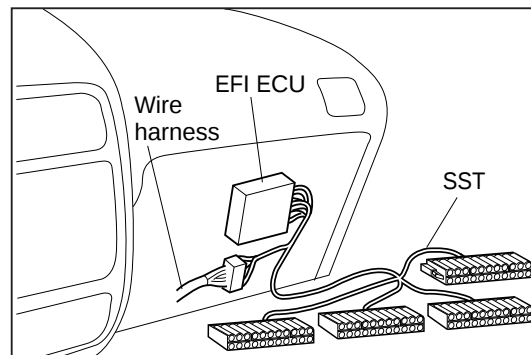
- Be sure to memorize the malfunction code before disconnecting the battery cable. Otherwise the malfunction code(s) will be erased by disconnecting the battery cable.



MEF00067-00057

2. Disconnect the wire harness connectors from the EFI ECU connectors at the cowl side of the passenger seat.
3. Connect the following SST between the wire harness connectors and the EFI ECU connectors.

SST: 09842-97201-000



MEF00068-00058

4. Reconnect the battery ground cable to the negative (–) terminal of the battery.

CAUTION:

- When disconnecting or reconnecting the EFI ECU connectors, be sure to disconnect the battery ground cable from the negative (–) terminal of the battery with the ignition switch and all accessory switches in the off state.
- When installing a new battery, care must be exercised not to mistake the battery polarity. Failure to observe this caution could cause ECU malfunction.
- Before using the SST, be sure to check to see if short or open wire exists between the terminals of the SST.

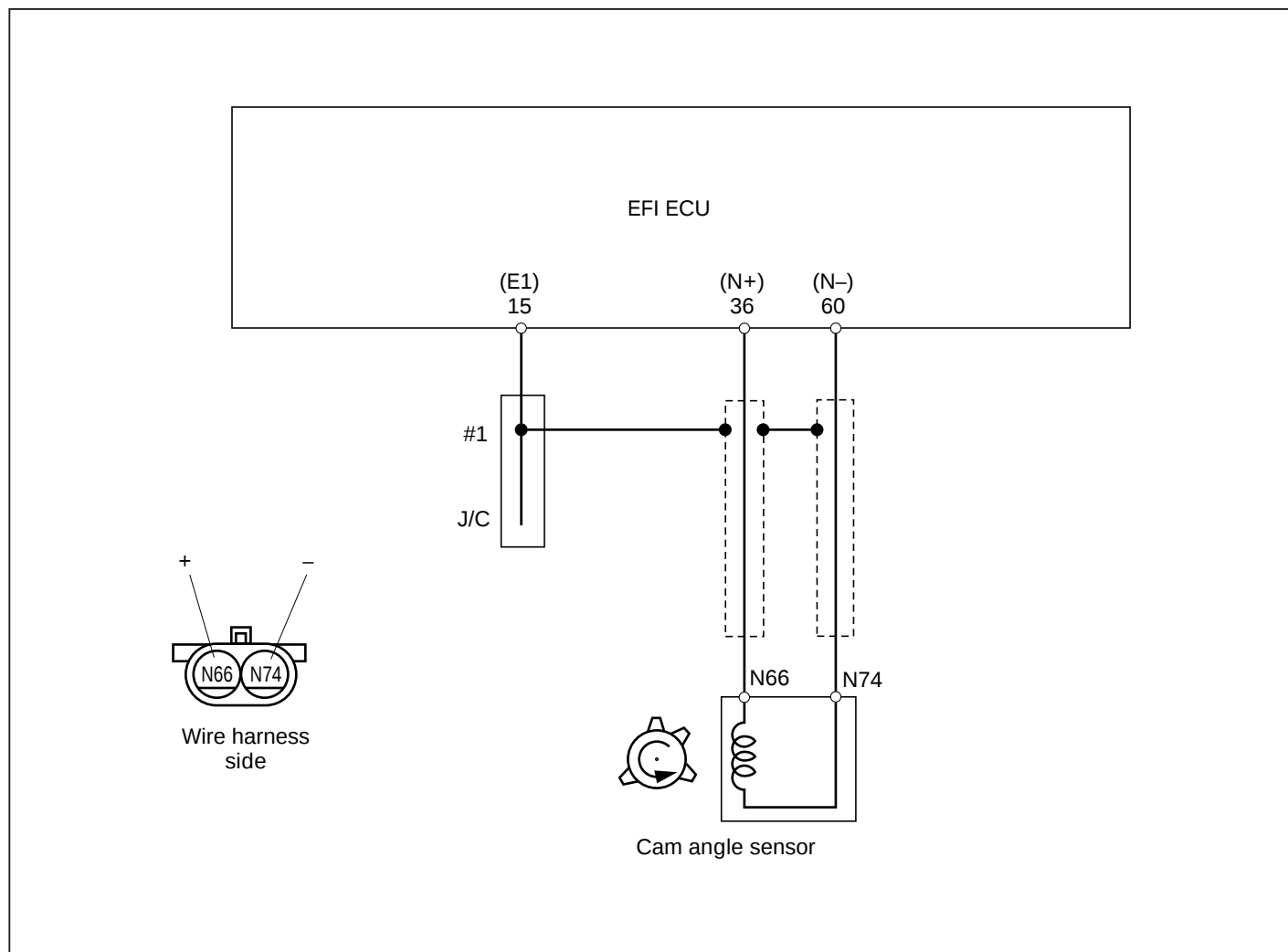
MEF00069-00000

5.2 DIAGNOSIS CODE TABLE

When the diagnosis system detects malfunctions, the check engine lamp will go on even if the diagnosis connector test terminal is not connected to the earth terminal.

Code No.	Number of flashing	Diagnosis item	Diagnosis contents	Trouble area	See page
Flashing		Normal	—	—	—
13		Cam angle sensor signal	When the input signal from the cam angle sensor circuit exhibits open wire or short circuit.	- Cam angle sensor circuit - Cam angle sensor	EF-23
18		Knock sensor signal	When the input signal from the knock sensor circuit exhibits open wire or short circuit.	- Knock sensor circuit - Knock sensor	EF-25
21		Oxygen sensor signal	When the input signal from the oxygen sensor circuit exhibits open wire or short circuit.	- Oxygen sensor circuit - Oxygen sensor (Only for NON-LEAD Spec)	EF-27
24		Variable resister sensor signal	When the input signal from the variable resister sensor circuit exhibits open wire or short circuit.	- Variable resister sensor circuit - Variable resister sensor (Only for LEAD Spec)	EF-30
31		Pressure sensor signal	When the input signal from the pressure sensor circuit exhibits open wire or short circuit.	- Pressure sensor circuit - Pressure sensor	EF-32
41		Linear throttle sensor signal	When the input signal from the linear throttle sensor circuit exhibits open wire or short circuit	- Linear throttle sensor circuit - Linear throttle sensor	EF-34
42		Coolant temperature signal	When the input signal from the engine coolant temperature sensor circuit exhibits open wire or short circuit.	- Coolant temp. sensor circuit - Water temperature sensor	EF-35
43		Intake air temp. signal	When the input signal from the intake air temperature sensor circuit exhibits open wire or short circuit.	- Air temperature sensor circuit - Air temperature sensor	EF-37
44		A/C evapo. temperature sensor signal	When the input signal from the A/C evapo. temperature sensor circuit exhibits open wire or short circuit.	- A/C evaporator temperature sensor circuit - A/C evaporator temperature sensor	EF-39
51		Switch signal	With terminal T shorted, when one of the following states is detected: The idle switch "OFF," or the A/C switch "ON," or the neutral start switch "ON." However, no memorizing will take place.	- A/C switch circuit - A/C switch - Linear throttle sensor circuit - Linear throttle sensor - Neutral start switch circuit - Neutral start switch.	EF-41
52		Vehicle speed sensor signal	When the input signal from the vehicle speed sensor circuit exhibits open wire or short circuit.	- Vehicle speed sensor circuit - Vehicle speed sensor	EF-43
81		Immobilizer signal	When the rolling codes can not be exchanged between the EFI ECU and the immobilizer ECU or the rolling codes are not matched.	- Wire harness between the Immobilizer ECU and the EFI ECU - Immobilizer ECU - EFI ECU (Only for EC, Israel spec)	EF-45
83		Immobilizer signal	When the rolling codes can not be exchanged in the EFI ECU.	EFI ECU (Only for EC, Israel spec)	EF-46

5.3 DIAGNOSIS CODE NO. 13 CAM ANGLE SENSOR & CIRCUIT



MEF00071-00060

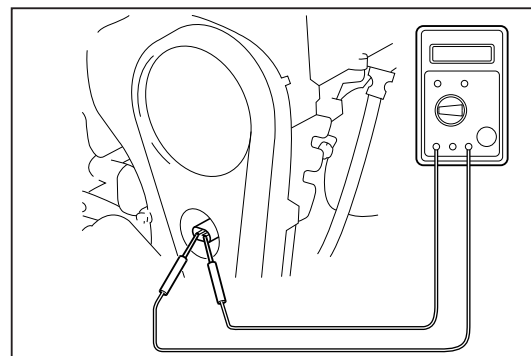
When no Ne signal is inputted even once while cranking is continued for several seconds with the accelerator pedal in a non-depressed state:

However, please remember that this code is outputted on the assumption that the pressure sensor and idle switch systems are functioning properly. If the codes related to these systems are outputted simultaneously, perform checks for these codes first.

1. Check of cam angle sensor
 - (1) Disconnect the connector of the cam angle sensor.
 - (2) Check that there is the specified resistance between the respective terminals of the cam angle sensor.
Specified Value: 950 - 1250 Ω at 20°C

NOTE:

- If the resistance will not conform to the specification, replace the cam angle sensor. Refer to the IG section.



MEF00072-00061

- (3) Temporarily remove the EFI main relay at the relay box.
- (4) Check that there is a voltage between the terminals of the cam angle sensor when the engine is being cranked.

Specified Value: 0.2 - 0.6 V (AC)

NOTE:

- The generating voltage should be measured, using the AC range of a volt meter.
- If the measured value does not conform to the specification, adjust the gap. See the IG section.

REFERENCE

- (1) Prepare an oscilloscope.
- (2) Connect a probe to the respective terminals.
- (3) Check to see if a signal shown in the graph appears at the terminals when the engine is being cranked.

NOTE:

- If not, check the air gap of the signal generator. Refer to the IG section of the service manual.

2. Check the wire harness and ground earth.

- (1) Check to see if the earth bolt exhibits looseness or corrosion.

- (2) Connect the wire harness connector to the connector of the cam angle sensor.
- (3) Connect the SST between the ECU connectors and the wire harness connectors.

NOTE:

- Refer to page EF-21, "Preparation of trouble shooting with SST".
- At this time, disengage the connector between the SST and the EFI ECU.

SST: 09842-97201-000

- (4) Measure the resistance between the SST terminals 36 and 60.

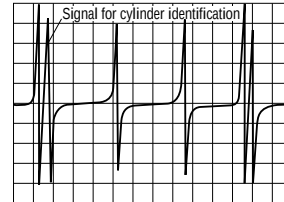
Specified Value: 950 - 1250 Ω at 20°C

NOTE:

- If the trouble has not been solved by repairing the wire harness or parts, then, proceed to page EF-47, Replacement of ECU.

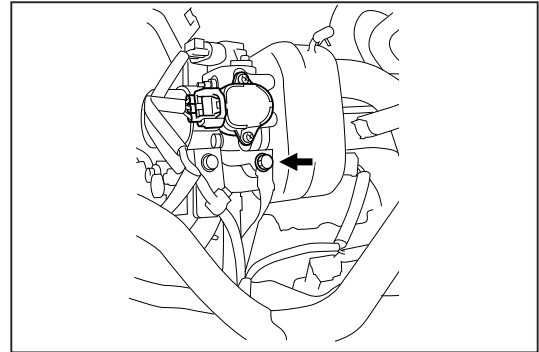
MEF00073-00000

Cam angle sensor output

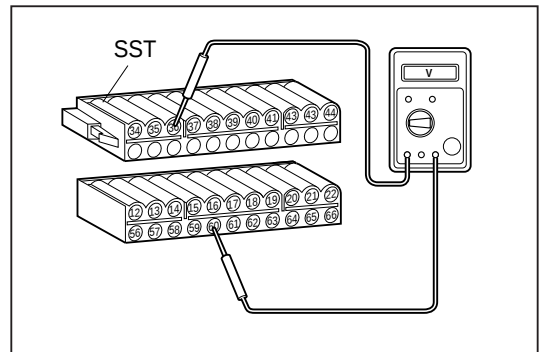


The rotation angle sensor signal will be outputted as shown in the figure above when an oscilloscope is used. (The frequency and voltage differ, depending upon the rotation speed.)

MEF00074-00062



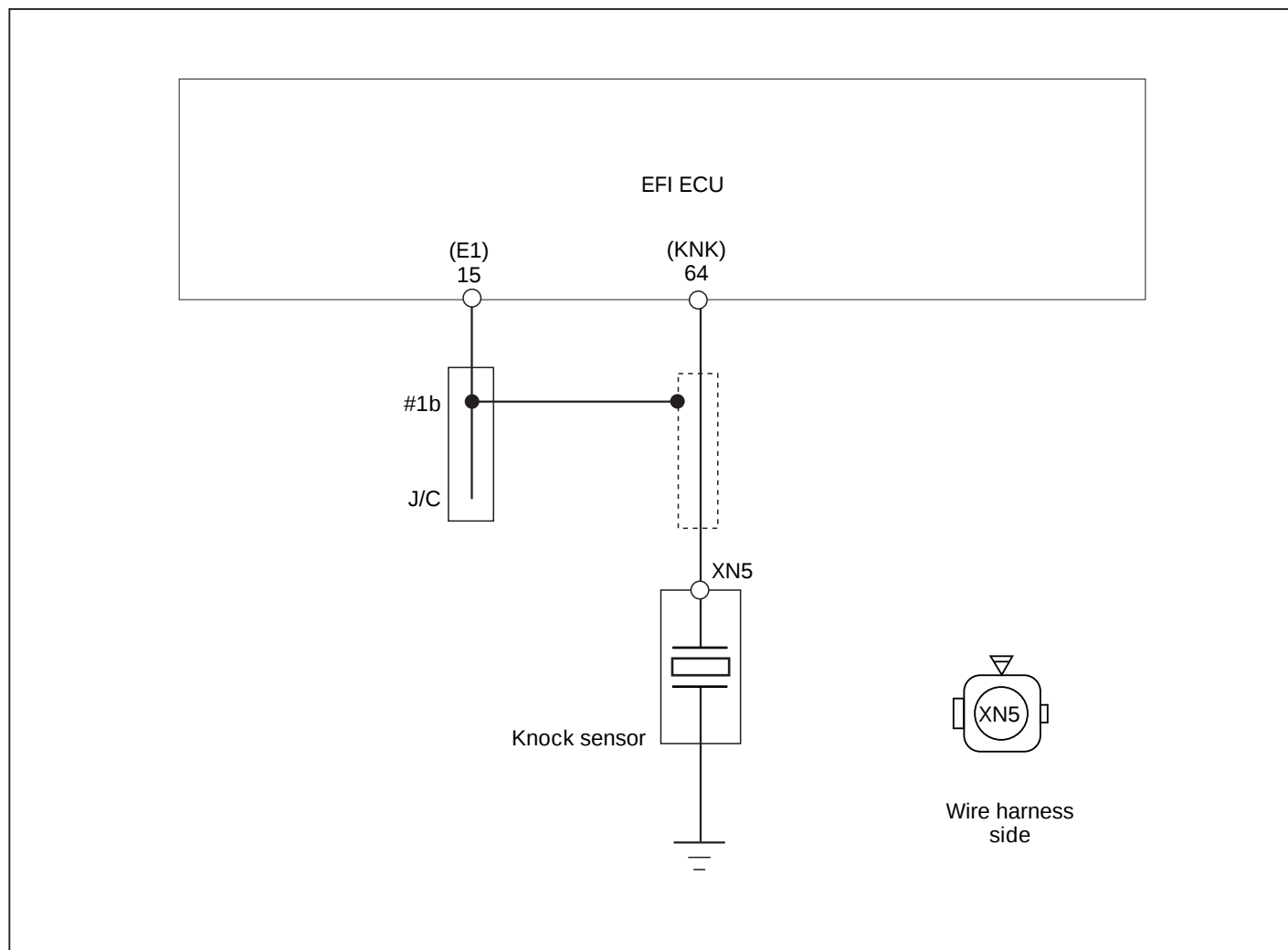
MEF00075-00063



MEF00076-00064

5.4 DIAGNOSIS CODE NO. 18

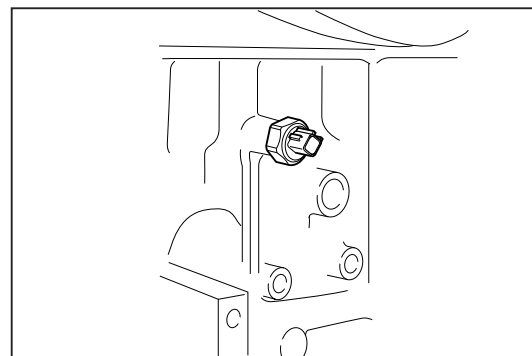
KNOCK SENSOR & CIRCUIT



MEF00077-00065

When the signal from the knock sensor exceeds the voltage preset according to the engine revolution speed continuously for more than a certain length of time while accelerating at a certain engine revolution speed of 2000 rpm or more:

1. Check to see if the connector is connected properly.

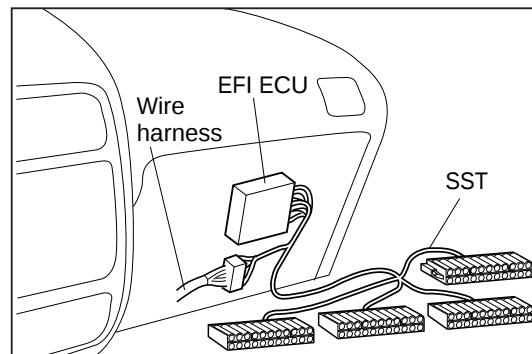


MEF00078-00066

2. Inspection of wiring harness

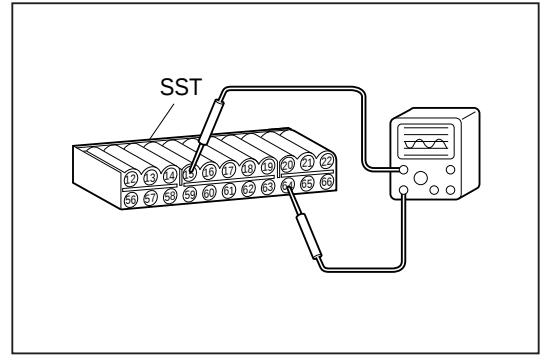
- (1) Connect the SST between the ECU connectors and the wire harness connectors.

SST: 09842-97201-000



MEF00079-00067

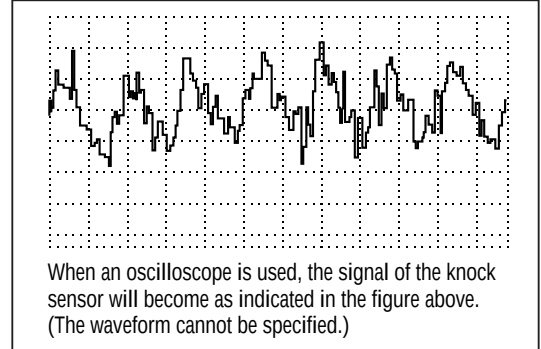
- (2) Ensure that the waveform indicated in the figure will be observed when the probes of the oscilloscope are connected to the terminals 64 and 15 of the SST while the engine is idling.



MEF00080-00068

NOTE:

- The waveform at the time of racing becomes greater than that at the time of idling.



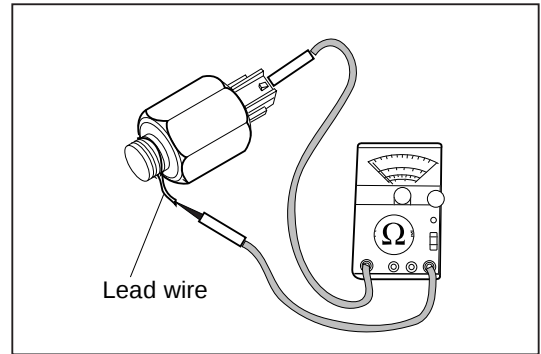
MEF00081-00069

3. Inspection of knock sensor unit

- (1) Turn off the ignition switch.
- (2) Disconnect the connector of the knock sensor.
- (3) Remove the knock sensor unit from the cylinder block.

NOTE:

- In cases where the knock sensor is normal, the resistance will become infinity.
- If the trouble has not been solved by repairing the wire harness or the knock sensor, then proceed to page EF-47, Replacement of ECU.



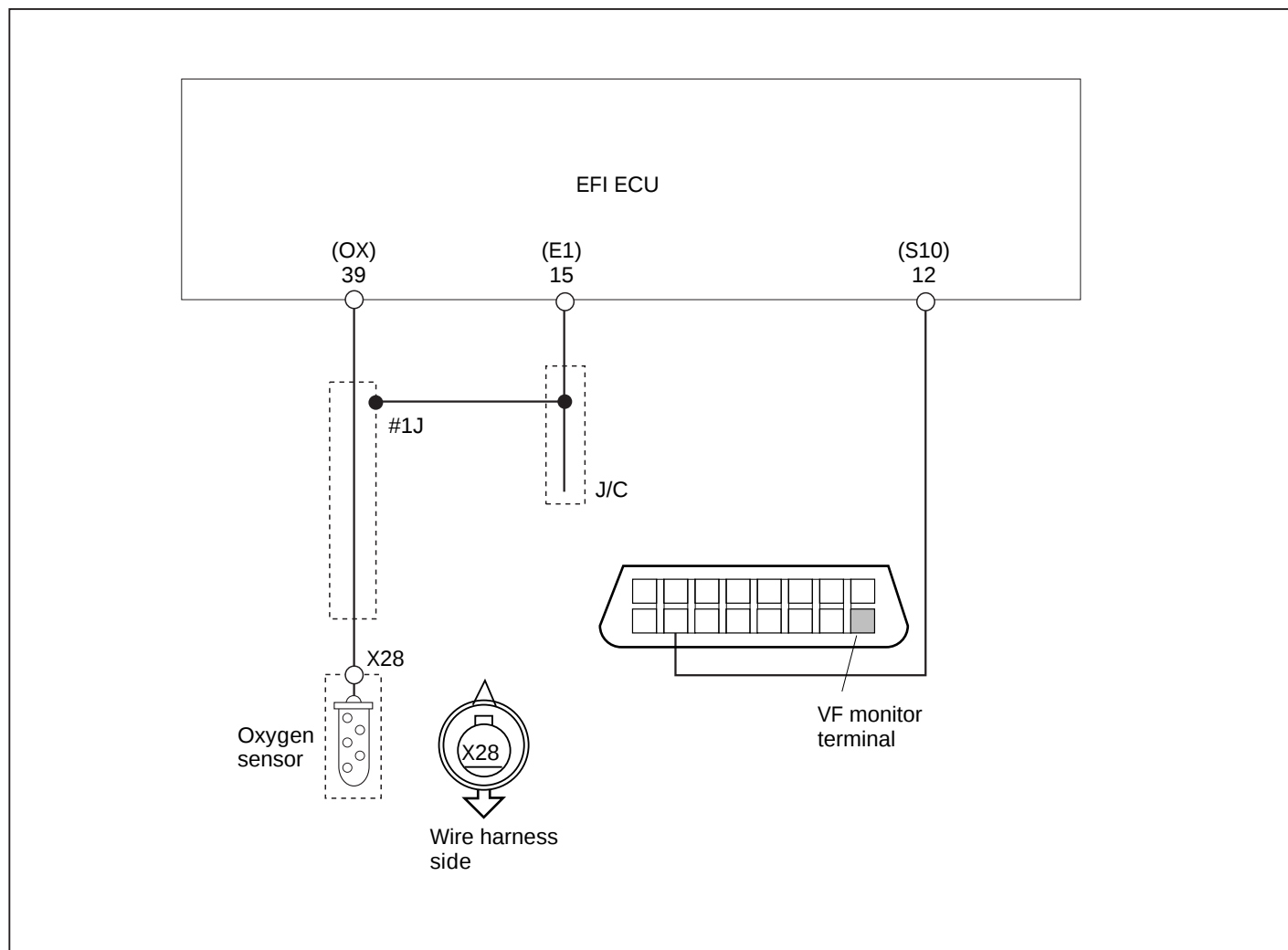
MEF00082-00070

CAUTION:

- When installing the knock sensor to the engine block, never use an impact wrench, etc. If an excessive impact is applied to the knock sensor, it will cause malfunction.

5.5 DIAGNOSIS CODE NO. 21

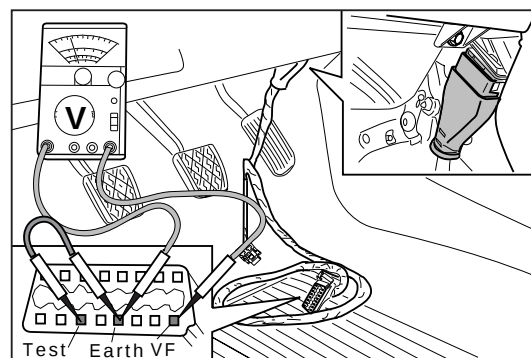
OXYGEN SENSOR & CIRCUIT



MEF00083-00071

When the signal from the oxygen sensor never becomes rich under a condition where the engine revolution speed has been kept at 3000 rpm or more and the power switch has been turned ON after the engine has warmed up: However, this code is emitted on the assumption that the pressure sensor system and water temperature sensor system are functioning normally. Therefore, when the codes No. 31 and 42 are simultaneously outputted, it is necessary to repair those systems first and, then, let the ECU carry out the diagnosis.

1. Inspection of oxygen sensor circuit
 - (1) Warm up the engine completely.
 - (2) Connect the test terminal and the earth terminal with a jump wire at the diagnosis connector.
 - (3) Keep the engine revolution speed at 3000 rpm for four minutes so as to warm up the oxygen sensor.
 - (4) Measure the voltage between the VF terminal and the earth terminal as illustration while keeping the engine revolution speed at 1200 rpm or more.
- Specified Voltage: $0 \leq 5 \text{ V}$



MEF00084-00072

- (5) While keeping the engine revolution speed at 1200 rpm, count how many times the pointer of the voltmeter swings within 10 seconds.

8 times or more: Normal
0 - 7 times: Proceed to the following step.

NOTE:

- There are cases where the measurement can not be conducted with a tester having a low reaction speed.

- (6) Measure the voltage between the VF terminal and the earth terminal while keeping the engine idle revolution when the jump wire is disconnected.

Specified Value: 2.5 ± 0.7 V

REFERENCE

- Prepare an oscilloscope.
- Connect a jump wire to the test terminal and the earth terminal.
- Connect a probe to the VF terminal and the earth terminal.
- Check to see if a signal shown in the graph appears at the terminals while the engine is rotating at 3000 rpm.

NOTE:

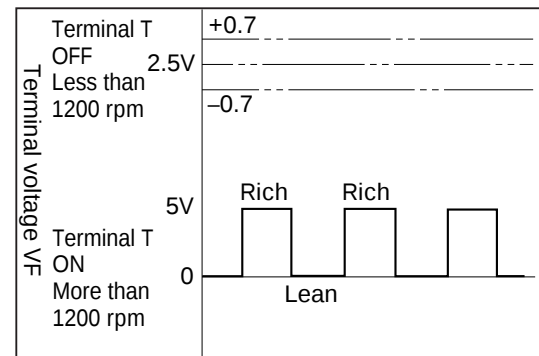
- There are cases where the measurement can not be conducted with a tester having a low reaction speed. Therefore, use a tester having a high reaction speed or oscilloscope.
- If no voltage appears, check the oxygen sensor unit.

2. Check of oxygen sensor

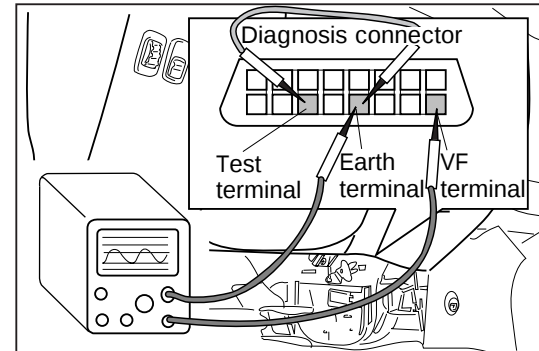
- Warm up the engine completely.
- Disconnect the connector of the oxygen sensor.
- Connect a voltmeter to the connector terminal of the oxygen sensor.
- Hold the engine revolution speed for 2 minutes at about 3000 rpm. At this time, ensure that the reading of the voltmeter registers 0.45 V or more.

NOTE:

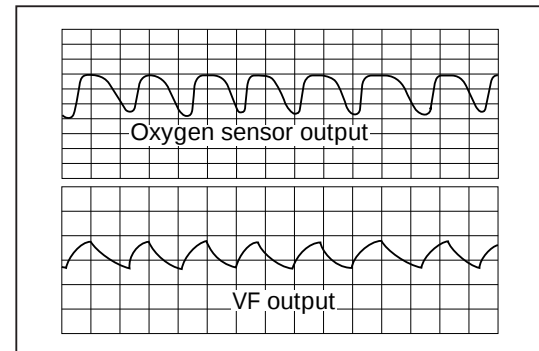
- When the oxygen sensor connector has been disconnected, an air-to-fuel mixture ratio of the engine will become rich. The oxygen sensor therefore generates an electromotive force of about 0.45 volts or more.
- Replace the oxygen sensor with a new part, if the reading will not register 0.45 V or more.
- If the reading conforms to the specification, proceed to the following procedure.



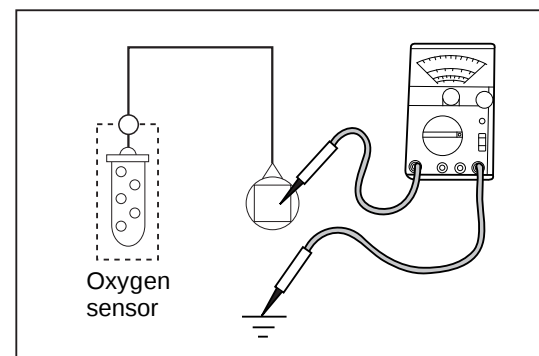
MEF00085-00073



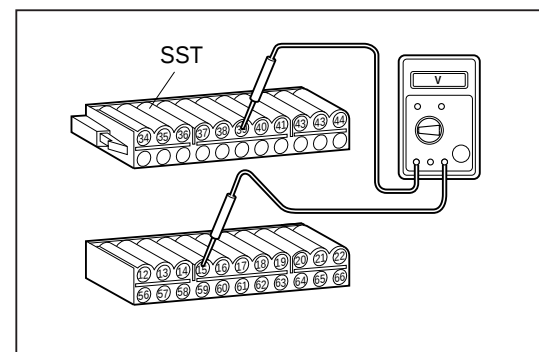
MEF00086-00074



MEF00087-00075



MEF00088-00076



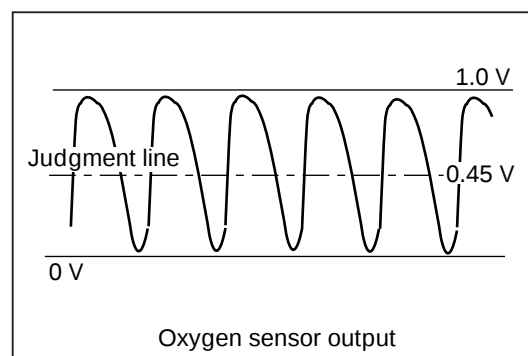
MEF00000-00077

3. Check of wire harness

- (1) Connect the SST between the ECU connectors and the wire harness connectors. (See page EF-21.)
- (2) Ensure that the voltage between the SST terminals 39 and 15 is the specified value while keeping the engine revolution speed at 3000 rpm.
Specified Voltage: 0.2 $\leftrightarrow$ 1.0 V

NOTE:

- At this stage, remove the jump wire from the test terminal and the earth terminal of the diagnosis connector.



MEF00089-00078

(3) Perform the procedure given in the table, according to the measurement results.

Measured voltage	Remedy
0 V	1) Check the oxygen sensor circuit for open wire or short circuit.
The measured voltage varies mainly within a range under 0.45 V.	Remedy causes for too-lean fuel mixture. • Pressure sensor • Pressure regulator • Fuel line • Fuel filter • Fuel pump • Injector
The measured voltage varies within a range of 0 - 1.0 V, centering around 0.45 V. However, the reaction speed the is low. (The pointer of the voltmeter swings less than 8 times within 10 seconds.)	Check the ECU. (Go to page EF-47, REPLACEMENT OF ECU.)
The measured voltage varies mainly within a range above 0.45 V.	Remedy causes for too-rich fuel mixture. • Pressure sensor • Fuel line • Pressure regulator • Injector
1.0 V	Remedy causes for too-rich fuel mixture. • Pressure sensor • Fuel line • Pressure regulator • Injector
More than 1.0 V	Check the oxygen sensor circuit for short circuit with other positive line. Repair or replace the wiring harness.

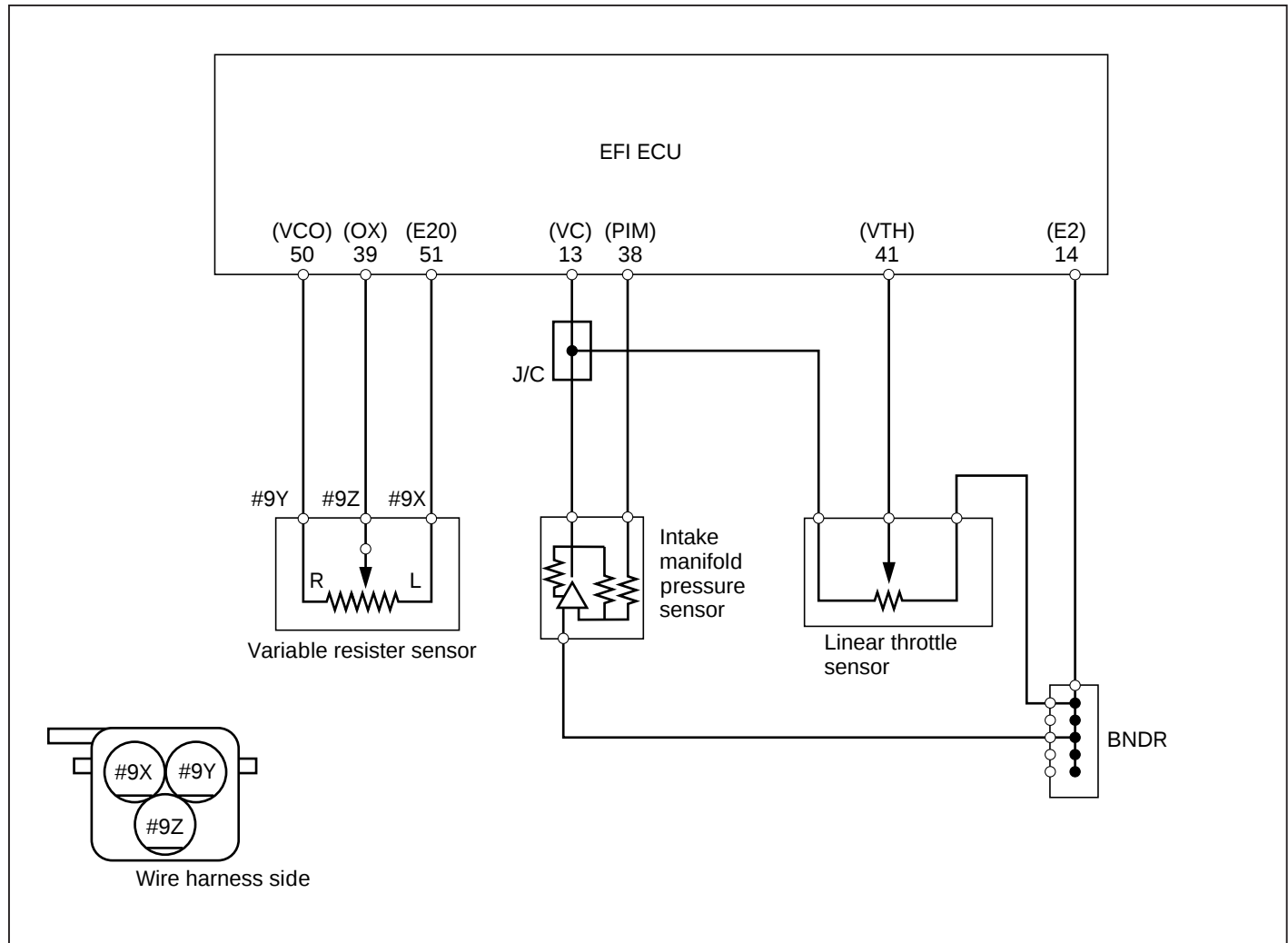
MEF00090-00000

NOTE:

- If the trouble has not been solved by repairing the wire harness or parts, then, proceed to page EF-47, Replacement of ECU.

MEF00091-00000

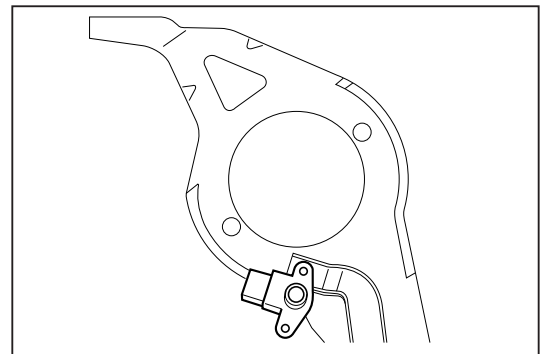
5.6 DIAGNOSIS CODE NO. 24 VARIABLE RESISTER SENSOR & CIRCUIT



MEF00092-00079

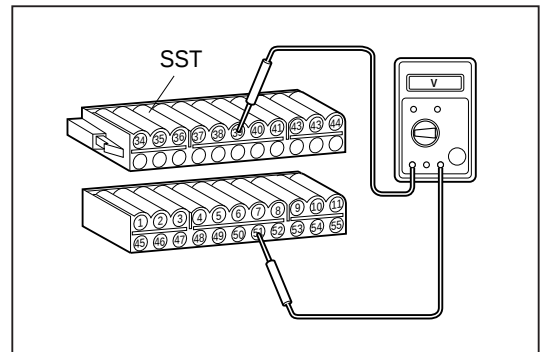
When the signal from the variable resistor sensor is 4.8 V or more or less than 0.2 V continuously for more than a certain length of time:

1. Check to see if the connector is connected properly.
2. Turn off the ignition switch.



MEF00093-00080

3. Check wire harness.
 - (1) Connect the SST between the ECU connectors and the wire harness connectors.
 - (2) Ensure that the voltage between the SST terminals 39 and 51 is within the specified value when the ignition switch is turned to the ON position.
Specified Value: 0.2 V or more, but less than 4.8 V



MEF00094-00081

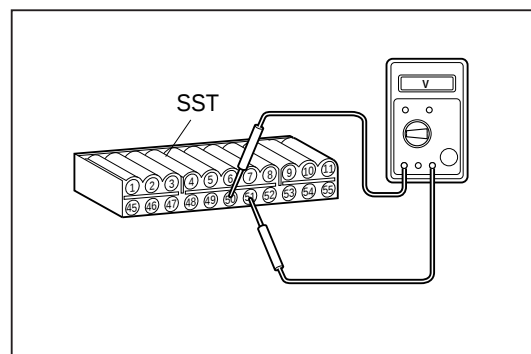
NOTE:

- If the measured voltage does not conform to the specifications, check the wire harness.

- (3) Ensure that the voltage between the SST terminals 50 and 51 is within the specified value when the ignition switch is turned to the ON position.
Specified Value: 4.5 - 5.5 V

NOTE:

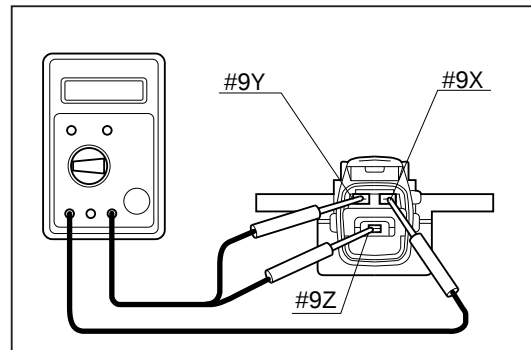
- If no voltage appears, check the ECU power supply circuit, ECU ground circuit and the wire harness.



MEF00095-00082

4. Check the variable resistor sensor unit
- Turn off the ignition switch.
 - Disconnect the connector of the variable resistor sensor.
 - Check the resistance between the terminals below.

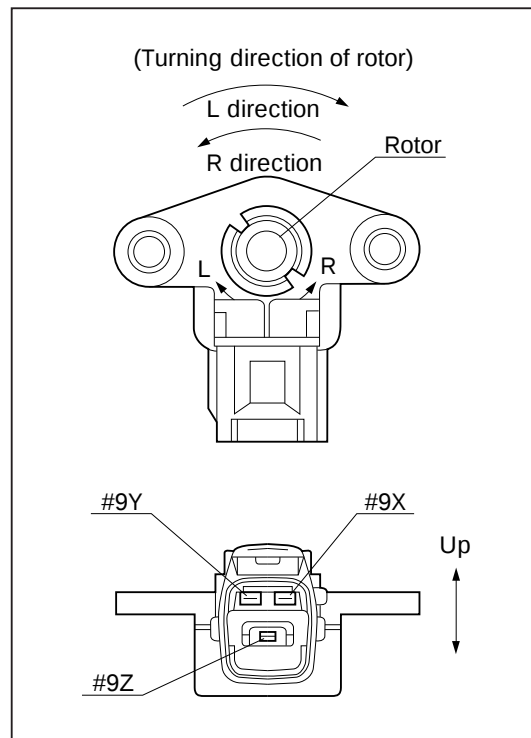
Terminal	Resistance kΩ
#9Y - #9X	5 ± 1.5 (25°C)
#9Z - #9X	The resistance should increase in proportion to the turning of the rotor in a direction from L to R.



MEF00096-00083

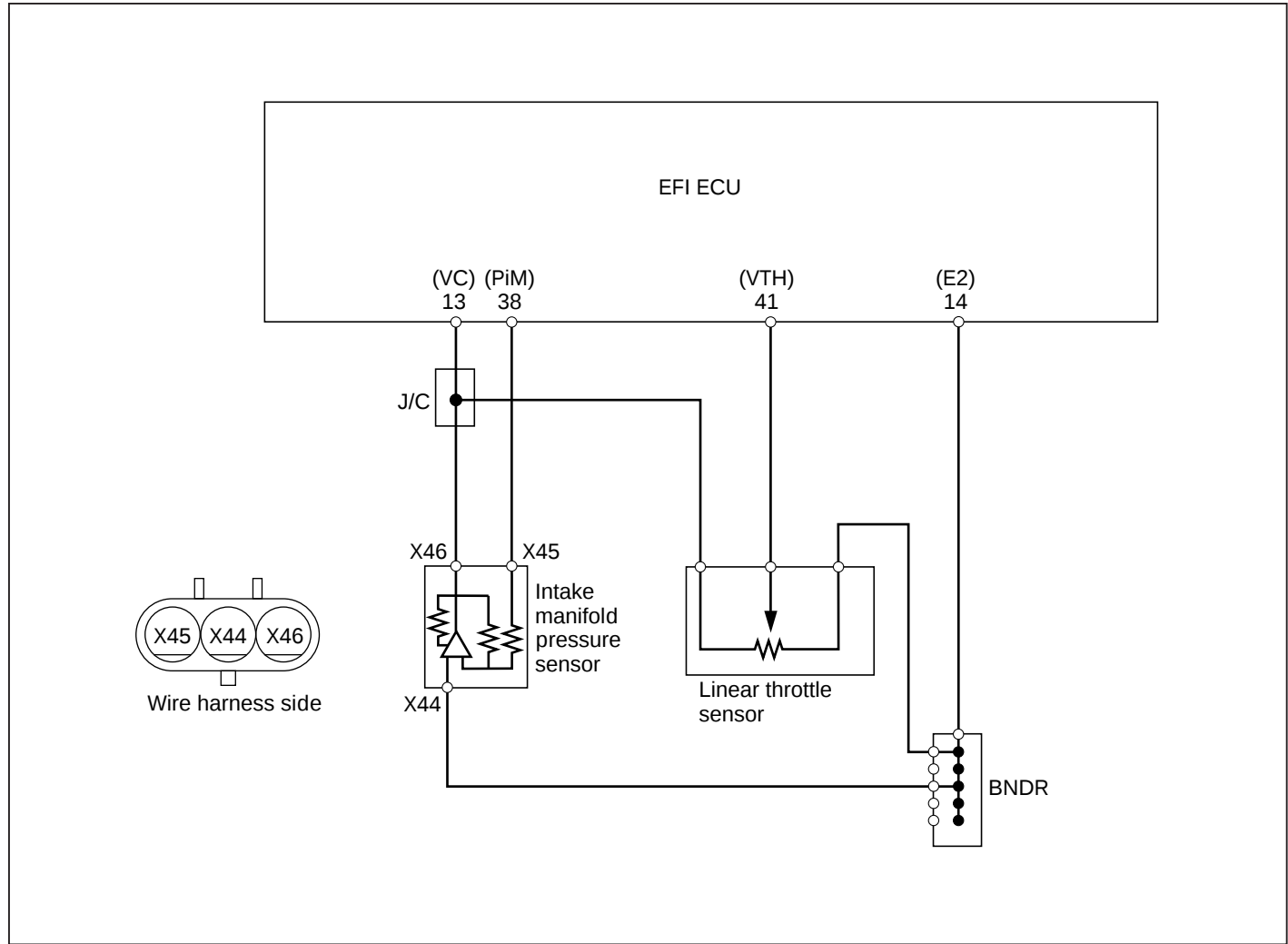
NOTE:

- Be sure to use the following SST to turn the rotor.
SST: 09243-87201-000
- If the resistance is 0.14 kΩ or more when the rotor is turned in the L direction, and is 6.24 kΩ or less when the rotor is turned in the R direction, the rotor is functioning properly.
- If the trouble has not been solved by repairing the wire harness or parts, proceed to page EF-47, Replacement of ECU.



MEF00097-00084

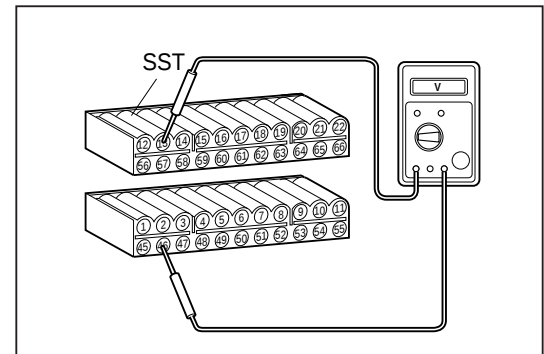
5.7 DIAGNOSIS CODE NO. 31 PRESSURE SENSOR & CIRCUIT



MEF00098-00085

When the signal from the pressure sensor is 4.9 V or more or less than 0.7 V continuously for more than a certain length of time:

1. Check the pressure sensor.
 - (1) Connect the SST between the ECU connectors and the wire harness connectors.
 - (2) Ensure that the voltage between the SST terminals 13 and 14 is within the specified value when the ignition switch is turned to the ON position.
Specified Value: 4.5 - 5.5 V



MEF00099-00086

NOTE:

- If no voltage appears, check the ECU power supply circuit, ECU ground circuit and the wire harness.

- (3) Ensure that the voltage between the SST terminals 38 and 14 is within the following specified voltage when the ignition switch is turned to the ON position.

Altitude (From sea level) m	Atmospheric pressure kPa (mmHg)	Voltage V
0	101.3 (760)	3.30 – 4.0
500	95.5 (716)	3.10 – 3.8
1000	89.9 (674)	2.95 – 3.65
1500	84.5 (634)	2.8 – 3.5
2000	79.5 (596)	2.65 – 3.35

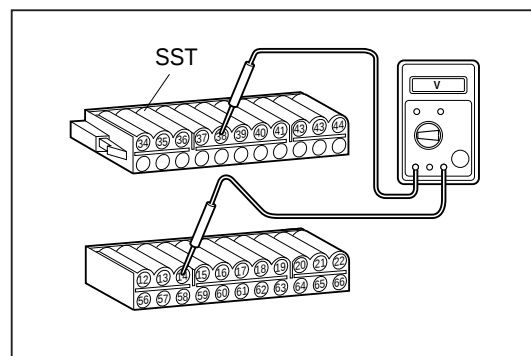
NOTE:

- Even if the measured voltage fails to conform to the specified value, continue the following procedure.

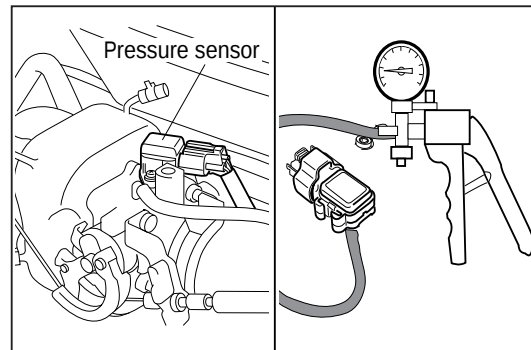
- (4) Disconnect the pressure sensor from throttle body. Apply a negative pressure of 26.7 kPa (200 mmHg) to the pressure sensor, using a MityVac. Check that the measured voltage between the SST terminals 24 and 52 drops by 0.65 - 0.95 V, compared with the voltage measured in the step (3).

NOTE:

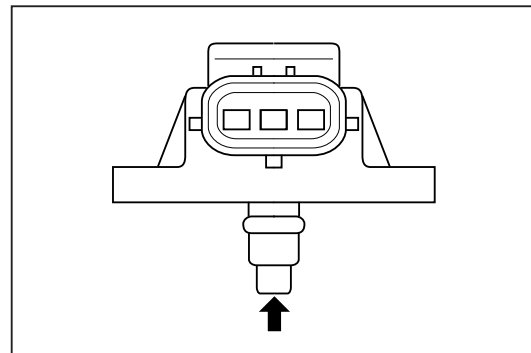
- If the pipe section of the pressure sensor indicated in the right figure is not clogged and the measured voltage will not drop to the specified value, replace the pressure sensor.
- If the trouble has not been solved by repairing the wire harness or parts, then proceed to page EF-47, Replacement of ECU.



MEF00100-00087

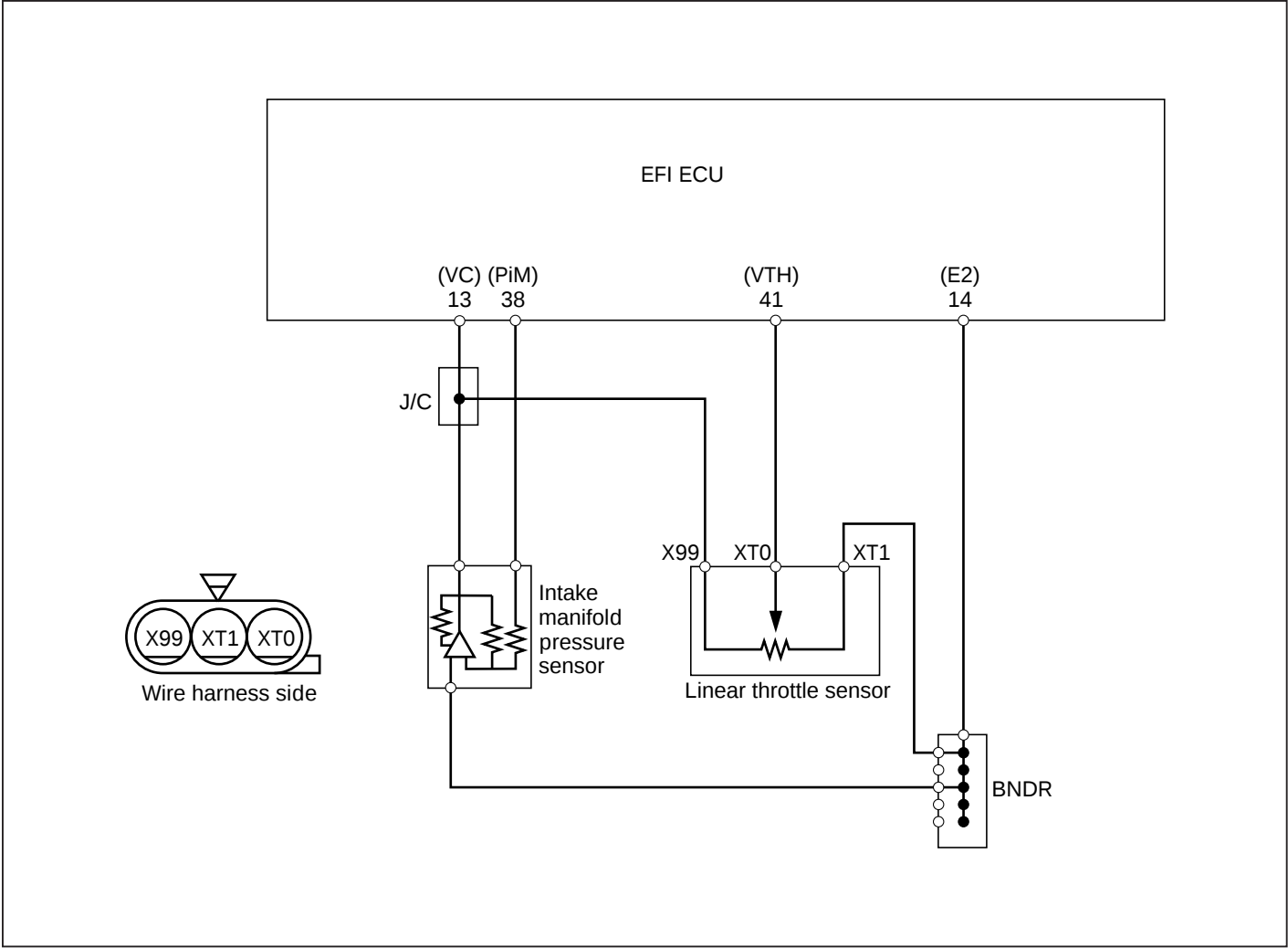


MEF00101-00088



MEF00102-00089

5.8 DIAGNOSIS CODE NO. 41
LINEAR THROTTLE SENSOR & CIRCUIT



MEF00103-00090

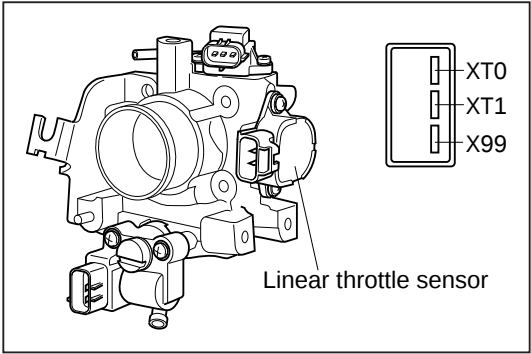
When the signal from the throttle sensor is 4.8 V or more or less than 0.2 V continuously for more than a certain length of time after starting:

1. Check to see if the connector is connected properly.
2. Disconnect the connector of the linear throttle sensor. Measure the resistance between the respective terminals.

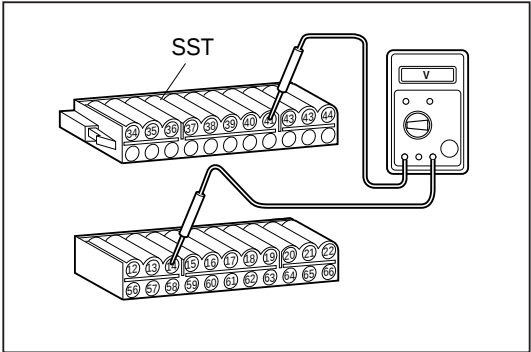
Terminal	Condition	Standard value kΩ
X99 – XT0		2.5 – 6.0
XT1 – XT0	Throttle valve fully closed	0.1 – 1.3
XT1 – XT0	Throttle valve fully opened	1.7 – 4.2

3. Connect the SST between the ECU connectors and the wire harness connectors.
4. Ensure that the voltage between the SST terminals 41 and 14 is within the specified value when the ignition switch is turned ON.

Terminal	Condition	Standard value
41 – 14	Throttle valve fully opened	4.5 – 5.5 V
41 – 14	Throttle valve fully closed	0.4 – 0.8 V



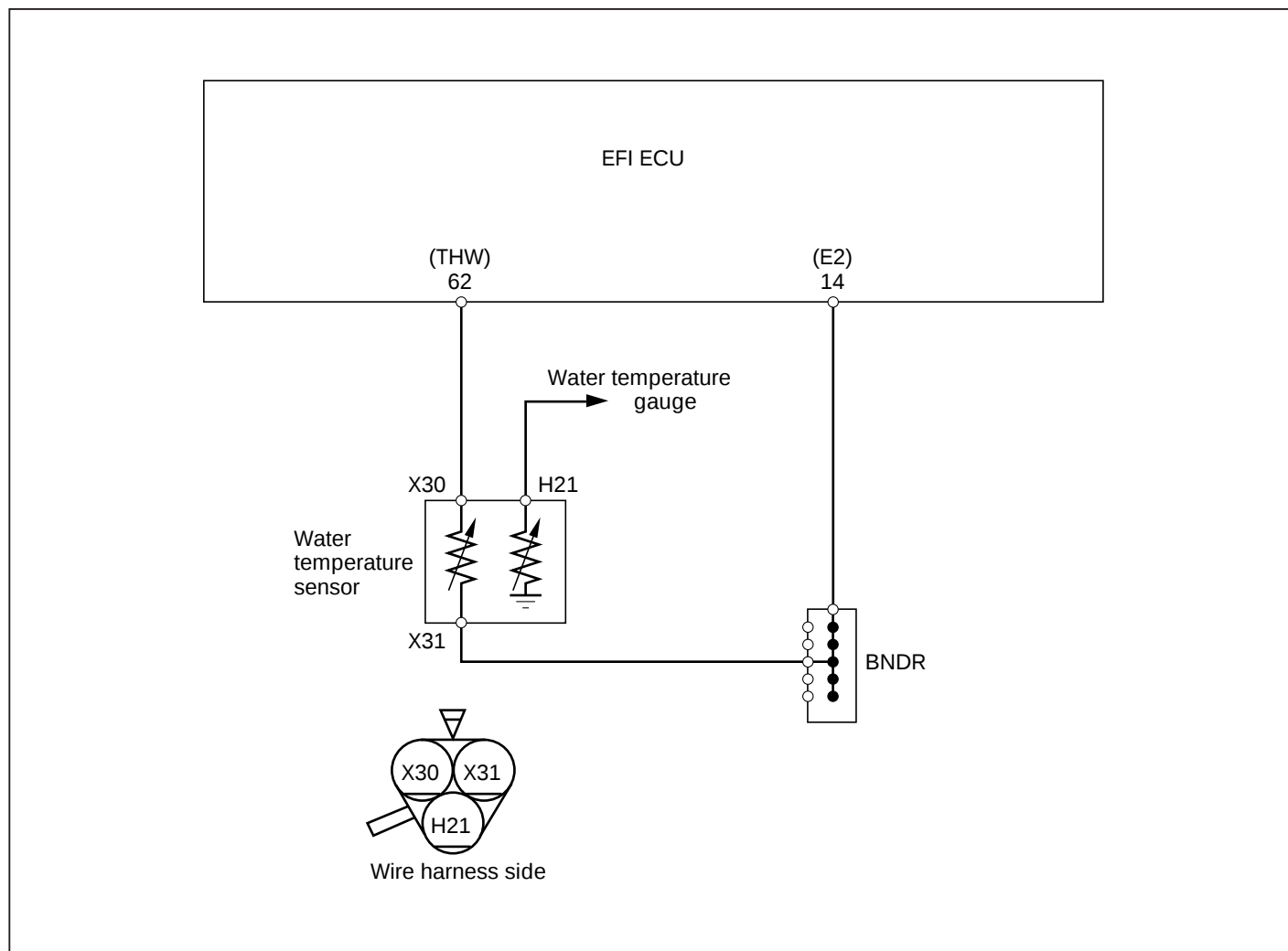
MEF00104-00091



MEF00105-00092

5.9 DIAGNOSIS CODE NO. 42

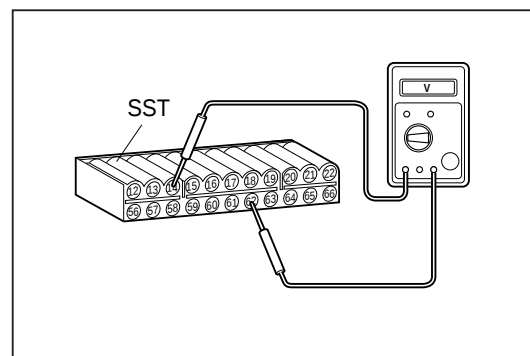
WATER TEMPERATURE SENSOR & CIRCUIT



MEF00106-000093

When the signal from the water temperature sensor is 4.85 V or more or less than 0.15 V continuously for more than a certain length of time:

1. Check to see if the connected properly.
2. Check of wire harness.
 - (1) Connect the SST between the ECU connectors and the wire harness connectors.
 - (2) Ensure that the voltage between the SST terminals 62 and 14 is within the specified value when the ignition switch is turned to the ON position.
 Specified Value: 0.2 - 4.8 V
 (Reference: 1.8 - 2.9 V at 20°C)



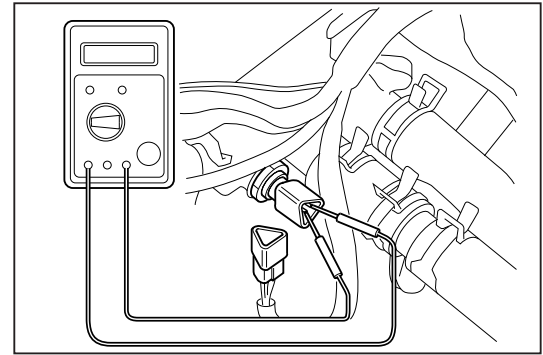
MEF00107-000094

NOTE:

- If the measured voltage does not conform to the specifications, check the wire harness.
- If the diagnosis code No. 42 is flashing, most likely it denotes that open wire occurs intermittently or the shielding is poor.

3. Check the water temperature sensor unit.
 - (1) Turn off the ignition switch.
 - (2) Disconnect the connector of the water temperature sensor.
 - (3) Check that the resistance between the terminals X30 and X31 of the water temperature sensor is within the specified range posted in the table.

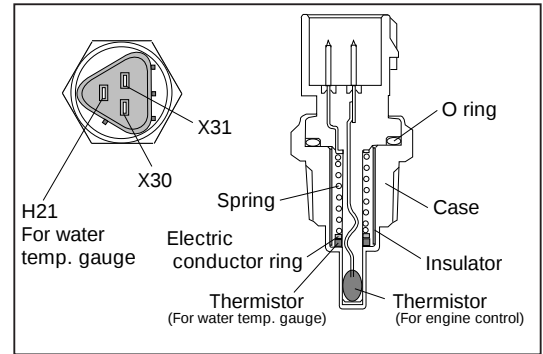
Temperature °C	Resistance kΩ
20	2.435 ± 0.16 $- 0.14$
80	0.315 ± 0.01
110	0.142 ± 0.003



MEF00108-00095

NOTE:

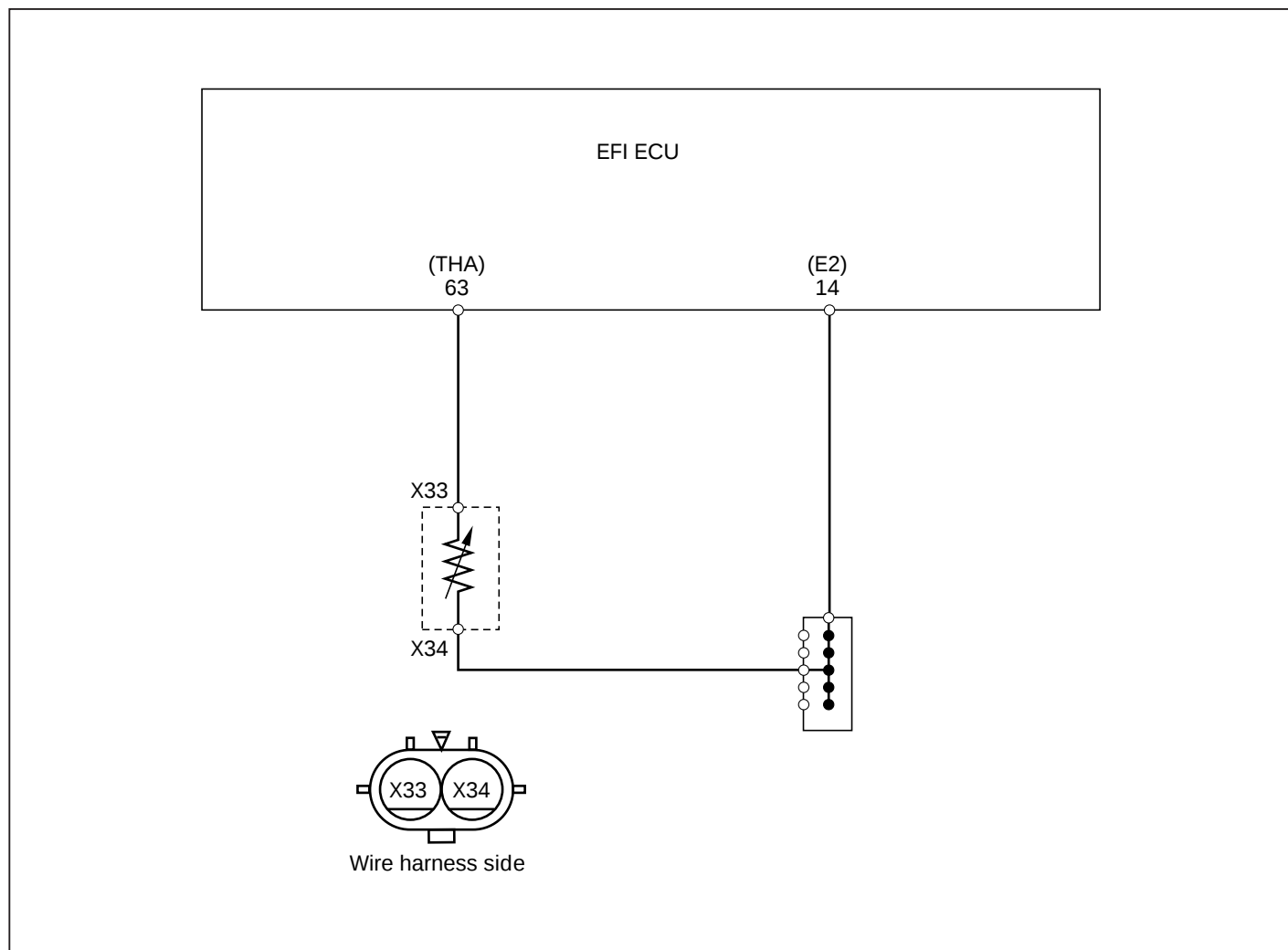
- If the trouble has not been solved by repairing the wire harness or parts, proceed to page EF-47, Replacement of ECU.



MEF00109-00096

5.10 DIAGNOSIS CODE NO. 43

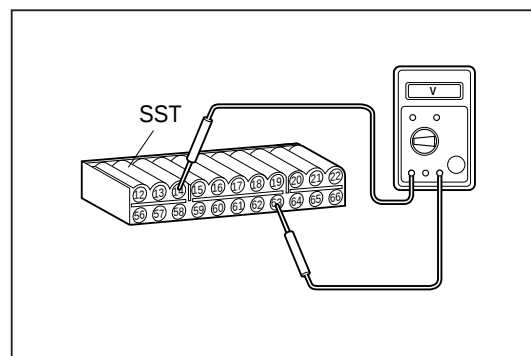
INTAKE AIR TEMPERATURE SENSOR & CIRCUIT



MEF00110-00097

When the signal from the intake air temperature sensor is 4.85 V or more or less than 0.15 V continuously for more than a certain length of time:

1. Check to see if the wire connectors are connected properly.
2. Turn off the ignition switch.
3. Check of wire harness.
 - (1) Connect the SST between the ECU connectors and the wire harness connectors.
 - (2) Ensure that the voltage between the SST terminals 63 and 14 is within the specified value when the ignition switch is turned to the ON position.
 Specified Value: 0.2 - 4.8 V
 (Reference: 1.8 - 2.9 V at 20°C)



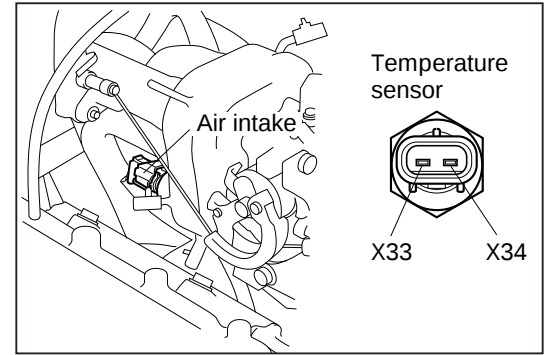
MEF00111-00098

NOTE:

- If the measured voltage does not conform to the specifications, check the wire harness.

4. Check the intake air temperature sensor unit.
 - (1) Turn off the ignition switch.
 - (2) Disconnect the connector of the water temperature sensor.
 - (3) Check that the resistance between the terminals X33 and X34 of the intake air temperature sensor is within the specified value.

Temperature °C	Resistance kΩ
80	0.322 ± 0.032
20	2.450 ± 0.24
-20	16.2 ± 1.6



MEF00112-00099

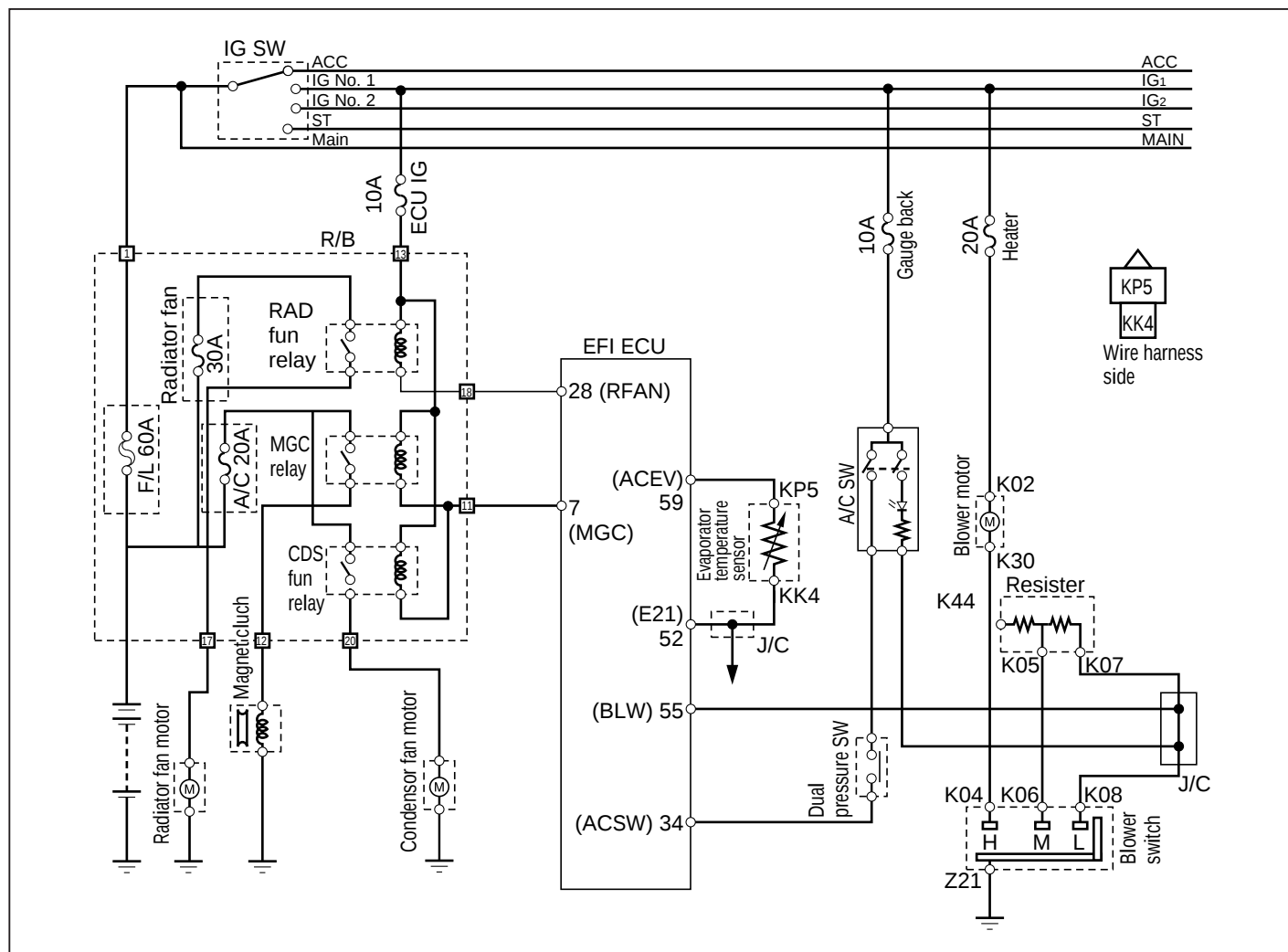
NOTE:

- If the trouble has not been solved by repairing the wire harness or parts, proceed to page EF-47, Replacement of ECU.

MEF00113-00000

5.11 DIAGNOSIS CODE NO. 44

AIR CONDITIONER EVAPORATOR TEMPERATURE SENSOR & CIRCUIT



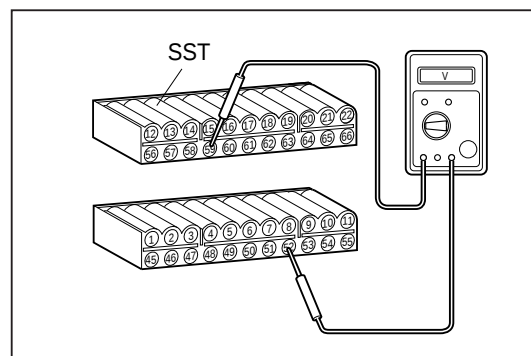
MEF00114-00100

When the signal from the air conditioner evaporator temperature sensor is 4.85 V or more or less than 0.098 V continuously for more than a certain length of time with the air conditioner switch turned ON:

1. Check to see if the wire harness connectors are connected properly.
2. Turn off the ignition switch.
3. Check of wire harness
 - (1) Connect the SST between the ECU connectors and the wire harness connectors.
 - (2) Ensure that the voltage between the SST terminals 59 and 52 is within the specified value when the ignition switch is turned to the ON position.
 Specified Value: 0.1 - 4.8 V
 (Reference: 1.8 - 2.9 V at 20°C)

NOTE:

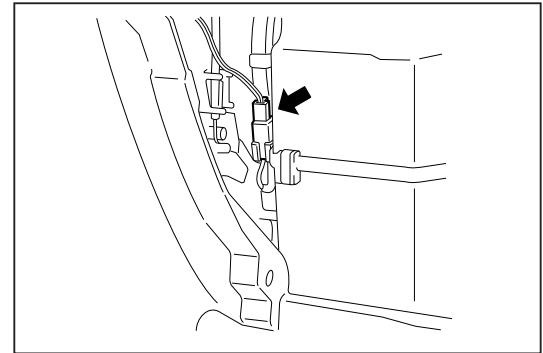
- If the measured voltage does not conform to the specification, check the wire harness.



MEF00115-00101

4. Check the evaporator temperature sensor unit.
 - (1) Turn off the ignition switch.
 - (2) Disconnect the connector of the evaporator temperature sensor.
 - (3) Check the resistance between the terminals.

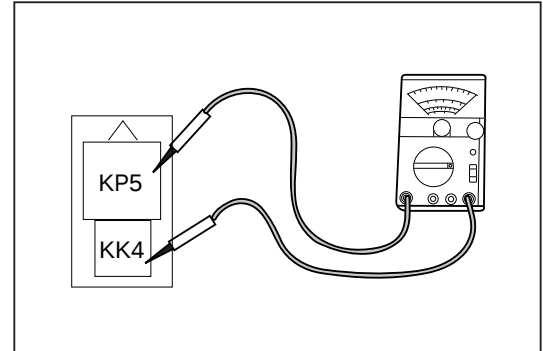
Temperature °C	Resistance kΩ
25	1.500 ± 0.15
15	2.340 ± 0.23
0	4.850 ± 0.24



MEF00116-00102

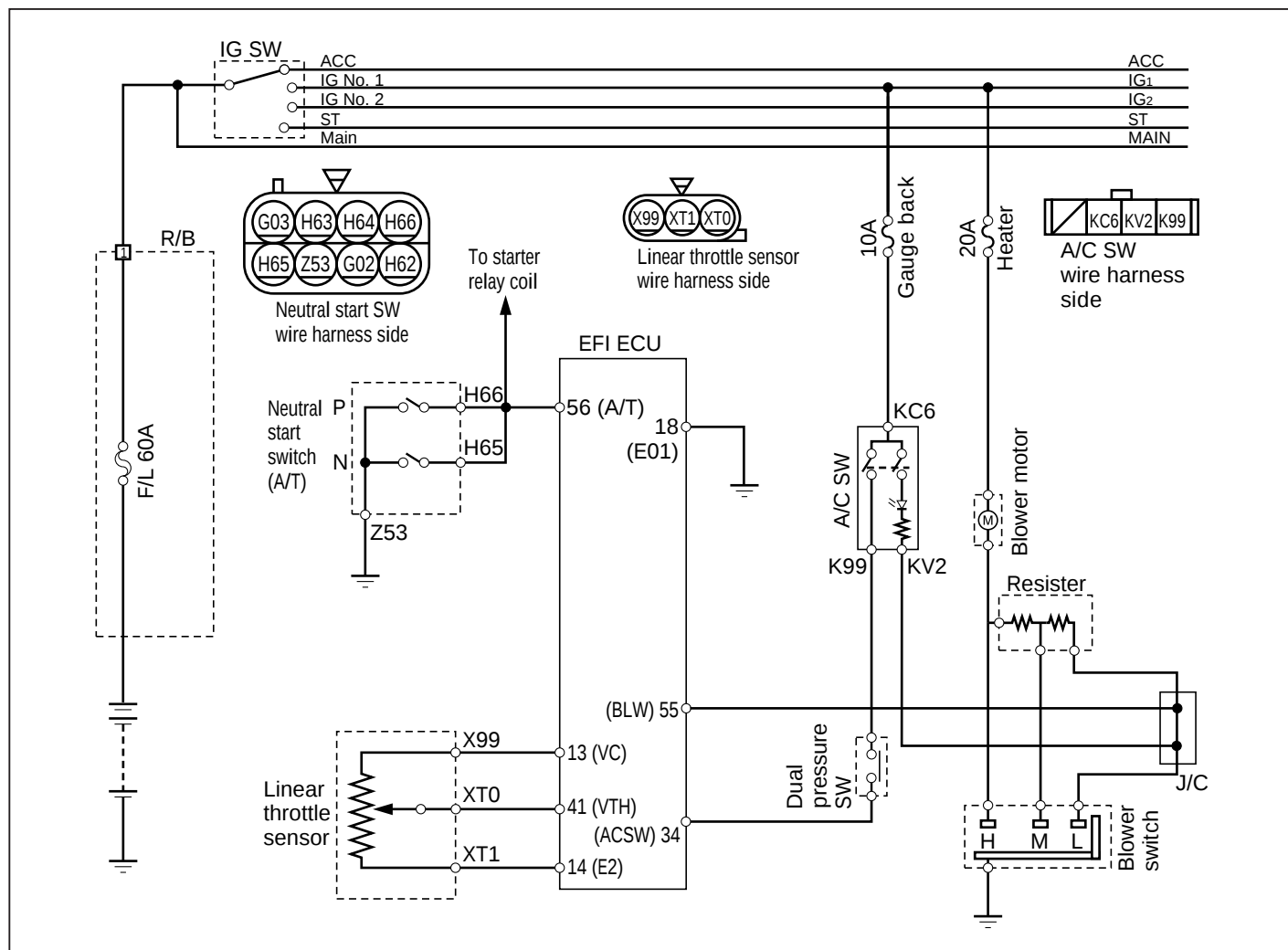
NOTE:

- If the measured resistance does not conform to the specification, replace the evaporator temperature sensor.
- If the trouble has not been solved by repairing the wire harness or parts, then, proceed to page EF-47, Replacement of ECU.



MEF00117-00103

5.12 DIAGNOSIS CODE NO. 51 SWITCHING SIGNAL CIRCUIT



MEF00118-00104

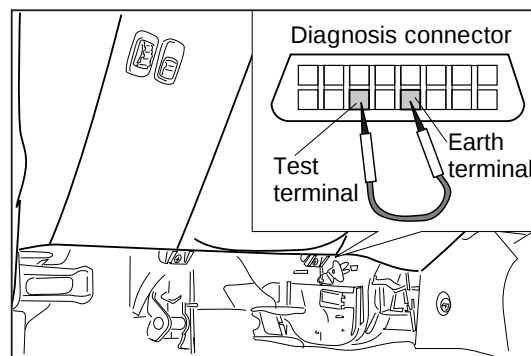
When one of the following conditions is detected when the terminal T is turned ON: IDL SW OFF, A/C SW ON, neutral start SW ON.

1. Check that the following wire connector or switching circuits are connected properly.
 - (1) Linear throttle sensor circuit
 - (2) A/C switch circuit
 - (3) Neutral start switch circuit of the A/T.

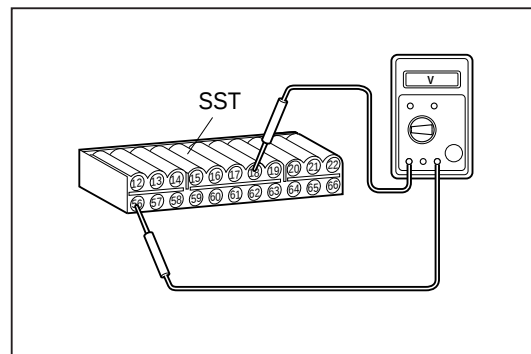
NOTE:

- This code will not be memorized.
- The diagnosis code will be indicated only when the test terminal is connected with the earth terminal as illustration.

2. Check of wire harness and switches.
 - (1) Connector the SST between the ECU connectors and the wire harness connectors.
 - (2) Check the voltage between the SST terminals 56 and 18 when the A/T shift lever is shifted to the P or N position and the ignition switch is turned on.
Specified Value: 1V or less



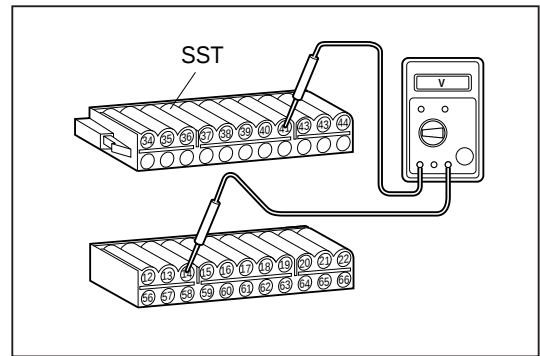
MEF00119-00105



MEF00120-00106

- (3) Check the voltage between the SST terminals 41 and 14 when the throttle valve is fully opened and the ignition switch is turned on.

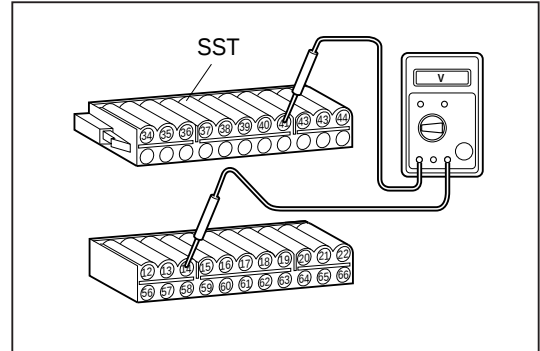
Specified Value: 4.5 - 5.5 V



MEF00121-00107

- (4) Check the voltage between the SST terminals 41 and 14 when the throttle valve is fully closed and the ignition switch is turned on.

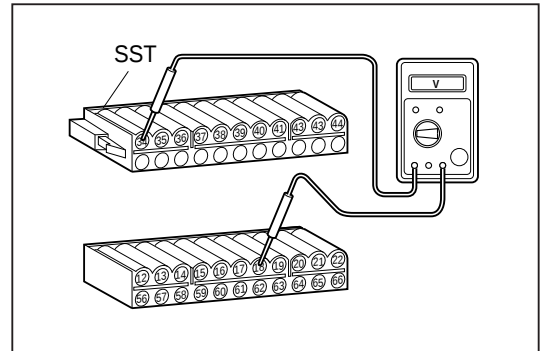
Specified Value: 0.4 - 0.8 V



MEF00122-00108

- (5) Check the voltage between the SST terminals 34 and 18 when the A/C switch is turned on.

Specified Value: Battery voltage



MEF00123-00109

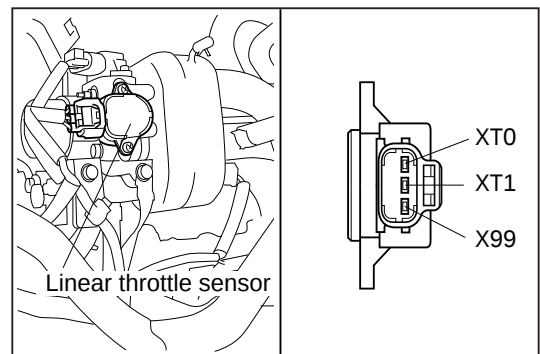
- (6) Turn off the ignition switch. Then, disconnect the connector of the linear throttle sensor.

- (7) Check the resistance between the terminals XT1 and XT0 of the linear throttle sensor. When the throttle valve is fully opened.

Specified Value: 1.7 - 4.2 kΩ

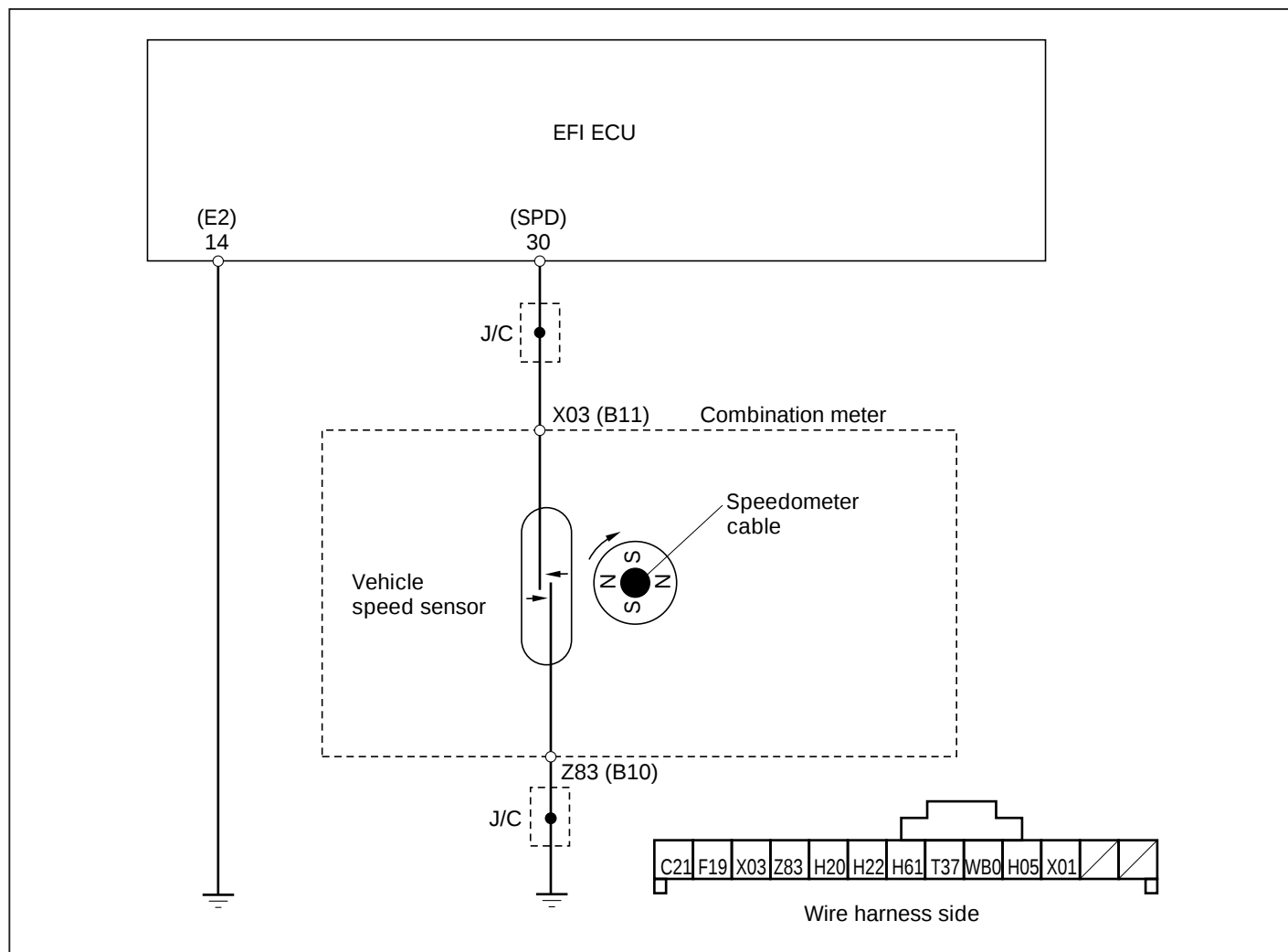
NOTE:

- If the trouble has not been solved by repairing the wire harness or parts, then, proceed to page EF-47, Replacement of ECU.



MEF00124-00110

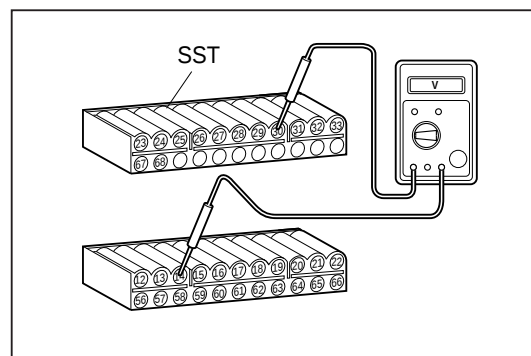
5.13 DIAGNOSIS CODE NO. 52 VEHICLE SPEED SENSOR & CIRCUIT



MEF00125-00111

When no vehicle speed signal is inputted for a certain length of time during the deceleration running with the engine revolution speed of 4000 rpm or less and with the throttle valve fully closed:

1. Check to see if the harness are connected properly.
 2. Turn off the ignition switch.
 3. Check of wire harness.
 - (1) Connect the SST between the ECU connectors and the wire harness connectors.
 - (2) Check that the voltage between the SST terminals 30 and 14 is within the following specified value when the vehicle moves and the ignition switch is turned to the ON position.
- Specified Value: 0 - 5 V for pulse signal



MEF00126-00112

Check of the reed switch

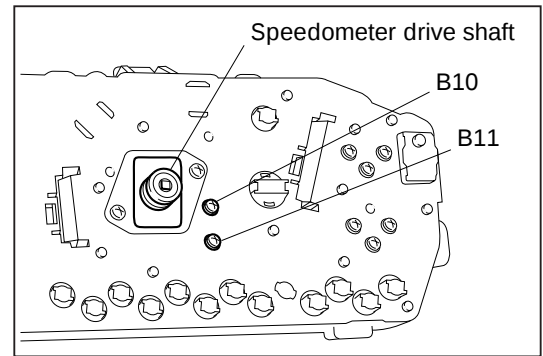
- (1) Remove the combination meter.
- (2) Ensure that continuity occurs four times at the terminals B10 and B11 of the combination meter while the speedometer drive shaft completes a turn.

NOTE:

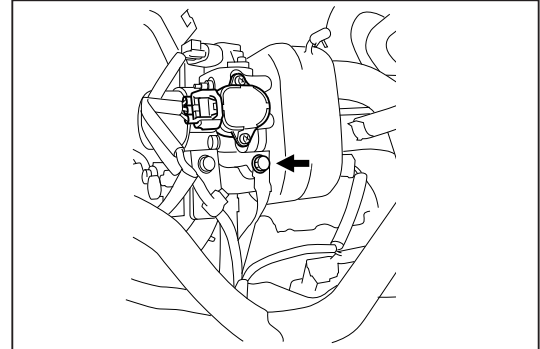
- The sensor has been so constructed that its rotary shaped-magnet rotates at the same revolution speed as the speedometer cable turns ON/OFF reed switch, thereby making it possible to input the vehicle speed to the computer. Four pulses are generated as the speedometer cable completes its one turn.

NOTE:

- If the measured voltage is 0 volt, check that the wire harness or connector is shorted.
- If the measured voltage is still 5 volts, check that the wire harness or connector exhibits open wire.
- If the diagnosis code No. 52 is flashing, most likely it denotes that open wire occurs intermittently or the shielding is poor.
- Check to see if the earth bolt exhibits looseness or corrosion.
- If the trouble has not been solved by repairing the wire harness or parts, then, proceed to page EF-47, Replacement of ECU.



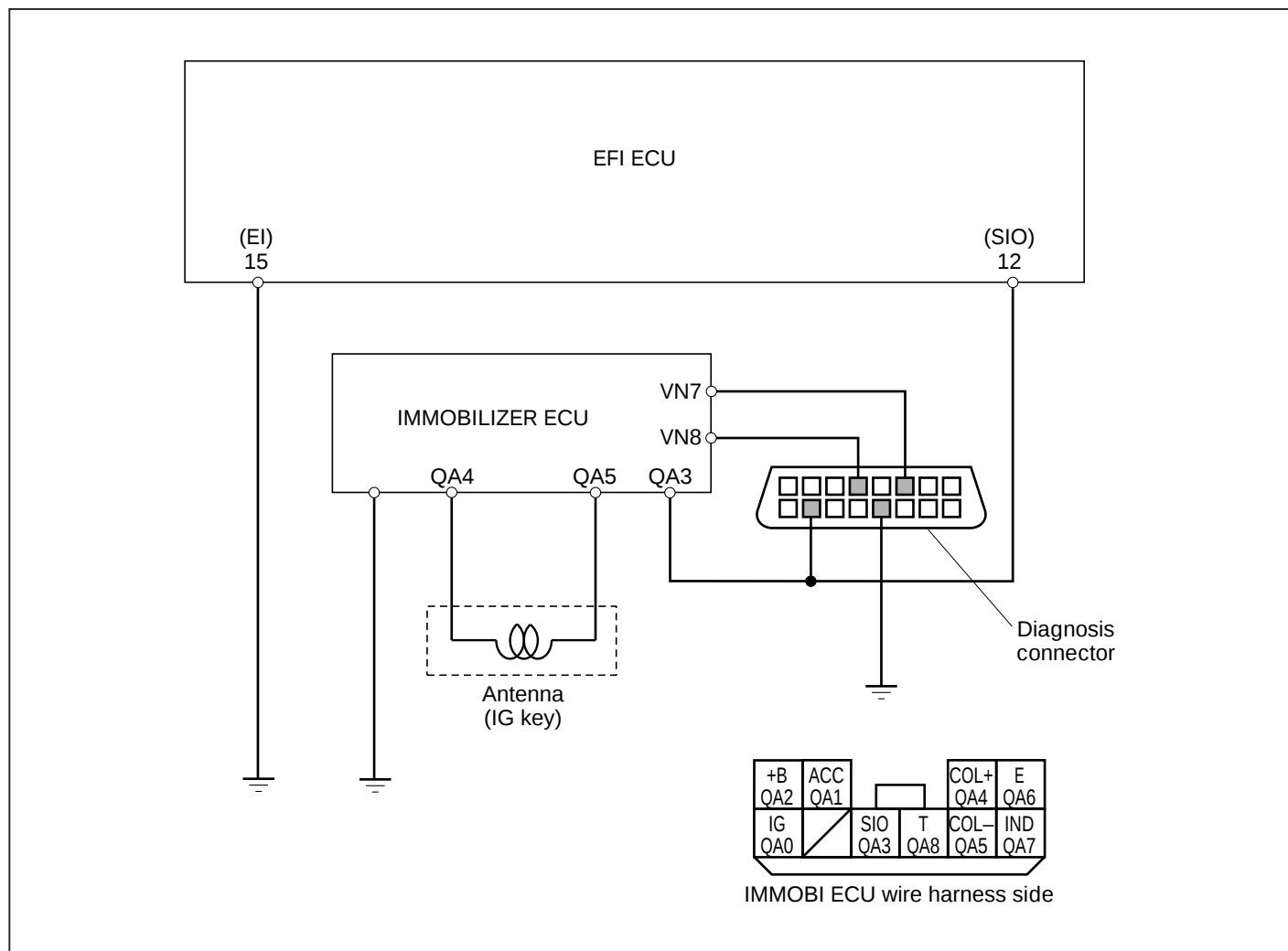
MEF00127-00113



MEF00128-00114

5.14 DIAGNOSIS CODE NO. 81

IMMOBILIZER SIGNAL CIRCUIT

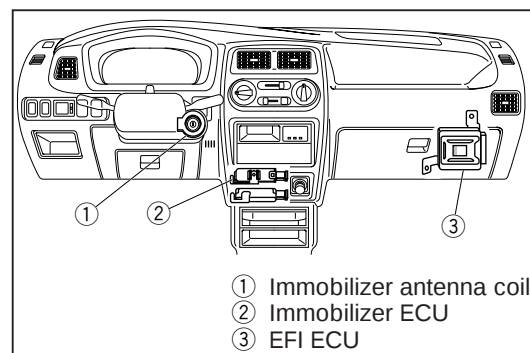


MEF00129-00115

When the rolling codes cannot be exchanged between the engine EFI ECU and the immobilizer ECU or the rolling codes are not matched.

1. Check of wire harness

- (1) Remove the screws of the glove compartment sub-assembly.
- (2) Disconnect the connector of the Immobilizer ECU.
- (3) Connect the SST between the EFI ECU connectors and the wire harness connectors.



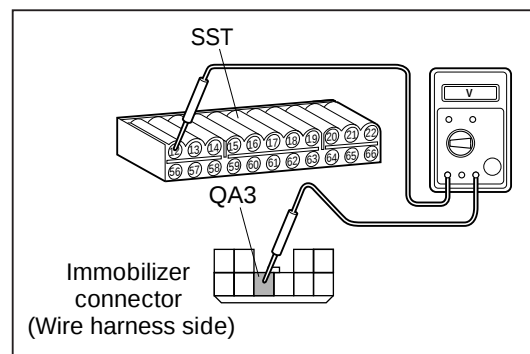
MEF00130-00116

- (4) Check that continuity exists between the terminal QA3 (Cowl wire side terminal of the Immobilizer ECU) and terminal 12 (SST terminal).

If not, check the wire harness.

NOTE:

- If the diagnosis code No. 81 is flashing, most likely it denotes that open wire occurs intermittently or the shielding is poor.
- If the trouble has not been solved by repairing the wire harness or connectors, then, proceed to the following steps.

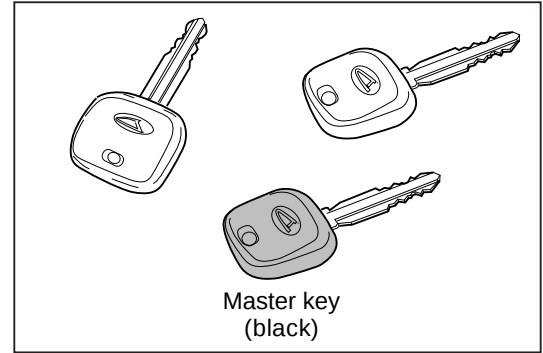
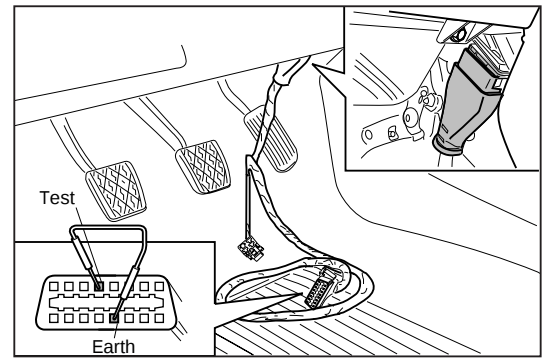


MEF00131-00117

2. Inspection of immobilizer system

NOTE:

- In cases where the ECU is replaced with a new EFI ECU, be sure to use the master key and connect the test terminal with the earth terminal, to start the engine for the first time. The engine will not start with a key other than the master key. In cases where the ECU is replaced with an EFI ECU other than a new one, the engine will not start even if the master key is used. For details, refer to the immobilizer manual.
- When the diagnosis code No. 81 occurs because of reasons other than abnormality of the wiring harness, most likely the immobilizer ECU is malfunctioning. Refer to the immobilizer manual.



5.15 DIAGNOSIS CODE NO. 83

IMMOBILIZER SIGNAL CIRCUIT

NOTE:

- When this code is illuminated, it denotes that abnormality is occurring in the inner circuit of the EFI ECU. Therefore, there is no checking and repairing method for this code. Hence, make sure that the trouble be solved by replacing the EFI ECU.

MEF00133-00000

6. REPLACEMENT OF ECU

6.1 INSPECTION

NOTE:

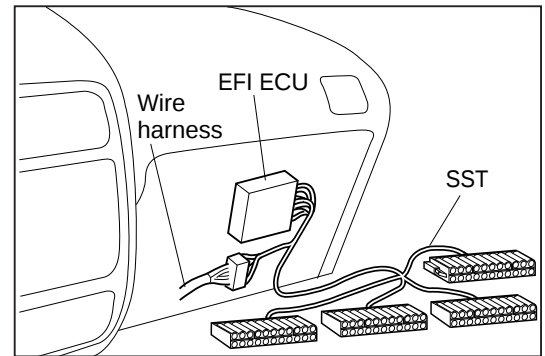
- Even when the replacement of the ECU is required in the previous check, make sure that the ECU malfunction has not been caused by factors other than the ECU by carrying out the following checks. Then, proceed to replace the ECU.
- The measurement of voltage should be conducted with all of the connectors connected.

CAUTION:

- In cases where the ECU is replaced with a new ECU, be sure to use the master key and connect the test terminal with the earth terminal, to start the engine for the first time. The engine will not start with a key other than the master key.
- In cases where the ECU is replaced with an ECU other than a new one, the engine will not start even if the master key is used.
For details, refer to the immobilizer manual.

MEF00134-00000

1. Install the SST.
See page EF-57, "Preparation of trouble shooting with SST".
SST: 09842-97201-000
2. Measurement of voltage or resistance
 - (1) Measure the voltage or resistance between respective terminals.
 - (2) Check to see if the measured voltage or resistance conform to the specifications in accordance with the following "CHARACTERISTICS OF ECU OUTPUT" table.



MEF00135-00120

6.2 CHARACTERISTICS OF ECU OUTPUT

The following are standard voltages or resistances at ECU.

Item	Terminal	Condition	Standard voltage or resistance	Remedies
Power supply	8 – 15	All times	Battery voltage	Check EFI fuse in the relay block.
	10 – 15 9 – 15	Ignition switch is turned on.	Battery voltage	Check main relay in the relay block.
Earth group	15 14 18	All time	1 Ω or less	Check earth of wiring harness.
Pressure sensor	13 – 14	Ignition switch is turned on.	4.5 – 5.5 V	Check ECU power supply.
	38 – 14	Ignition switch is turned on. Atmospheric pressure is 101 kPa.	3.3 – 4.0 V	Check pressure sensor.
Water temp. sensor	62 – 14	When ignition switch is turned on. (Cooling water temperature is 80 - 90°C after engine has fully warmed up)	0.2 – 4.8 V (0.4 – 0.65 V)	Check cooling water temperature sensor.
Intake air temp. sensor	63 – 14	Ignition switch is turned on. (Air temperature is 20°C)	0.2 – 4.8 V (1.8 – 2.9 V)	Check air temp. sensor.
Oxygen sensor	39 – 15	While engine speed is being kept at 3000 rpm with engine fully warmed up.	Voltage varies within a range of 0.2 – 1.0 V	Check oxygen sensor.
Variable resister sensor	50 – 51	Ignition switch is turned on.	4.5 – 5.5 V	Check ECU power supply.
	39 – 51	Ignition switch is turned on.	0.2 – 4.8 V	Check variable resister sensor.
Cam angle sensor	36 – 60	While the engine is being cranked by the starter motor.	0.2 – 0.6 V (AC range)	Check cam angle sensor.
Throttle position sensor	41 – 14	Ignition switch is turned on. Throttle valve is fully closed.	0.4 – 0.8 V	Check throttle position sensor.
		Ignition switch is turned on. Throttle valve is fully opened.	4.5 – 5.5 V	
Vehicle speed sensor	30 – 14	Ignition switch is turned on. When vehicle is moved. (Measured voltage changes 4 times for movement of 1.6 m)	Change in voltage between 0.1 V or less and approx. 5 V	Check speed sensor.
Ignition coil drive	46 – 14 68 – 14 67 – 14	While the engine is being cranked by the starter motor.	0.1 - 0.3 V (AC range)	Check ignition coil.
Injector drive	47 – 18 21 – 18 20 – 18	Ignition switch is turned on.	Approx. battery voltage	Check injector(s).
Fuel pump drive	6 – 18 27 – 18	Ignition switch is turned on.	Voltage is 1 V or less for two second after ignition switch has been turned on. Then, voltage becomes battery voltage.	Check fuel pump relay The terminal 6 is for immobilizer system.
VF monitor	54 – 14	While engine speed is being kept at the idling revolution with engine fully warmed up.	1.8 – 3.2 V	Check oxygen sensor.

Item	Terminal	Condition	Standard voltage or resistance	Remedies
Knock sensor signal	64 – 15	Engine is running at 3000 rpm. (Racing condition)	Approx. 2 V	Check wire harness or knock sensor.
Electrical load	32 – 18	Tail lamp switch is turned on.	Approx. battery voltage	Check tail lamp fuse or switch.
	57 – 18	Ignition switch is turned on and defogger switch is turned on.	Approx. battery voltage	Check defogger fuse or switch.
	55 – 18	Ignition switch is turned on and heater blower switch is turned on.	1 V or less	Check heater blower switch.
	34 – 18	Ignition switch is turned on, heater blower switch turned off and A/C switch is turned on.	Approx. battery voltage	Check wire harness or A/C switch.
		Ignition switch is turned on, heater blower switch turned on and A/C switch is turned on.	1 V or less	Replace ECU.
	56 – 18	Engine is running and A/T shift lever is in N or P range.	1 V or less	Check wire harness or.
		Engine is running and A/T shift lever is in D range.	Approx. battery voltage	Replace ECU.
	65 – 18	Engine is running and steering wheel is neutral position	Approx. battery voltage	Replace ECU.
		Engine is running and steering wheel is turned to the right or left fully.	1 V or less	Check wire harness or P/S oil pressure switch
	28 – 18	Engine is running and radiator fan motor is operated.	1 V or less	Check wire harness or fan motor and relay.
		Engine is running and radiator fan motor is not operated.	Approx. battery voltage	Replace ECU.
Tachometer signal	29 – 15	Ignition switch is turned on.	0.1 V or less	Check tachometer.
		Engine is running at idling speed.	Approx. 6 V (AC range)	Replace ECU.
Automatic transmission signal	56 – Body earth	When A/T shift lever is in P or N range.	1 Ω or less	Check wire harness.
Evaporator temperature sensor	59 – 52	Ignition switch is turned on.	0.1 V – 4.8 V	Check evaporator temperature sensor.

MEF00136-00000

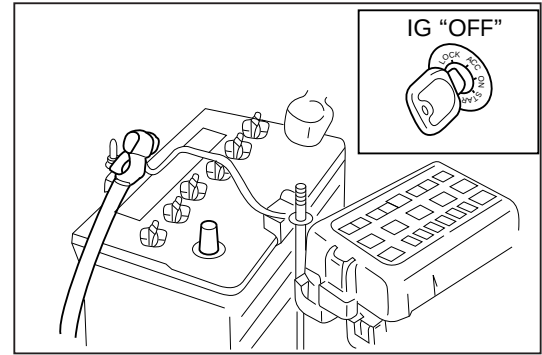
After completion of the inspection

- (1) Disconnect the ground cable terminal from negative (–) terminal of the battery.
- (2) Remove the SST by disconnecting its connectors from the EFI ECU and wire harness connectors.
- (3) Connect the wire harness connectors to the EFI ECU connectors.
- (4) Reconnect the ground terminal to the battery.

MEF00137-00000

6.3 ECU REPLACEMENT

1. Disconnect the ground cable terminal from the negative (–) terminal of the battery.
2. Remove the glove compartment subassembly.

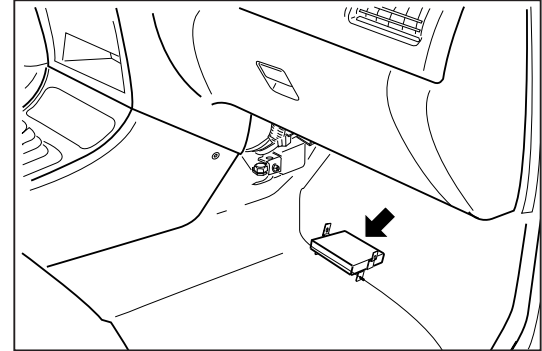


MEF00138-00121

3. Disconnect the wire harness connectors from the EFI ECU.
4. Remove the ECU by removing the attaching bolts and nuts.
5. Install a new EFI ECU.

CAUTION:

- Never touch the bracket screws mounted on the ECU proper. This tampering will cause an ECU malfunction.



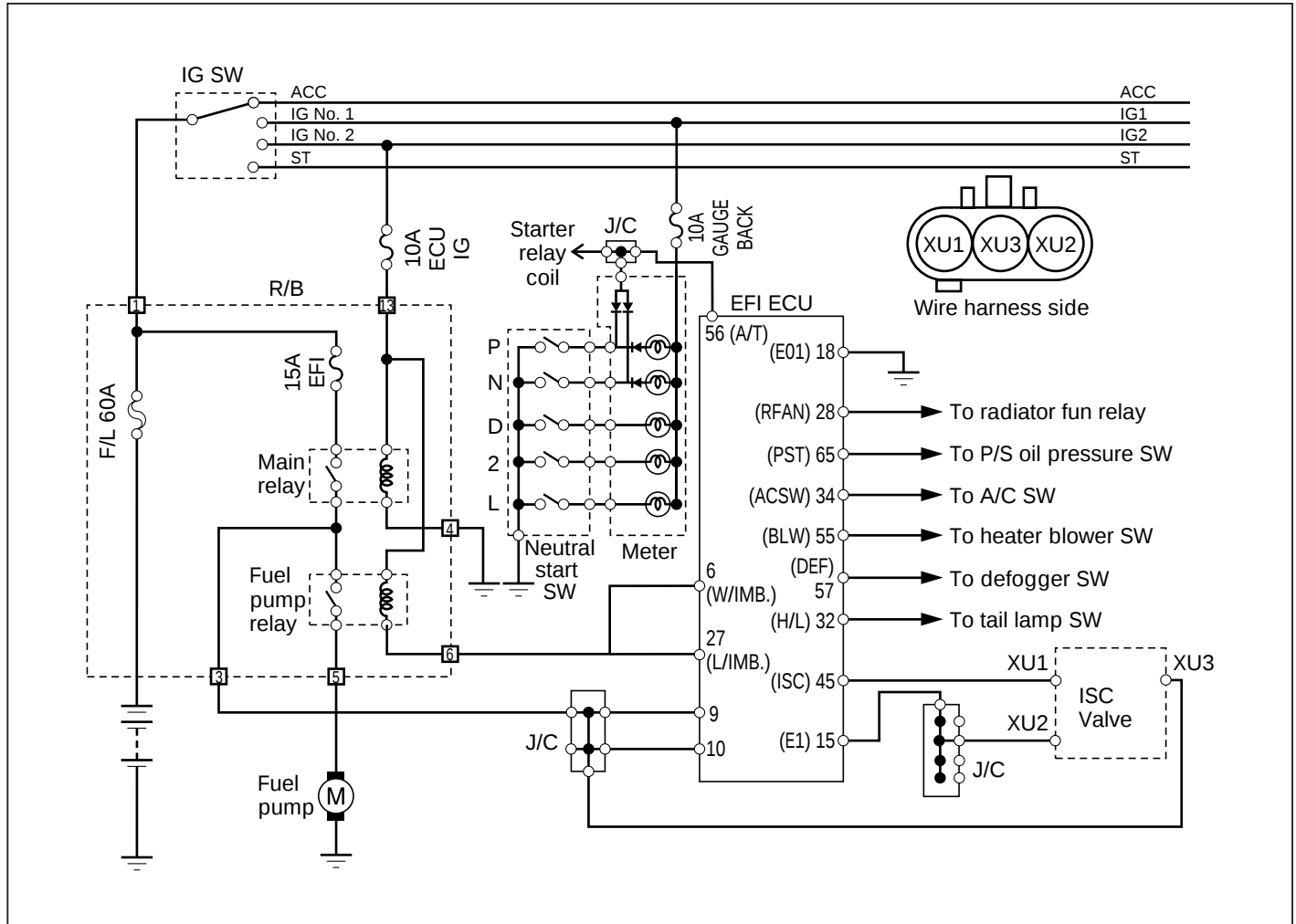
MEF00139-00122

6. Connect the wire harness connectors to the EFI ECU.
7. Install the computer cover to the EFI ECU bracket.
8. Connect the ground cable terminal to the negative (–) terminal of the battery.

MEF00140-00000

7. INSPECTION OF ROTARY ISC SYSTEM

7.1 WIRING DIAGRAM

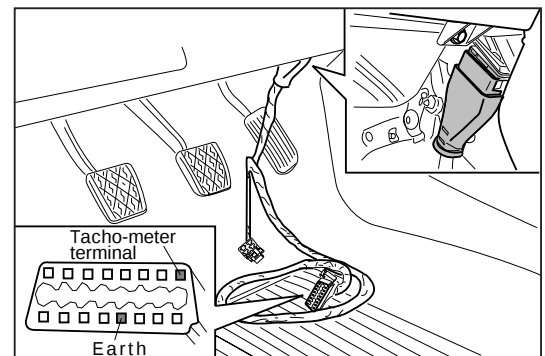


MEF00141-00123

7.2 ISC SYSTEM BASIC INSPECTION

1. Ensure that the engine revolution speed is high during the cold period. Also, ensure that the engine revolution speed drops as the engine warms up and that the idle speed is maintained.

Specified Value: 850 rpm (A/T & M/T)



MEF00142-00124

2. After the engine has warmed up completely, disconnect the connector of the ISC valve. At this time, ensure that the idle speed rises. (This confirmation should be conducted with no load, such as air conditioner and electric load, applied.)

Specified Value: 850 → 1600 rpm

NOTE:

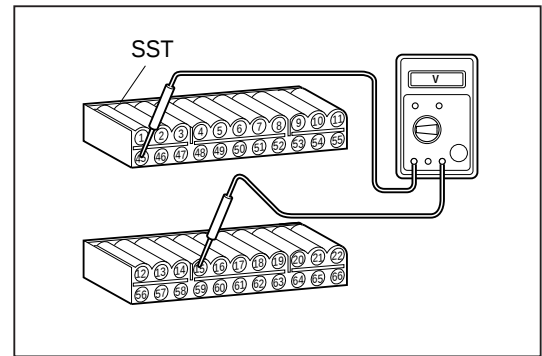
- The above inspection should be conducted only when the engine coolant temperature is above 80°C.

MEF00143-00000

3. Turn OFF the ignition switch.
4. Connect the SST between the EFI ECU terminals and the wire harness terminals.
5. Start the engine.
6. Measure the voltage between the SST terminals 45 and 15.

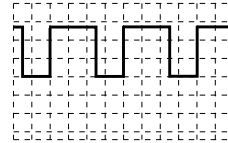
NOTE:

- Ensure that the measured voltage is stabilized at a certain level according to the warming-up state.

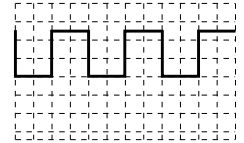


Idling condition

(Electrical load "OFF")



(Electrical load "ON")



When an oscilloscope is used, the ISC control signal becomes the waveform as indicated in the figure above. (The duty ratio cannot be specified.)

MEF00000-00126

7.3 ISC IDLE-UP SYSTEM INSPECTION

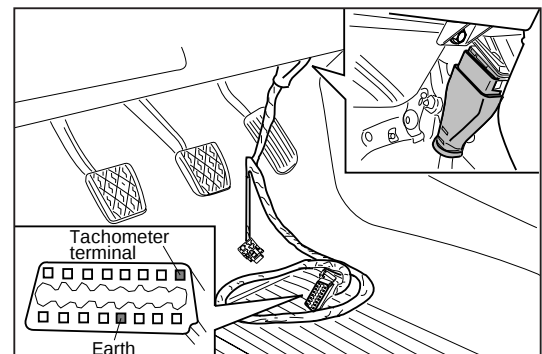
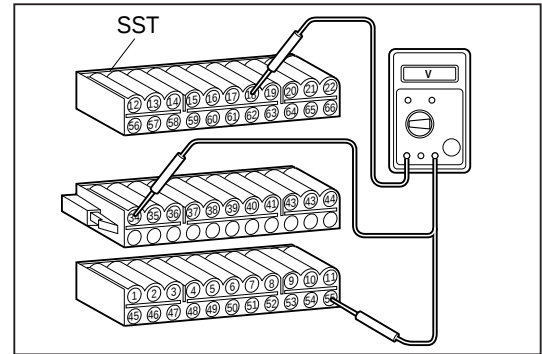
1. Warm up the engine completely.
2. Turn OFF the Ignition switch.
3. Connect the SST between the EFI ECU terminals and the wire harness terminals.
4. Start the engine.
5. Measure the voltage between the SST terminals 34, 55 and 18 and measure the idling speed when the A/C switch is in the following condition while the heater blower is being turned on.

■EC, General

A/C switch	Voltage V		Revolution speed rpm	
	OFF	ON	OFF	ON
M/T	0.5 or less	Battery voltage	850	950
A/T	↑	↑	850	900

■AUS, ISRAEL, GCC

A/C switch	Voltage V		Revolution speed rpm	
	OFF	ON	OFF	ON
M/T	0.5 or less	Battery voltage	900	1200
A/T	OFF	↑	900	1100
	ON	↑		900



6. Measure the voltage between the SST terminals 56 and 18 when the neutral start switch is in the following condition.

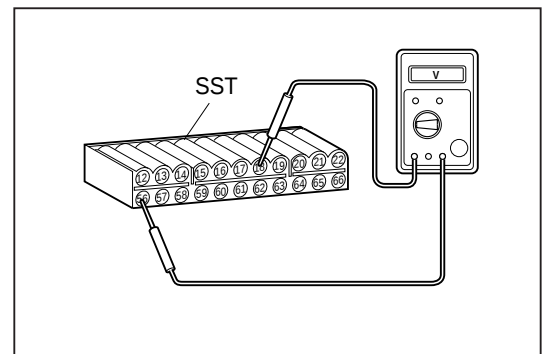
Specified Value: P or N range 0.5 V or less

Other than P and N ranges

Battery voltage

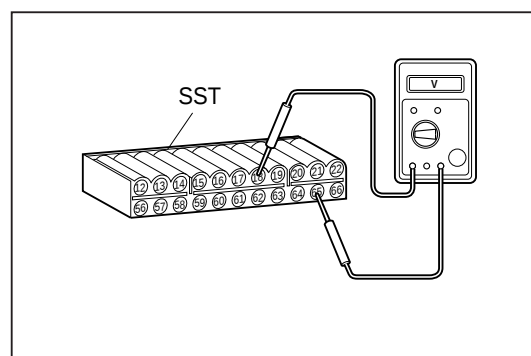
NOTE:

- Make sure that the idle speed will not change when the shift lever is shifted to a position other than the P and N ranges.



7. Measure the voltage between the SST terminals 65 and 18 and measure the idling revolution when the steering wheel is neutral and turned to the right or left fully.

	Voltage V		Revolution speed	
	OFF	ON	OFF	ON
Oil pressure SW	OFF	ON	OFF	ON
A/T & M/T	Battery voltage	0.5 or less	850	—

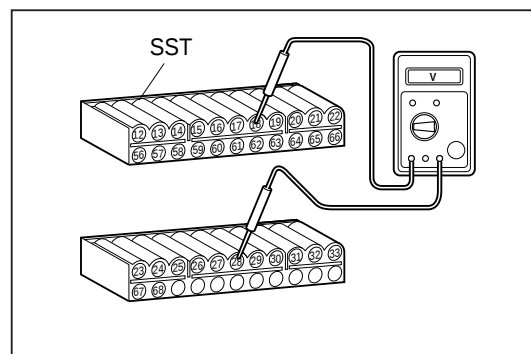


MEF00147-00130

8. Measure the voltage between the SST terminals 28 and 18 when the radiator fan motor is following.

Specified Value:

Radiator fan OFF	Battery voltage
Radiator fan ON	0.5 V or less



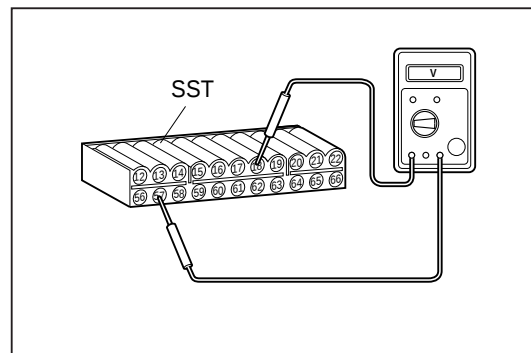
MEF00148-00131

9. Turn OFF the Ignition switch and then turn it to the ON position.

10. Measure the voltage between the SST terminals 57 and 18 when the defogger switch is following.

Specified Value:

Defogger switch OFF	0.5 V or less
Defogger switch ON	Battery voltage

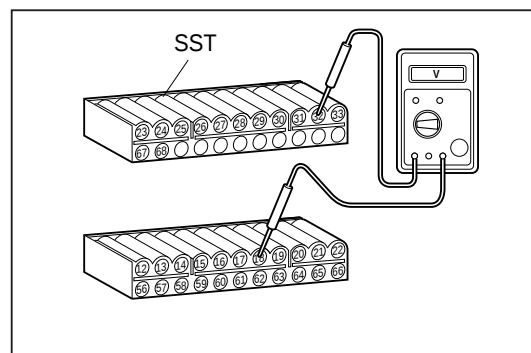


MEF00149-00132

11. Measure the voltage between the SST terminals 32 and 18 when the tail lamp switch is following.

Specified Value:

Tail lamp switch OFF	0.5 V or less
Tail lamp switch ON	Battery voltage



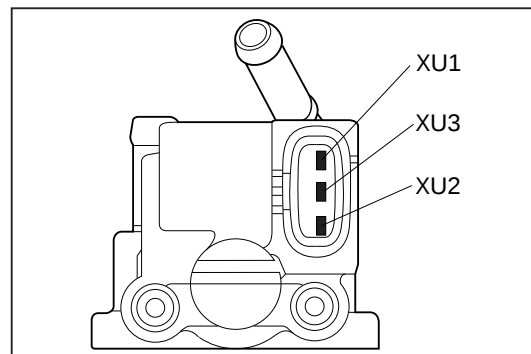
MEF00150-00133

NOTE:

- If the voltage and idle revolution will not conform to the specified value, replace the ISC valve.

NOTE:

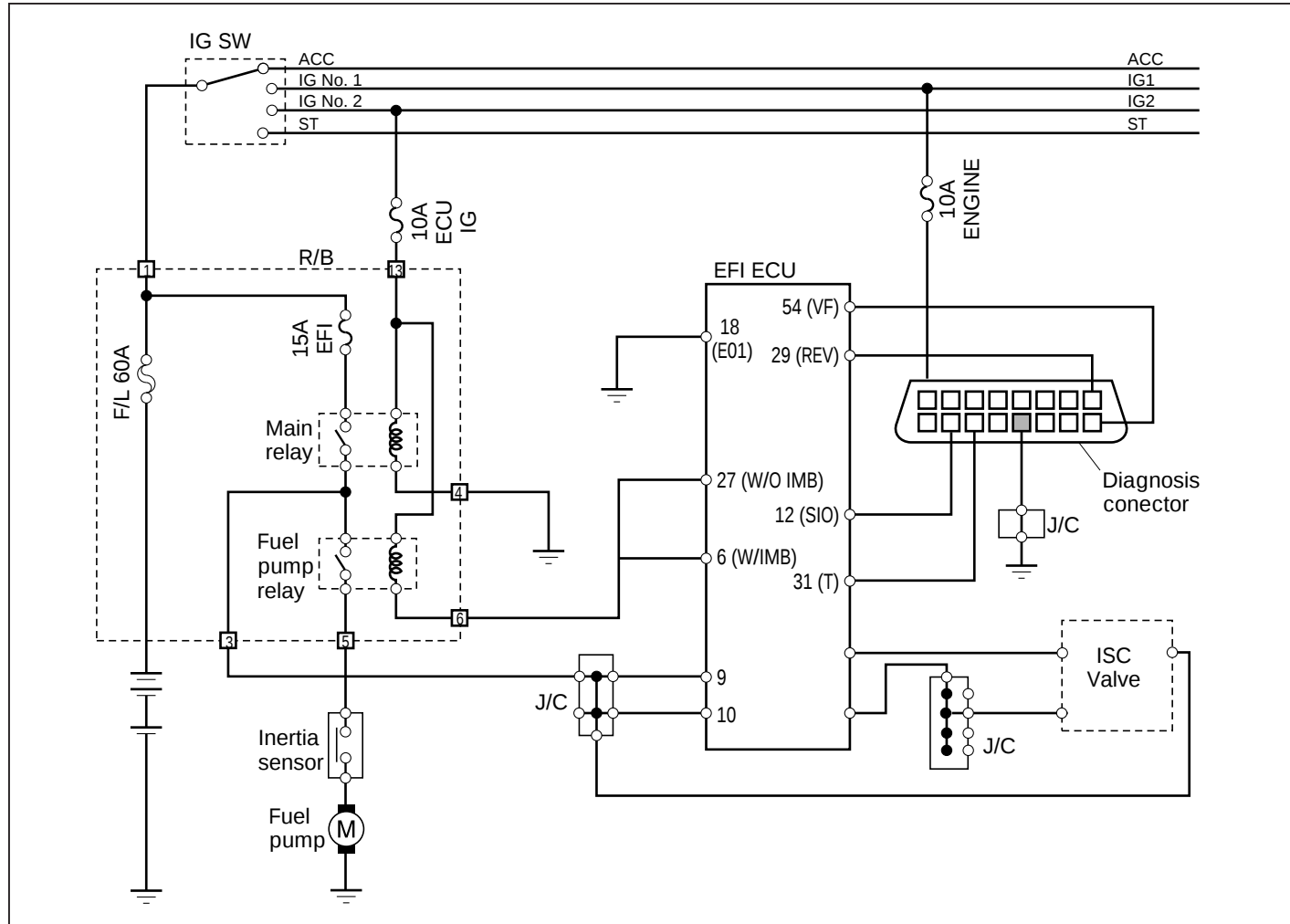
- The ISC valve incorporates an IC circuit, thereby converting the DUTY signal from the ECU into a driving circuit. Therefore, the check of coil resistance and unit check of operation cannot be carried out.
- Never connect the battery (+) B terminal to the terminals XU1 and XU2 nor connect an insulator resistance meter between the respective terminals of XU1 through XU2, for it would damage the inner circuit.



MEF00151-00134

8. INSPECTION OF FUEL SYSTEM

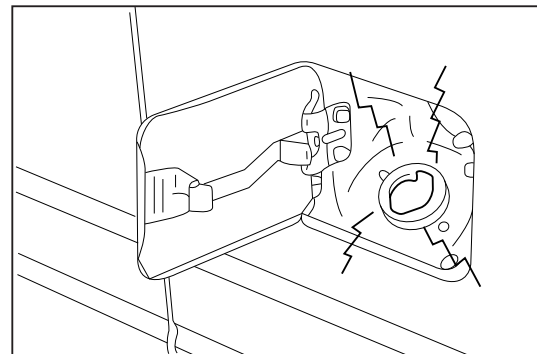
8.1 WIRING DIAGRAM



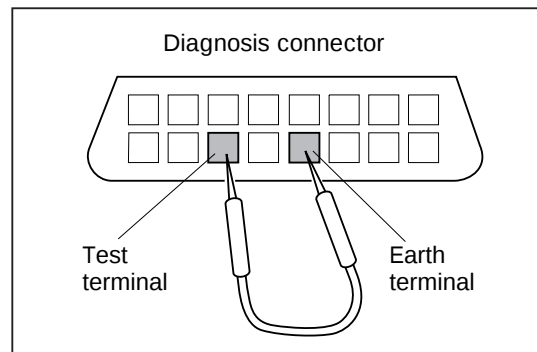
MEF00152-00135

8.2 INSPECTION OF FUEL PUMP OPERATION

1. Check to see if the wire harness connectors are connected properly.
2. Check that you can hear fuel pump operating sound for 8 seconds when the ignition switch is turned on while connecting the terminals with a jump wire as indicated in the illustration.
3. If not, check the wire harness.
 - (1) Turn off the ignition switch.
 - (2) Connect the SST between the ECU connectors and the wire harness connectors.
 - (3) Check that the voltage between the SST terminals 6.27 and 18 is within the following specified value when the ignition switch is turned to ON position.



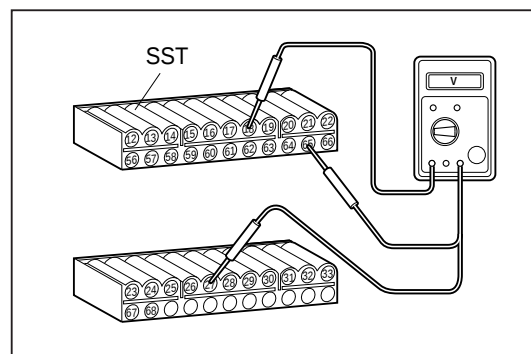
MEF00153-00136



MEF00154-00137

Specified Value:

- 2 V or less (For 8 seconds with IG ON)
- Battery voltage (8 seconds after IG has been turned ON)

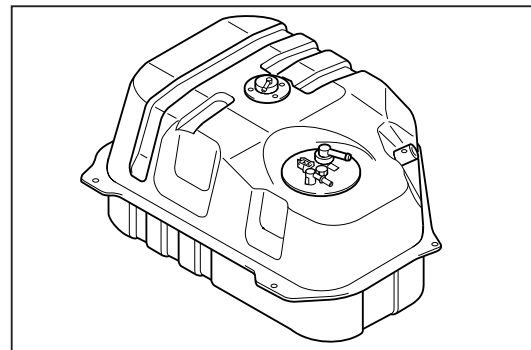


MEF00155-00138

8.3 FUEL TANK

UNIT INSPECTION

1. Check the fuel tank for deformation, cracks or fuel leakage.
2. Check the filler neck for damage or fuel leakage.
3. Check to see if the hose and tube connections are installed as shown in the right figure.

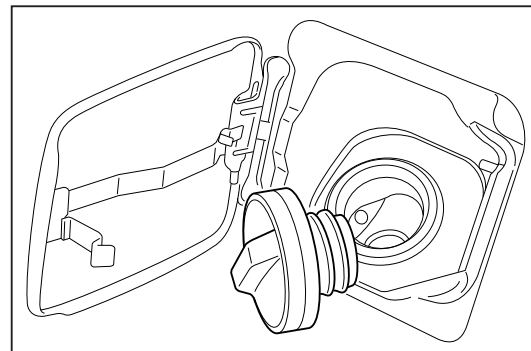


MEF00156-00139

4. Check to see if the fuel tank cap and gasket exhibit damage.

NOTE:

- If the fuel tank and its related parts exhibit any defect, repair or replace the fuel tank.
- Replace the gasket if it is damaged. Also, replace the fuel tank cap if it exhibits damage.



MEF00157-00140

8.4 FUEL PUMP

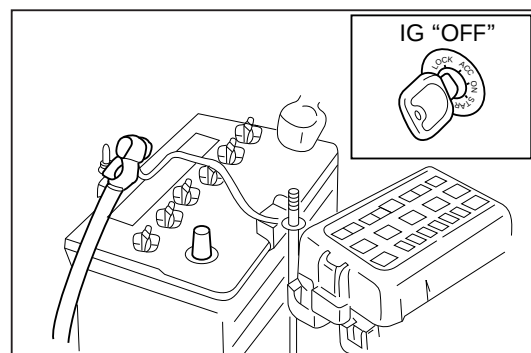
REMOVAL

1. Disconnect the battery ground cable from the negative (-) terminal of the battery.
 2. Remove the fuel tank.
- Refer to the BO section of the service manual.

WARNING:

- Never allow any fire to be brought near the working site.

3. Remove the fuel pump assembly.

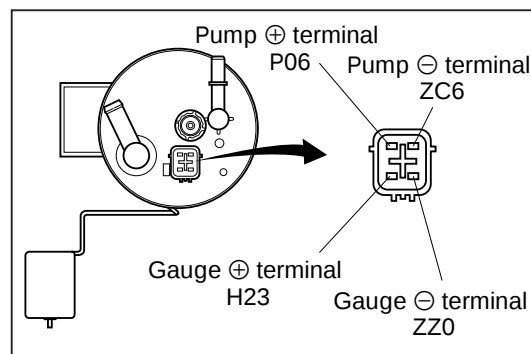


MEF00158-00141

UNIT INSPECTION

Measure the resistance across the terminals of the fuel pump.

Specified Value: 0.2 - 3.0 Ω



MEF00159-00142

INSTALLATION

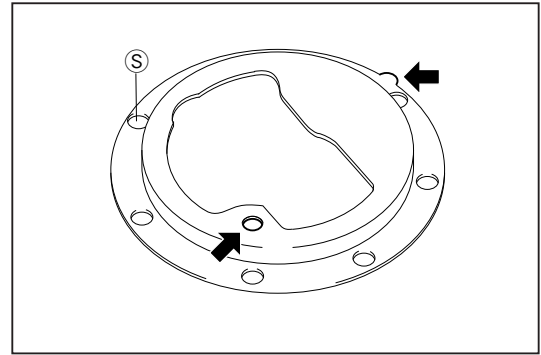
1. Install a new fuel pump assembly to the fuel tank with a new gasket.
2. Tighten the attaching screws.
Tightening Torque: 1.5 - 2.5 N·m

3. Install the fuel tank and its related parts to the body.

Refer to the BO section of the service manual.

NOTE:

- Perform the installation, while aligning the hole of the bracket with the protruding section of the pump and the bracket with the mating mark on the fuel tank.



MEF00160-00143

9. TROUBLE SHOOTING ACCORDING TO MALFUNCTION PHENOMENA

9.1 Description

This section describes the checking procedure for cases where no abnormality code of diagnosis is indicated, but the vehicle is encountered with a malfunction.

In the trouble shooting according to malfunction phenomena, first arrange in order the contents of diagnosis through inquiries, basic checks and ECU circuit checks. Next, narrow down possible causes, referring to the table showing possible causes according to malfunction phenomena. Then, determine the priority of checks.

At this time, perform the trouble shooting progressively according to the systems and parts, referring to the table below.

CAUTION:

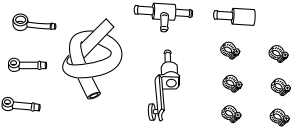
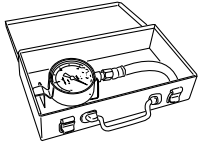
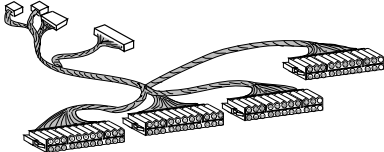
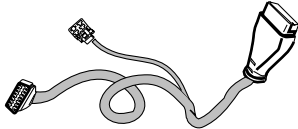
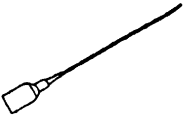
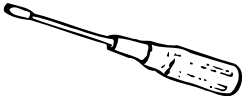
- When checking each component, be sure to also check the harnesses and connectors connected to the component.

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9.2 Table showing possible causes according to malfunction phenomena

Malfunction phenomena		Poor starting				Unstable idling				Engine stalling				Poor running					
		No initial combustion takes place.	Although initial combustion takes place, combustion is not complete.	Hard starting (during cold period)	Hard starting (during hot period)	Fast idle is not effective.	Idle revolution speed is too low.	Idle revolution speed is too high.	Unstable idling	Hunting during idling	Engine stalls when accelerator pedal is depressed.	Engine stalls when accelerator pedal is released.	Engine stalls during idling.	Engine stalls when A/C switch is turned on.	Hesitation during acceleration period	Hunting during running	Lack of output	Knocking	Back fire/After fire
Sys-tem	Part																		
Control system	Pressure sensor		●				●	●	●	●	●	●			●		●	●	●
	Coolant temperature sensor		●	●		●	●	●			●			●		●		●	
	Intake air temperature sensor			●															
	Linear throttle sensor							●	●					●	●	●	●	●	
	Air conditioner switch						●	●											
	Vehicle speed sensor						●	●							●				
	Oxygen sensor								●										
	Variable resistor sensor								●										
	Neutral start switch						●	●											
	Electrical load switch (defogger, heater blower, tail lamp P/S oil pressure)						●	●											
	Cam angle sensor	●																	
Fuel system	Fuel pump	●	●						●				●		●		●		
	Pressure regulator	●	●						●				●		●	●	●	●	
	Fuel filter/Fuel line	●	●										●		●	●	●		
	Injector	●	●		●				●						●	●	●	●	
Ignition system	IG coil	●							●						●	●		●	
	Spark plug	●	●	●					●						●		●	●	
	Ignition timing	●													●			●	
	Knock sensor														●		●		
Air intake system	Rotary ISC valve			●	●	●	●	●	●		●		●						
	Throttle valve							●	●		●								
	Hose, etc., disconnected		●				●	●		●									
Power supply system	ECU power supply circuit	●																	
	IG switch	●																	
	Fuel pump relay	●	●										●						
	Main relay	●																	
	Inertia sensor	●																	

10. SST (Special Service Tools)

Shape	Parts number & Name	Purpose	See page
	09268-87701-000 EFI fuel pressure gauge	Inspection of fuel pressure	EF-11
	09842-30070-000 EFI inspection wire	Inspection of fuel injector	EF-12
	09268-87702-000 Inspection measuring tool set	Inspection of fuel pressure Inspection of fuel injector	EF-11
	09842-97201-000 EFI computer check sub-harness	Inspection of computer input/output voltage	EF-21
	09991-87404-000 Engine control system inspection wire	Diagnosis code check	EF-3
	09991-87402-000 Tacho-pluse pick-up wire	Measurement of engine revolution speed	EF-13
	09991-87403-000 Diagnosis check wire	Shorting terminal T	EF-4
	09243-87201-000 Idle adjusting wrench	Adjustment and check of variable resister	EF-14

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11. TIGHTENING TORQUE

Tightening components	Tightening torque		Remarks
	N·m	kgf-m	
Cylinder head x Spark plug	14.5 - 20.5	1.5 - 2.1	
Cylinder head x Water temperature sensor	19.0 - 29.0	2.0 - 3.0	
Cylinder head x Cam angle sensor	6.4 - 9.6	0.64 - 0.96	
Surge tank x Throttle body	6.4 - 9.6	0.6 - 0.9	
Cylinder head x Delivery pipe	15.2 - 22.8	1.6 - 2.3	
Exhaust manifold x Oxygen sensor	29.0 - 39.0	3.0 - 4.0	
Cylinder block x Knock sensor	29.4 - 58.8	3.0 - 6.0	Never use an air impact wrench.
Intake manifold x Intake air temp sensor	15.7 - 23.5	1.6 - 2.4	Never use an air impact wrench.
Fuel pump x Fuel tank	2.5 - 5.0	0.25 - 0.50	

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