

DAIHATSU

L500, L501

EF

EFI SYSTEM

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LEF00001-00000

NO. 9198-LE

INTRODUCTION

The EFI system consists of the following three systems given below:

- ① Fuel system
- ② Intake system
- ③ Control system

The electronic control unit (ECU) incorporating a microcomputer controls the EFI system, based on signals inputted from various sensors.

Fuel system

The fuel system is a system which supplies the injectors with the fuel necessary for combustion.

Fuel sucked up from the fuel tank by means of the fuel pump is sent to the delivery pipe under a pressurized state.

The pressure regulator mounted at the delivery pipe keeps the fuel pressure higher than the surge tank inner pressure. In this way, the fuel injection amount for each injector energizing time is kept at a constant level.

Intake system

The intake system is a system which supplies each cylinder with air necessary for combustion.

Air sucked from the air cleaner passes through the throttle body to the surge tank. Then, the air is sucked to each cylinder through the intake manifold.

Control system

The control system is a system which controls the fuel amount, using the ECU, by detecting the engine and vehicle running conditions, based on signals inputted from various sensors to the ECU.

(1) EFI control system

Upon receiving those signals concerned with the intake air amount, engine speed and water temperature, the EFI control system controls the amount of fuel injection in such a way that an optimum air-to-fuel ratio for the engine may be attained.

(2) ESA (Electronic spark advance) control system

The ESA control system provides an optimum ignition timing, based on the engine speed and its load conditions.

(3) ISC (Idle Speed Control) system

The ISC system employ the rotary type valve which is controlling the air flow to the intake manifold at idling from the air cleaner side over the throttle valve. This valve controls the engine revolution speed to the target revolution speed memorized in the ECU.

Self diagnosis function

If any abnormality should occur in each input signal (e.g. each sensor, wire harness and connectors), the ECU memorizes this abnormality. Later, this abnormality is indicated during the trouble diagnosis period by codes through the blinking of check engine lamp.

As regards important items, this system turns ON the relevant check engine lamp, thus warning the driver of the abnormality.

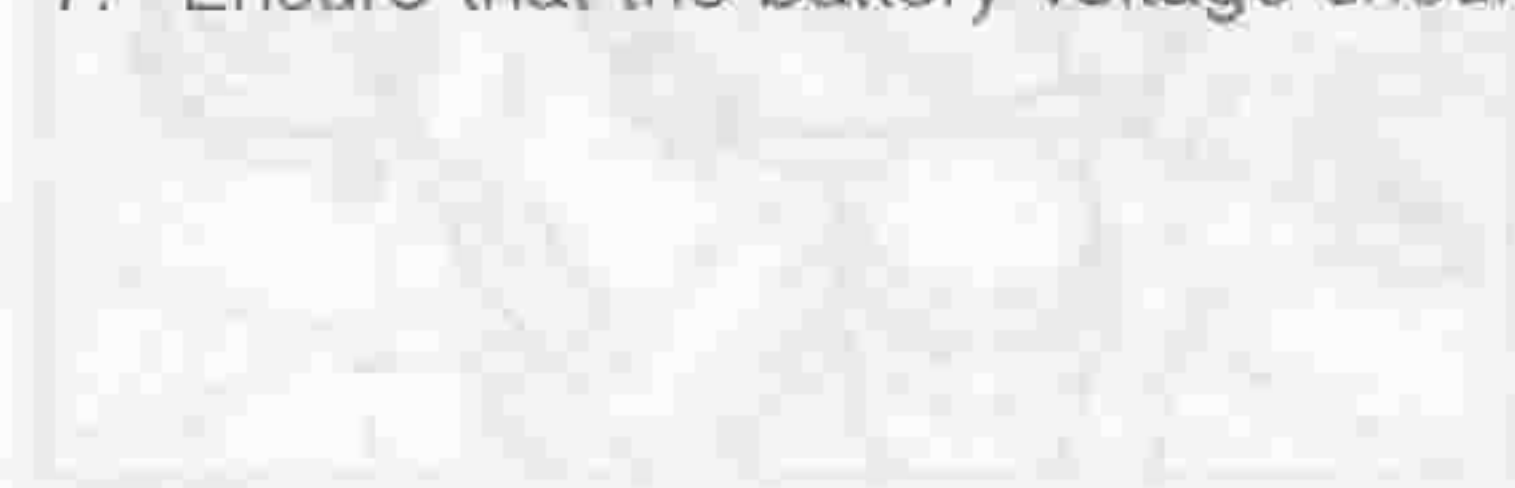
Fall-safe function

In the event that any abnormality takes place in the signals inputted from the important sensors to the ECU and the control can no longer be continued based on the inputted data, an evacuation running is made possible using the data memorized in the ECU in advance. This function is called "fail-safe function."

PRECAUTION

1. The engine control system has self diagnosis function. The ECU memorizes all malfunction codes which have occurred in the past and/or are occurring at present.
The memorized malfunction codes are erased when the battery ground cable is disconnected from the battery terminal. Hence, prior to starting any repairs, be sure to check to see if any malfunction code has been memorized.
2. When performing operations on the fuel system or its related operation, never smoke and keep away any fire.
3. Before disconnecting the fuel line, be sure to disconnect the battery ground cable from the negative terminal of the battery.
4. The fuel line is pressurized to a pressure about 250 kPa (2.55 kgf/cm²) higher than the pressure inside the surge tank. Therefore, when disconnecting the fuel line, be sure to loose the fuel line slowly and prevent the fuel from splashing with a cloth or the like.
5. Do not allow gasoline to get to any parts made of rubber, leather and resin and/or to the electric parts.
6. When cleaning the engine compartment with water, make sure that no water gets to the electrical system.
7. Ensure that the battery voltage should be 11 volts or more, before performing the inspection.

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INSPECTION PRECAUTIONS

MAINTENANCE PRECAUTIONS

1. Ensure that the engine is correctly tuned up.

LEF00004-00000

2. Precautions during gauge connection

- (1) Connecting the tachometer, connect the following SST between the ignition coil and the ignition coil connector of the engine wire.

SST: 09991-87604-000

NOTE:

- This does not apply if your tachometer is a pick-up type.

- (2) Connect the measuring terminal of the tachometer to the measuring terminal of the SST.

NOTE:

- This does not apply if your tachometer is a pick-up type.

- (3) Use the battery as power source for a timing light, tachometer and so forth.

- (4) Never allow the tachometer terminal to touch the ground, for it could result in damage to the igniter and/or ignition coil.

- (5) 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.

3. If engine misfire takes place, the following measures should be taken.

- (1) Ensure that the battery terminals and so forth are connected properly.
- (2) Handle the spark plug wires carefully.
- (3) After completion of repairs, ensure that the ignition coil terminals and other ignition system wire are reconnected securely.

4. Precautions during oxygen sensor handling

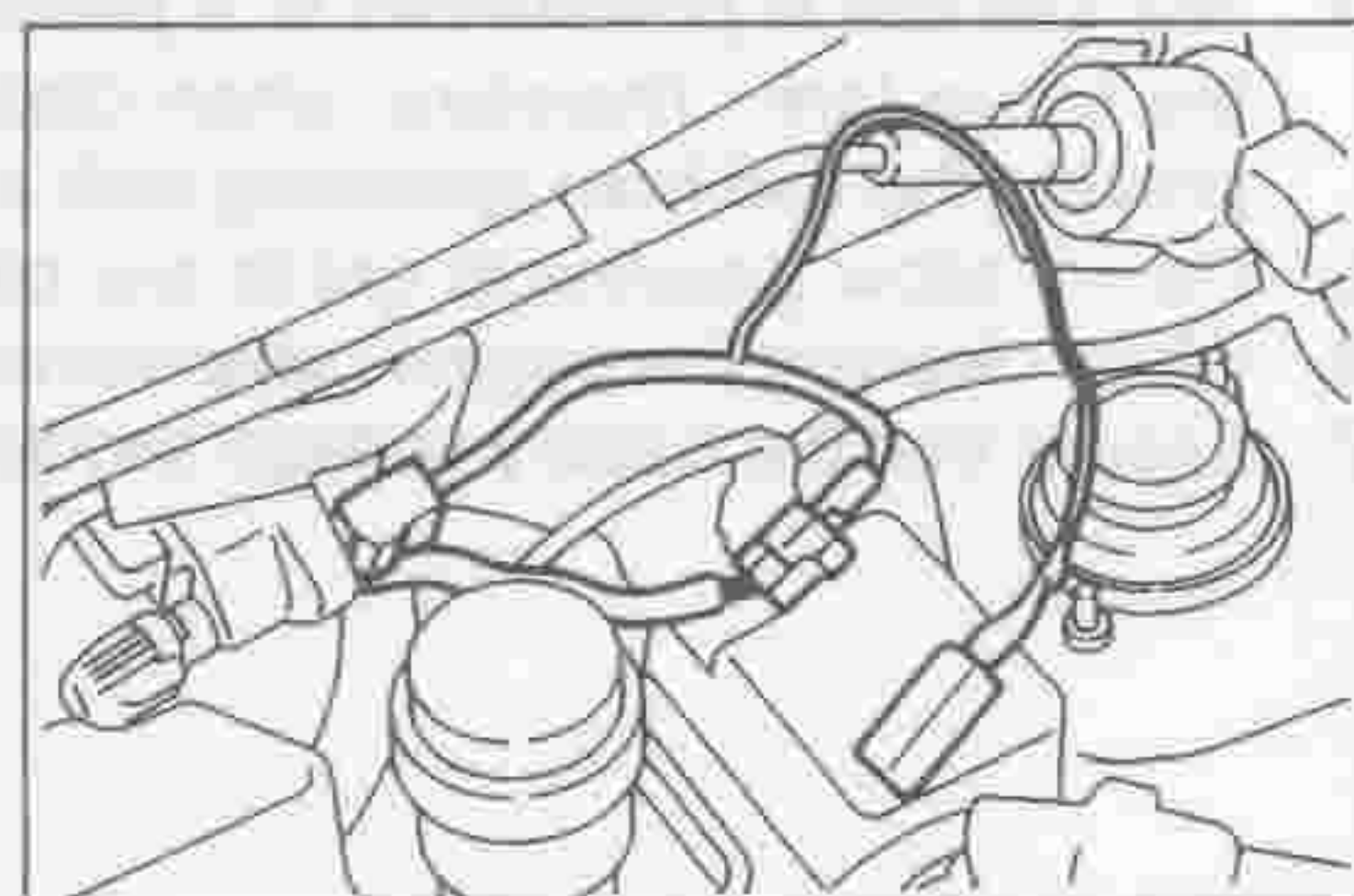
- (1) Do not drop the oxygen sensor or hit it to other objects.
- (2) Do not immerse the sensor in water or do not cool it by water.

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

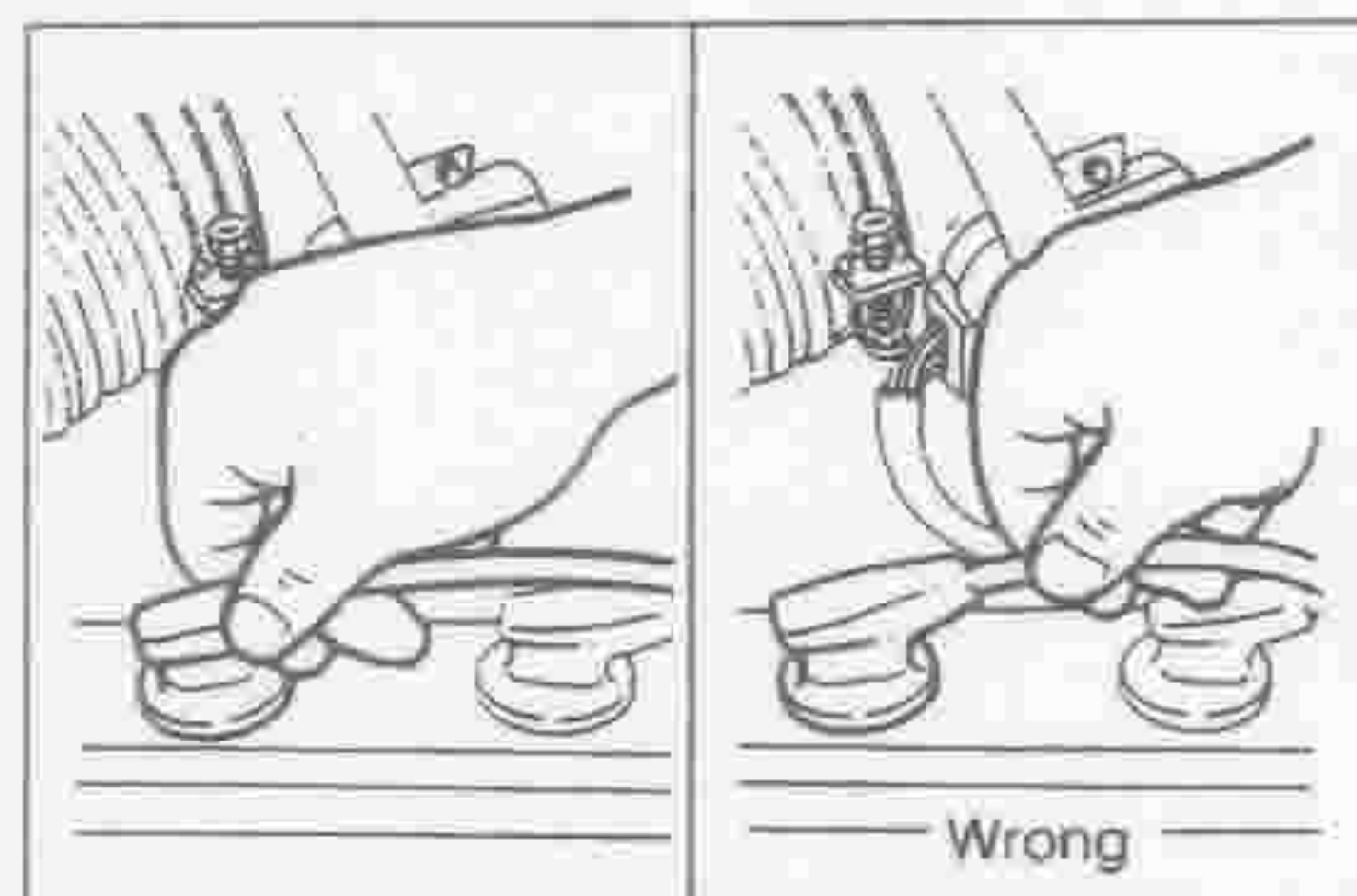
(Failure to observe this caution could cause ECU malfunction.)

6. Do not touch the screws of the bracket installed on the ECU proper.

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



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LEF00006-00002

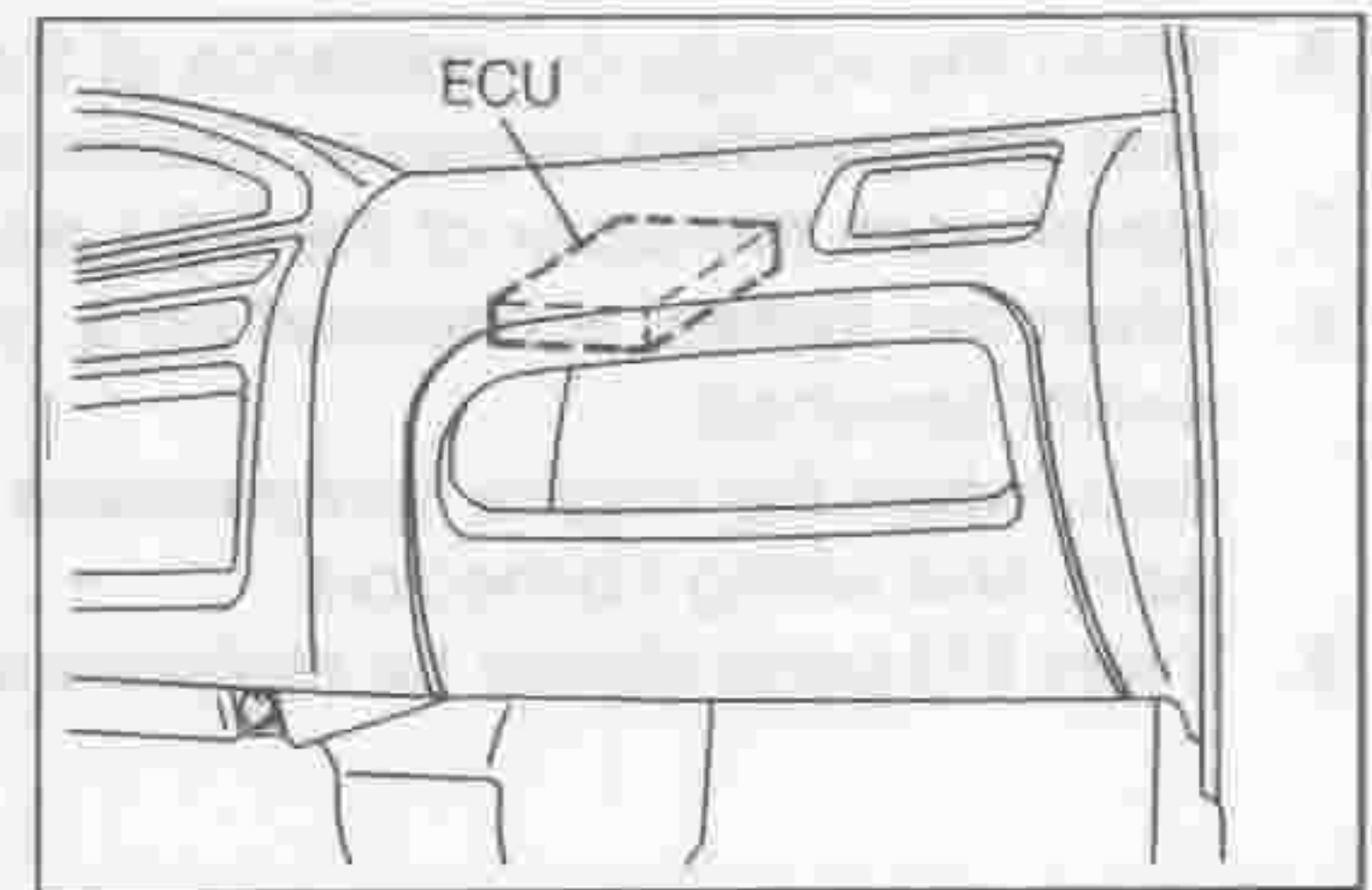
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When the vehicle is equipped with wireless installation (HAM, CB, etc.)

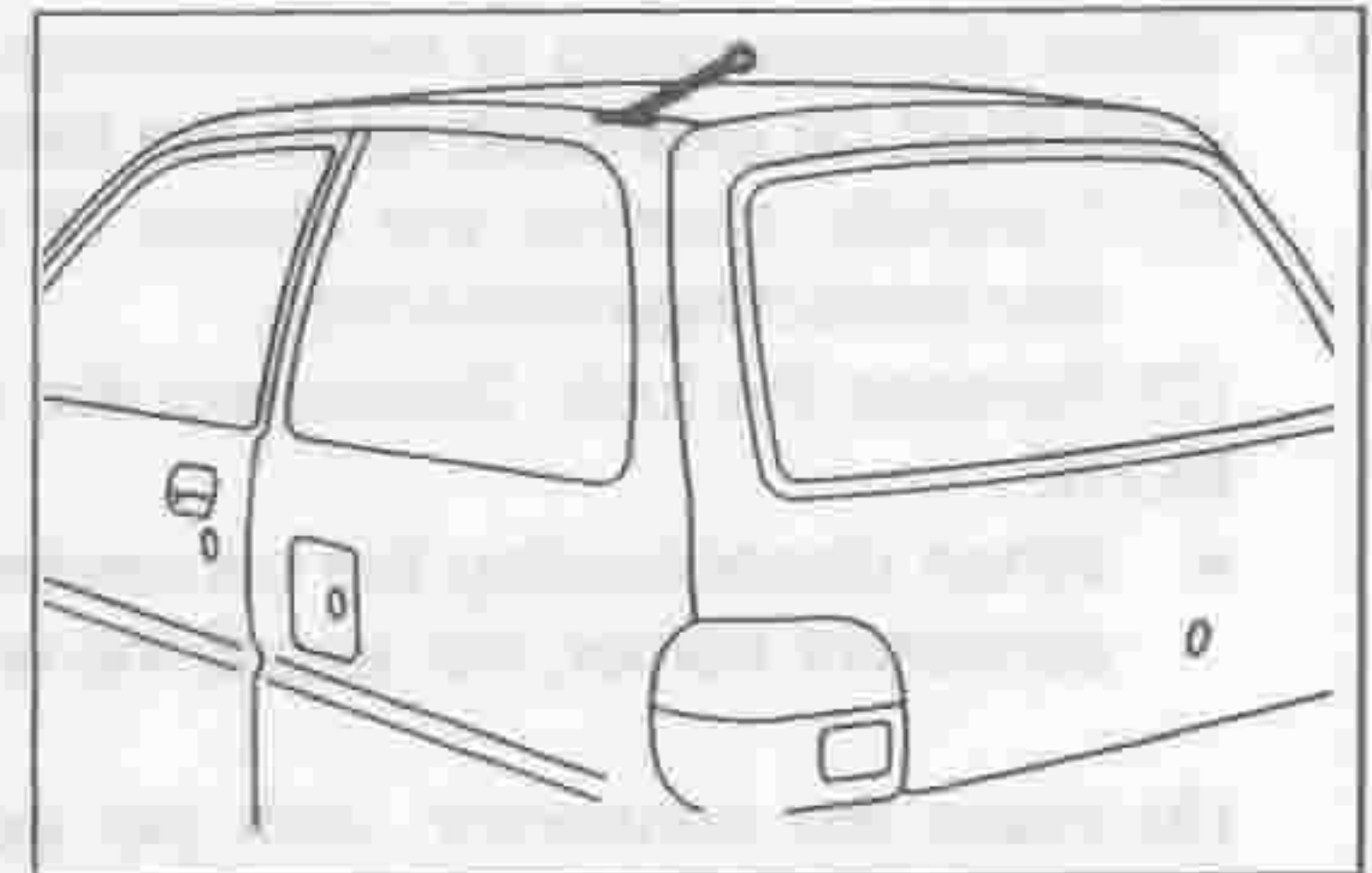
The ECU has been so designed that it is resistant to external influence.

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 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.



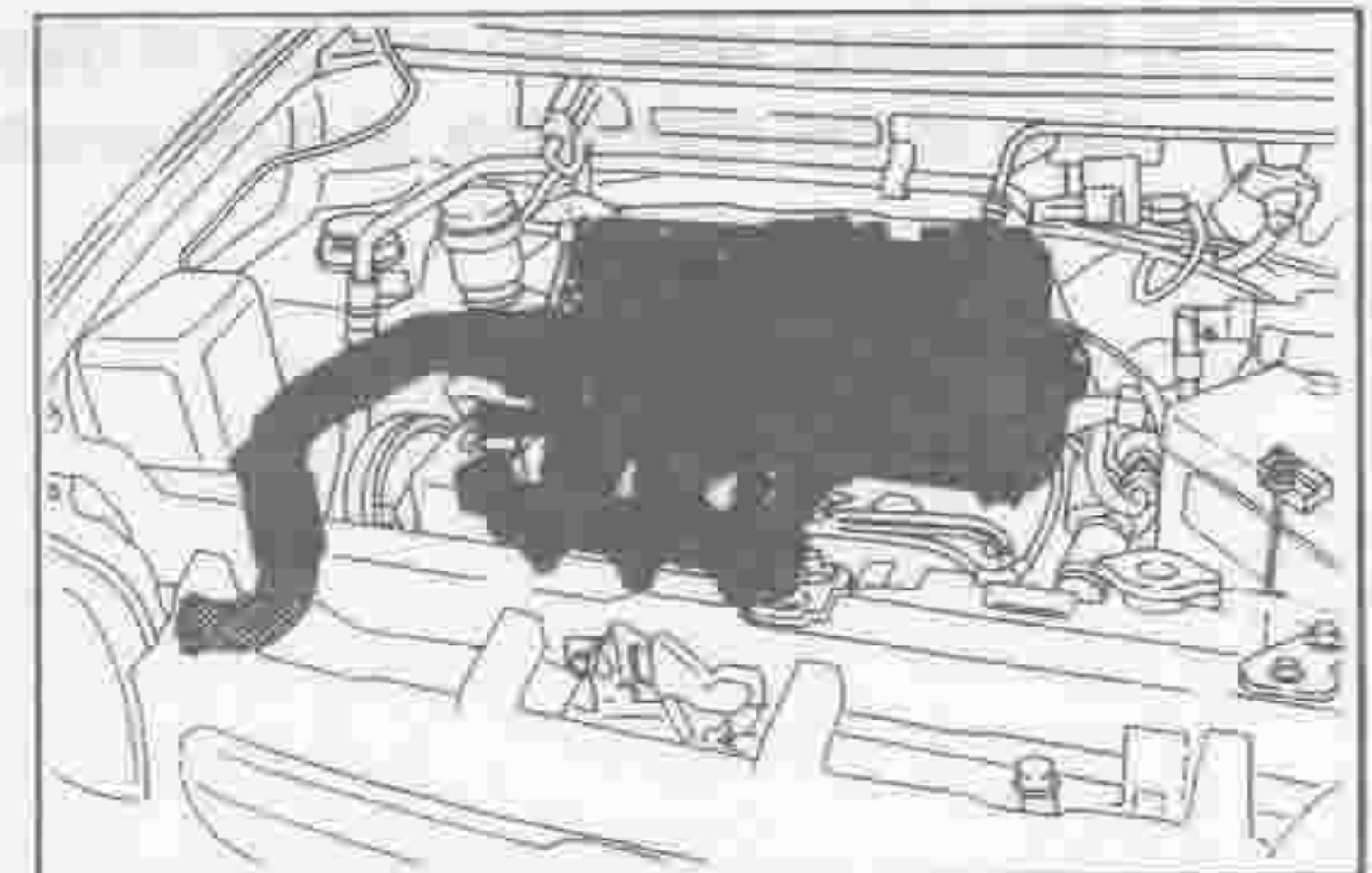
LEF00008-00003



LEF00009-00004

Air induction system

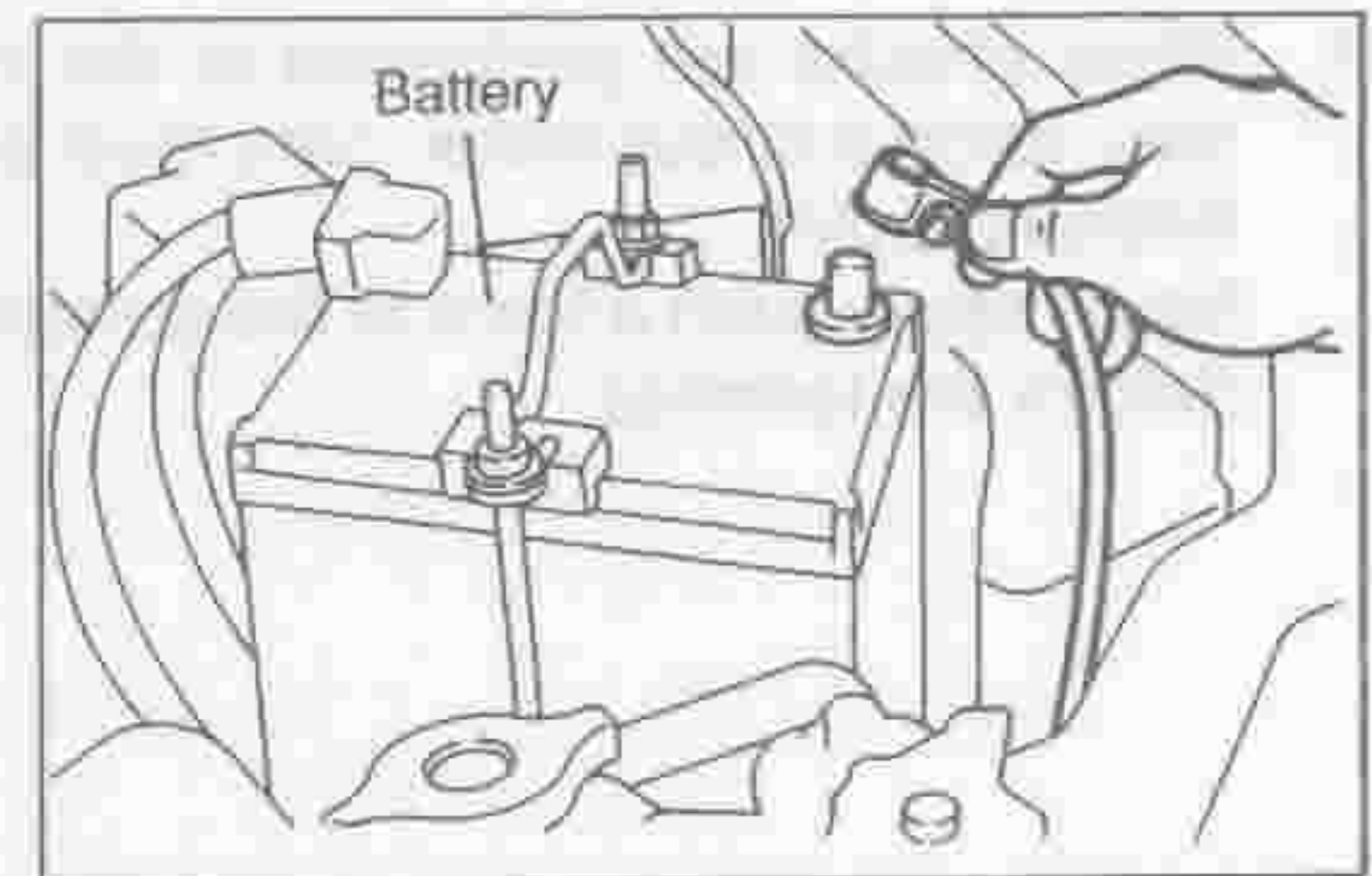
1. Unless all of the oil level gauge, oil filler cap, PCV hose and so forth are installed securely, the engine tune-up can not be performed properly.
2. If air leakage (air admission) is present between the throttle body and the cylinder head, the engine revolution speed can not be adjusted.



LEF00010-00005

Electronic control system

1. Before disconnecting or reconnecting the connector of the sensor system 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.
2. Before disconnecting or reconnecting 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.
3. Be sure to keep the number of disconnection/reconnection of the connector of the EFI system at a minimum level.
4. When installing the battery, care must be exercised not to mistake the battery polarity.
5. 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.



LEF00011-00006

LEF00012-00000

6. 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.
7. Never open the cover of the ECU proper.
8. 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 being splashed to the EFI-related parts and wiring connectors.
9. Every EFI parts should be replaced as an assembly.

LEF00013-00000

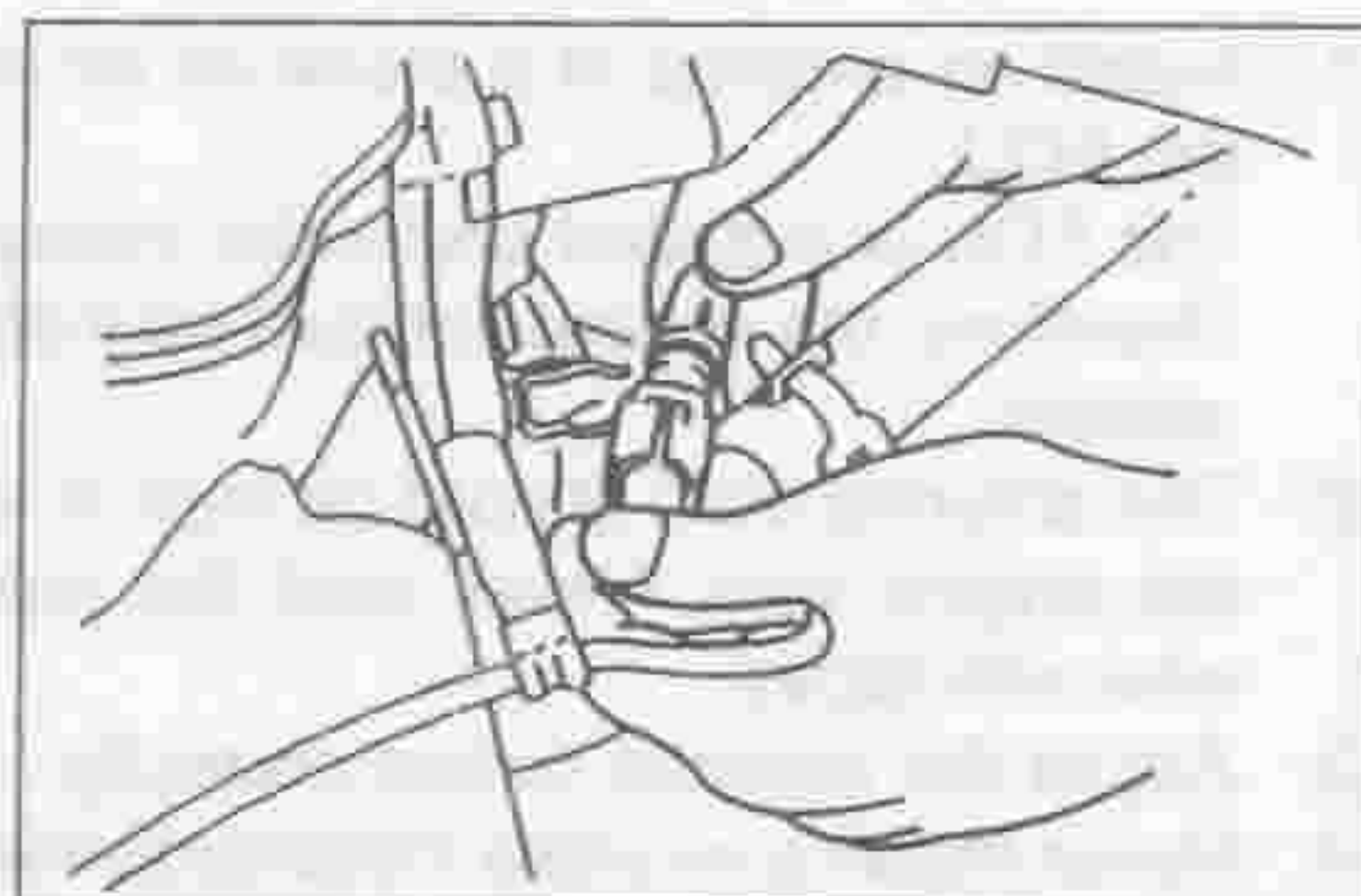
10. When disconnecting or reconnecting the wiring connector, care must be exercised as to the following points.
 - (1) Carefully observe the shape of the lock prior to the disconnecting/connection.
 - (2) Release the lock. Disconnect the connector.

NOTE:

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

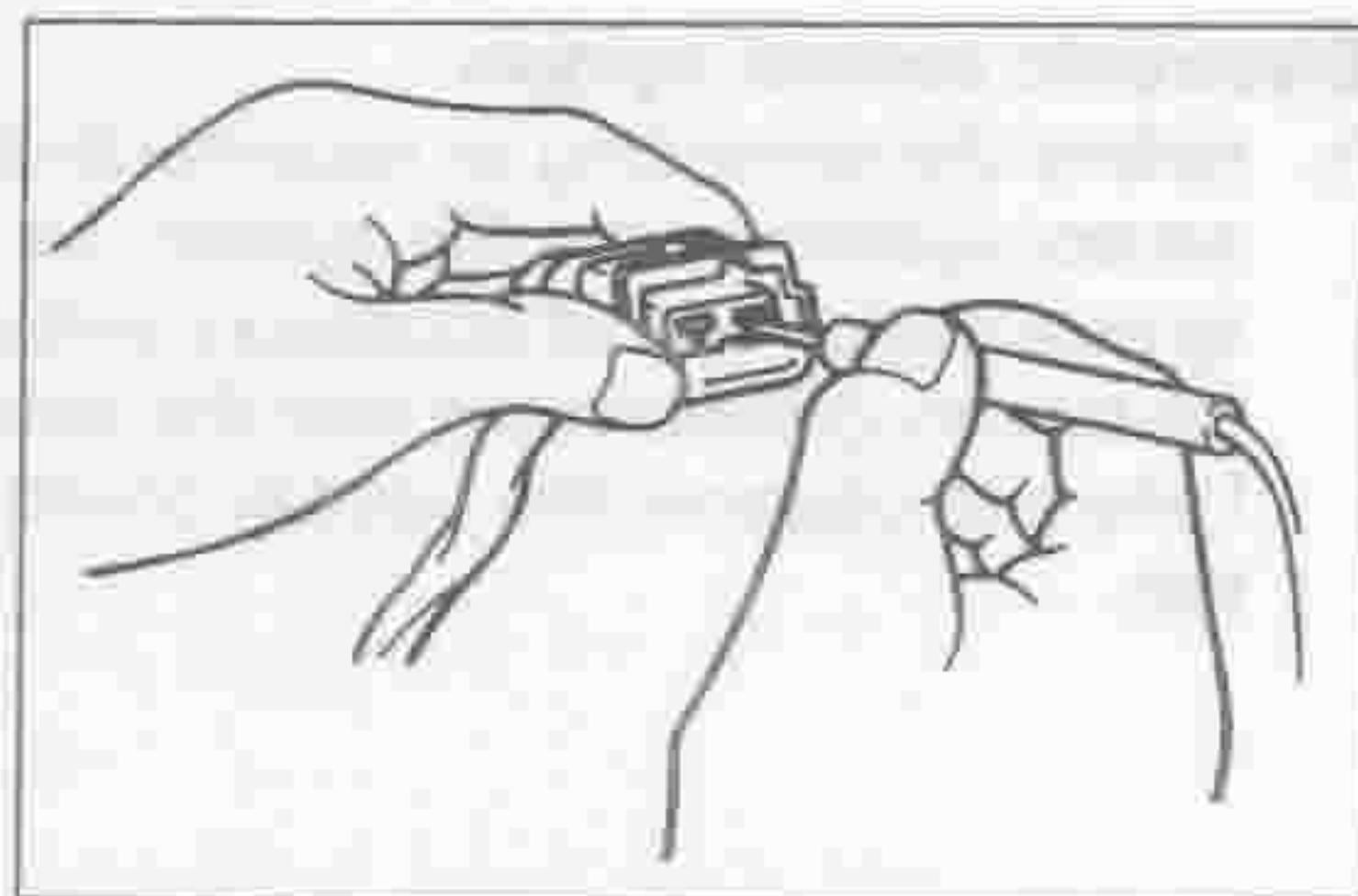
- (3) Insert the connector, until the lock is engaged completely.

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



LEF00014-00007

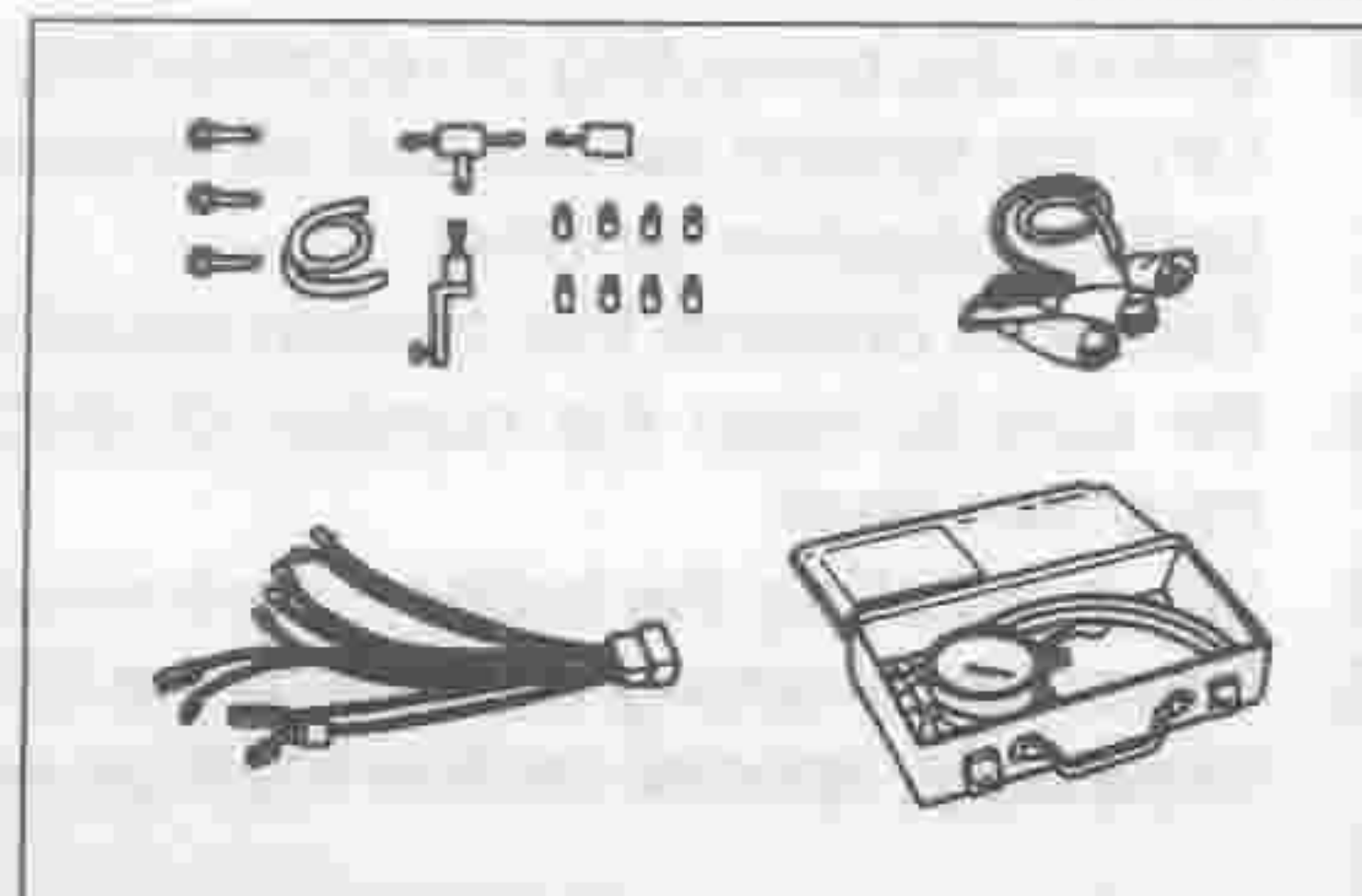
11. When checks are performed at the connector-side terminals, using a circuit tester, care must be exercised as to the following point.
Never apply such a force to the connector terminal that can deform the terminal.



LEF00015-00008

12. When checking the fuel system, such as the injectors, pressure regulator and fuel pressures, use the following SSTs.

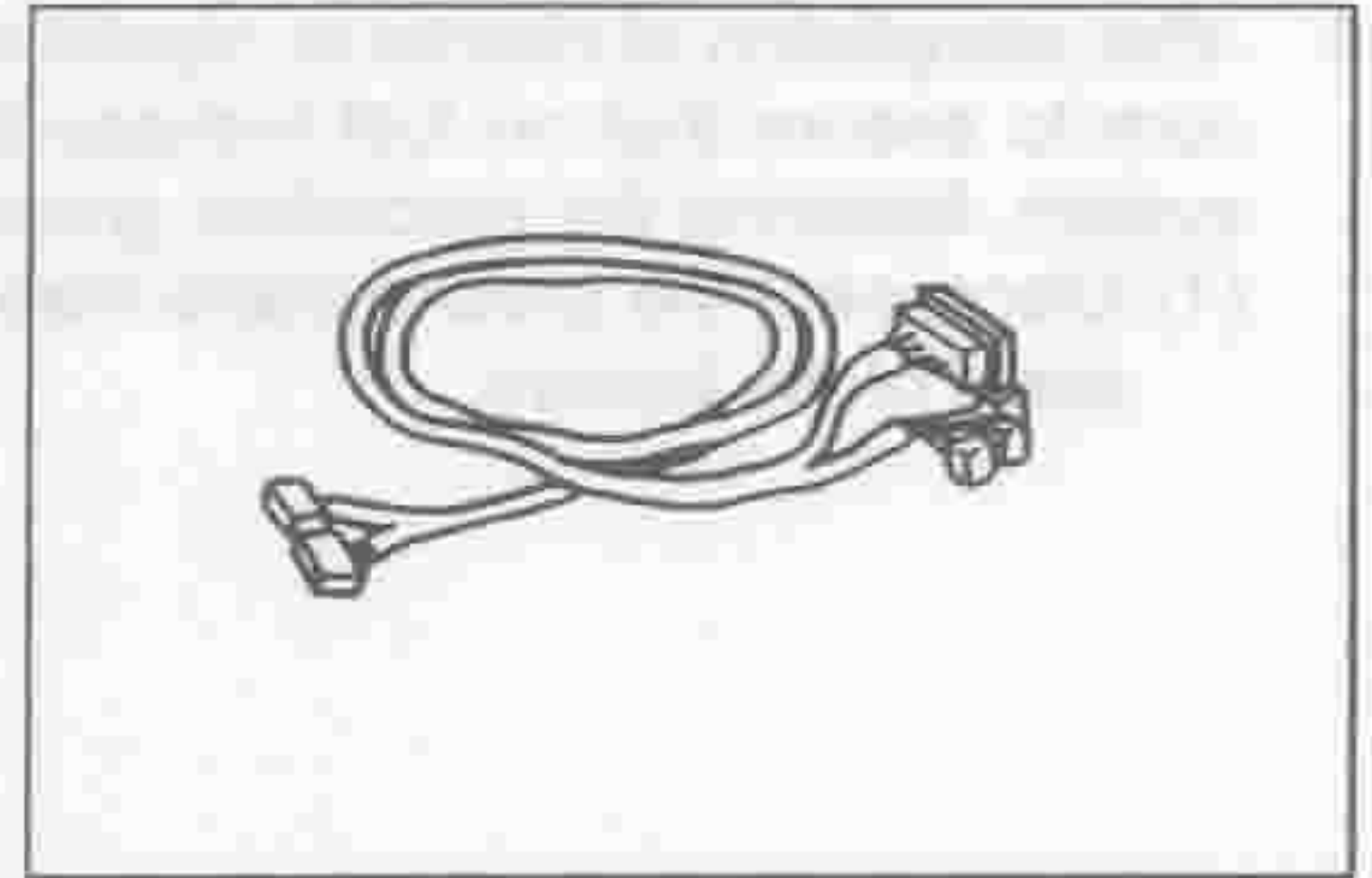
SSTs: 09268-87702-000
09991-87210-000
09268-87701-000
09842-30070-000



LEF00016-00009

13. When measuring the voltage or resistance of each system, use the following SST.

SST: 09842-87502-000



LEF00017-00010

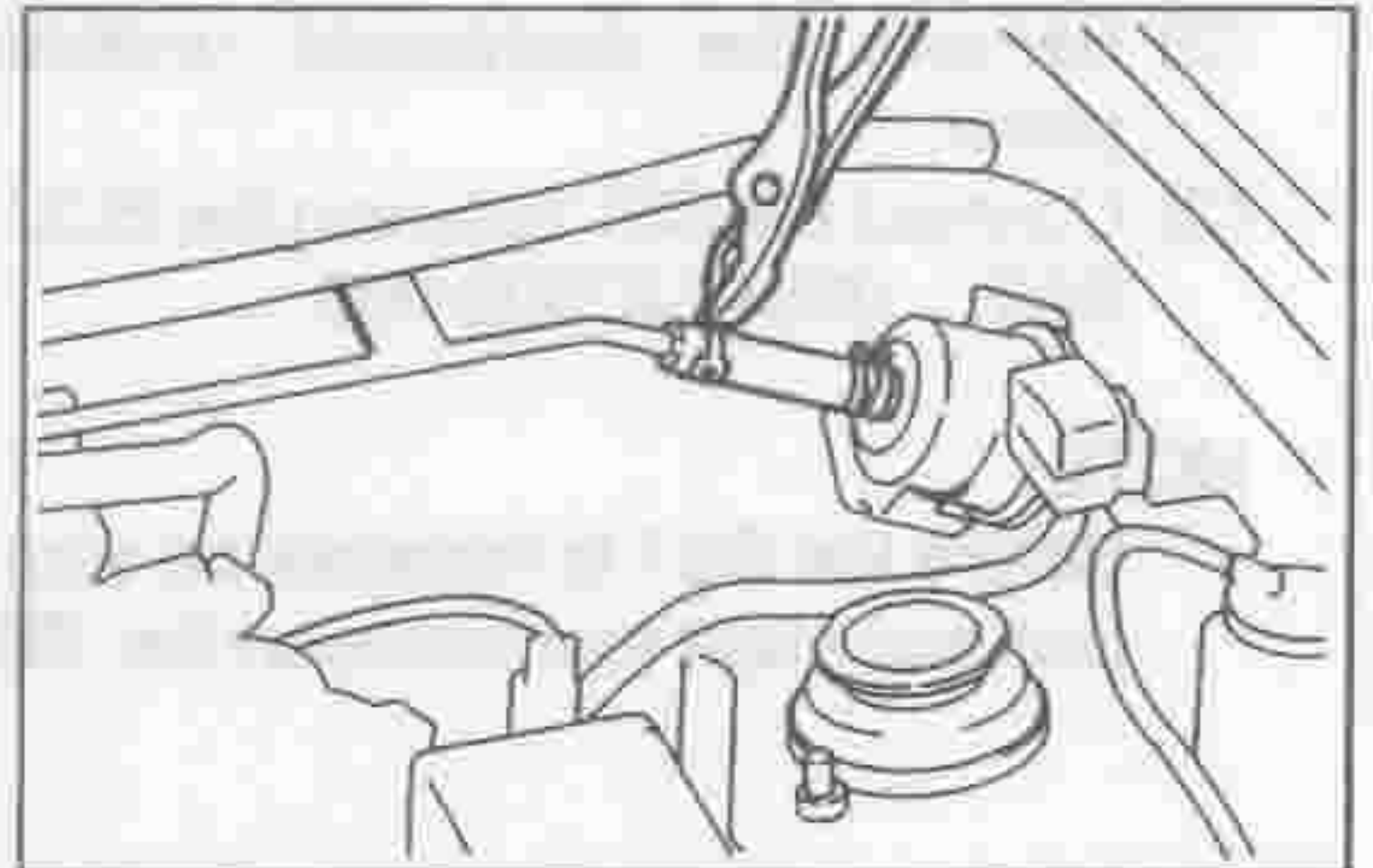
Fuel system

1. The fuel line at the high-pressure side is pressurized to a fuel pressure of about 250 kPa (2.55 kgf/cm²). Therefore, a large amount of gasoline flows out when parts of the fuel line is disconnected. Hence, take the following counter-measures.

CAUTION:

- Release the inner pressure of the fuel tank by removing the fuel filler cap in advance.

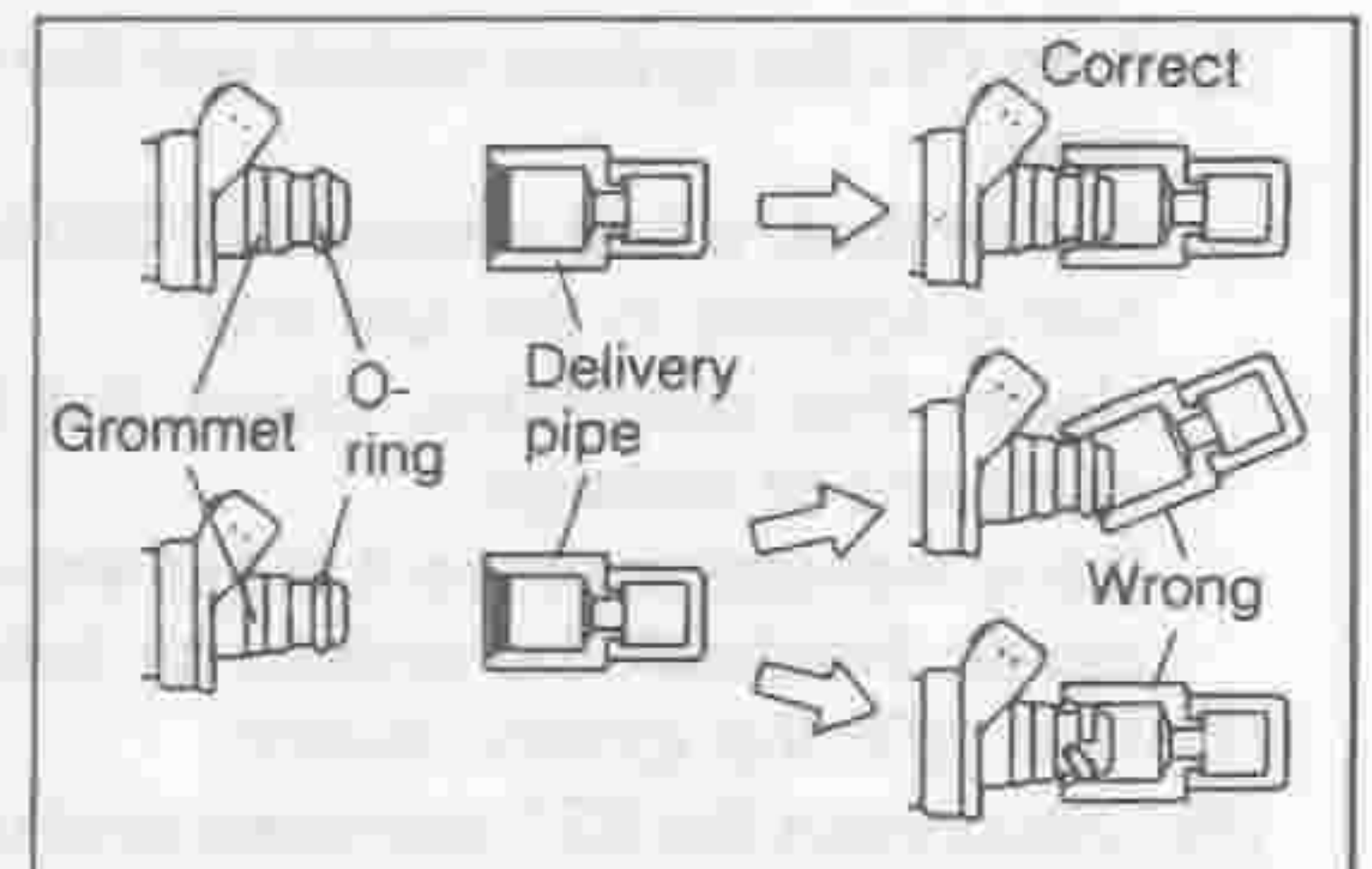
- (1) Place a suitable container, a cloth or the like under the disconnecting connection.
- (2) Detach the hose clamp at the fuel filter side, using pliers.
- (3) Slowly pull out the fuel hose from the fuel filter.
- (4) Plug the disconnected connection with a rubber plug or the like so that no dust may enter into the fuel line.



LEF00018-00011

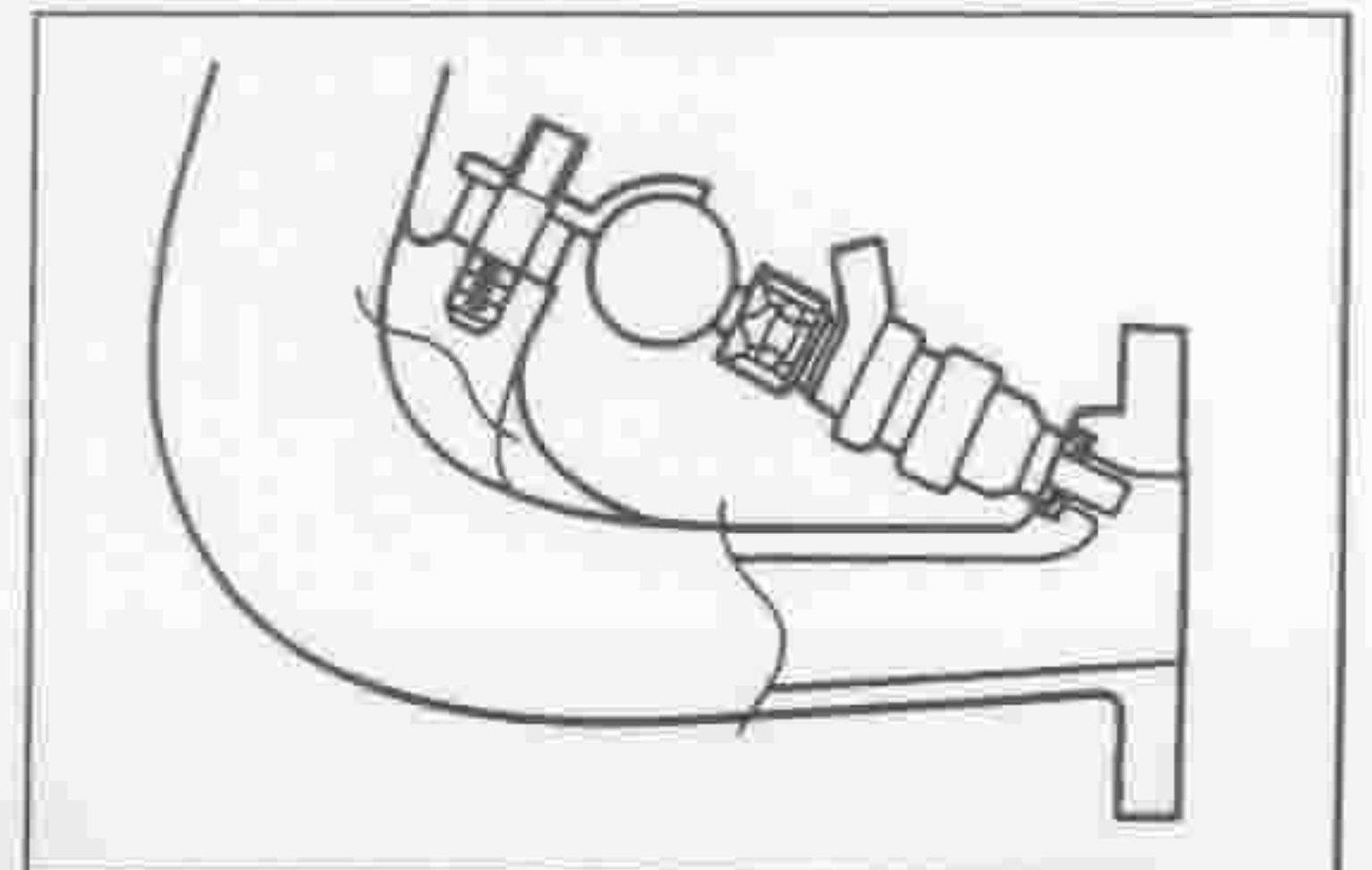
2. When removing/installing the injector, observe the following instructions.

- (1) Do not reuse the O-ring.
- (2) When installing the O-ring to the injector, be careful not to damage the O-ring.
- (3) When connecting the injector to the delivery pipe, apply silicon oil to the O-ring of the injector in advance. (Never use engine oil, gear oil and so forth.)
- (4) When connecting the injector to the delivery pipe, be very careful not to damage the O-ring of the injector.



LEF00019-00012

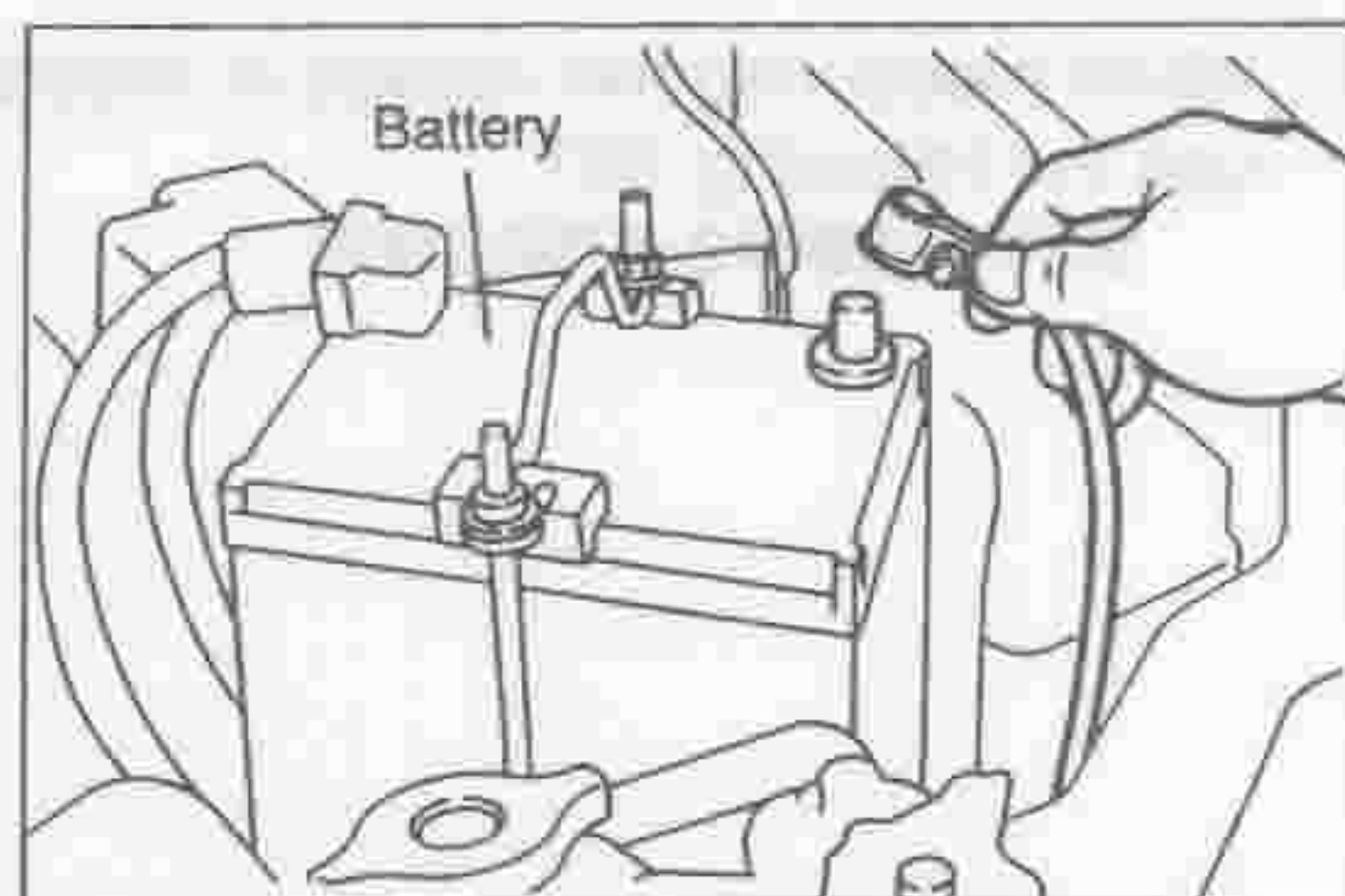
3. Install the injector to the delivery pipe and intake manifold, as shown in the figure.



LEF00020-00013

- 4 After completion of checks or repairs of the fuel system, be sure to ensure that no fuel leakage is present in the fuel system, following the procedure given below.

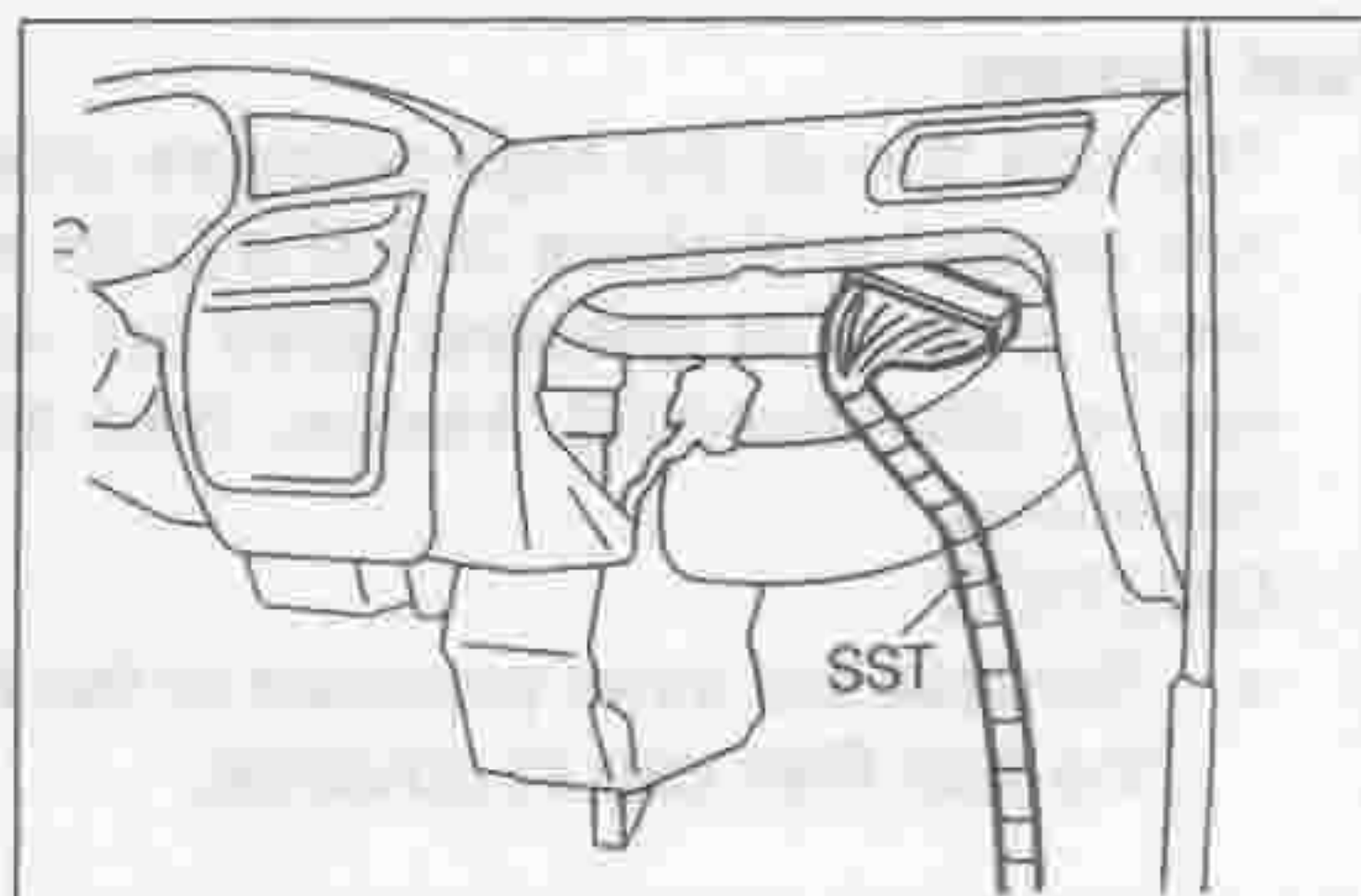
(1) Disconnect the ground cable from the negative (-) terminal of the battery.



LEF00021-00014

(2) Remove the dashboard undertray from instrument panel.

(3) Connect the SST between the ECU and the engine wire.
SST: 09842-87502-000



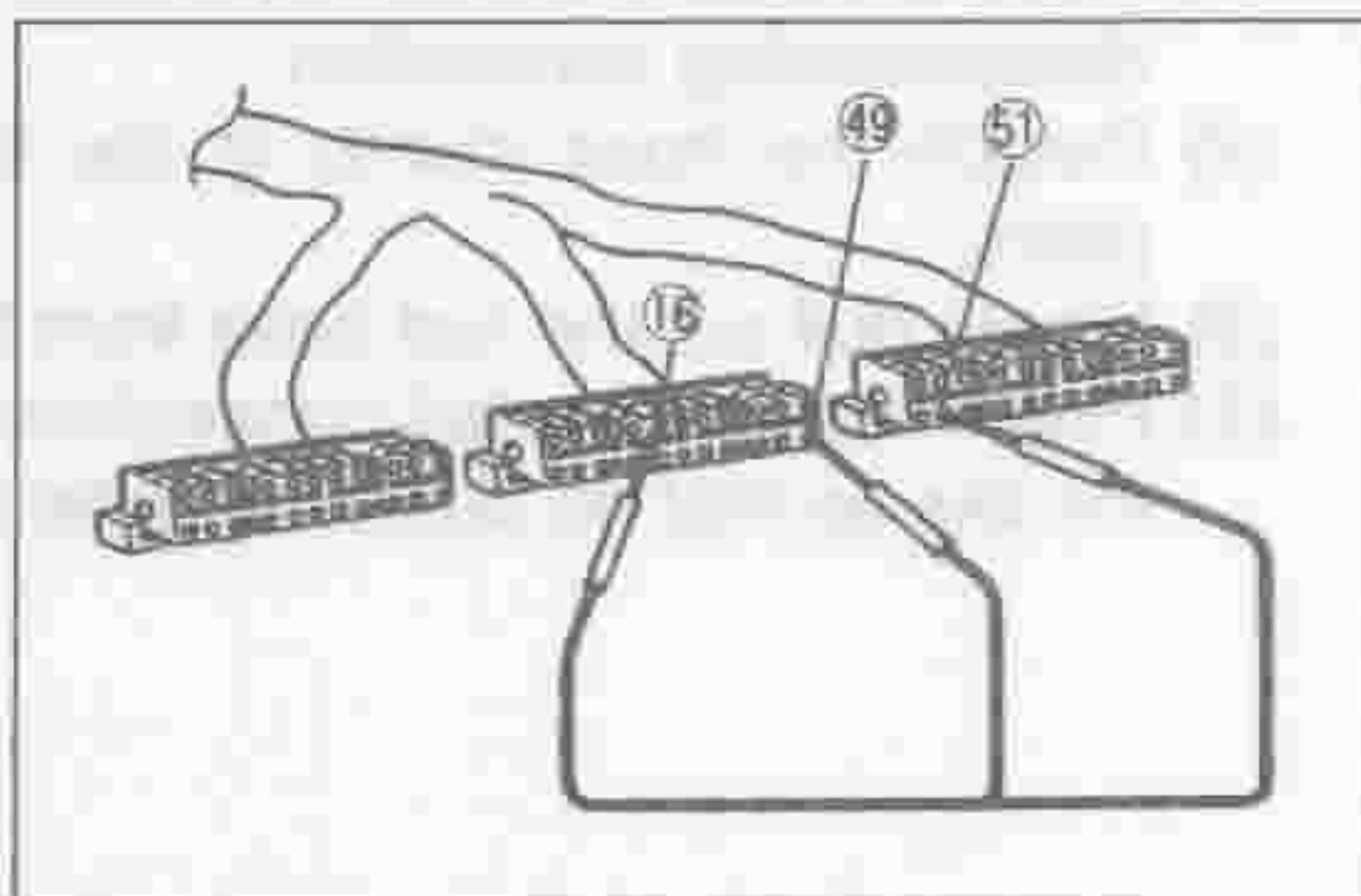
LEF00022-00015

NOTE:

- Before the SST is installed, be sure to perform continuity test and short test between the SST terminals.

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

(5) Connect the SST terminals between ⑤① and ①⑥ (EF-EL) or ④⑨ and ①⑥ (ED-20)



LEF00023-00016

(6) Turn ON the ignition switch with the engine in a stopped state.

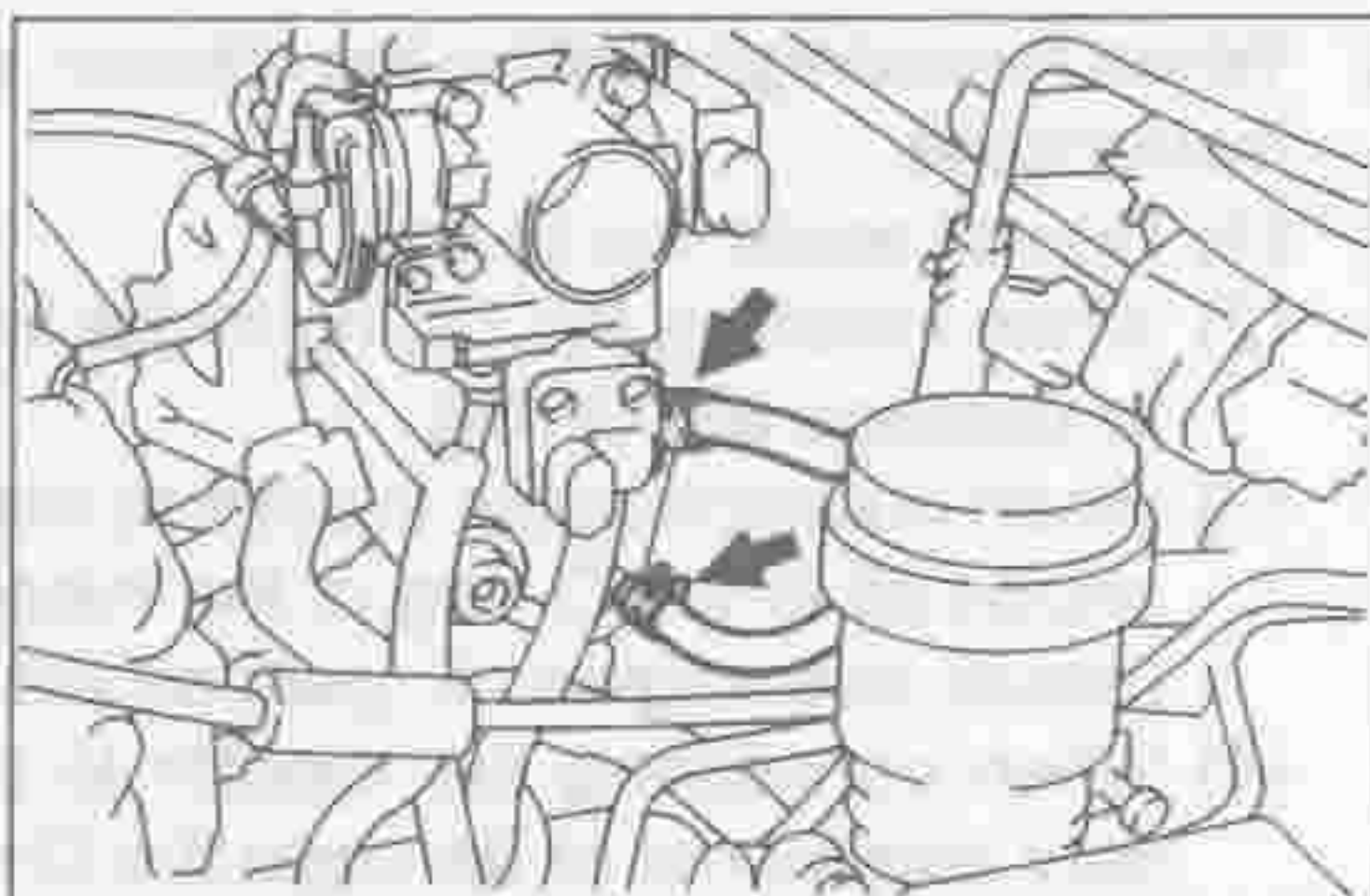
At this time, a fuel pressure of 250 kPa (2.55 kgf/cm²) is being applied to the fuel line.

Under this conditions, check the fuel line system for evidence of leakage.

If any leakage is present at fuel line system, repair leaky points. Recheck the system for leakage.

(7) Turn OFF the ignition switch.

(8) Disconnect the SST terminals and remove the SST from the ECU.



LEF00024-00017



TROUBLE SHOOTING

TROUBLE SHOOTING HINTS

1. In most cases, engine troubles are attributable to systems other than the EFI system.
Prior to starting the trouble shooting for the EFI system, check other systems.

- (1) Power supply

- Battery voltage
- Fuse blown
- Fusible link blown

- (2) Body ground

- (3) Fuel supply

- Fuel leakage
- Fuel filter clogged
- Fuel pump malfunctioning

- (4) Ignition system

- Spark plugs faulty
- Spark plug wires faulty
- Distributor and igniter faulty
- Ignition coil faulty

- (5) Air induction system

- Admission of air

- (6) Others

- Ignition timing adjusted improperly
- ISC valve malfunctioning
- etc.

LEF00025-00000

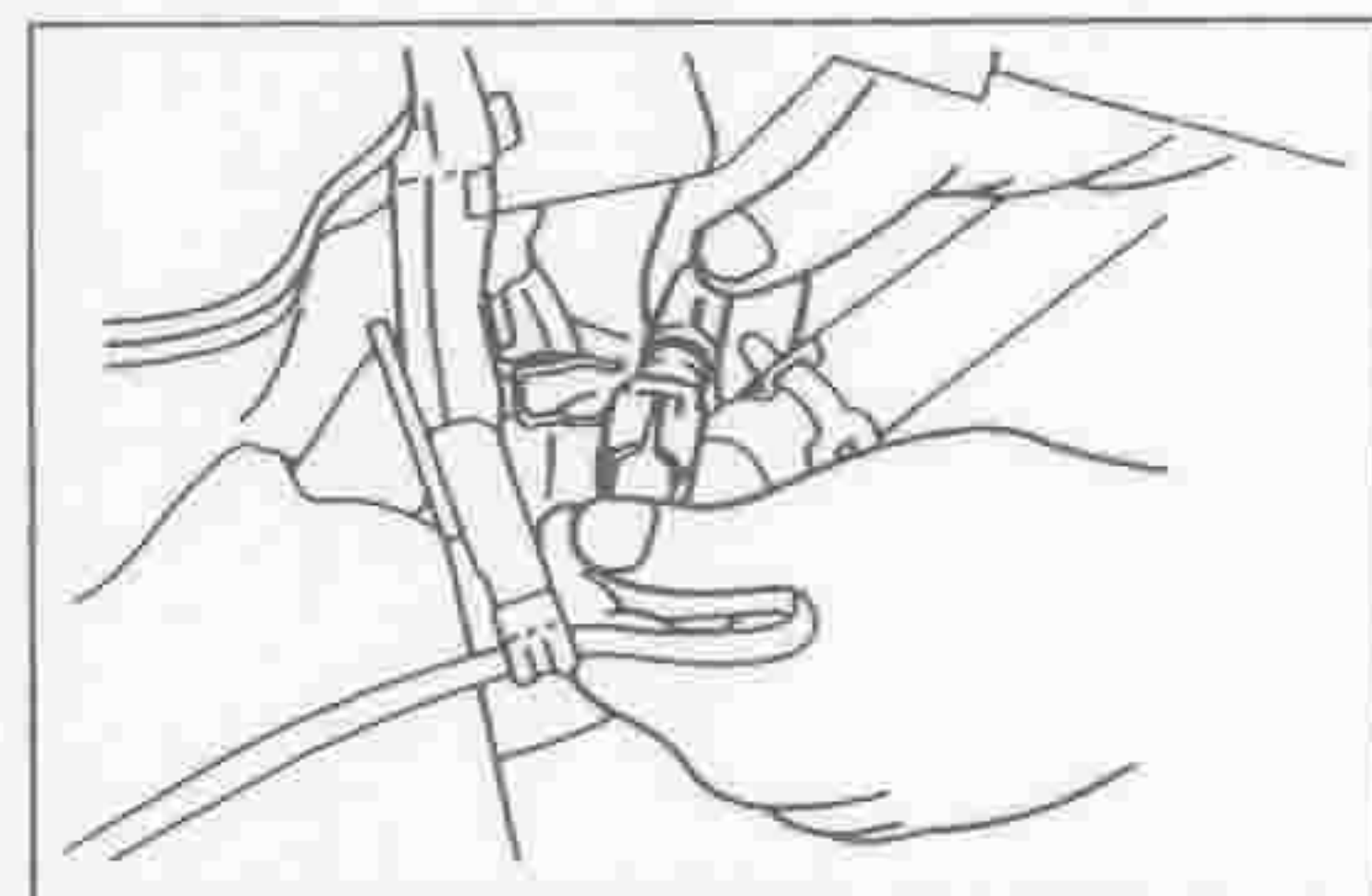
2. Most of troubles related to the EFI system are merely caused by poor wire connections.

Ensure that connectors are connected securely.

Check connectors, being careful as to the following points.

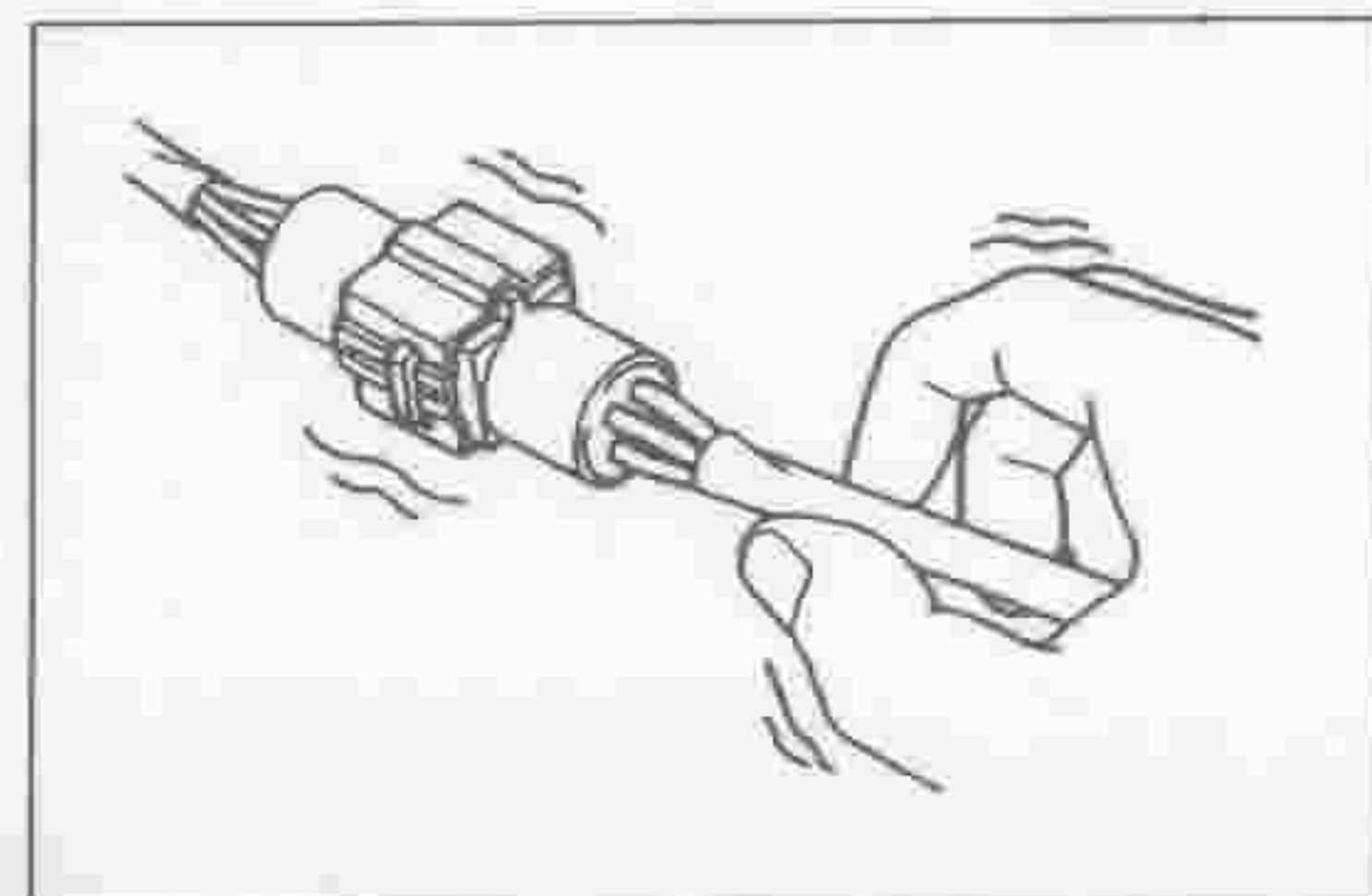
- (1) Visually inspect that terminals are not bent.

- (2) Ensure that connectors are securely connected and locked.



LEF00026-00018

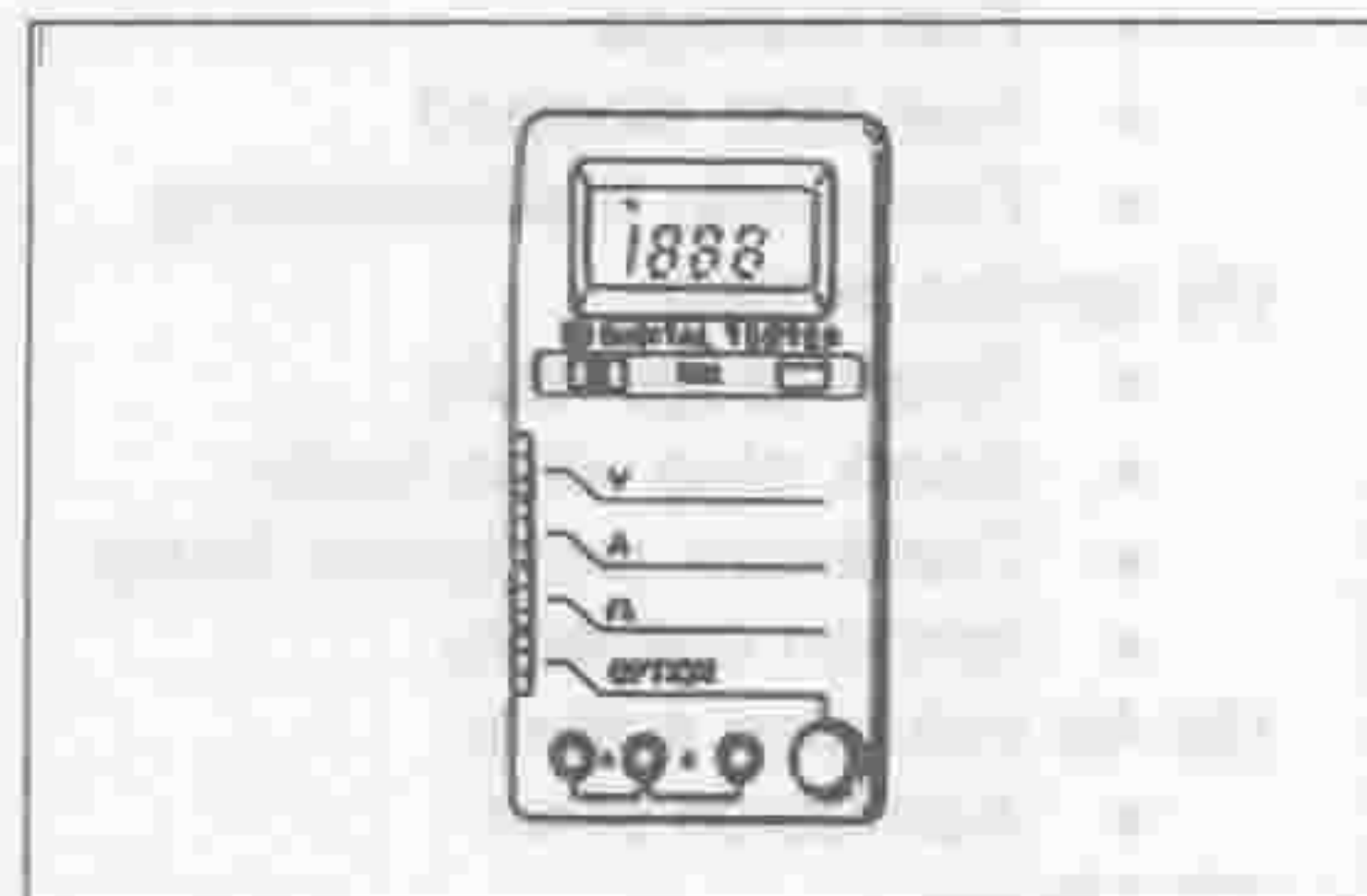
- (3) Check to see if the malfunction phenomenon takes place when applying light vibration to the connector or the wire connected to the connector.



LEF00027-00019

3. Prior to replacing the ECU, thoroughly perform the trouble shooting for possible items other than the ECU. The ECU is a reliable, but an expensive part. Even when the ECU has been replaced according to the check results of the trouble shooting and the relevant malfunction has been remedied, be sure to reinstall the old ECU so as to confirm that the malfunction was obviously caused by the faulty ECU.

4. For the trouble shooting, use a volt/ohmmeter whose internal resistance is $10\text{ k}\Omega/\text{V}$ or more. Use of a volt/ohmmeter whose internal resistance is less than $10\text{ k}\Omega/\text{V}$ may cause an ECU malfunction or wrong diagnosis. Furthermore, be sure to employ a meter whose resolution is 0.1 V or more, $0.5\text{ }\Omega$ or more and whose accuracy is $\pm 2\%$ or more.



LEF00029-00020

5. In this trouble shooting, no consideration has been made to any displacement of timing belt teeth. Hence, if the trouble persists even after the trouble shooting has been carried out, check to see if the timing belt exhibits any tooth skipping.

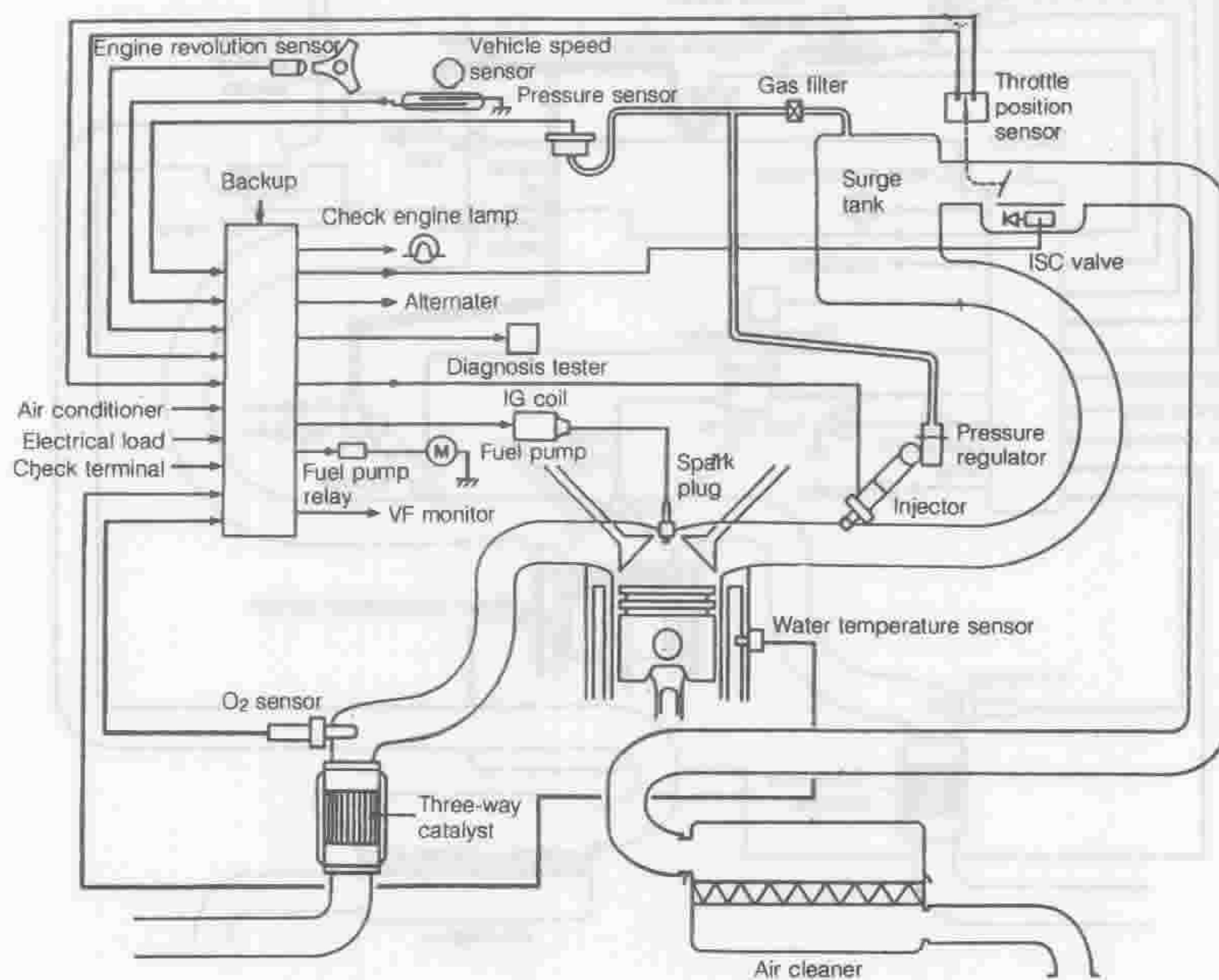
LEF00030-00000



SYSTEM DESCRIPTION

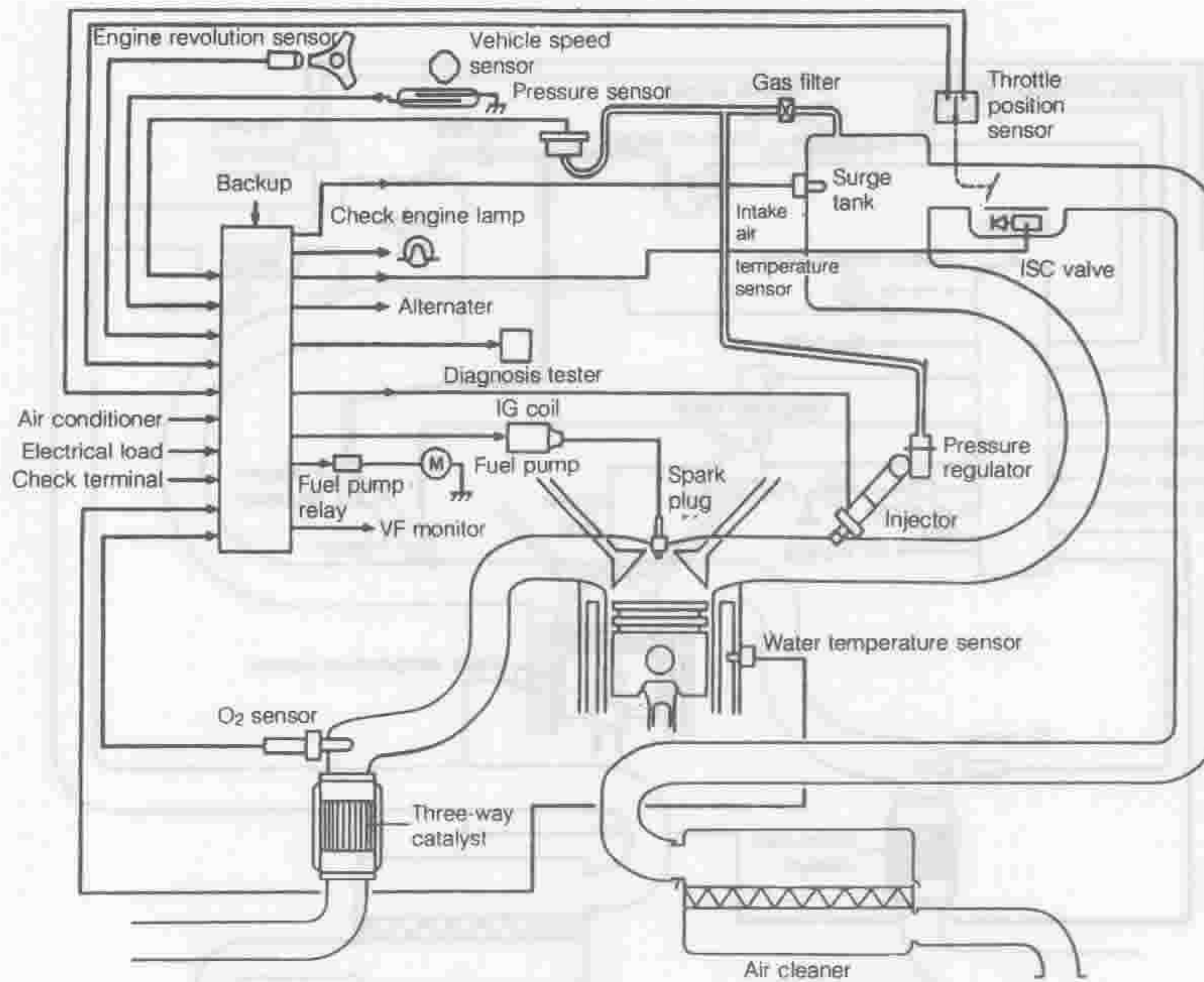
System diagram

[EF-EL Engine]



Systematic diagram

[ED-20 Engine]



SUMMARIZED OF TROUBLE SHOOTINGS

Following table shows a trouble cases of the EFI system.

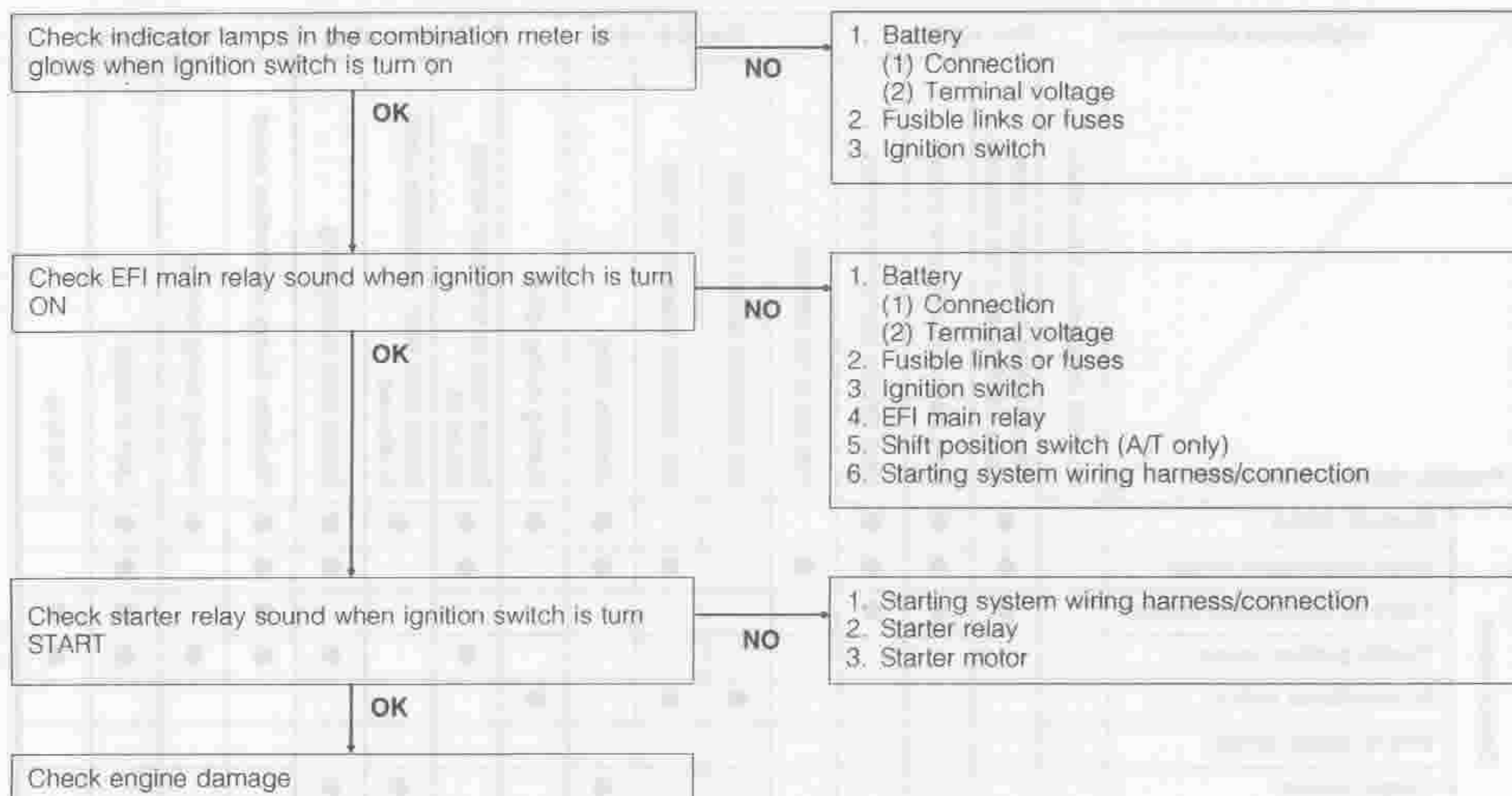
Malfunction phenomena Possible malfunctioning parts		Poor starting				Unstable idling				Engine stalling			Poor running				
		No initial combustion takes place.	Although initial combustion takes place, combustion is not complete.	Hard starting (during cold period)	Hard starting (during hot period)	Fast idle is not effective.	Idle revolution speed is too low.	Idle revolution speed is too high.	Unstable idling	Hunting during idling	Engine stalls at time when vehicle moves off.	Engine stalls when accelerator pedal is released.	Engine stalls during idling.	Hesitation during accelerating period	Hunting during running	Lack of output	Knocking
Control system	Pressure sensor		●	●	●				●	●	●	●	●	●	●	●	
	Water temperature sensor		●	●	●	●		●	●		●		●	●		●	
	Intake air temperature sensor		●	●	●								●			●	●
	Throttle position sensor									●		●	●	●	●	●	●
	Air conditioner switch						●	●		●							
	Vehicle speed sensor																
	Oxygen sensor								●			●	●				
	Neutral start switch (A/T vehicle only)						●										
Fuel system	Fuel pump system	●	●						●				●	●	●	●	
	Pressure regulator	●	●	●	●	●			●				●	●	●	●	
	Fuel line filter	●	●	●	●								●	●	●	●	
	Injector	●	●	●	●	●			●				●	●	●	●	
Ignition system	IG coil	●											●		●		
	Spark plug	●	●	●	●				●				●	●		●	
	Resistive cord	●	●	●	●		●		●				●	●		●	
	Ignition timing		●	●			●			●						●	●
	Distributor	●											●	●	●		
Air intake system	ISC system		●	●	●	●	●	●	●	●	●	●					
	Throttle valve			●		●	●	●	●	●						●	
	Throttle body								●	●						●	
	Hose, etc., disconnected		●	●	●				●	●			●	●			
Power supply system	ECU power supply circuit	●															
	IG switch	●															
	Fuel pump relay	●															
	Main relay	●															

NOTE:

- Prior to the troubleshooting according to malfunction phenomena, conduct the basic inspections so as to narrow down the possible causes for malfunctions. For instance, if the spark inspection of the basic inspection proves to be normal, it can be assumed that the ignition system is functioning normally. Moreover, the information obtained during diagnosis through questions can help further narrow down the possible causes.

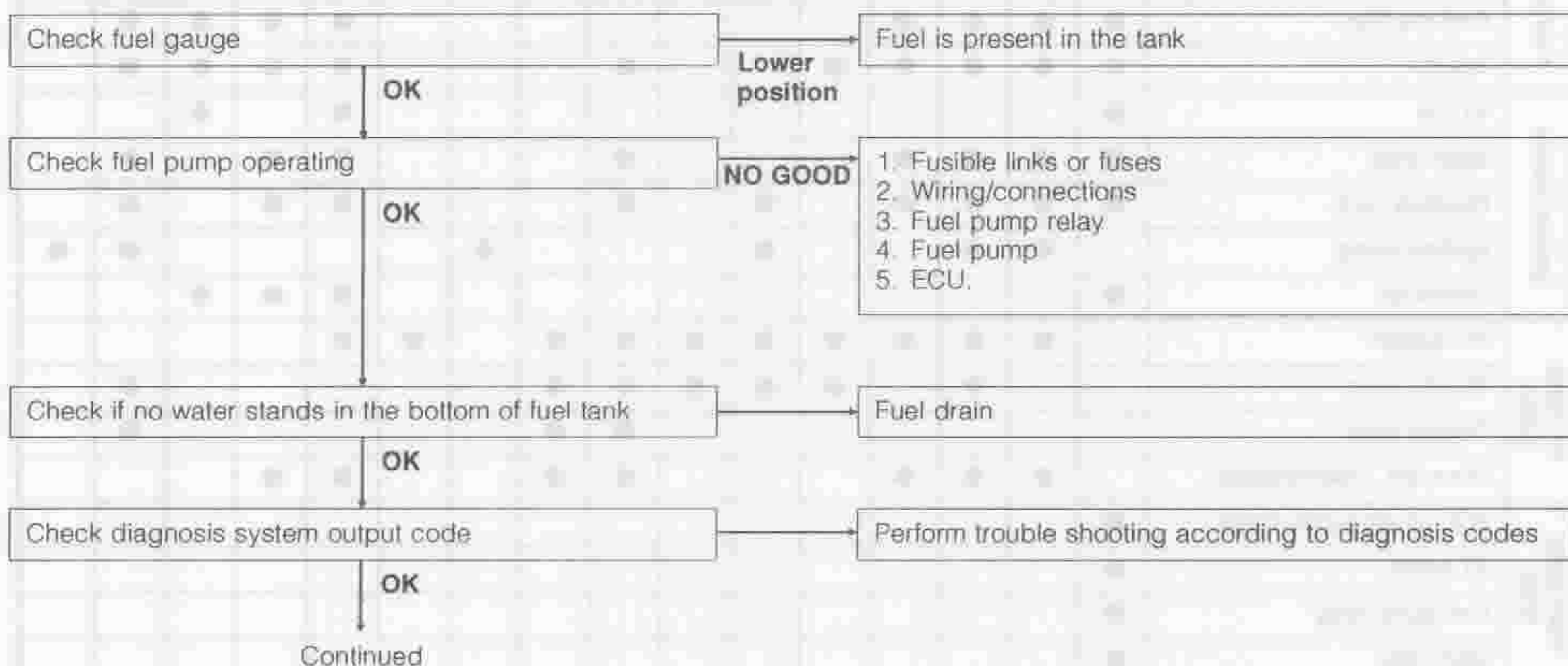
TROUBLE SHOOTING PROCEDURE

1 Engine will not crank or cranks slowly

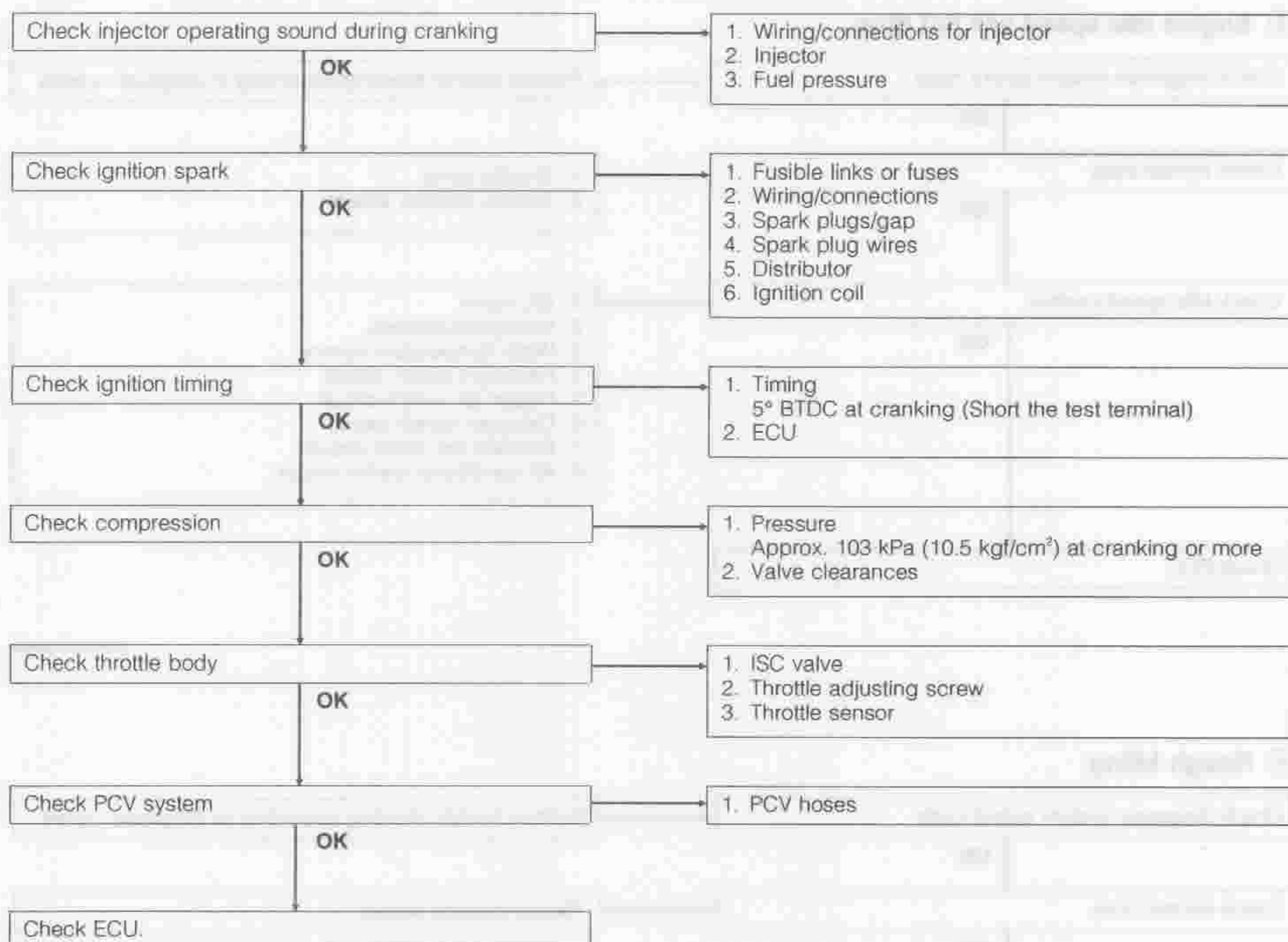


LEF00034-00000

2 Engine will not start (Engine cranks normally)

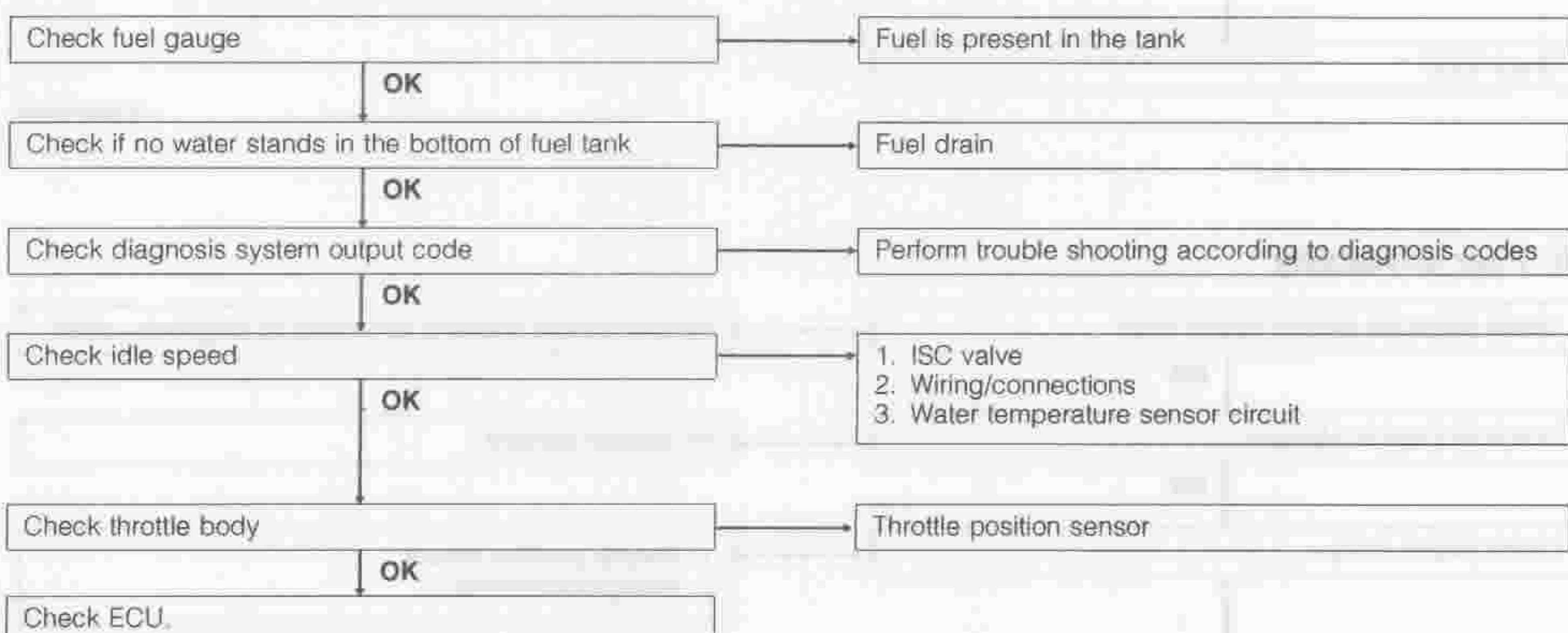


LEF00035-00000



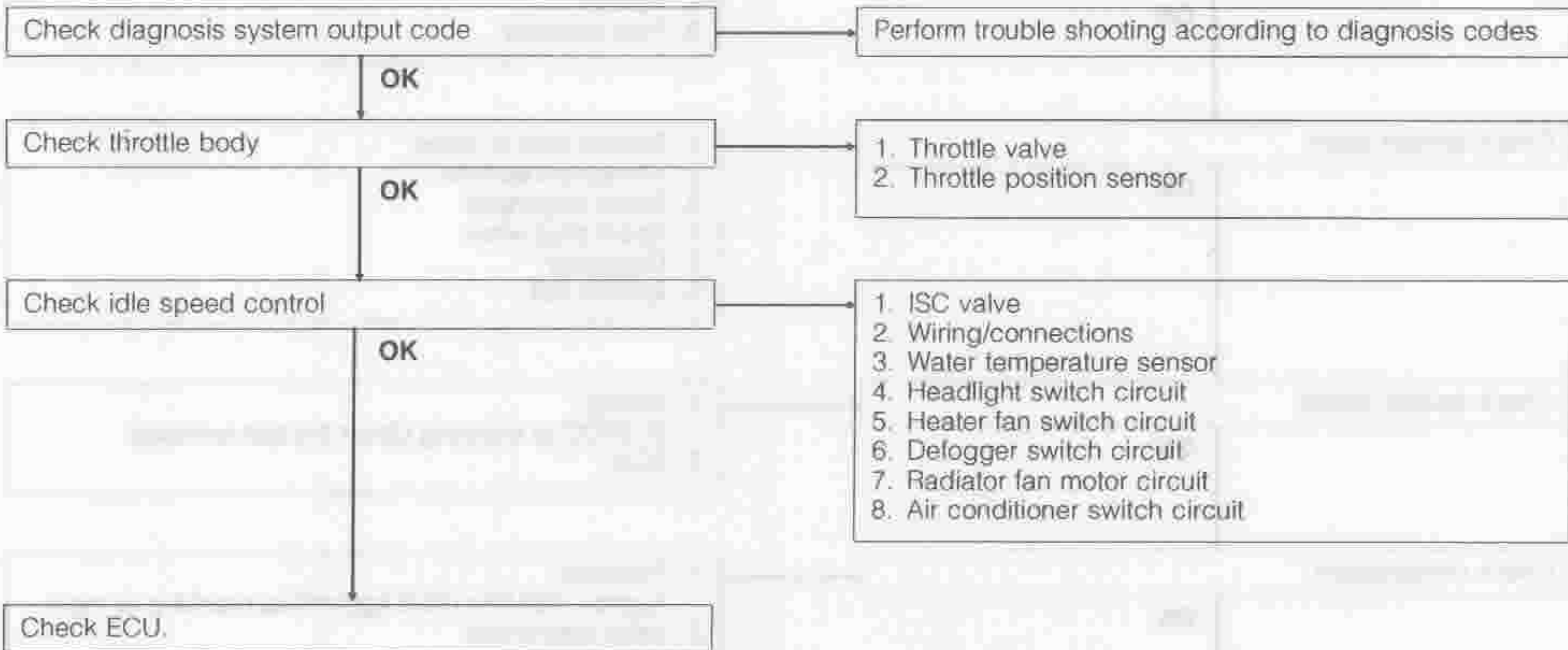
LEF00036-00000

3 Engine stalls while idling



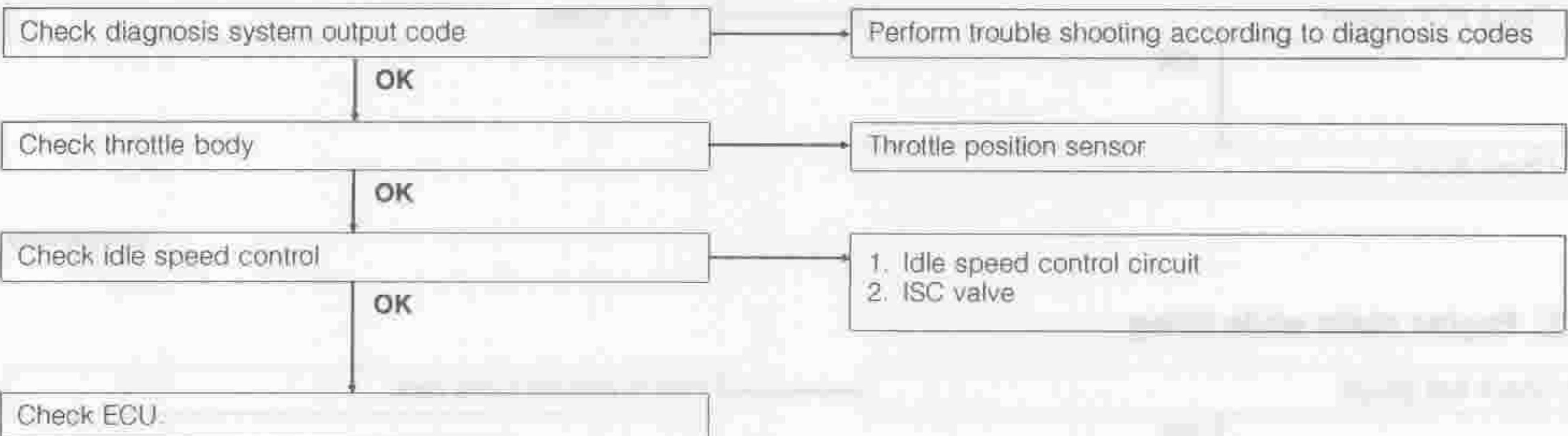
LEF00037-00000

4 Engine idle speed will not drop



LEF00038-00000

5 Rough idling

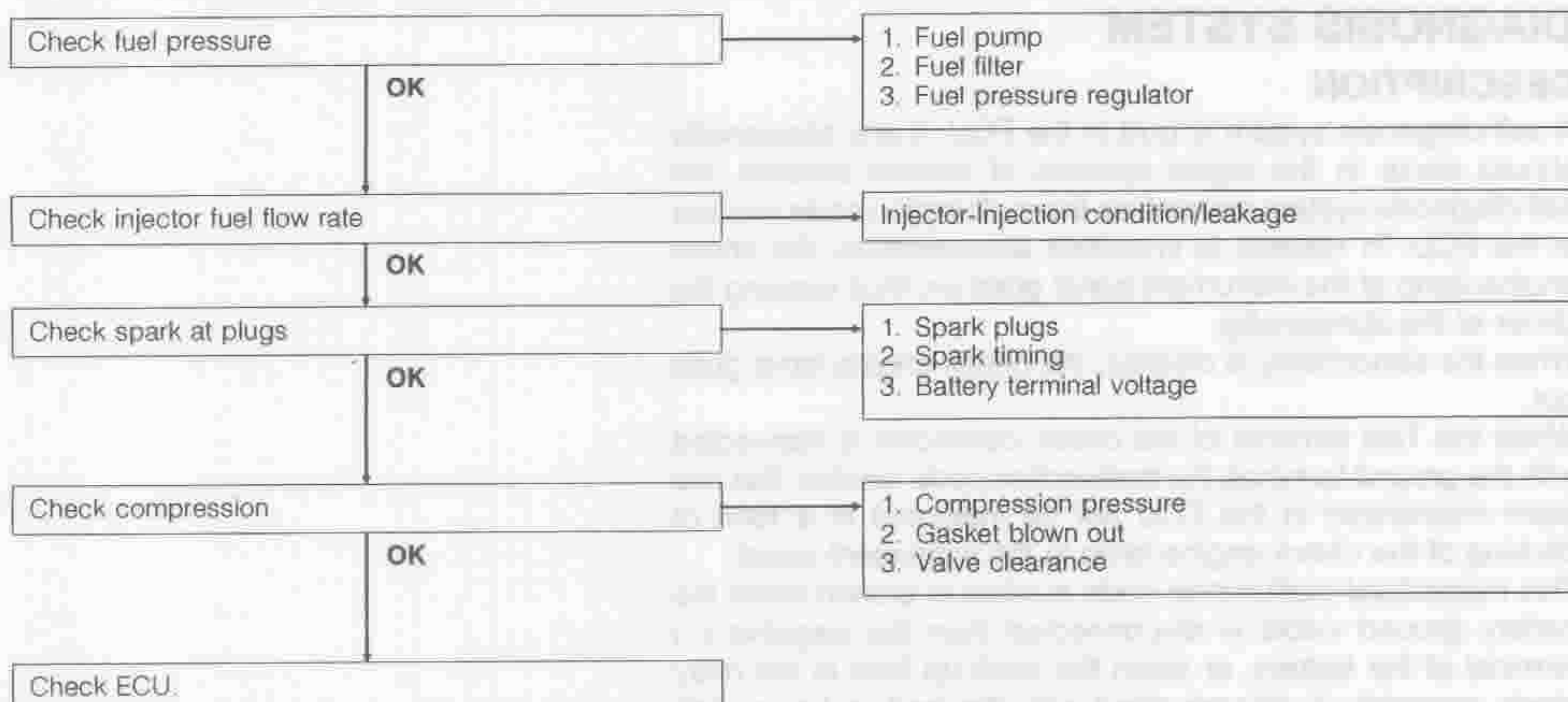


LEF00039-00000

6 Poor driveability



LEF00040-00000



LEF00041-00000



High pressure fuel pump assembly to pump fuel from the tank to the injectors. The pump is driven by the engine and has a pressure relief valve to prevent over-pressurization. The fuel filter is located between the pump and the injectors to remove any debris that may be in the fuel. The fuel pressure regulator is located on the fuel line between the filter and the injectors to maintain a constant fuel pressure.

Injector-Injection condition/leakage. The injectors are responsible for spraying the fuel into the combustion chamber. They should be checked for proper operation and leakage. If an injector is leaking, it can cause a rich mixture and poor engine performance. If an injector is not spraying properly, it can cause a lean mixture and poor engine performance.

Spark plugs and spark timing. The spark plugs are responsible for igniting the fuel mixture in the combustion chamber. They should be checked for proper operation and timing. If a spark plug is not firing properly, it can cause a misfire and poor engine performance. If the spark timing is incorrect, it can cause a lean mixture and poor engine performance.

Battery terminal voltage. The battery provides the electrical power for the engine. The terminal voltage should be checked to ensure it is sufficient to start the engine. If the terminal voltage is low, it can cause a no-start condition.

Compression pressure, Gasket blown out, Valve clearance. The compression pressure is a measure of the engine's ability to compress the fuel mixture. It should be checked to ensure it is within the normal range. A gasket blown out can cause a loss of compression and poor engine performance. Valve clearance is the gap between the valve and the cam. It should be checked to ensure it is within the normal range. If the valve clearance is incorrect, it can cause a lean mixture and poor engine performance.

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.

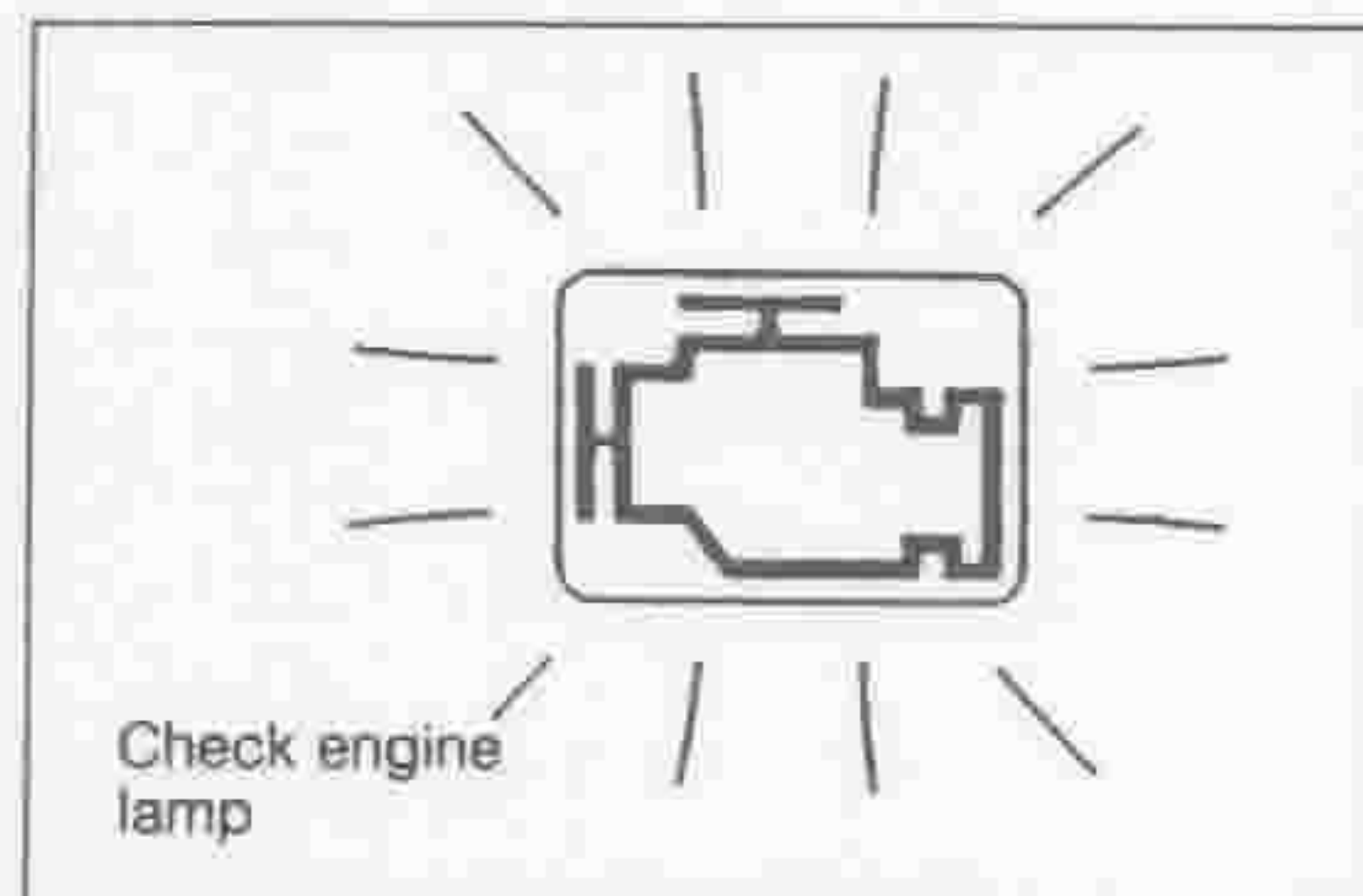
When the Test terminal of the check connector is connected with the ground terminal, the malfunction code number that has been memorized in the ECU will be indicated in a form of blinking of the check engine lamp in the instrument panel.

This memorized malfunction code number is erased when the battery ground cable is disconnected from the negative (-) terminal of the battery, or when the back-up fuse in the relay block assembly is disconnected with the ignition key switch turned OFF.

LEF00042-00000

Check of "Check Engine" warning light

1. When the ignition switch is turned ON, the check engine lamp goes on.
(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 malfunctions.



LEF00043-00023

Output of diagnosis codes

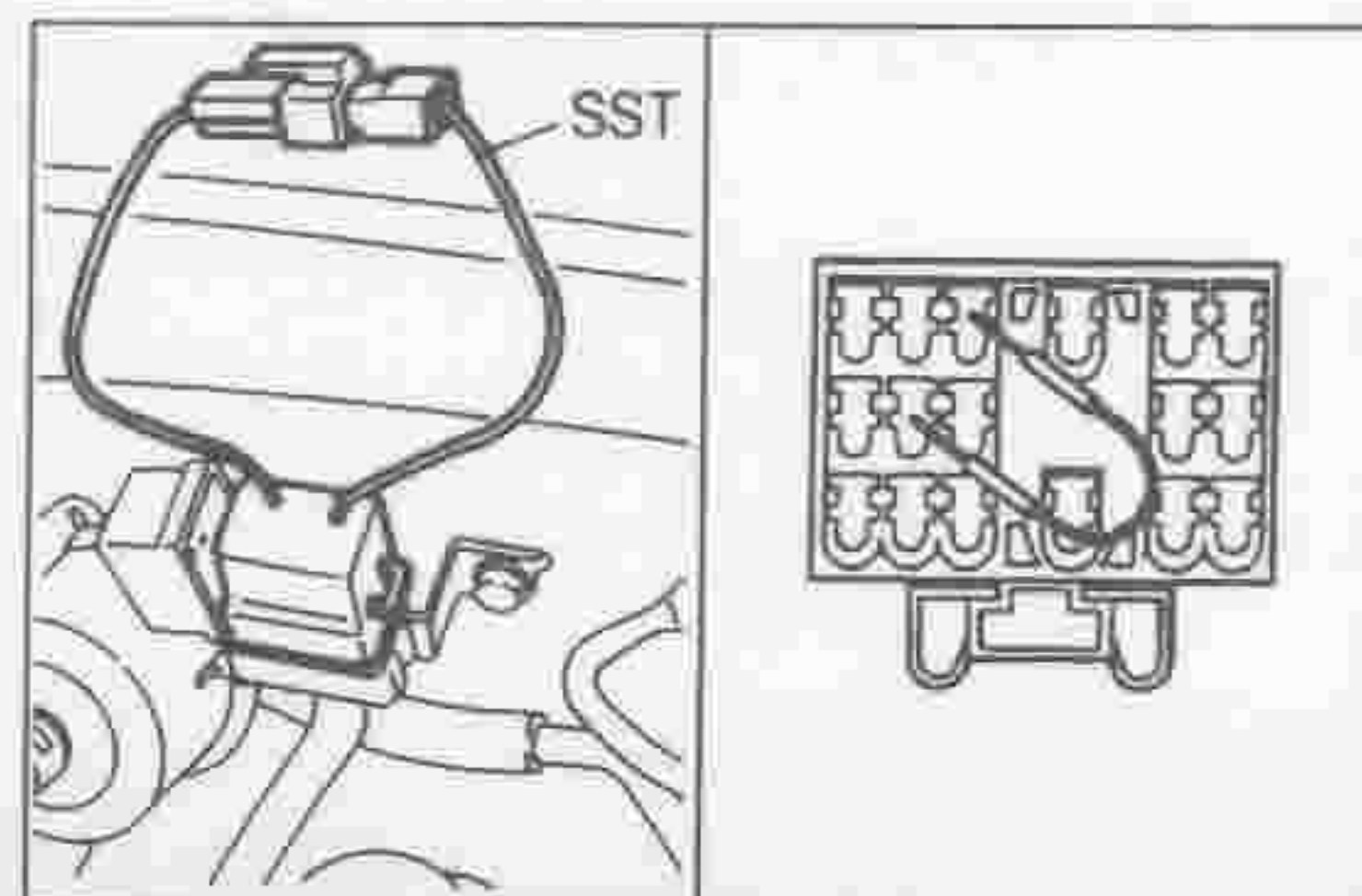
1. Initial conditions
 - (1) Battery voltage of 11 volts or more
 - (2) Throttle valve fully closed
 - (3) All accessory switches turned OFF
2. Connect the Test terminal of the check connector with the ground terminal, using the following SST.
SST: 09991-87210-000

NOTE:

- The check connector is located at the fender apron section on the left side of the engine compartment.

CAUTION:

- Care must be exercised to ensure that no connection is made on terminals except for those specified.



LEF00045-00024

3. Set the ignition switch to the ON position.
At this time, be careful not to start the engine.
4. Read the diagnosis code by observing the blinking number of the check engine lamp.

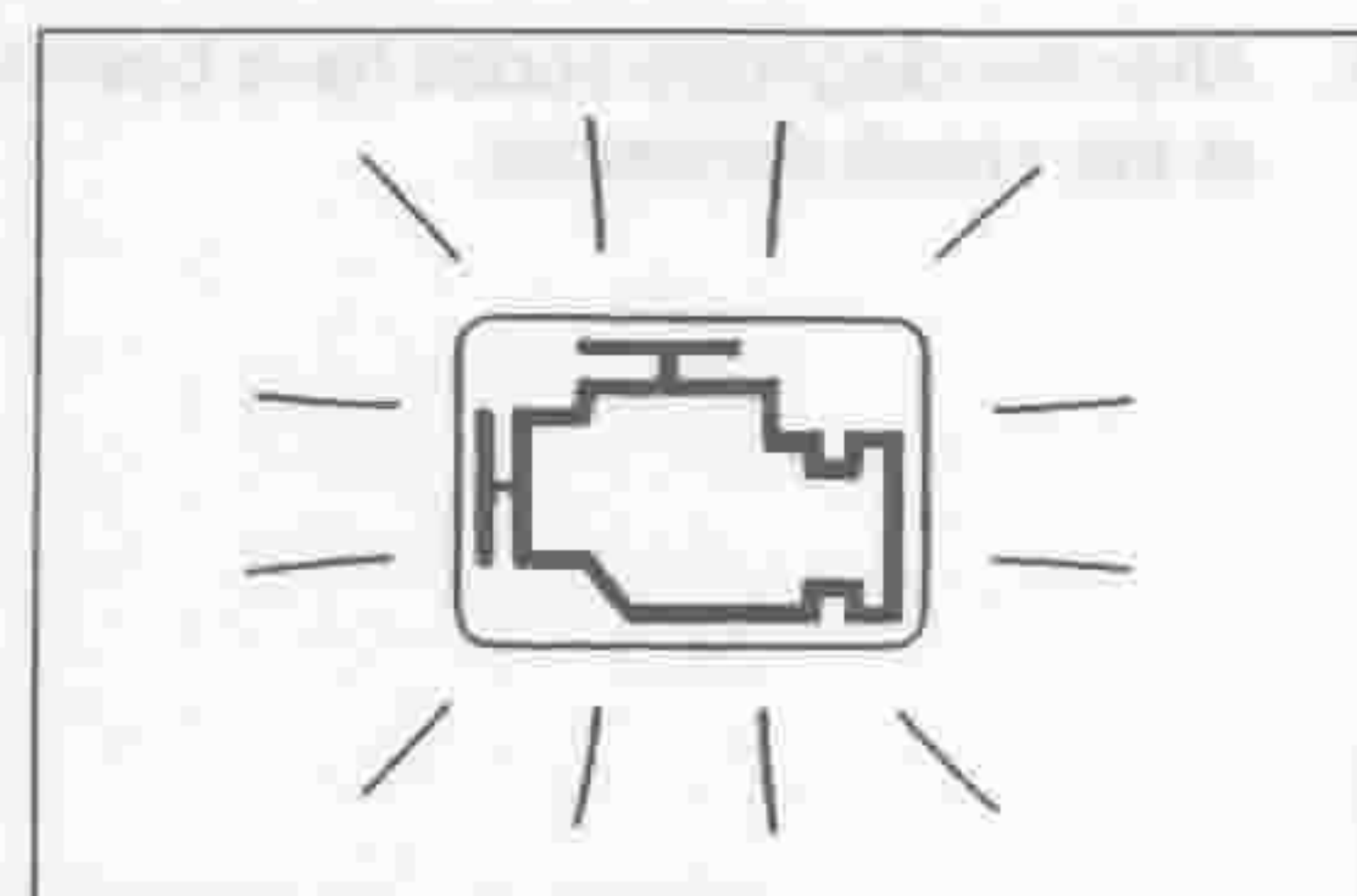
NOTE:

- 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.

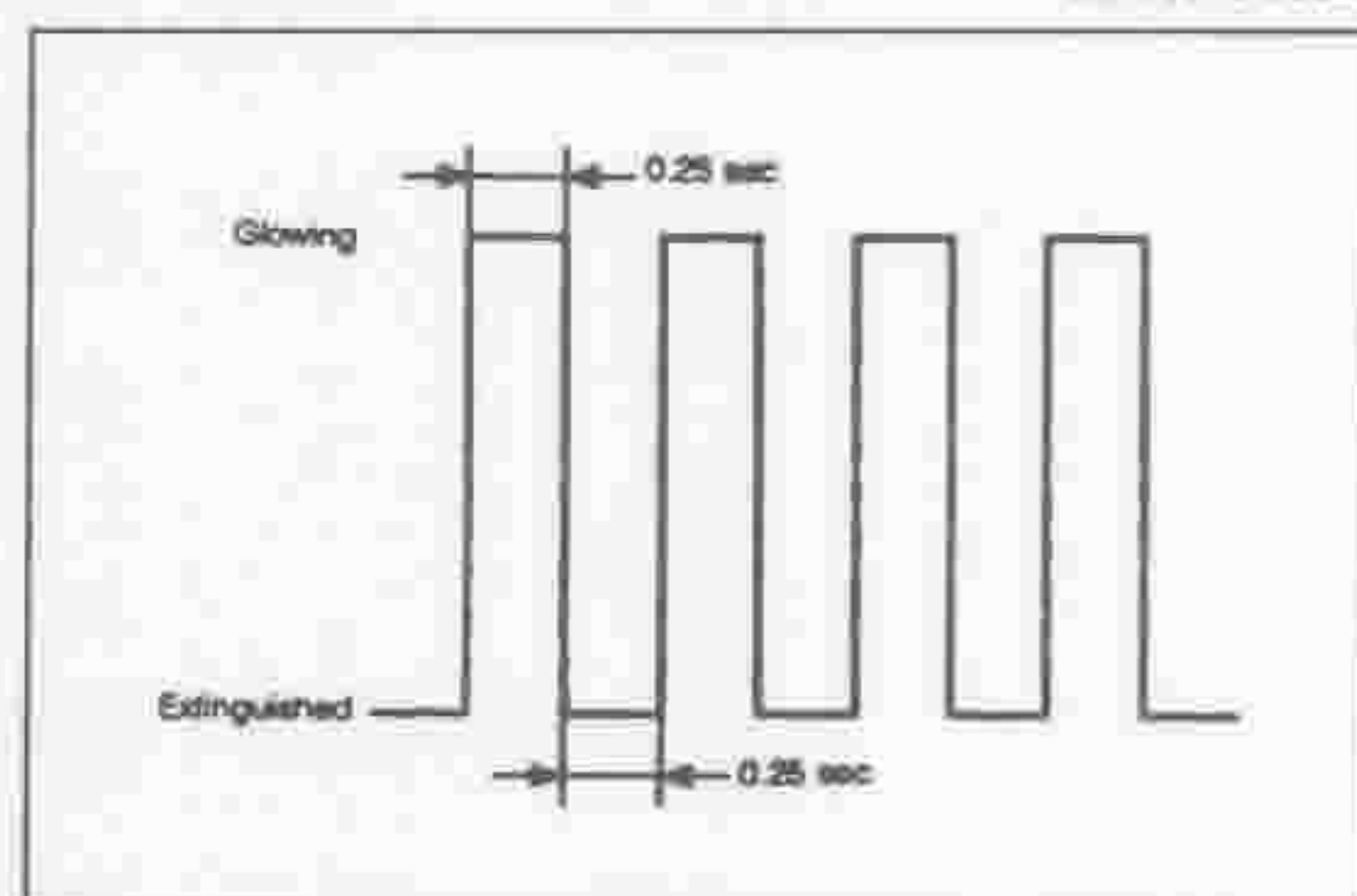
Output of diagnosis code

(1) Indication of normal code

The engine check lamp glows for 0.25 second, 0.25 second later 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.



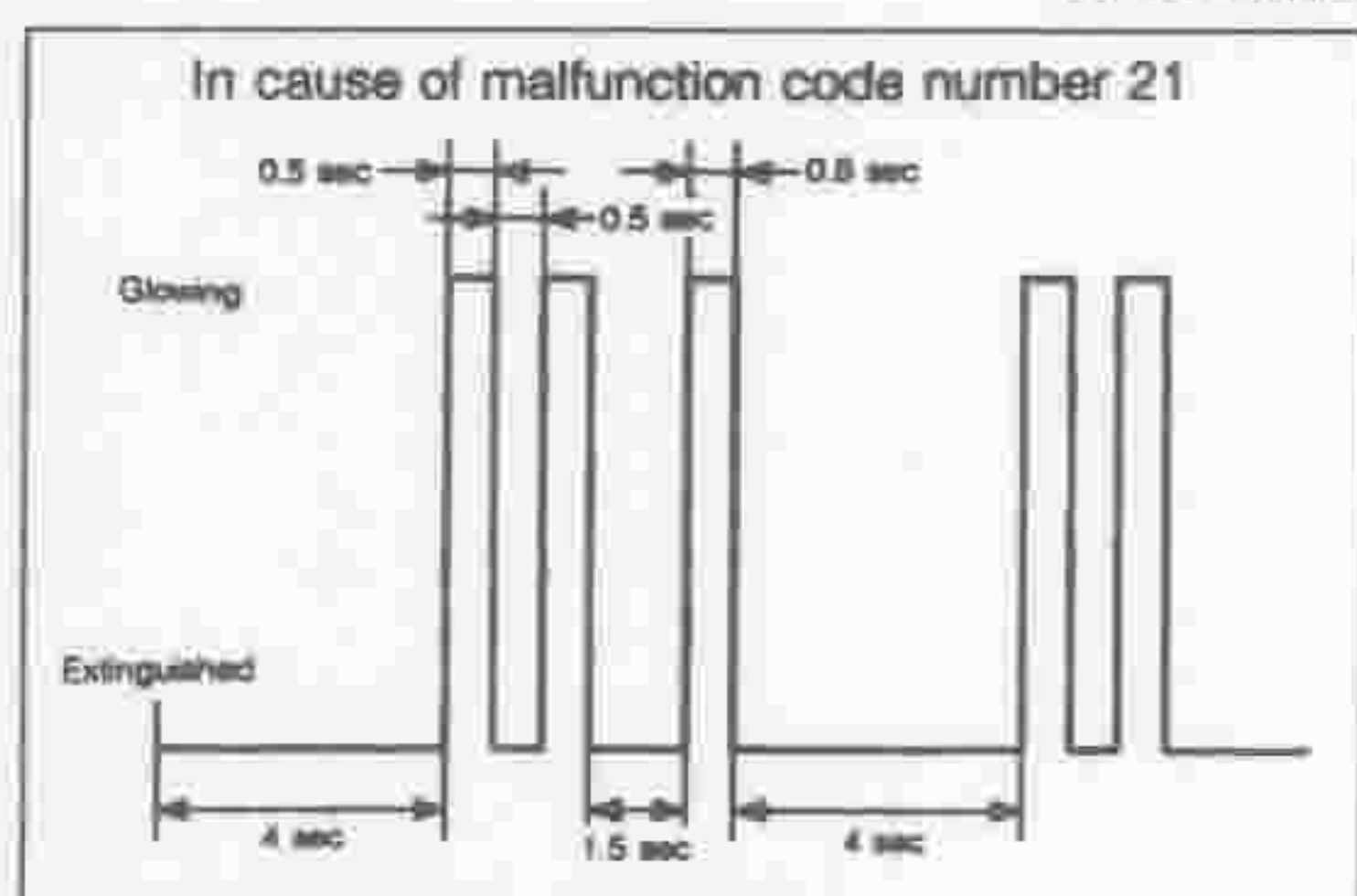
LEF00046-00025



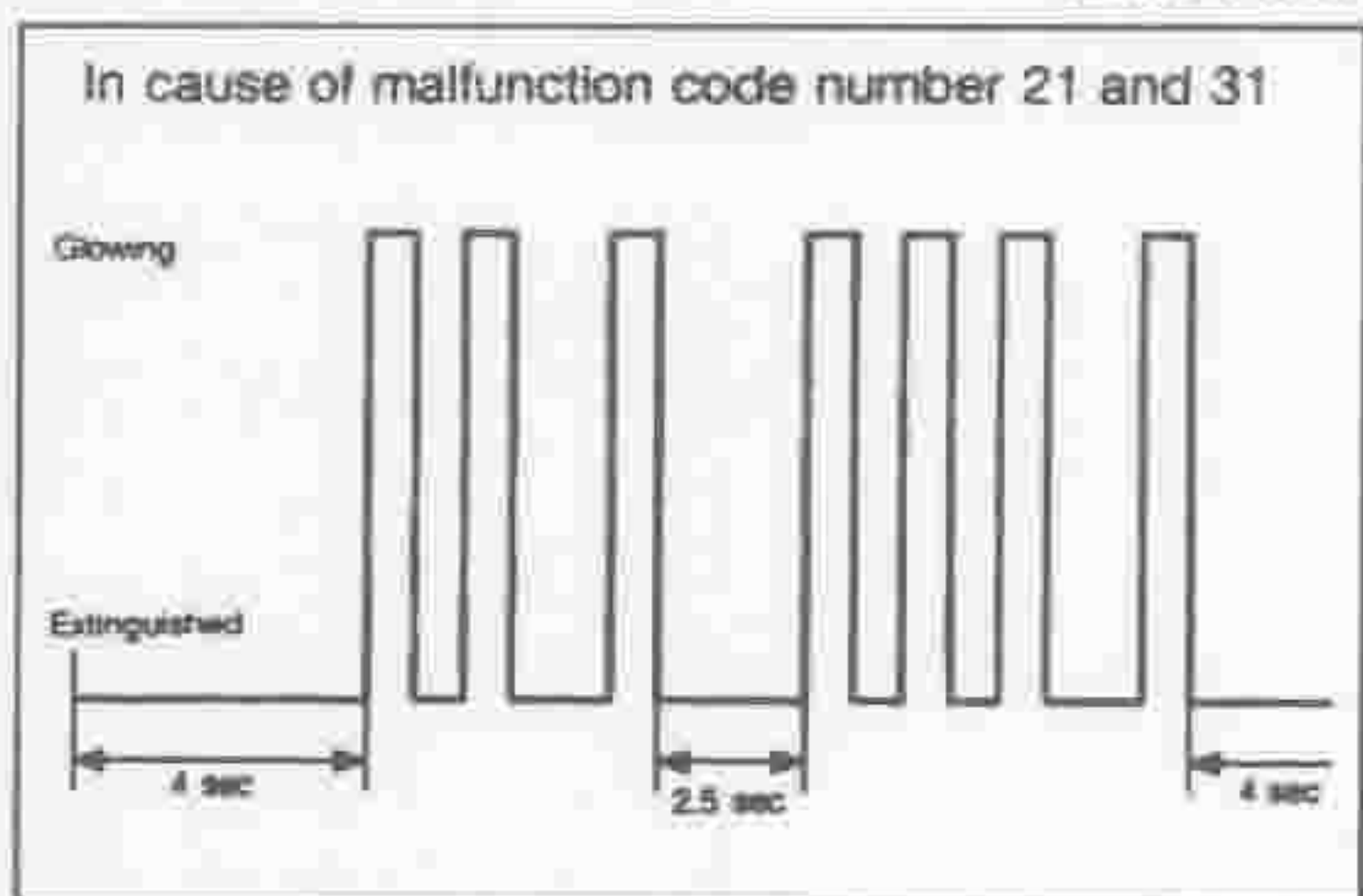
LEF00047-00026

(2) Indication of malfunction code

- 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 later 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.
- 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.

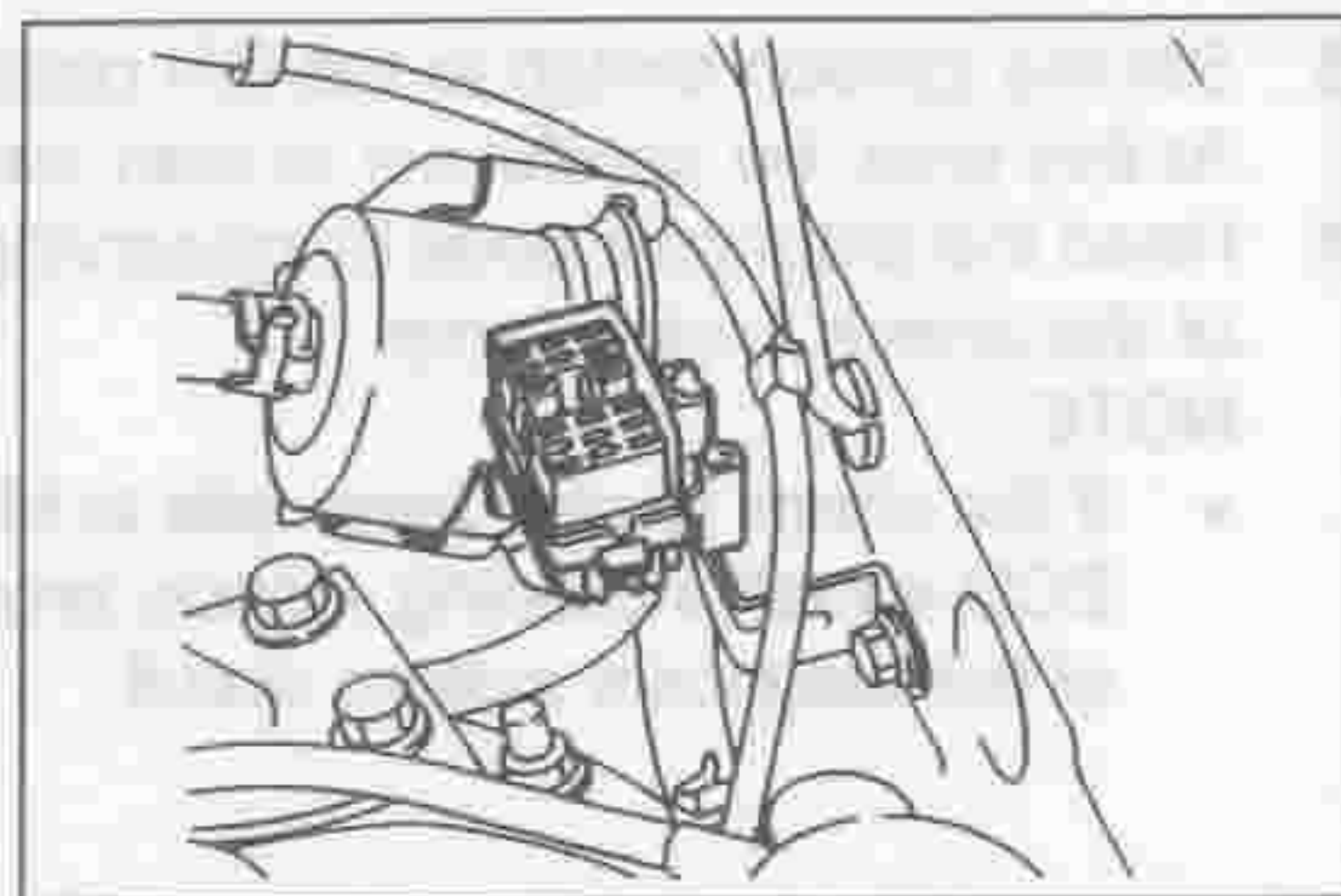
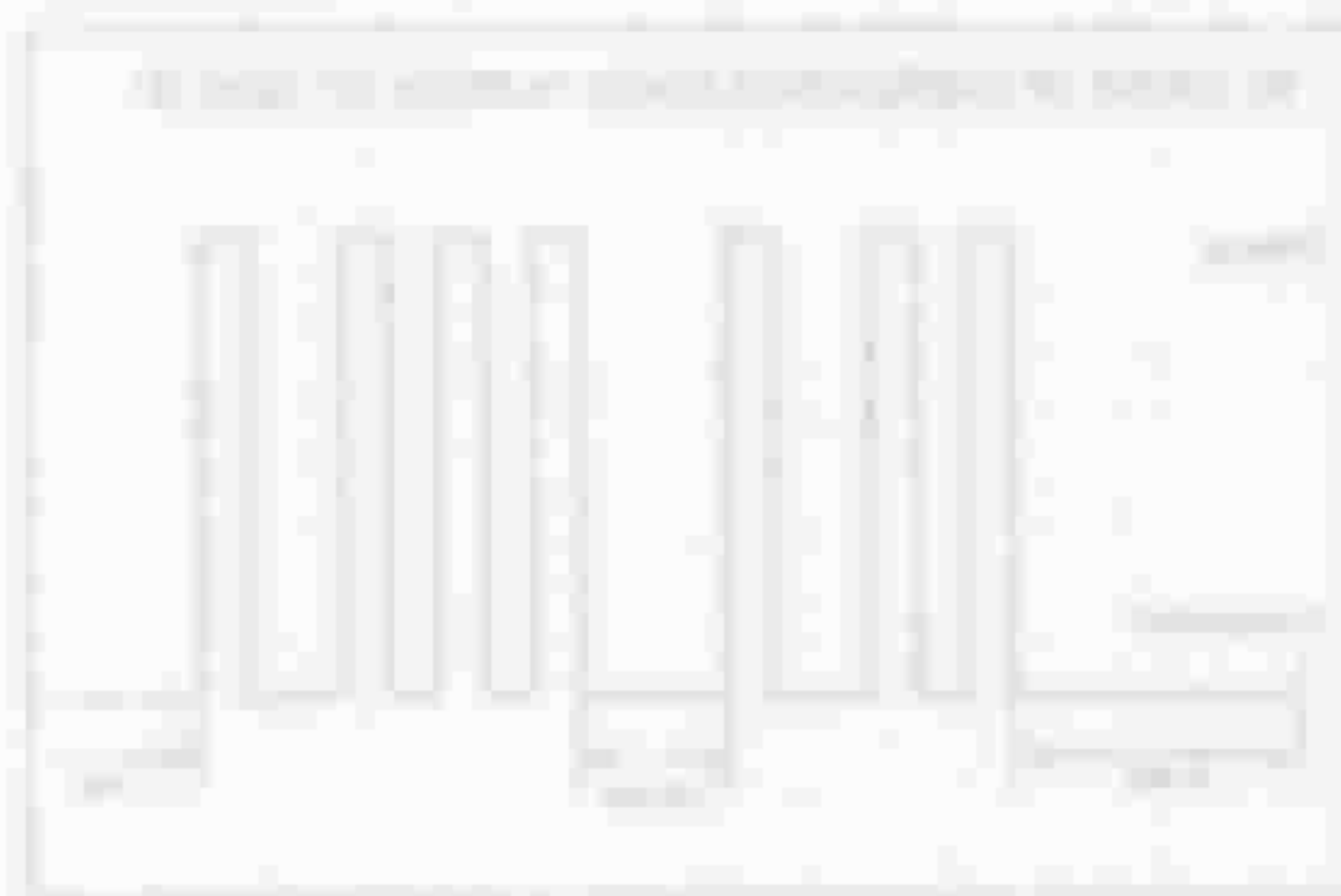
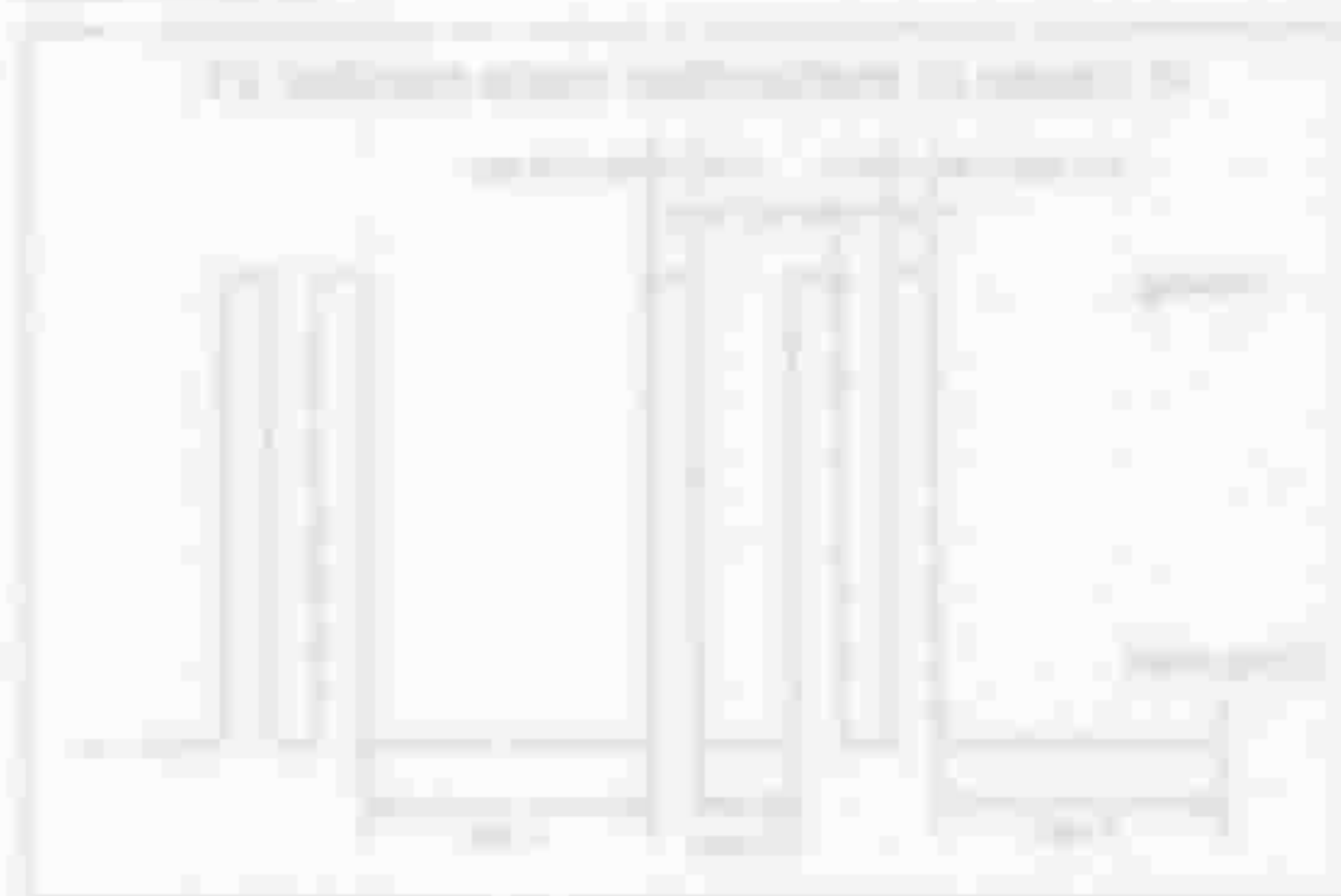
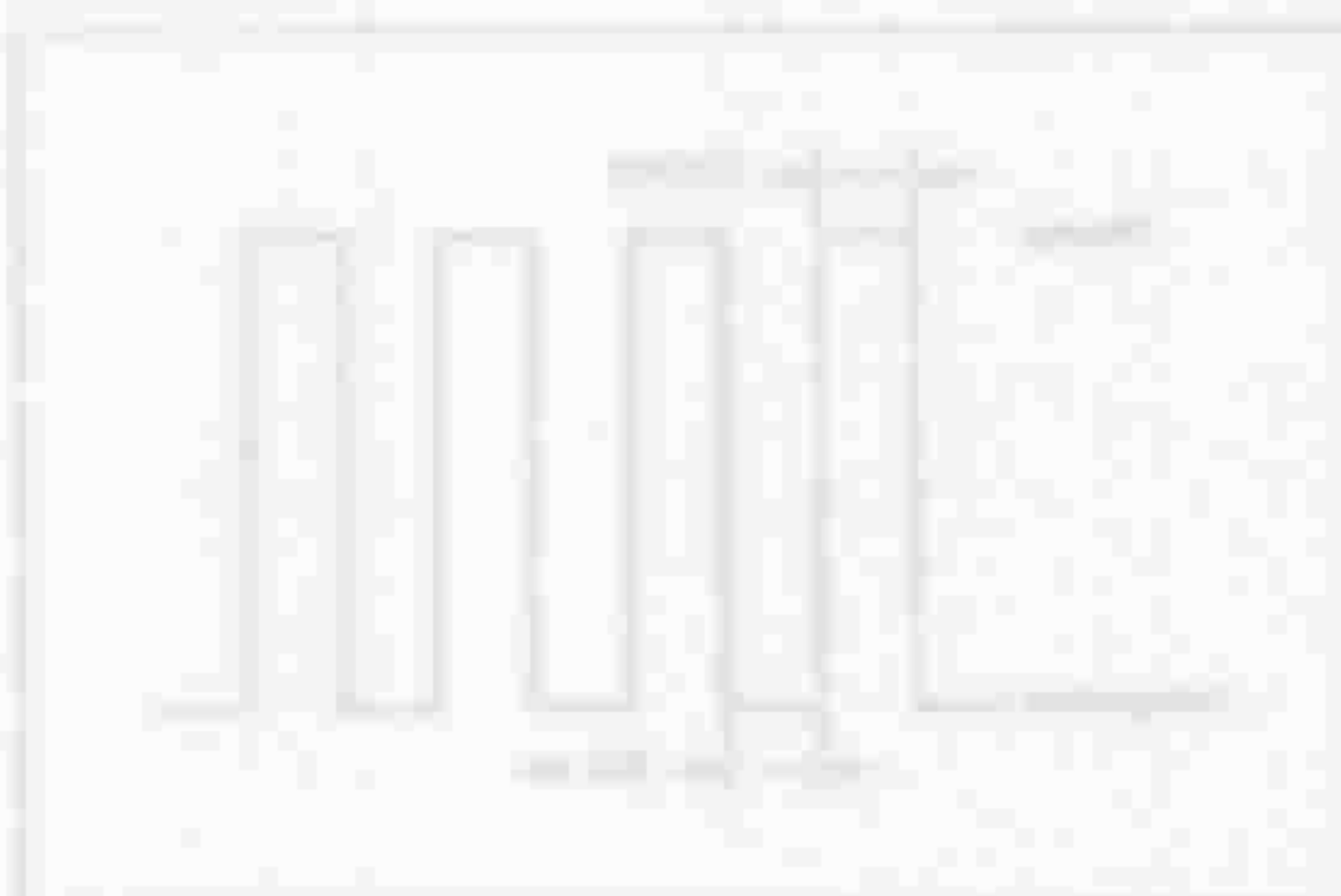


LEF00048-00027



LEF00049-00028

5. After the diagnosis codes have been read, remove the SST at the check connector.



LEF00050-00029

After the diagnosis codes have been read, remove the SST at the check connector.

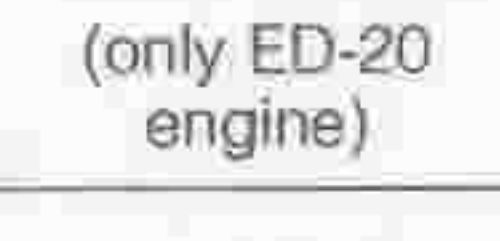
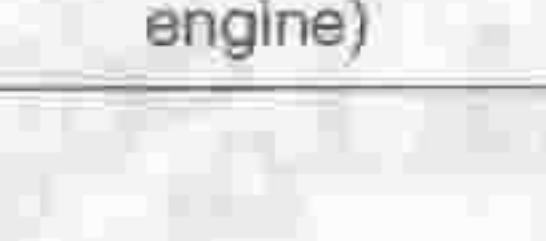
After the diagnosis codes have been read, remove the SST at the check connector.

After the diagnosis codes have been read, remove the SST at the check connector.

Page 20

DIAGNOSIS CODE

When the diagnosis system detects malfunctions, the check engine lamp will go on without the check connector test terminal shorted.

Code NO.	-Number of glowing of check engine lamp	Diagnosis item	Diagnosis contents	Trouble area	See page
13		Revolution signal	When Ne signal is not inputted within a few seconds after engine starts cranking.	1. Distributor circuit 2. Distributor 3. ECU	
16		Ignition signal	No ignition confirmation signal is inputted.	1. Ignition circuit (+B, IGf) 2. ECU	
21		Oxygen sensor signal and/or fuel system	When the oxygen sensor signal circuit becomes open or shorted.	1. Oxygen sensor circuit 2. Oxygen sensor 3. ECU 4. Fuel system	
31		Pressure sensor	When the signal from pressure sensor becomes open or shorted.	1. Pressure sensor circuit 2. Pressure sensor 3. ECU	
42		Water temperature sensor	When the signal from the water temperature sensor circuit becomes open or shorted.	1. Water temperature sensor circuit 2. Water temperature sensor 3. ECU	
43	 (only ED-20 engine)	Intake air temperature sensor signal	When the intake air sensor signal circuit becomes open or shorted.	1. Air temperature sensor circuit 2. Air temperature sensor 3. ECU	
44	 (only EF-EL engine)	Air conditioner evaporator temperature sensor	When the air conditioner evaporator temperature sensor circuit becomes open or shorted.	1. Air conditioner evaporator temperature sensor circuit 2. Air conditioner evaporator temperature sensor 3. ECU	
51		Switch signal	When the air conditioner is turned ON, the idle switch is turned OFF with the diagnosis connector terminal T shorted. However, no memorizing will take place.	1. Air conditioner switch circuit 2. Air conditioner switch 3. Idle switch circuit 4. Throttle position sensor 5. ECU	
52		Vehicle speed sensor signal	When the vehicle speed sensor signal circuit becomes open or shorted.	1. Vehicle speed sensor circuit 2. Vehicle speed sensor 3. ECU	

FAIL-SAFE FUNCTION

The fail-safe function has been set for the following six items. The fail-safe function operates if the following failure occurs in these items or if any diagnosis code is detected. Thus, the fail-safe function is a function whereby the engine is operated, based on a control program that has been pre-inputted to the ECU.

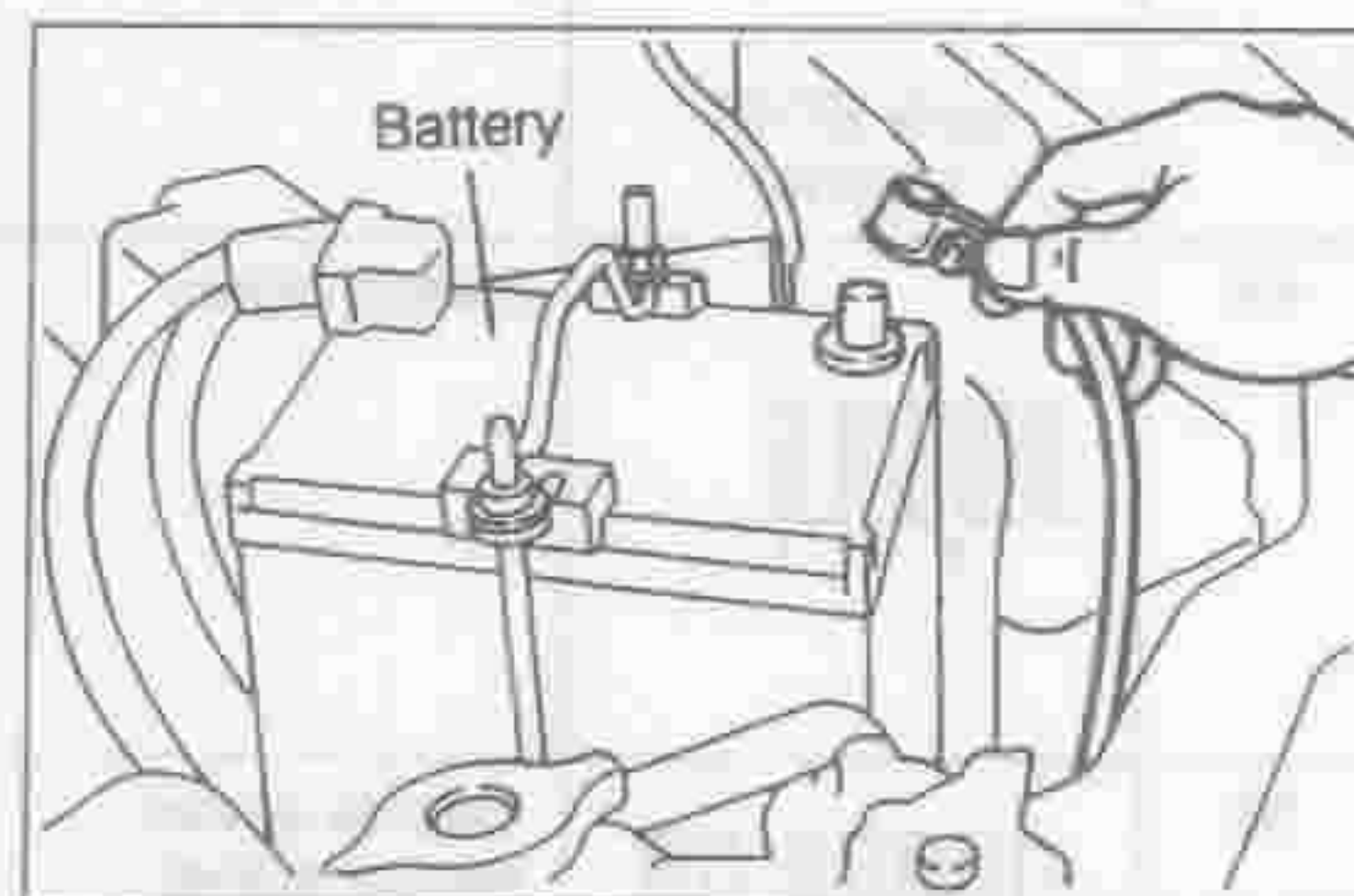
Item	Evaluation condition	Fail-safe function
Pressure sensor signal	If input voltage from pressure sensor of 4.9 V or more or 0.7 V or less is detected	Engine is controlled, based on backup data that have been programmed in advance.
Ignition signal	If no ignition signal is detected consecutively three time or more.	Fuel injection will be stopped.
Coolant temperature sensor	If input value from coolant temperature sensor indicates that temperature is -47°C or less or 135°C or more.	Engine is controlled, based on backup data that have been programmed in advance.
Intake air temperature sensor signal (ED-20 Engine only)	If input value from intake air temperature sensor indicates that temperature is -47°C or less or 135°C or more.	Engine is controlled, based on backup data that have been programmed in advance.
Air conditioner evaporator temperature sensor signal (EF-EL Engine only)	If input value from evaporator temperature sensor indicates that temperature is -51°C or less or 112°C or more.	Air conditioner will not operate
ISC	If all of the following three conditions are satisfied consecutively four times or more: A: The vehicle speed is 10 km/h or less. B: The idle switch is ON. C: The intake manifold negative pressure exceeds the set value.	Engine is controlled, based on backup data that have been programmed in advance.

The fail-safe function operates for the aforesaid items and under the evaluation conditions described above. Even when no diagnosis code is memorized in the ECU, there is the possibility that open wire or short circuit is taking place at the sensor, connector or wiring. When conducting the check, pay utmost attention as to open wire, short circuit and so forth.

LEF00052-00000

Canceling Diagnosis Code

To erase the diagnosis codes memorized in the ECU after malfunctions have been repaired, disconnect the battery ground cable from the negative (-) terminal of the battery for at least 10 seconds with the ignition switch turned OFF. [When ambient temperature is about 20°C .]



LEF00053-00031

TROUBLE SHOOTING WITH VOLT/OHMMETER

PREPARATION OF TROUBLE SHOOTING

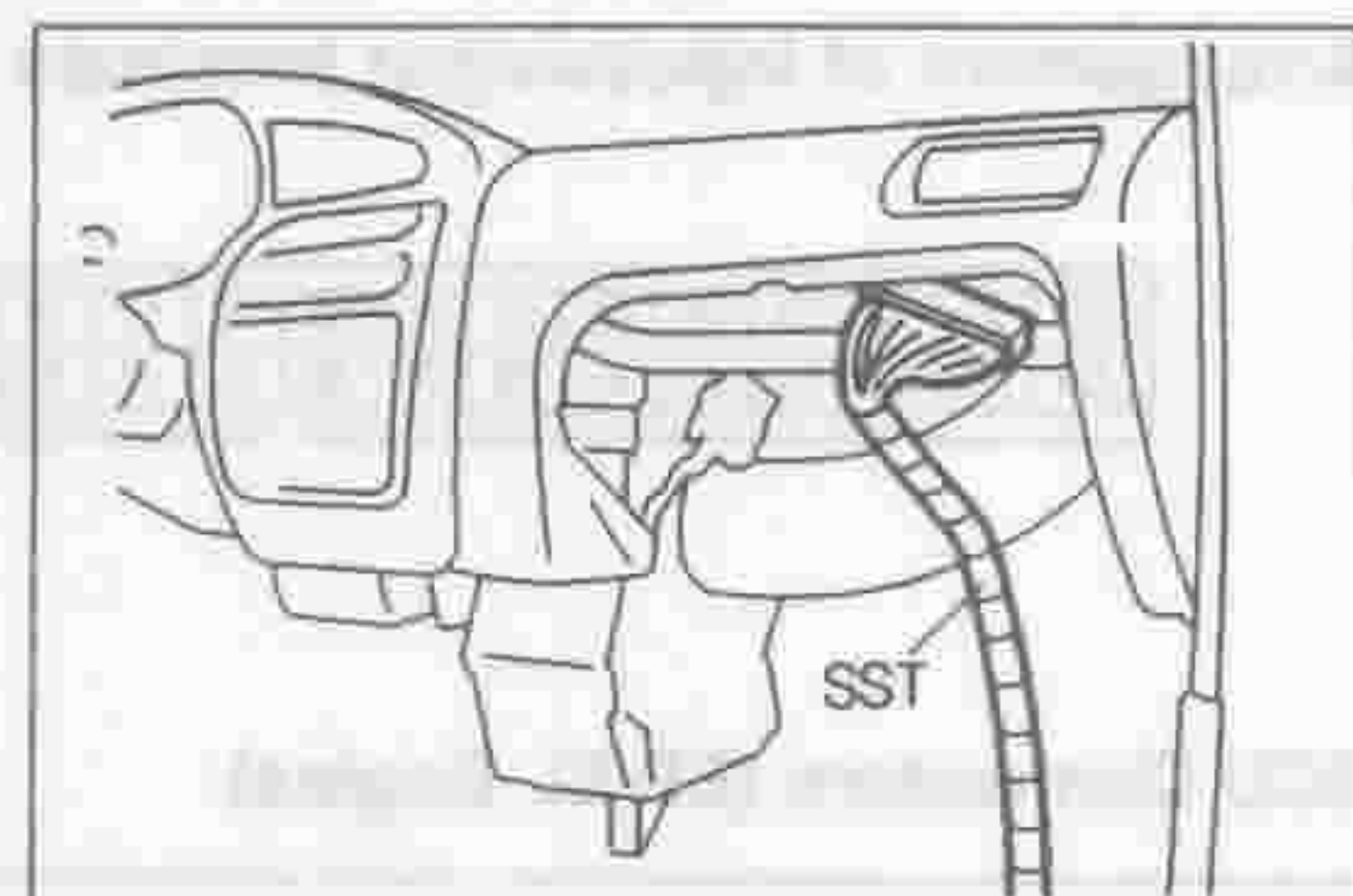
1. Disconnect the battery ground cable from the negative (-) terminal of the battery.
2. Remove the dashboard undertray.
3. Disconnect the engine harness from ECU.
4. Connect the following SST between the engine wire and the ECU.

SST: 09842-87502-000

5. Reconnect the battery ground cable to the negative (-) terminal of the battery.

CAUTION:

- After completion of the inspection, before the SST is removed, be sure to disconnect the battery ground cable from the negative (-) terminal of the battery.
- After the engine harness has been connected to the ECU, reconnect the battery ground cable to the negative (-) terminal of the battery.
- Before using the SST, be sure to check to see if short or open wire exists between the terminals.



LEF00054-00032

LEF00055-00000

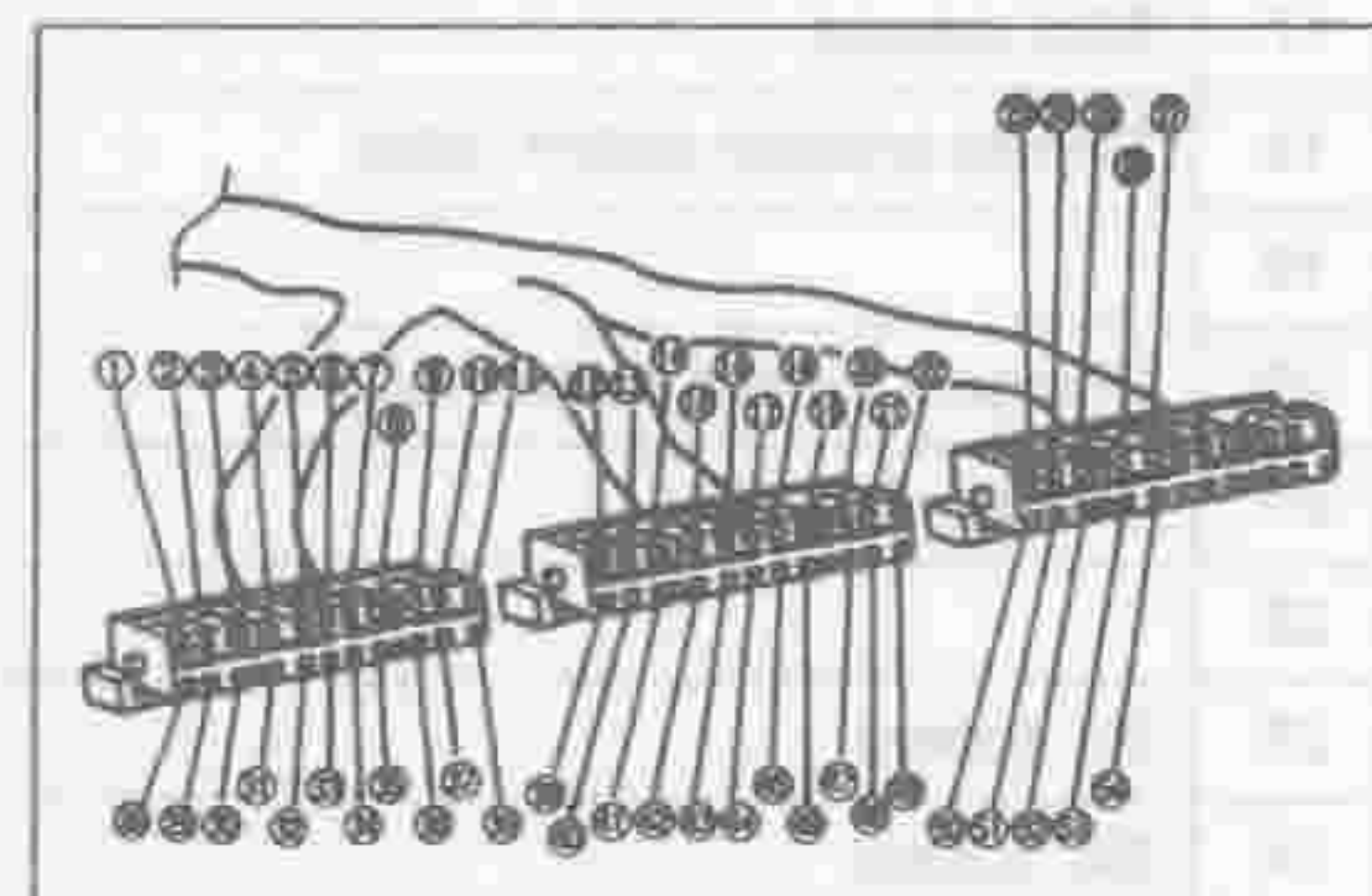
CHECK PROCEDURE FOR EFI SYSTEM

NOTE:

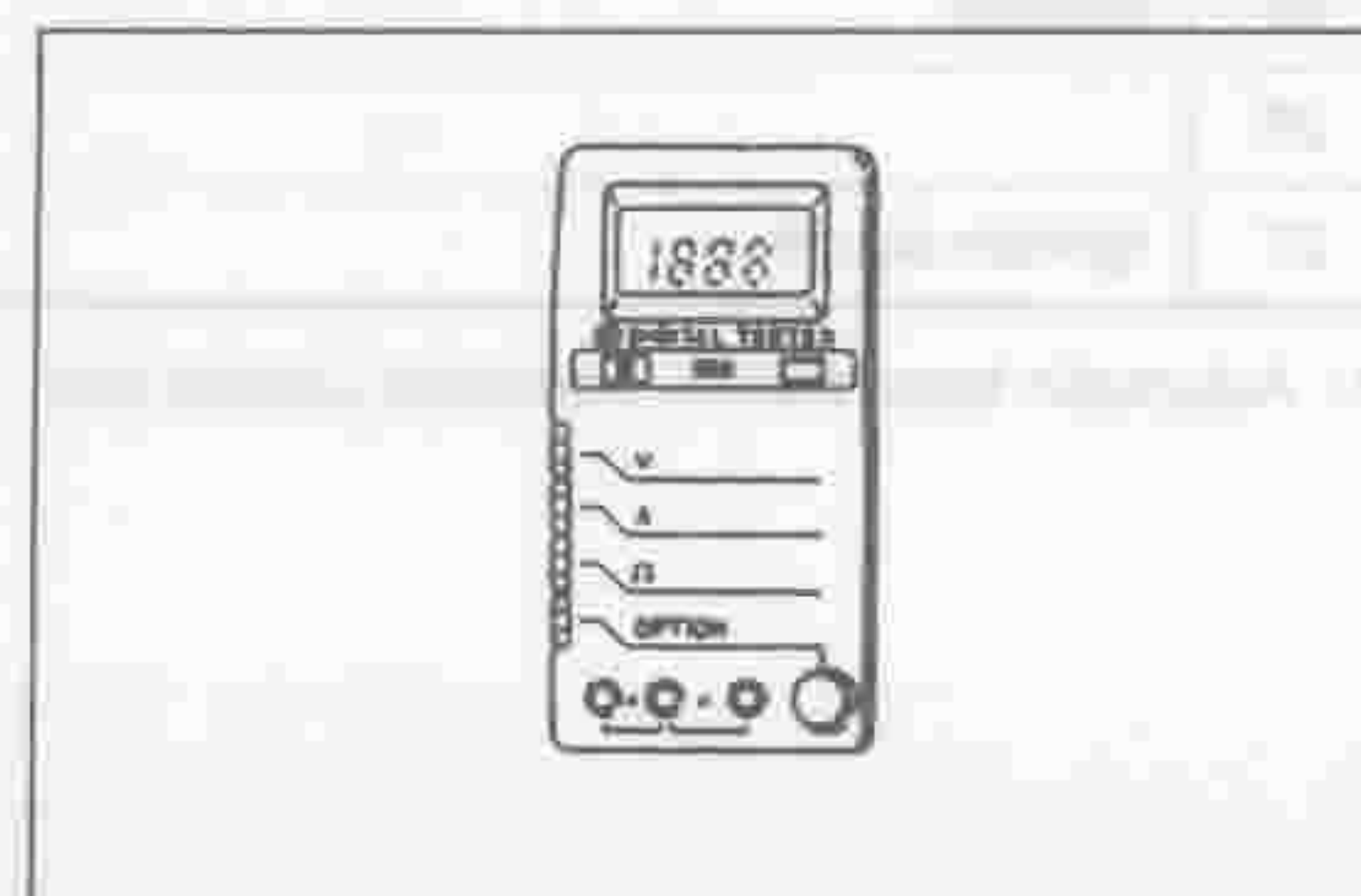
1. The EFI circuit can be checked by measuring the resistance and voltage at the SST terminals.
2. The voltage check should be conducted under a condition where all connectors are connected.
3. Prior to the check, ensure that the battery voltage is 11V or more when the ignition switch is turned ON.
4. If any problem is encountered during this check, see the section under "Trouble Shooting for EFI Electronic Circuit with Volt/Ohmmeter."

CAUTION:

- For the trouble shooting, use a volt/ohmmeter whose internal impedance is more than 10 k Ω /V. Use of a volt/ohmmeter whose internal resistance is 10 k Ω /V or less may cause ECU malfunction and/or misjudgment.
- No terminal except for the specified terminal should be connected. Failure to observe this caution may cause ECU malfunction.



LEF00056-00033



LEF00057-00034

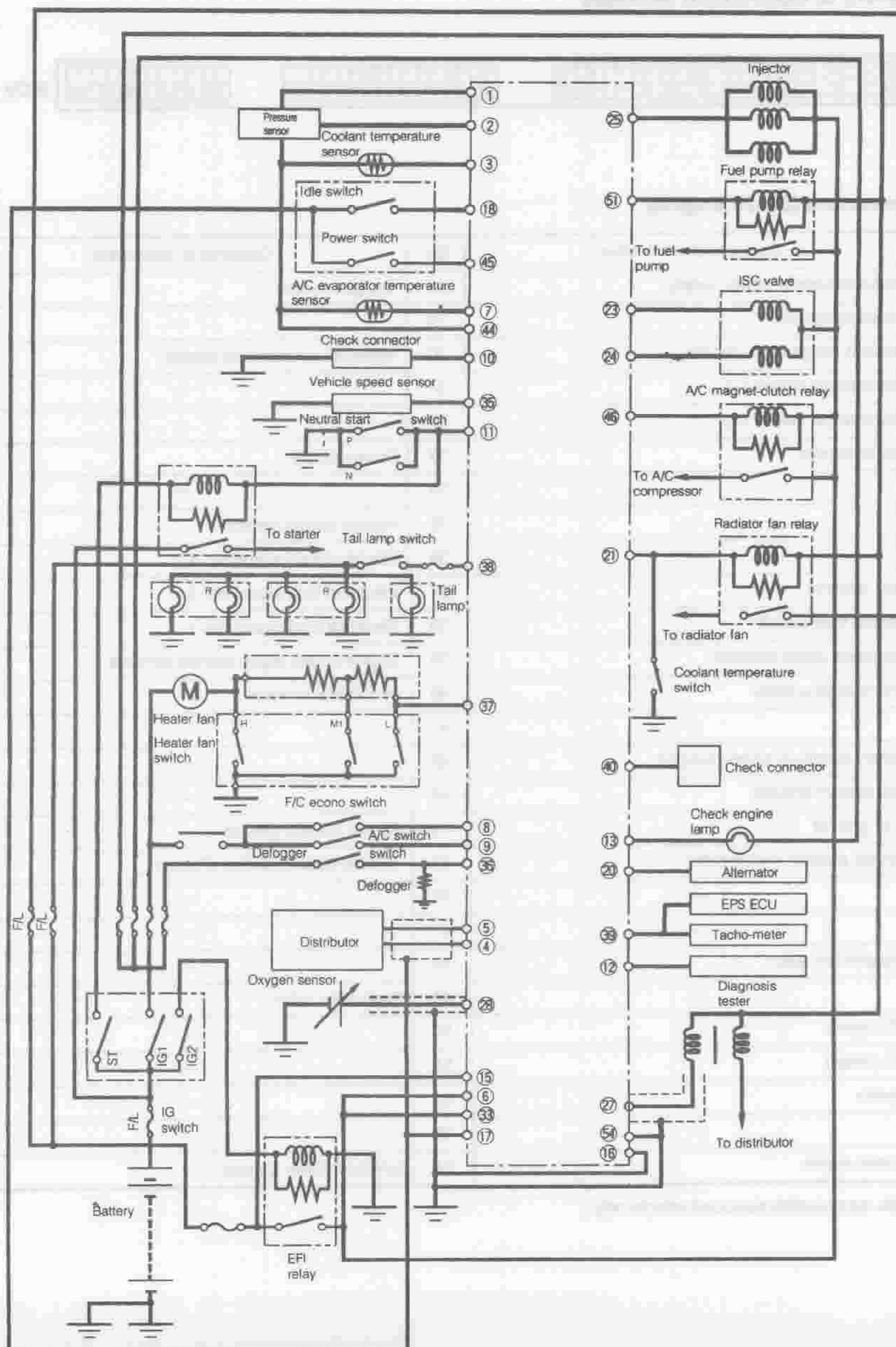
Arrangement of input/output terminals

27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	(ECU side)
54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	

ECU Connectors (EF-EL Engine)

No.	Contents of connection	No.	Contents of connection
1	Pressure sensor power supply	28	Oxygen sensor
2	Pressure sensor	29	—
3	Coolant temperature sensor	30	—
4	Crank angle sensor (-)	31	—
5	Crank angle sensor (+)	32	—
6	Power supply	33	Power supply
7	A/C evaporator temperature sensor	34	—
8	A/C econo switch	35	Vehicle speed sensor
9	A/C switch	36	Electrical load signal No. 4
10	Test terminal	37	Electrical load signal No. 3
11	Neutral start switch*	38	Electrical load signal No. 1
12	Diagnosis tester terminal	39	Engine speed signal out-put terminal
13	Check engine lamp	40	VF monitor terminal
14	—	41	—
15	Battery (Back-up power supply)	42	—
16	Fuel system ground	43	—
17	ECU ground	44	Sensor system ground
18	Throttle position switch (Idle)	45	Throttle position switch (Power)
19	—	46	A/C magnet-clutch relay
20	Charging system control relay	47	—
21	Radiator fan relay	48	—
22	—	49	—
23	ISC (open)	50	—
24	ISC (close)	51	Fuel pump relay
25	Injector	52	—
26	—	53	—
27	Ignition signal	54	Ignition system ground

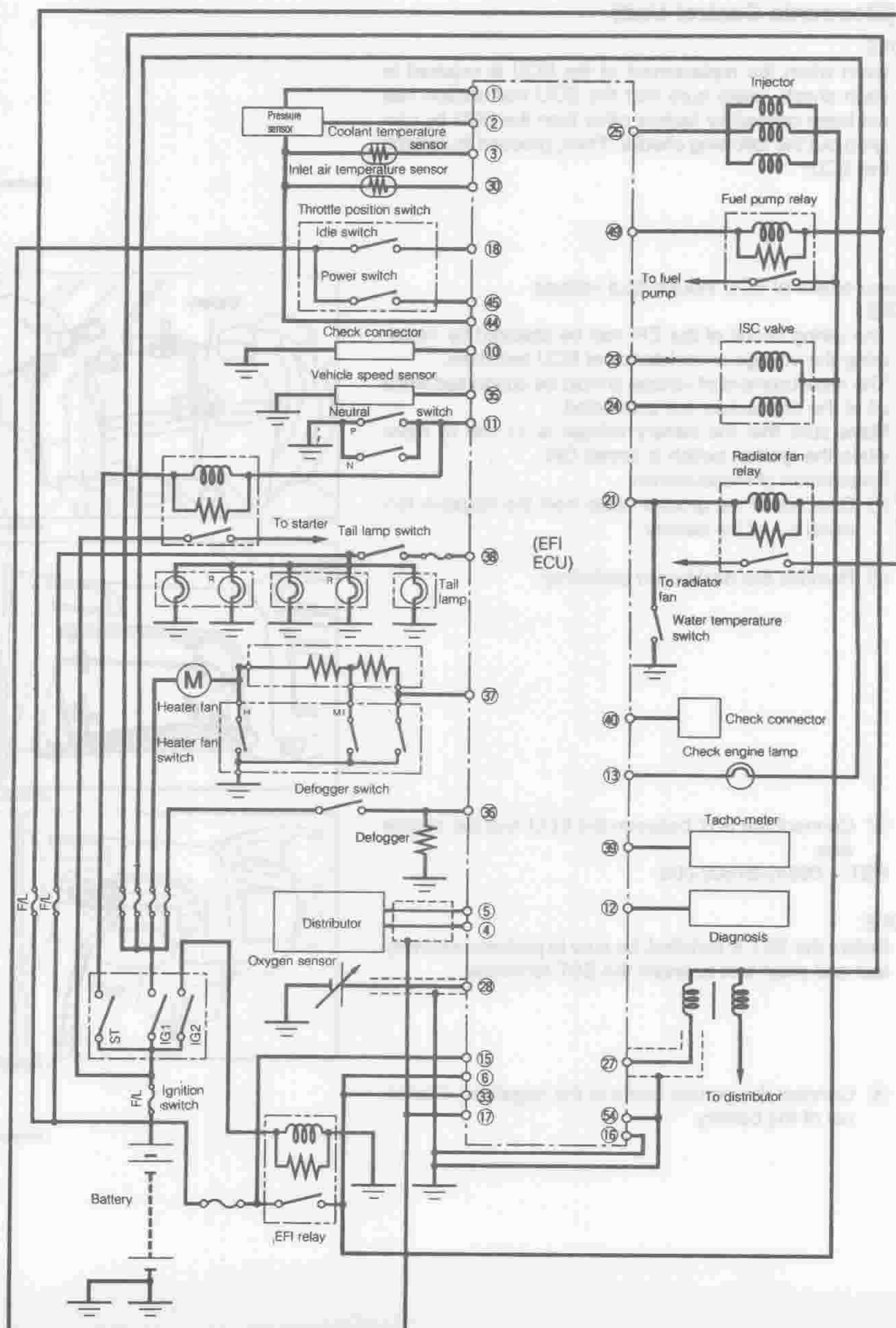
*1: Automatic transmission equipped vehicle only.



Arrangement of input/output terminals

ECU Connectors (ED-20 Engine)

*1: Automatic transmission equipped vehicle only.



ECU (Electronic Control Unit)

NOTE:

- Even when the replacement of the ECU is required in each 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.

LEF00060-00000

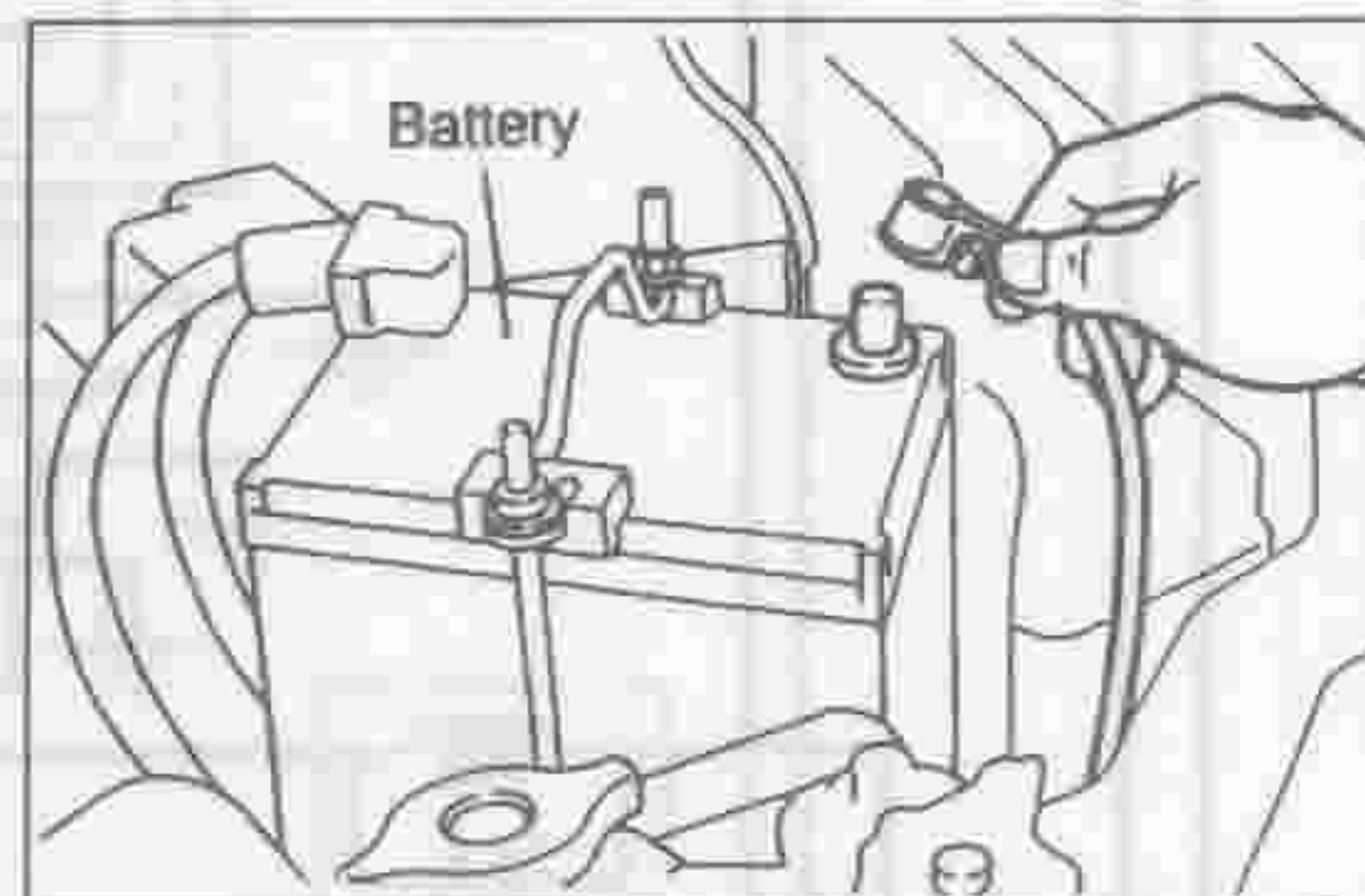
1. Measurement of ECU input/output voltage

NOTE:

- The wiring circuit of the EFI can be checked by measuring the voltage or resistance at ECU terminals.
- The measurement of voltage should be conducted while all of the connectors are connected.
- Make sure that the battery voltage is 11 volt or more when the ignition switch is turned ON.

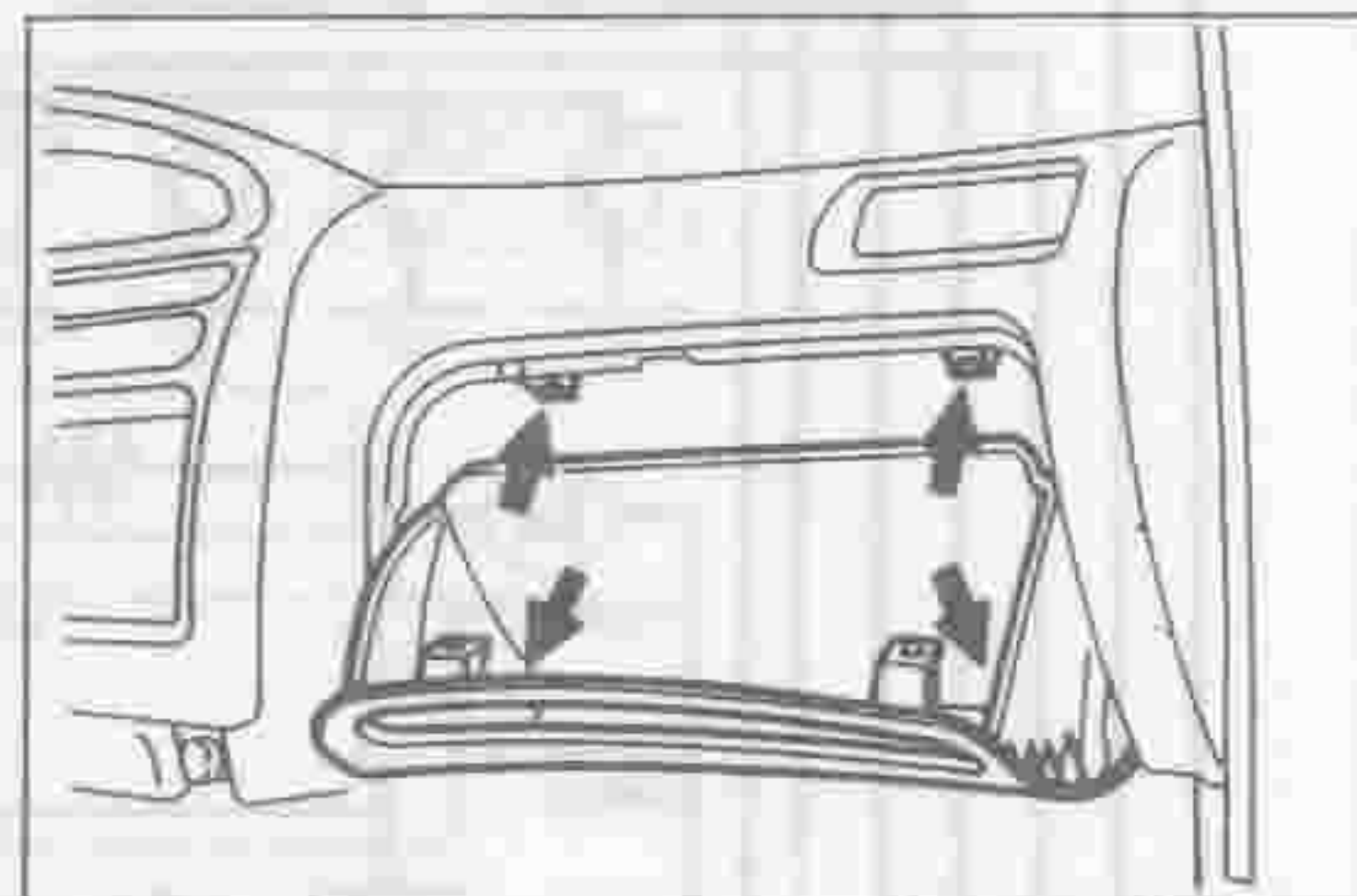
(1) Preparation of measurement

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



LEF00061-00037

- ② Remove the dashboard undertray.



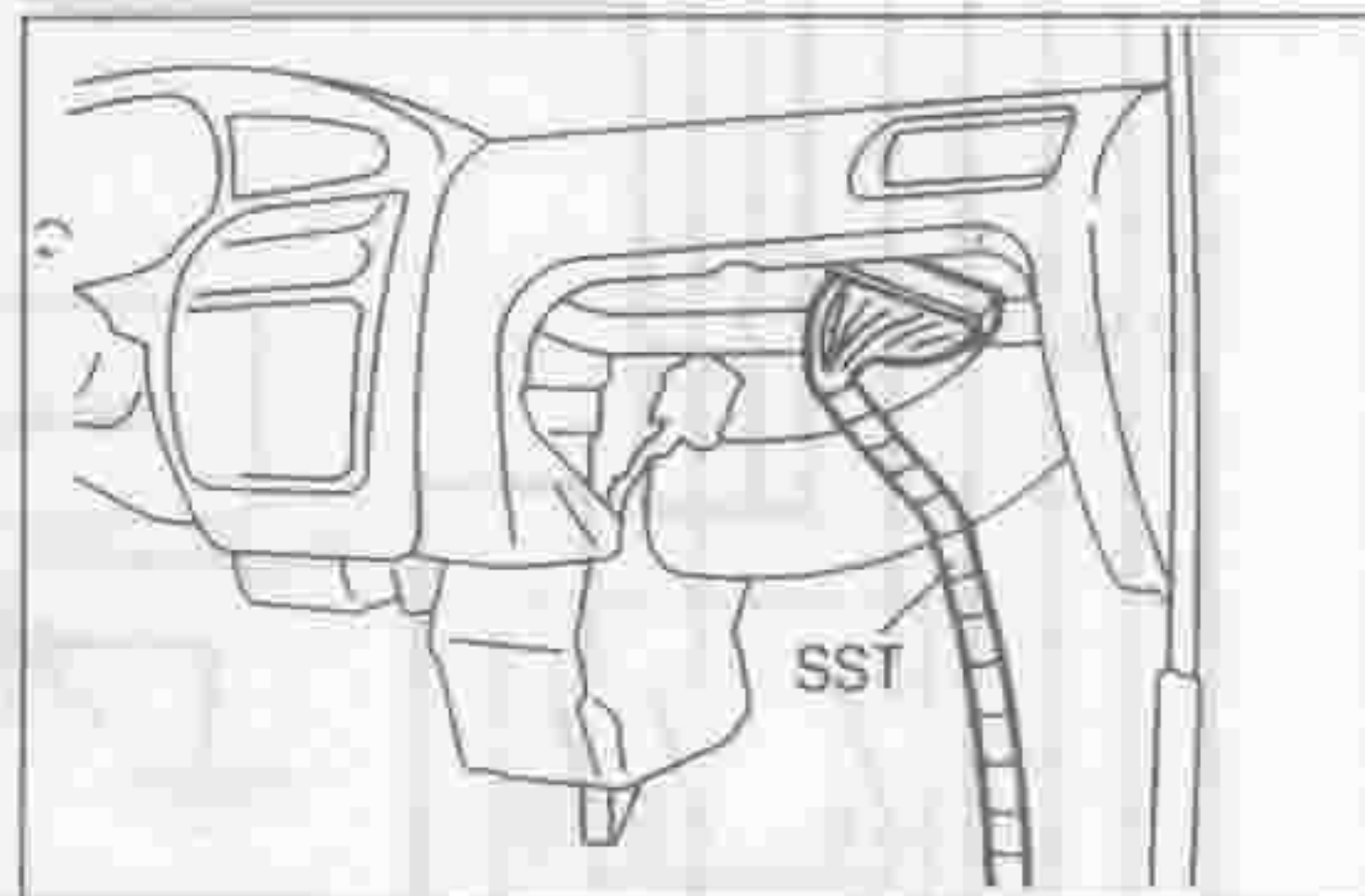
LEF00062-00038

- ③ Connect the SST between the ECU and the engine wire.

SST: 09842-87502-000

NOTE:

- Before the SST is installed, be sure to perform continuity test and short test between the SST terminals.

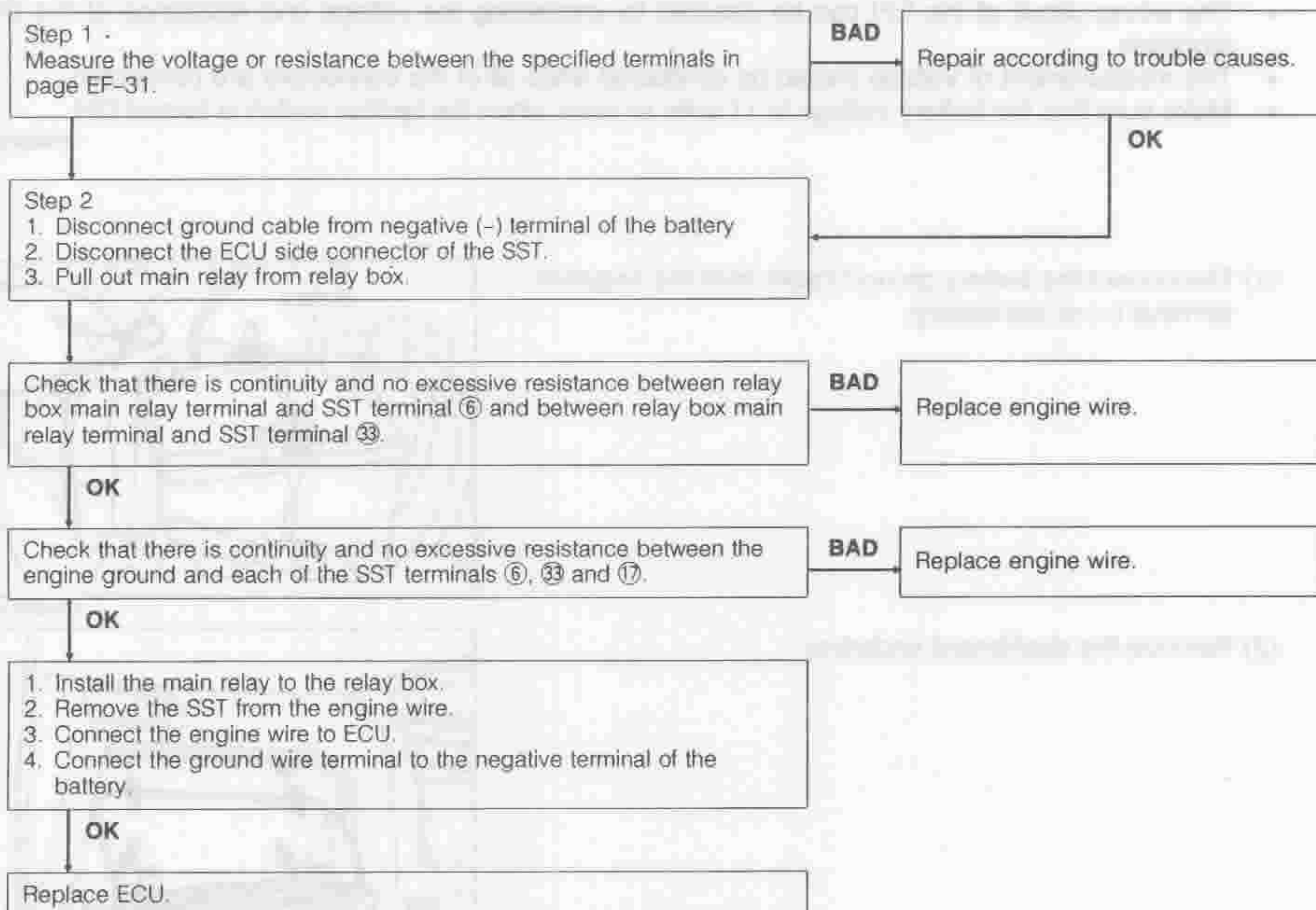


LEF00063-00039

- ④ Connect the ground cable to the negative (-) terminal of the battery.

LEF00064-00000

- (2) Measure the voltage or resistance between each specified terminal. Then, check that the measured voltage and resistance conform to the specifications. Perform the check and repair in accordance with the flow chart given below.



NOTE:

- Even when the trouble has been solved by replacing the ECU, be sure to install the old ECU again. Thus, confirm that the trouble was attributable to the old ECU.

Inspection of terminal voltage and resistance of ECU.

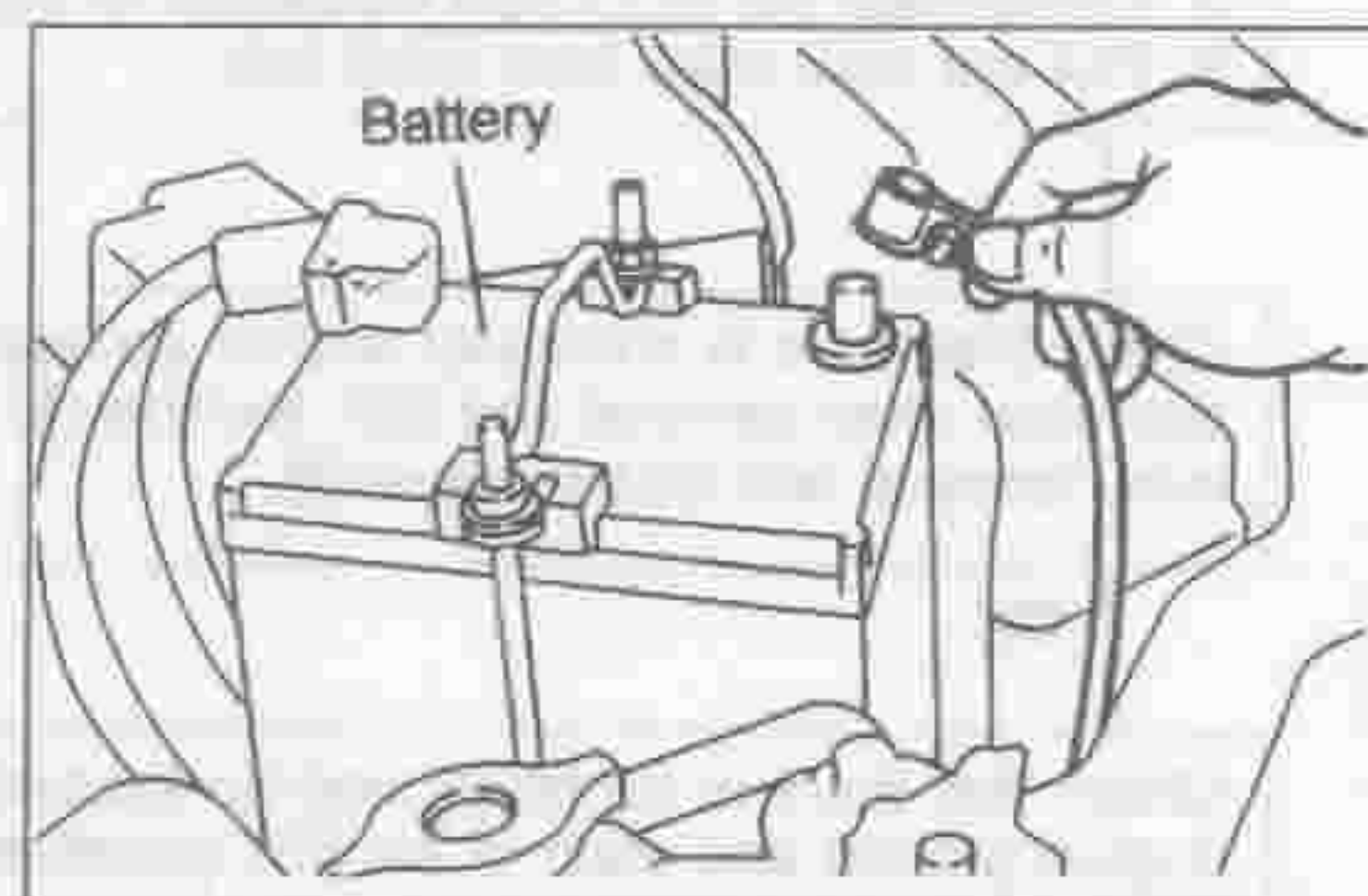
1. Measurement of ECU voltage

NOTE:

- The wiring circuit of the EFI can be checked by measuring the voltage and resistance at the ECU terminals.
- The measurement of voltage should be conducted while all of the connectors are connected.
- Make sure that the battery voltage is 11 volts or more when the ignition switch is turned ON.

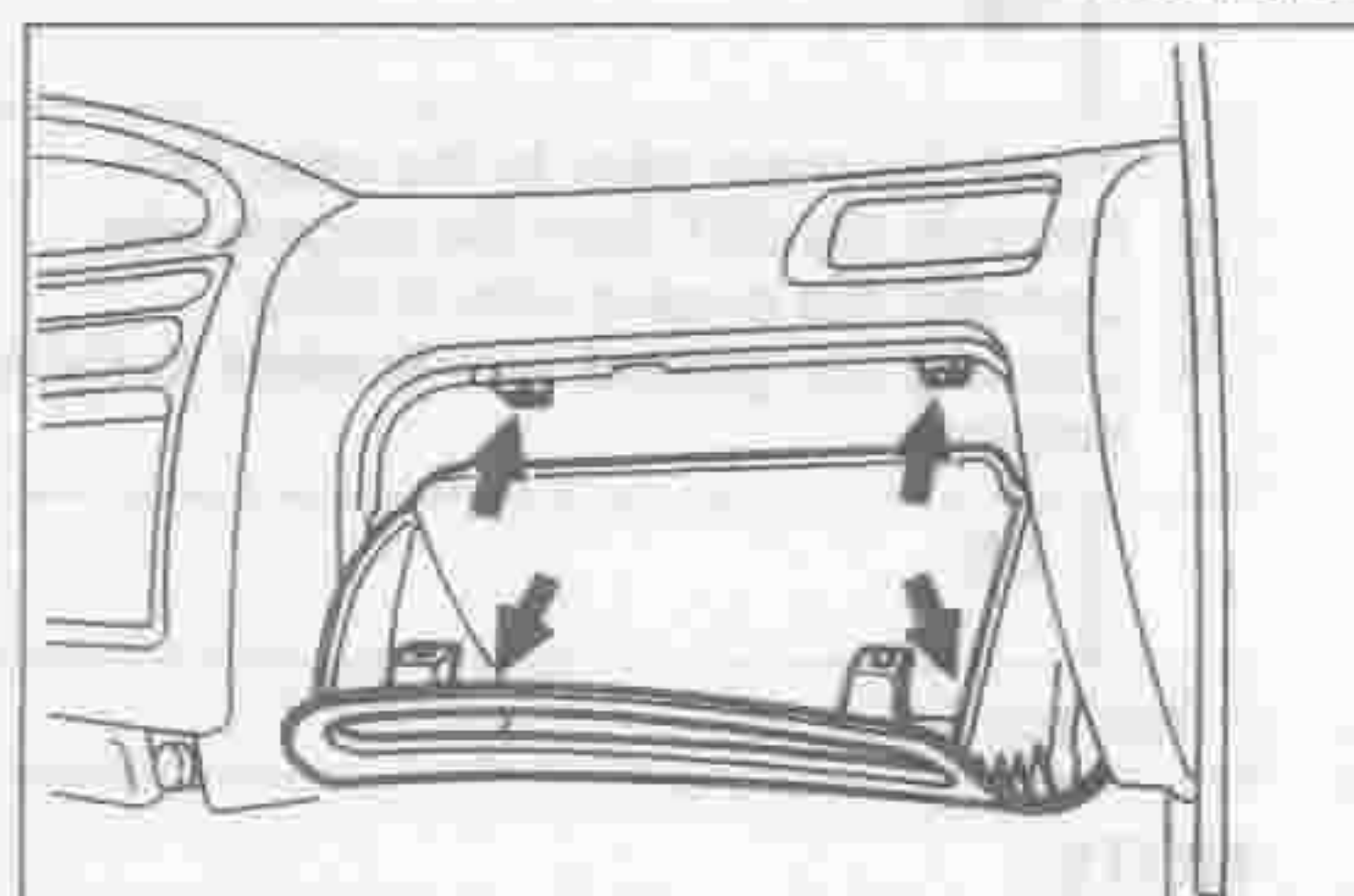
LEF00066-00000

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



LEF00067-00040

- (2) Remove the dashboard undertray.



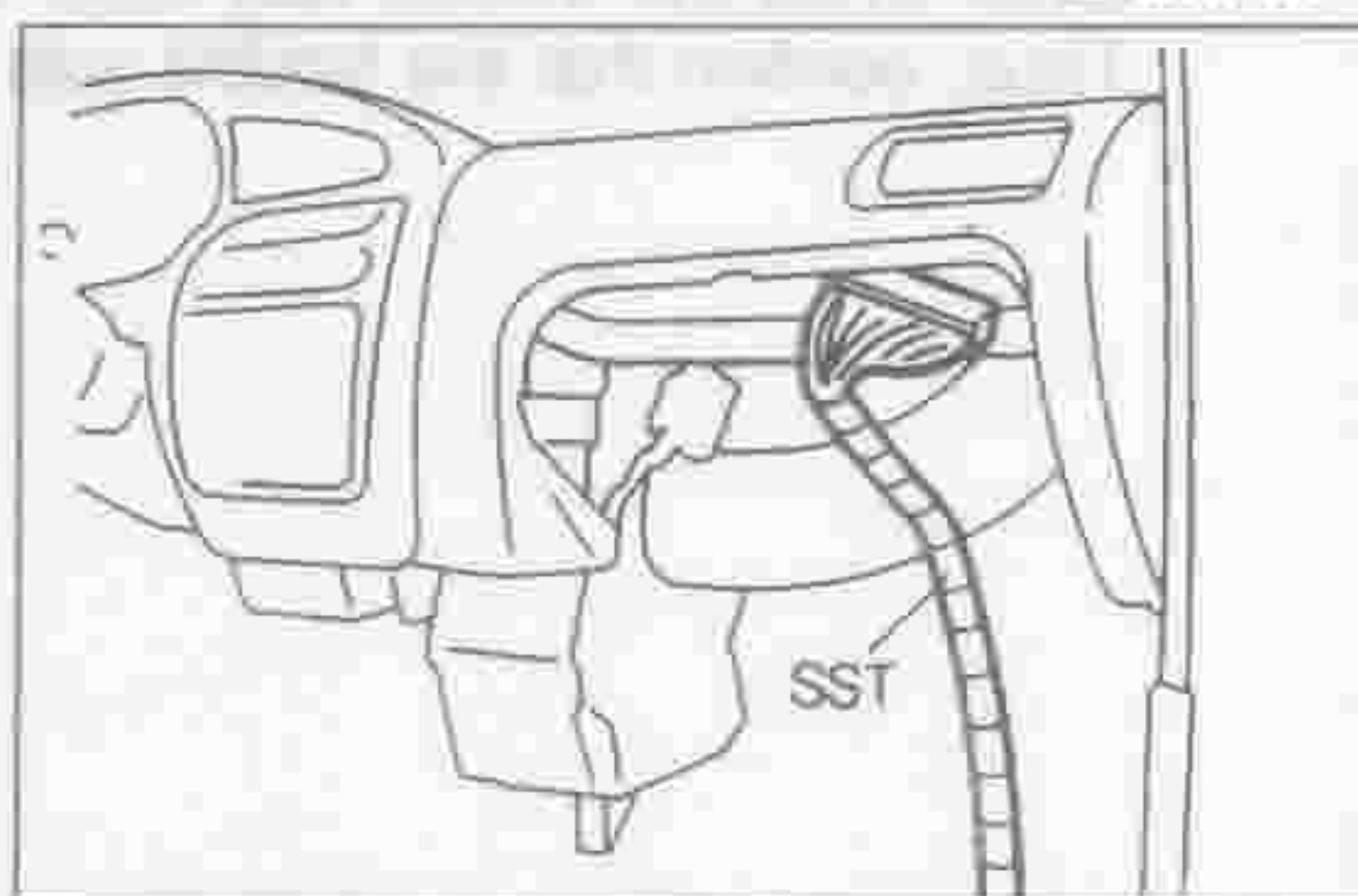
LEF00068-00041

- (3) Connect the SST between the ECU and the engine wire.
SST: 09842-87502-000

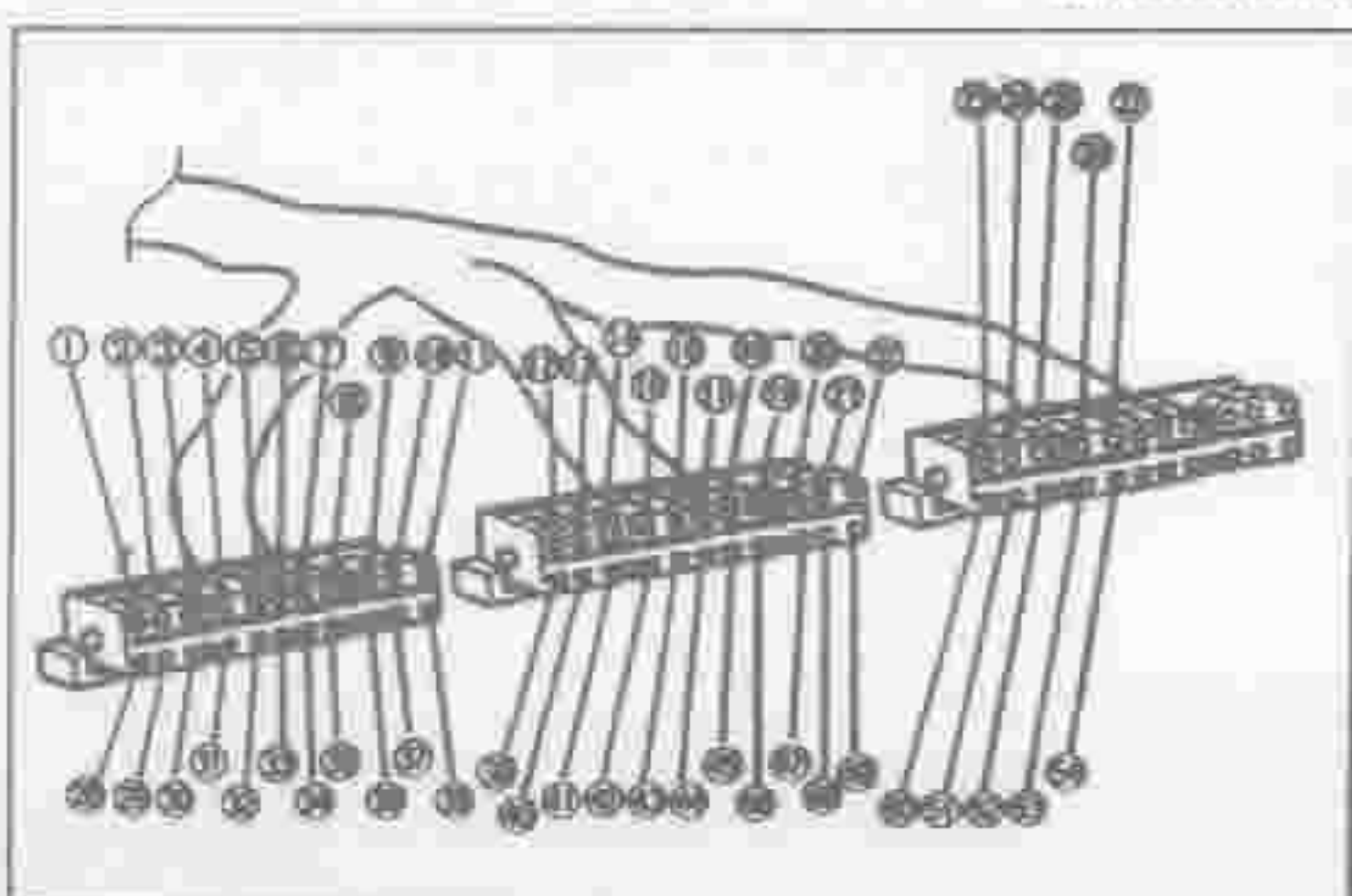
- (4) Connect the battery ground cable to the negative terminal (-) of the battery.

NOTE:

- After completion of the inspection, before the SST is removed, be sure to disconnect the battery ground cable from the negative (-) battery terminal. After the ECU and engine wire have been connected, reconnect the battery ground cable to the negative (-) battery terminal.



LEF00069-00042



LEF00000-00043

Voltage at ECU connector (EF-EL Engine)

Terminal	STD voltage	Condition	
1 - 44	4.5 - 5.5 V	Ignition switch turned ON	
2 - 44	2.3 - 3.0 V	Ignition switch turned ON	When atmospheric pressure is 101 kPh (760 mmHg).
3 - 44	0.9 - 3.0 V	Ignition switch turned ON	When coolant temperature is 20°C.
4 - 17	About 0.6 V	Ignition switch turned ON	
5 - 17	About 0.6 V	Ignition switch turned ON	
6 - 17	Approx. Battery voltage	Ignition switch turned ON	
7 - 44	0.9 - 3.0 V	Ignition switch turned ON	When evaporator temperature is 15°C.
8 - 17	More than 7 V	When engine is running with ignition switch turned ON	When A/C econo switch is turned ON while engine is running.
	Less than 0.5 V		When A/C econo switch is turned OFF.
9 - 17	More than 7.0 V	When engine is running with ignition switch turned ON	When A/C switch turned ON.
	Less than 0.5 V		When A/C switch turned OFF.
10 - 17	4.5 - 5.5 V	Ignition switch turned ON	
	Less than 0.3 V	Ignition switch turned ON	When check connector terminal T and ground is connected.
11 - 17 (AT only)	Less than 1.0 V	Ignition switch turned ON	When shift lever is P or N position.
	More than 7.0 V		When shift lever is in a position other than P-N position.
13 - 17	Less than 2.0 V	Ignition switch turned ON	
	Approx. Battery voltage	When engine is running with ignition switch turned ON and diagnosis cord is normal during diagnosis code check.	
15 - 17	Approx. Battery voltage	All time	
18 - 17	Less than 0.3 V	Ignition switch turned ON	Throttle valve is fully closed.
	4.5 - 5.5 V		Throttle valve is fully opened.
20 - 17	Approx. Battery voltage	When engine is running with ignition switch turned ON.	
21 - 17	Approx. Battery voltage	When engine is running with ignition switch turned ON	Radiator cooling fan is not operating.
	Less than 1.0 V		Radiator cooling fan is operating.
25 - 17	Approx. Battery voltage	Ignition switch turned ON	
27 - 17	Less than 1.8 V	Ignition switch turned ON	
	AC 0.3 - 5.0 V	When engine running	
28 - 17	Change in output voltage 0 to 1.0 V	When engine speed is held at 3000 rpm for two minutes after engine has fully warmed up.	
33 - 17	Approx. Battery voltage	Ignition switch turned ON	
35 - 17	Change in output voltage 4.5 to 5.5 V	Ignition switch turned ON	When vehicle is moving.
36 - 17	Less than 0.5 V	Ignition switch turned ON	When defogger switch is tuned OFF.
	More than 7.0 V		When defogger switch is tuned ON.
37 - 17	More than 7.0 V	Ignition switch turned ON	When heater fan switch is tuned OFF.
	Less than 1.0 V		When heater fan switch is tuned ON.
38 - 17	Less than 0.5 V	Ignition switch turned ON	When head-lamp switch is turned OFF.
	More than 7.0 V		When head-lamp switch is turned ON.

Terminal	STD voltage	Condition	
39 - 17	Change in voltage between 0 to battery voltage	When engine is running with ignition switch turned ON.	
45 - 17	Less than 0.3 V	Ignition switch turned ON	Throttle valve is fully opened.
	4.5 - 5.5 V		Throttle valve is fully closed.
46 - 17	Less than 1.5 V	When air conditioner switch is turned ON while engine is running.	
	Approx. Battery voltage	When quick acceleration is made with air conditioner switch is turned ON (During full throttle operation)	
51 - 16	Approx. Battery voltage	After a lapse of 2 seconds after ignition switch ON	
	Less than 1.2 V	When engine is running	

LEF00070-00000

Voltage at ECU connector (ED-20 Engine)

Terminal	STD voltage	Condition	
1 - 44	4.5 - 5.5 V	Ignition switch turned ON	
2 - 44	2.3 - 3.0 V	Ignition switch turned ON	When atmospheric pressure is 101 kPh (760 mmHg).
3 - 44	0.9 - 3.0 V	Ignition switch turned ON	Coolant temperature is 20°C.
4 - 17	About 0.6 V	Ignition switch turned ON	
5 - 17	About 0.6 V	Ignition switch turned ON	
6 - 17	Approx. Battery voltage	Ignition switch turned ON	
10 - 17	4.5 - 5.5 V	Ignition switch turned ON	
	Less than 0.3 V	Ignition switch turned ON	When the check connector terminal T and ground is connected.
11 - 17 (AT only)	Less than 1.0 V	Ignition switch turned ON	When shift lever is P or N position.
	More than 7.0 V		When shift lever is in a position other than P-N position.
13 - 17	Less than 2.0 V	Ignition switch turned ON	
	Approx. Battery voltage	When engine is running with ignition switch turned ON and diagnosis cord is normal during diagnosis code check	
15 - 17	Approx. Battery voltage	All time	
18 - 17	Less than 0.3 V	Ignition switch turned ON	Throttle valve is fully closed.
	4.5 - 5.5 V		Throttle valve is fully opened.
21 - 17	Approx. Battery voltage	Ignition switch turned ON	Radiator cooling fan is not operating
	Less than 1.0 V		Radiator cooling fan is operating
25 - 17	Approx. Battery voltage	Ignition switch turned ON	
27 - 17	Less than 1.8 V	Ignition switch turned ON	
	AC 0.3 - 5.0 V	When engine is running	
28 - 17	Change in output voltage 0 to 1 V	When engine speed is held at 3000 rpm for two minutes after engine has fully warmed up.	
30 - 17	0.9 - 3.0 V	Ignition switch turned ON	Intake air temperature is 20°C
33 - 17	Approx. Battery voltage	Ignition switch turned ON	
35 - 17	Change in voltage between 4.5 to 5.5 V	Ignition switch turned ON	When vehicle is moving
36 - 17	Less than 0.5 V	Ignition switch turned ON	When defogger switch is turned OFF.
	More than 7.0 V		When defogger switch is turned ON.
37 - 17	More than 7.0 V	Ignition switch turned ON	When heater fan switch is turned OFF.
	Less than 1.0 V		When heater fan switch is turned ON.
38 - 17	Less than 0.5 V	Ignition switch turned ON	When lead-lamp switch is turned OFF.
	More than 7.0 V		When lead-lamp switch is turned ON.
39 - 17	Change in voltage between 0 to battery voltage	When engine is running with ignition switch turned ON	
45 - 17	Less than 0.3 V	Ignition switch turned ON	Throttle valve is fully opened.
	4.5 - 5.5 V		Throttle valve is fully closed.

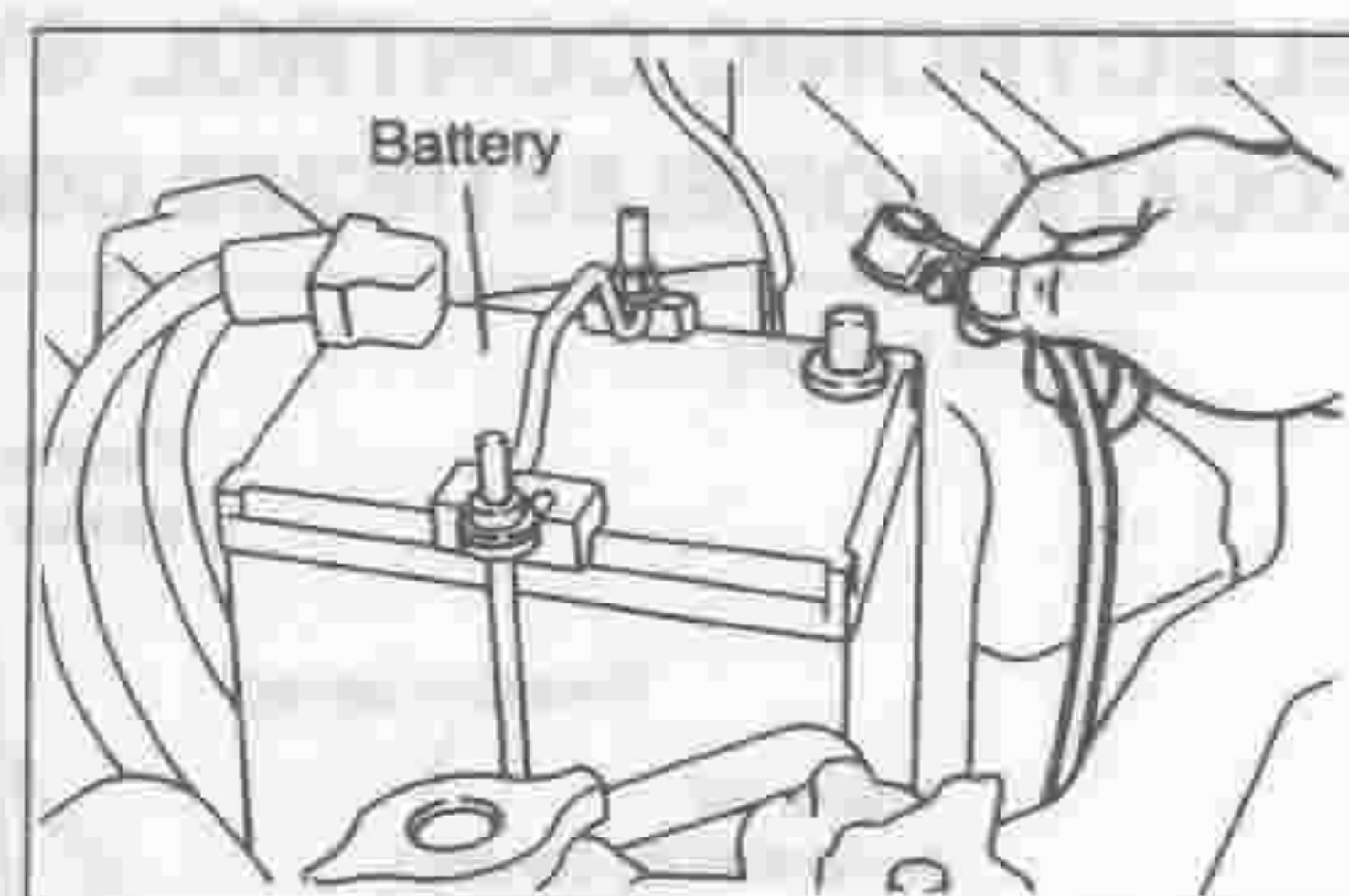
2. Measurement of resistance of ECU

CAUTION:

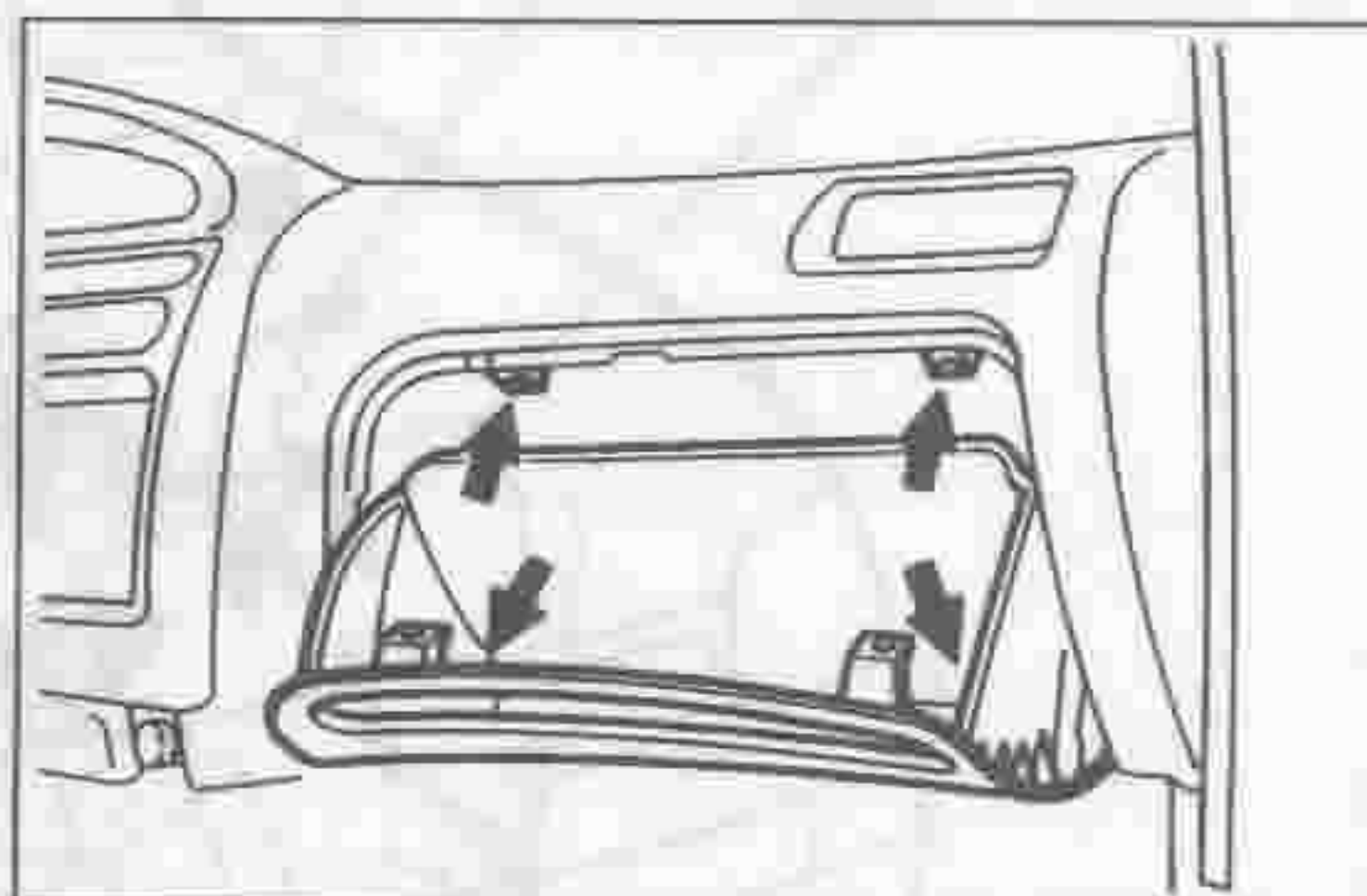
- Be sure to conduct the resistance measurement at the SST terminals.

- (1) Disconnect the battery ground cable from the negative (-) terminal of the battery.
- (2) Remove the dashboard undertray.

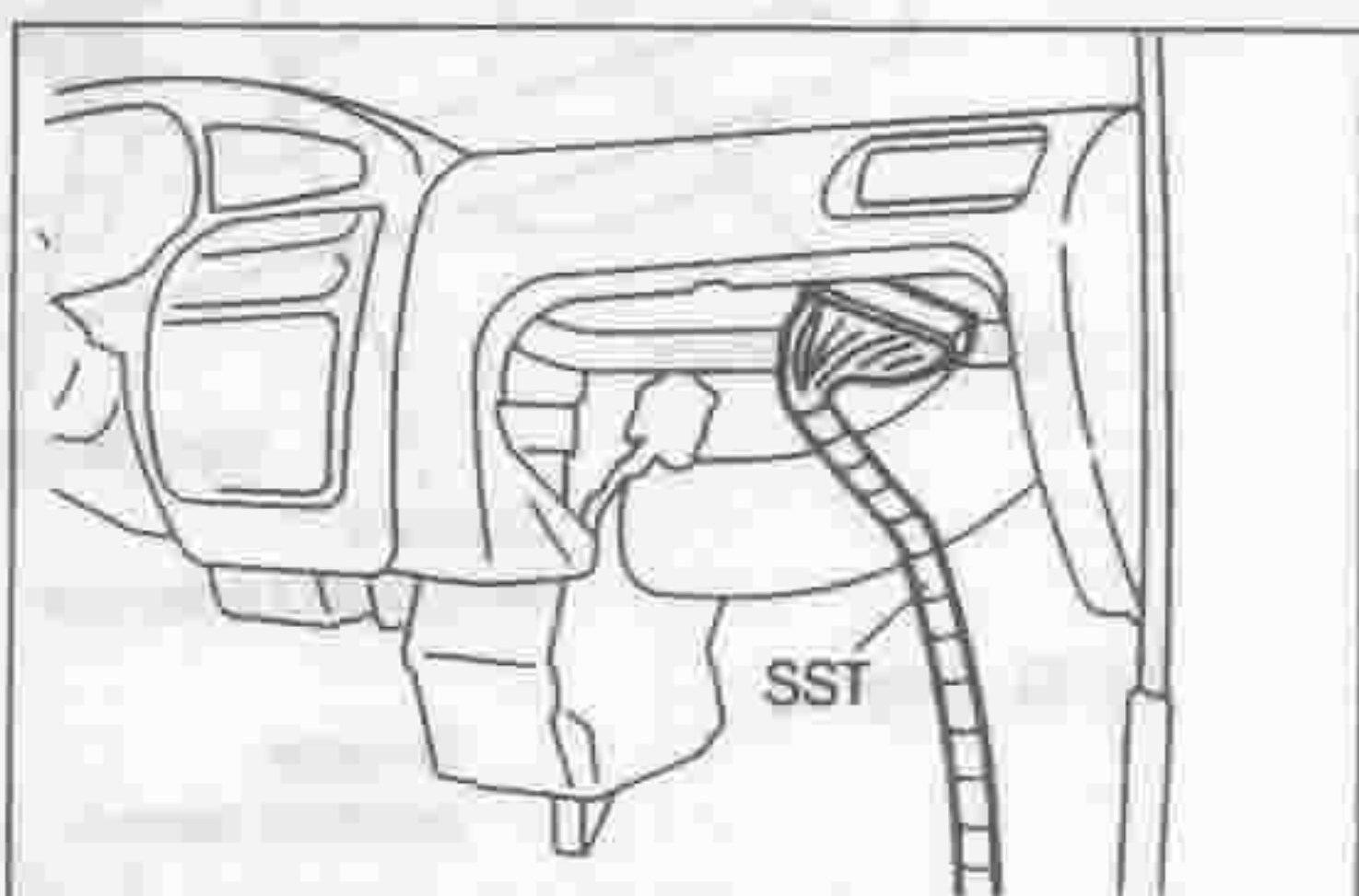
- (3) Disconnect the engine wire from the ECU.
 - (4) Connect the SST to the engine wire side.
(Never connect the SST to the ECU side.)
- SST: 09842-87502-000



LEF00072-00044



LEF00073-00045



LEF00074-00046

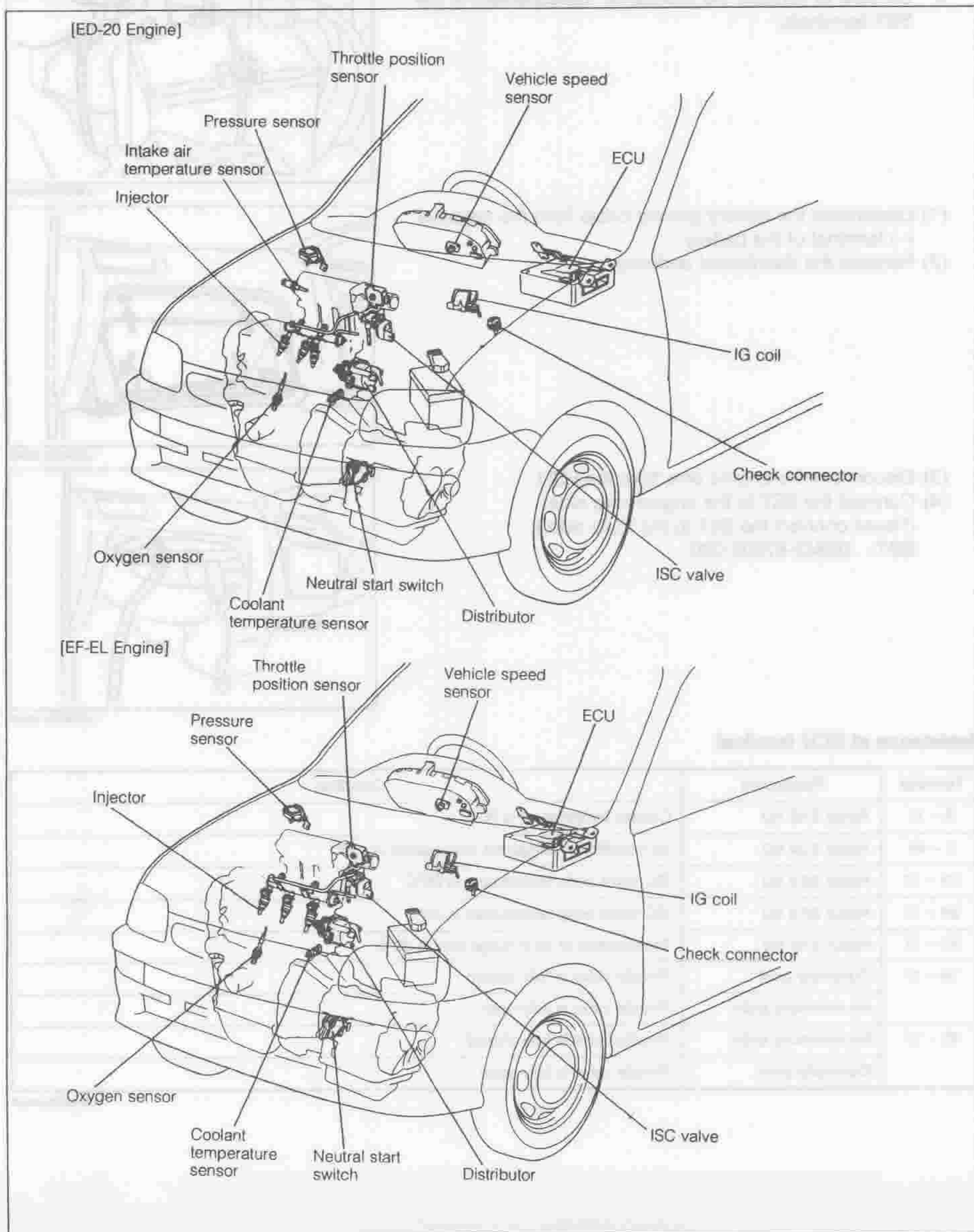
Resistance at ECU terminal

Terminal	Resistance	Condition
3 - 12	About 2.45 k Ω	Coolant temperature is 20°C
7 - 44	About 2.34 k Ω	Air conditioner refrigerant temperature is 15°C
23 - 17	About 20.8 k Ω	ISC valve body temperature is 20°C
24 - 17	About 20.8 k Ω	ISC valve body temperature is 20°C
30 - 17	About 2.45 k Ω	Temperature of air in surge tank is 20°C
18 - 17	Continuity exist	Throttle valve is fully closed
	No continuity exists	Throttle valve is fully open
45 - 17	No continuity exists	Throttle valve is fully closed
	Continuity exist	Throttle valve is fully open

LEF00075-00000

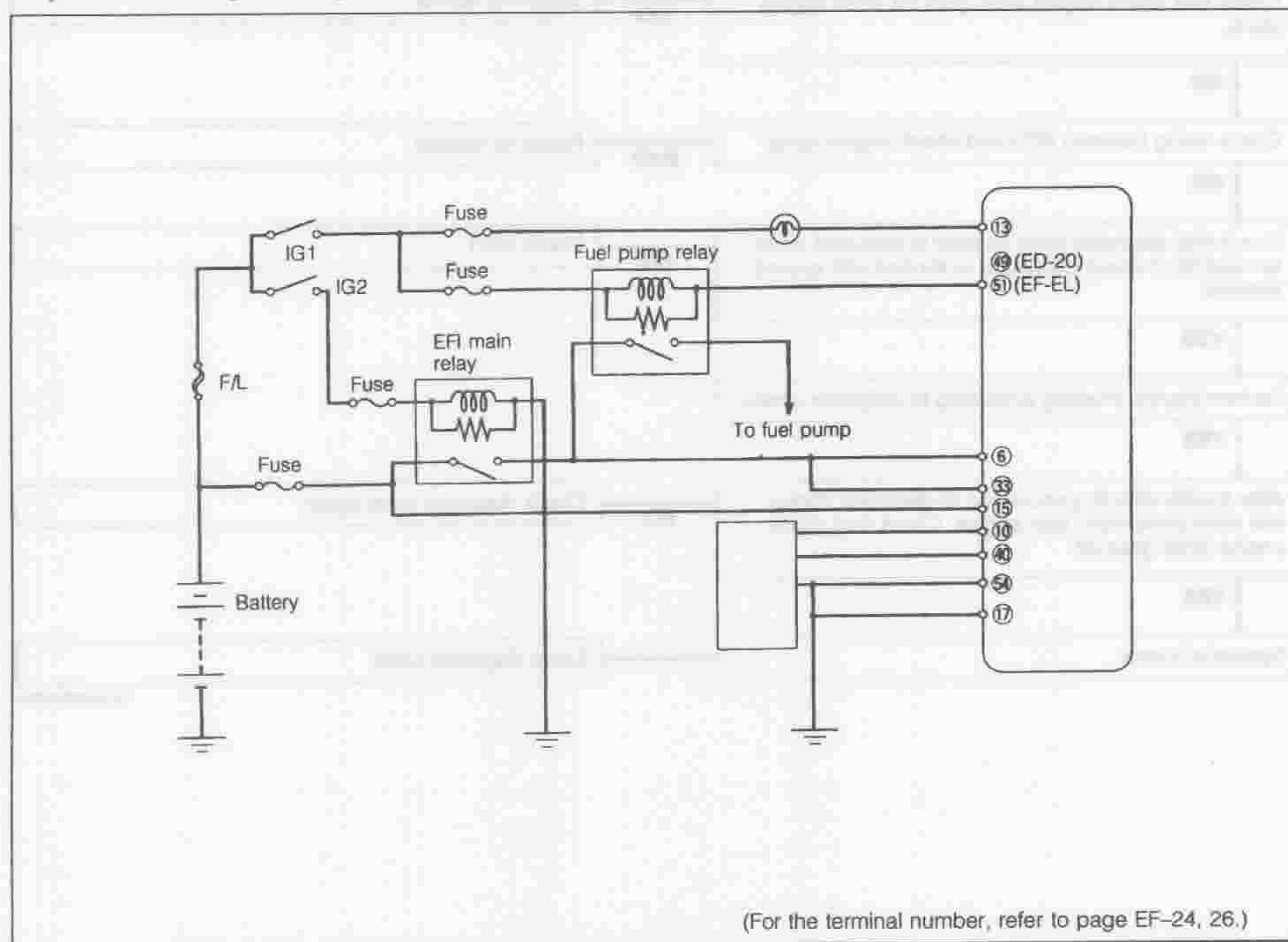
ELECTRONIC CONTROL SYSTEM

LOCATION OF ELECTRONIC CONTROL PARTS



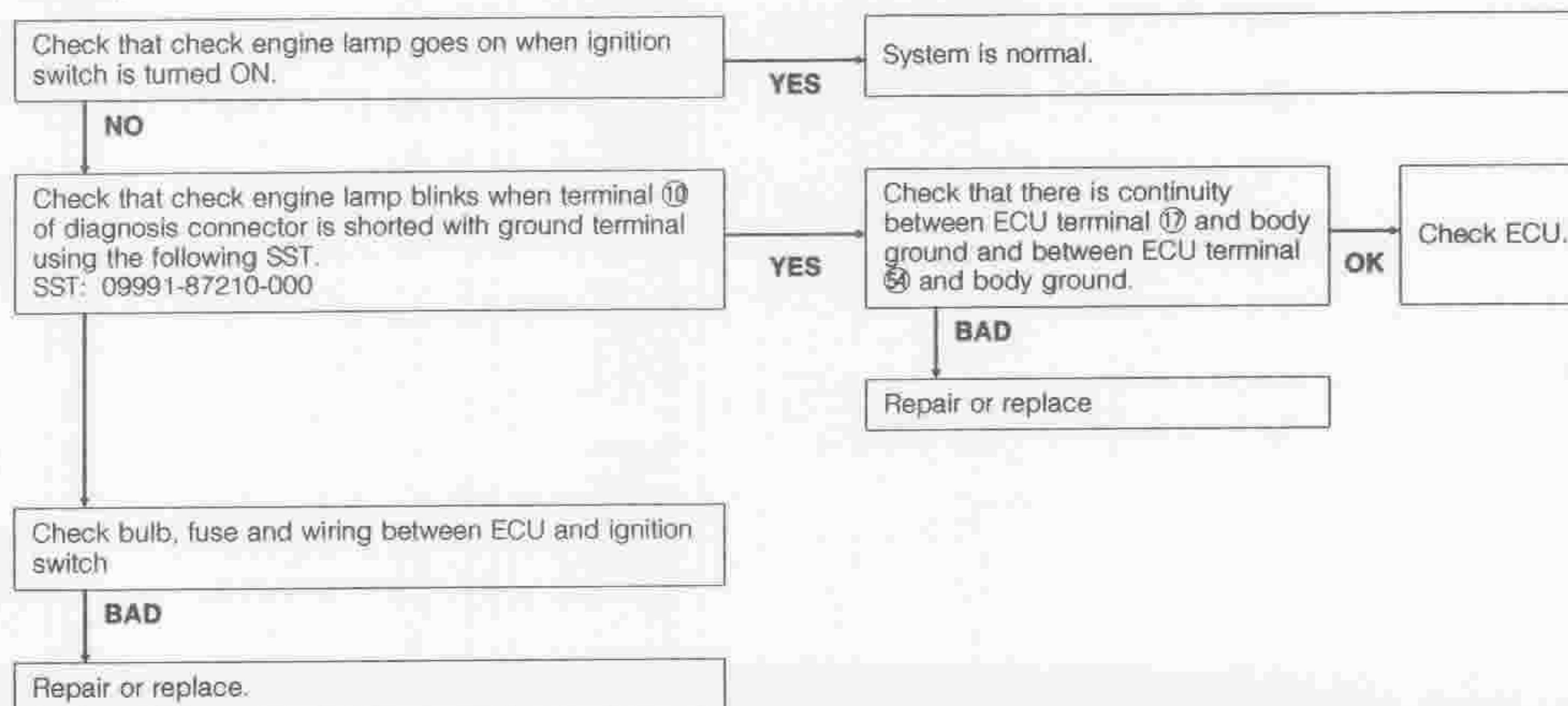
INSPECTION OF ECU CIRCUIT

Inspection of diagnosis system circuit



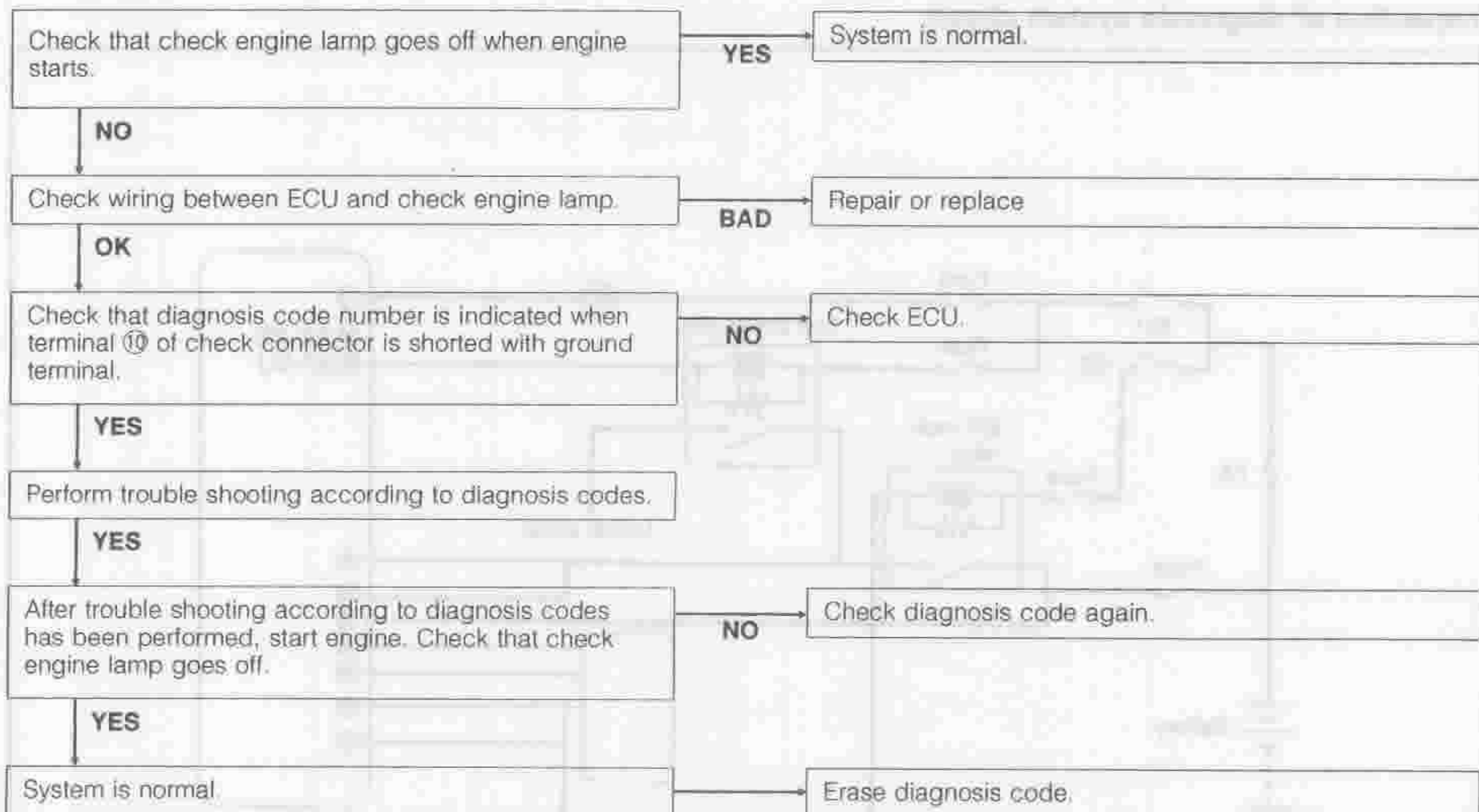
LEF00077-00048

1st step



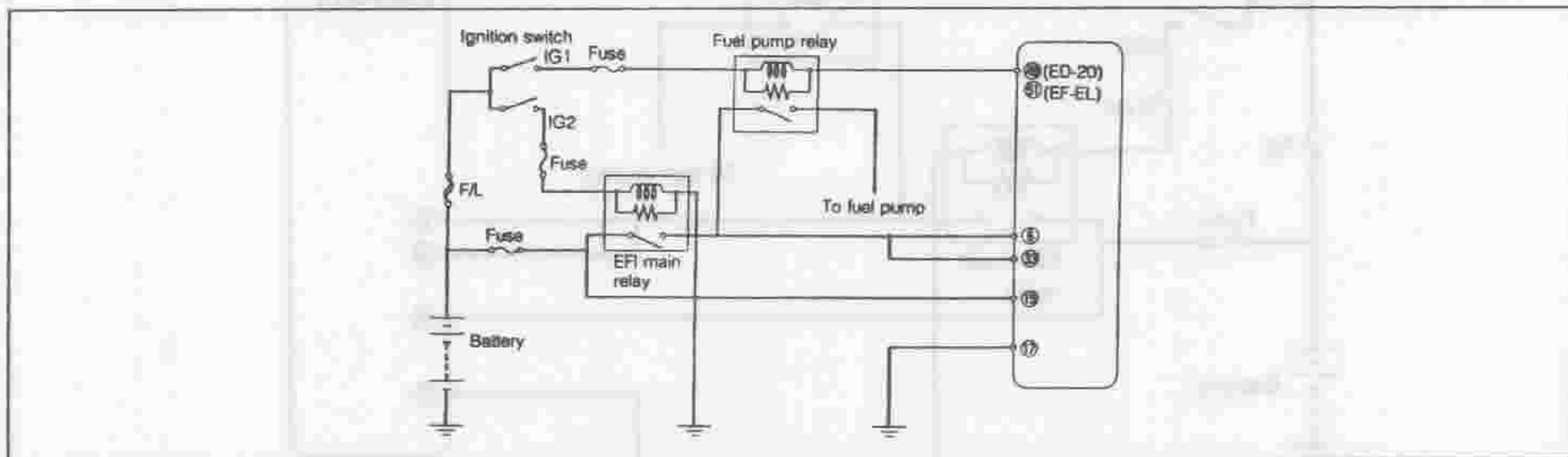
LEF00078-00000

2nd step



LEF00079-00000

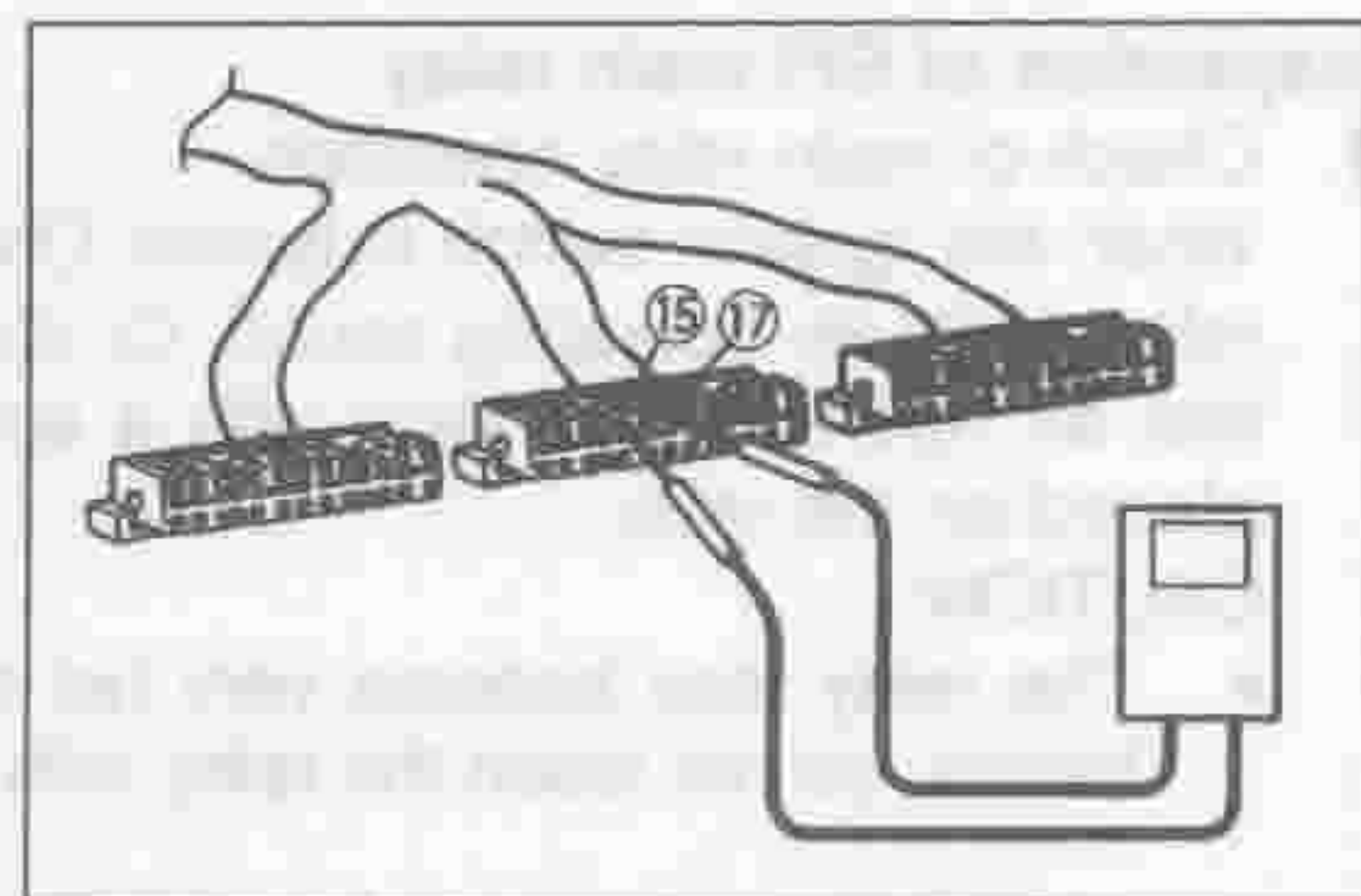
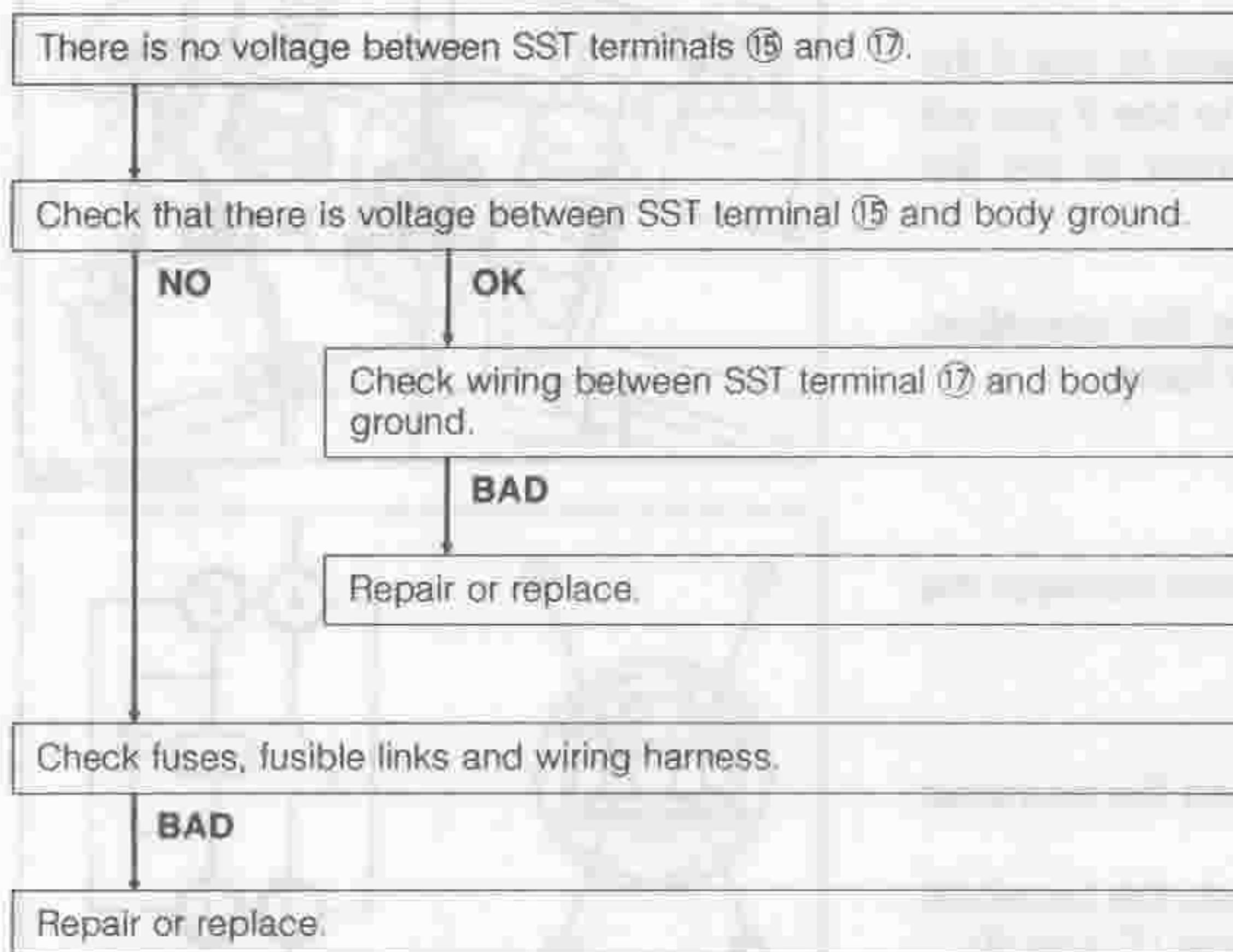
Terminals	Trouble	Conditions	STD voltage
⑮ - ⑰	No voltage	At all time	10 - 15.5
⑥ ③③ - ⑰	No voltage	Ignition switch ON	10 - 15.5



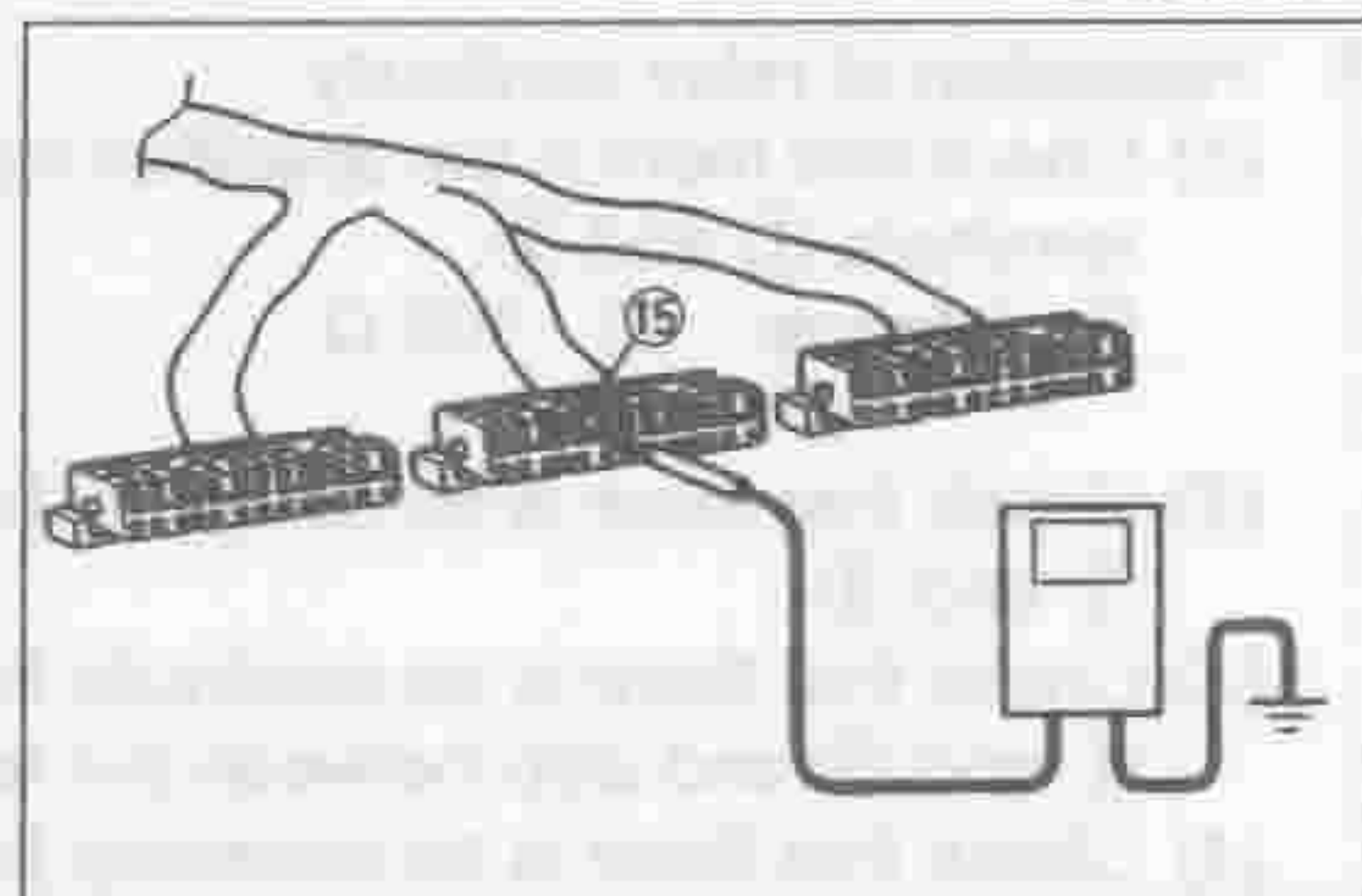
LEF00084-00053

If the SST (09842-87502-000) has not been installed yet, install the SST, referring to the section under "Preparation of Trouble-shooting" at page EF-30.

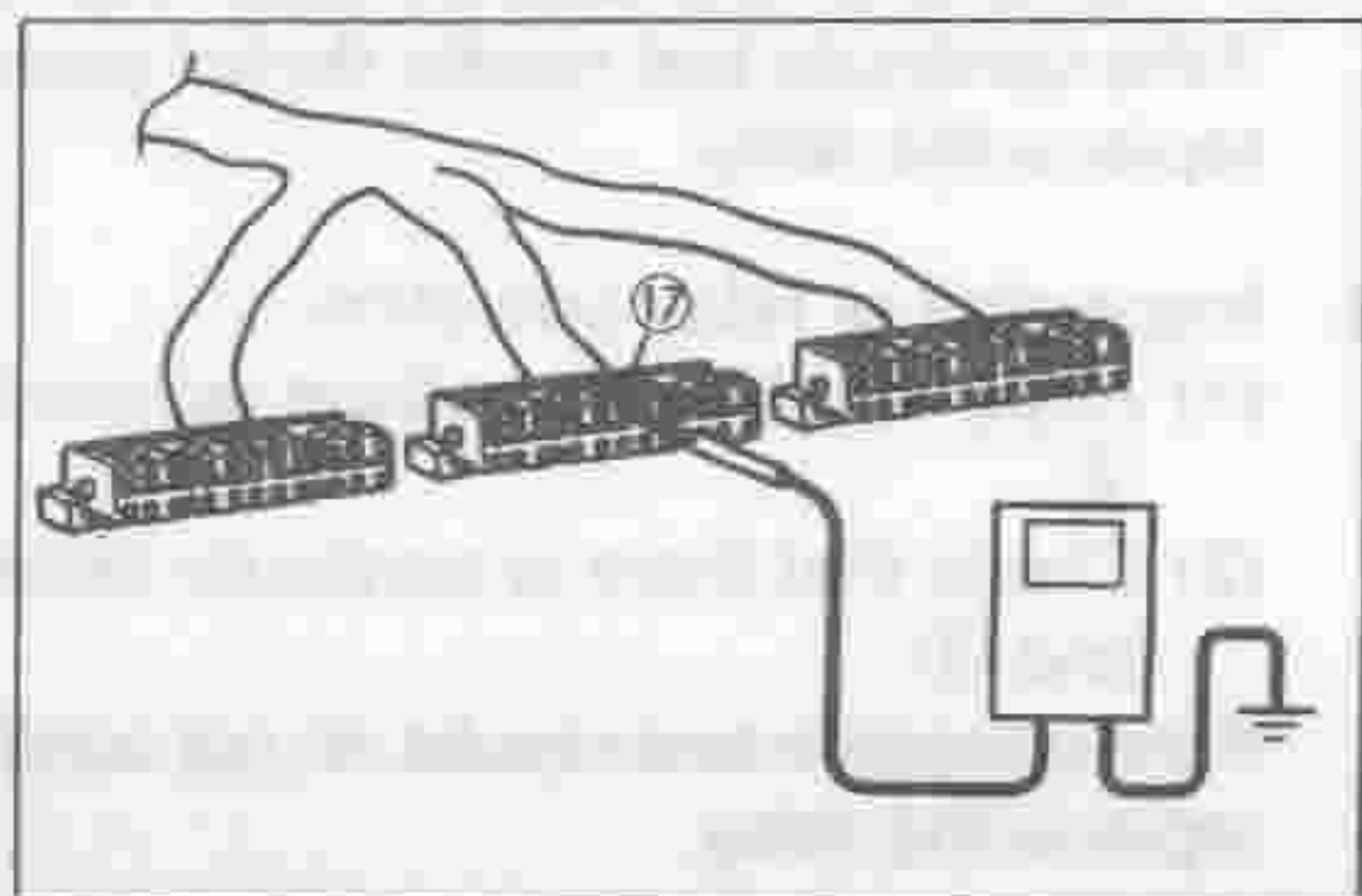
• ⑮ - ⑰



LEF00000-00054



LEF00000-00055



LEF00085-00056

- ⑥ or ⑤③ – ⑪

There is no voltage between SST terminal ⑥ or ③③ and ①⑦.

Check that there is voltage between SST terminal ⑥ or ③③ and body ground when ignition switch is turned ON.

NO

OK

Check wiring between ECU terminal ⑰ and body ground.

BAD

Repair or replace.

Check fuses, fusible links and wiring harness.

OK

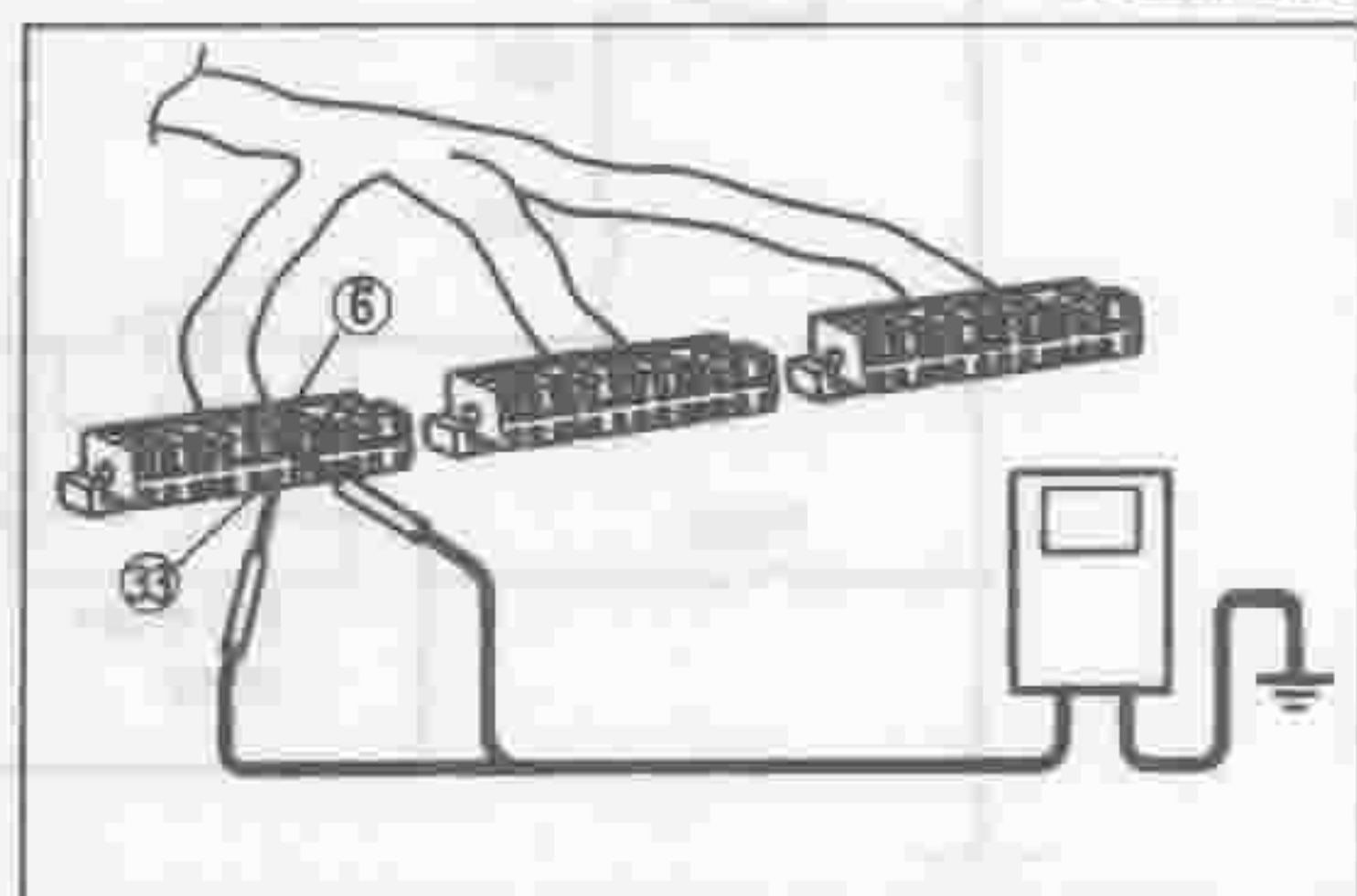
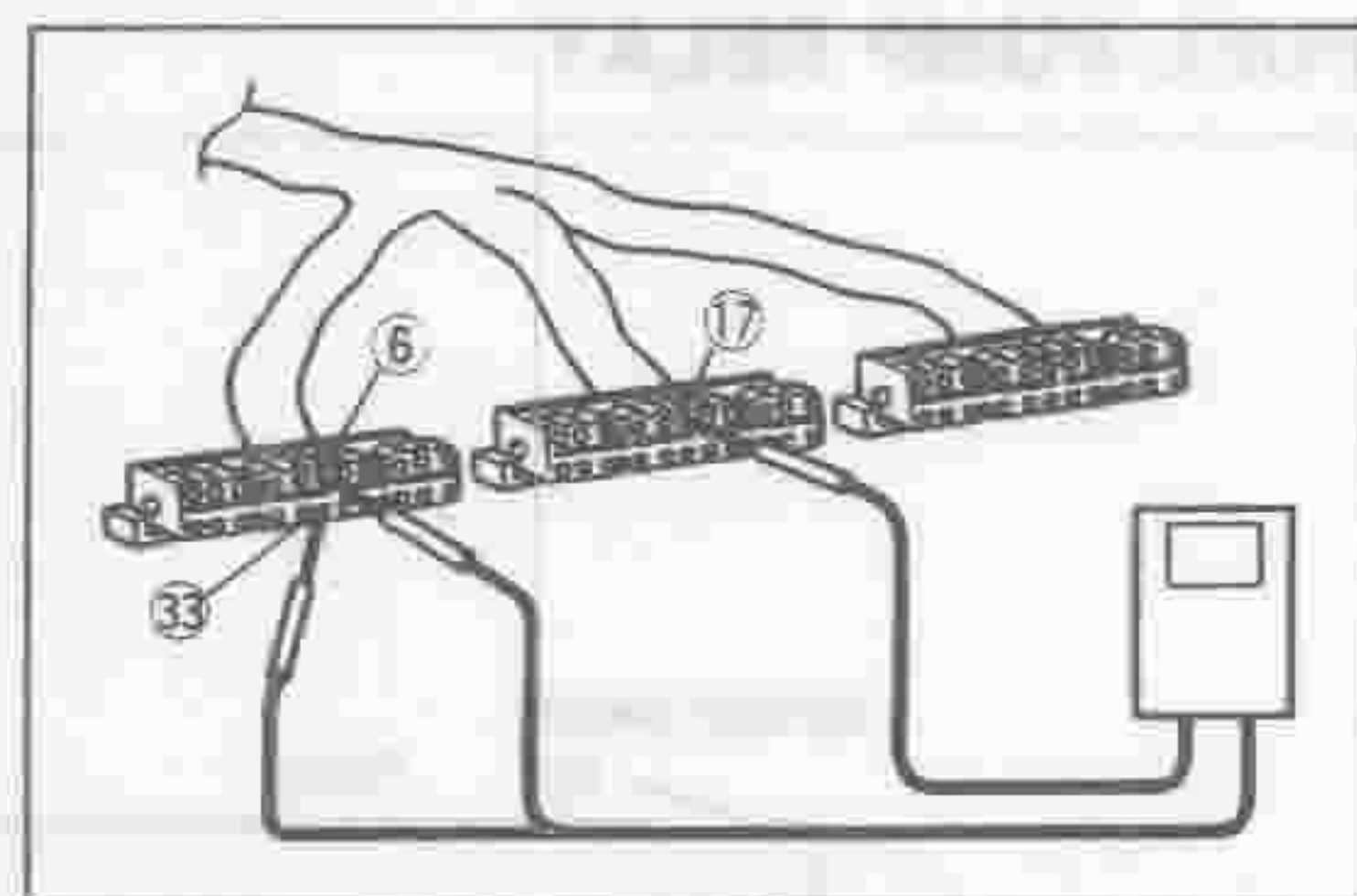
BAD

Repair or replace.

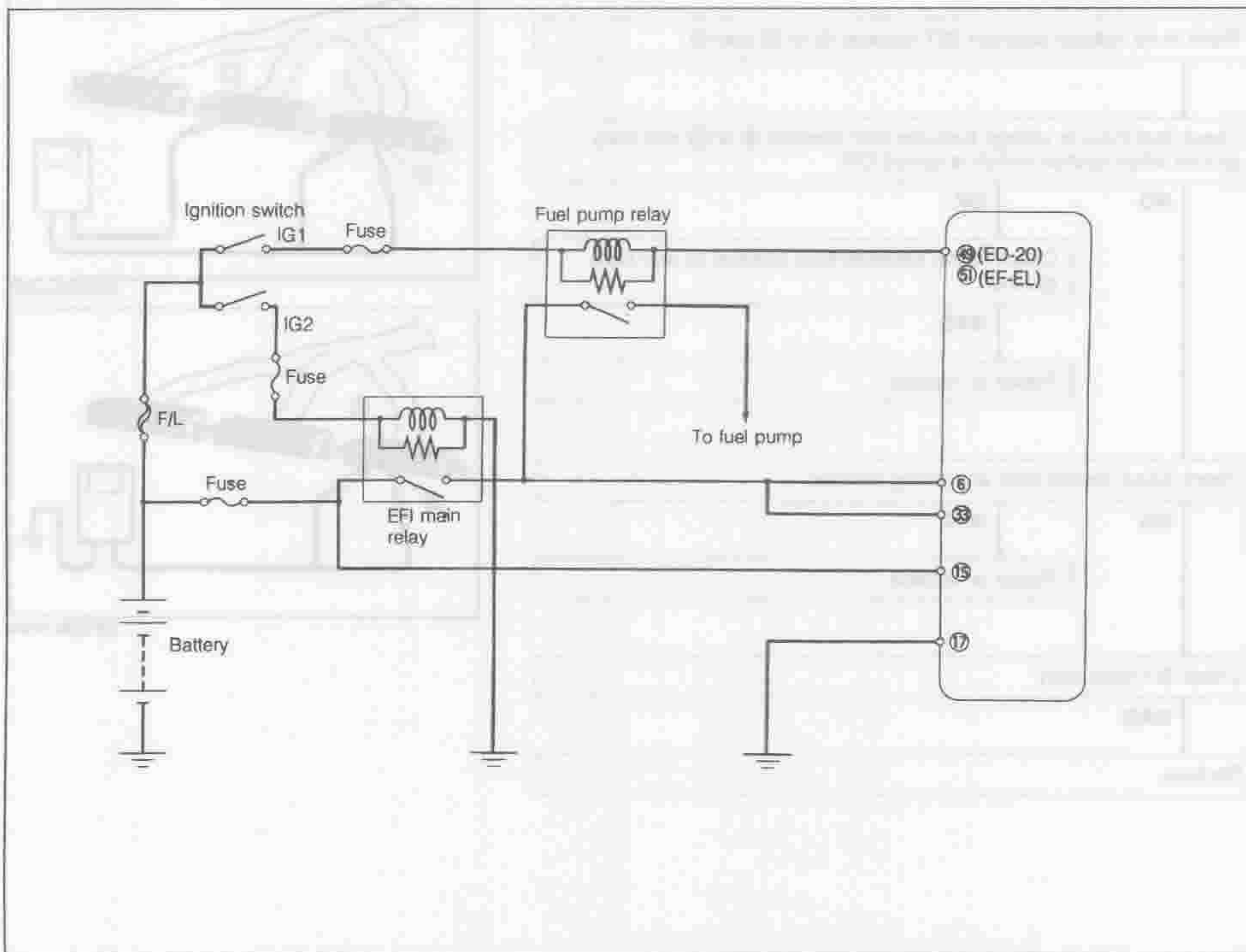
Check EFI main relay

BAD

Replace.



FUEL PUMP RELAY



LEF00087-00059

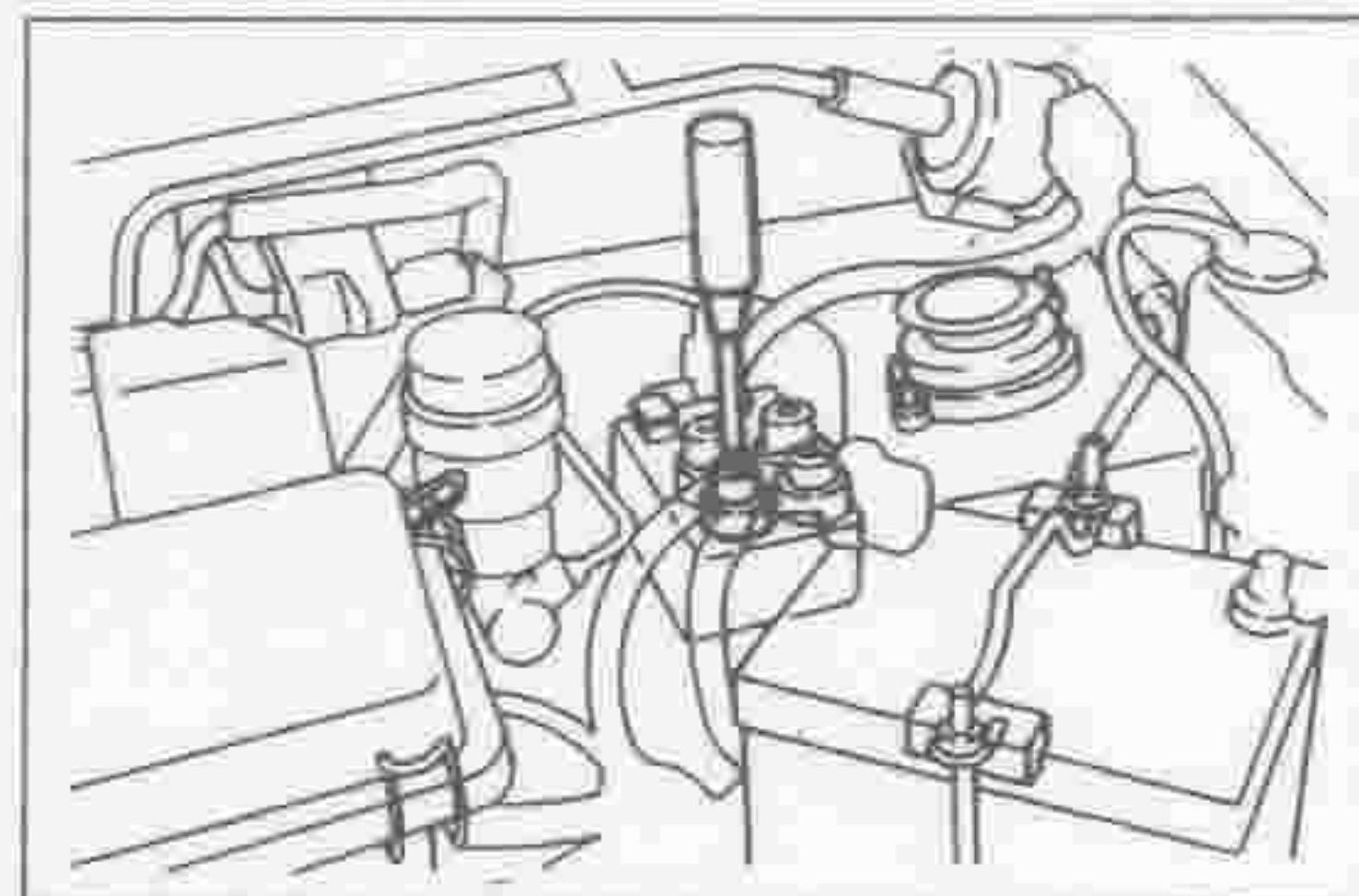
Inspection of fuel pump relay

1. Check of fuel pump operation

When the ignition switch is set to ON position, check to see if the relay emits an operating sound. Or check to see if you will feel an operating vibration with a screwdriver or the like placed on the relay.

CAUTION:

- The relay may become very hot during the operation. Hence, do not touch the relay with your hand.



LEF00088-00060

2. Inspection of relay continuity

- (1) Check that there is the specified resistance between the terminals ① and ②.

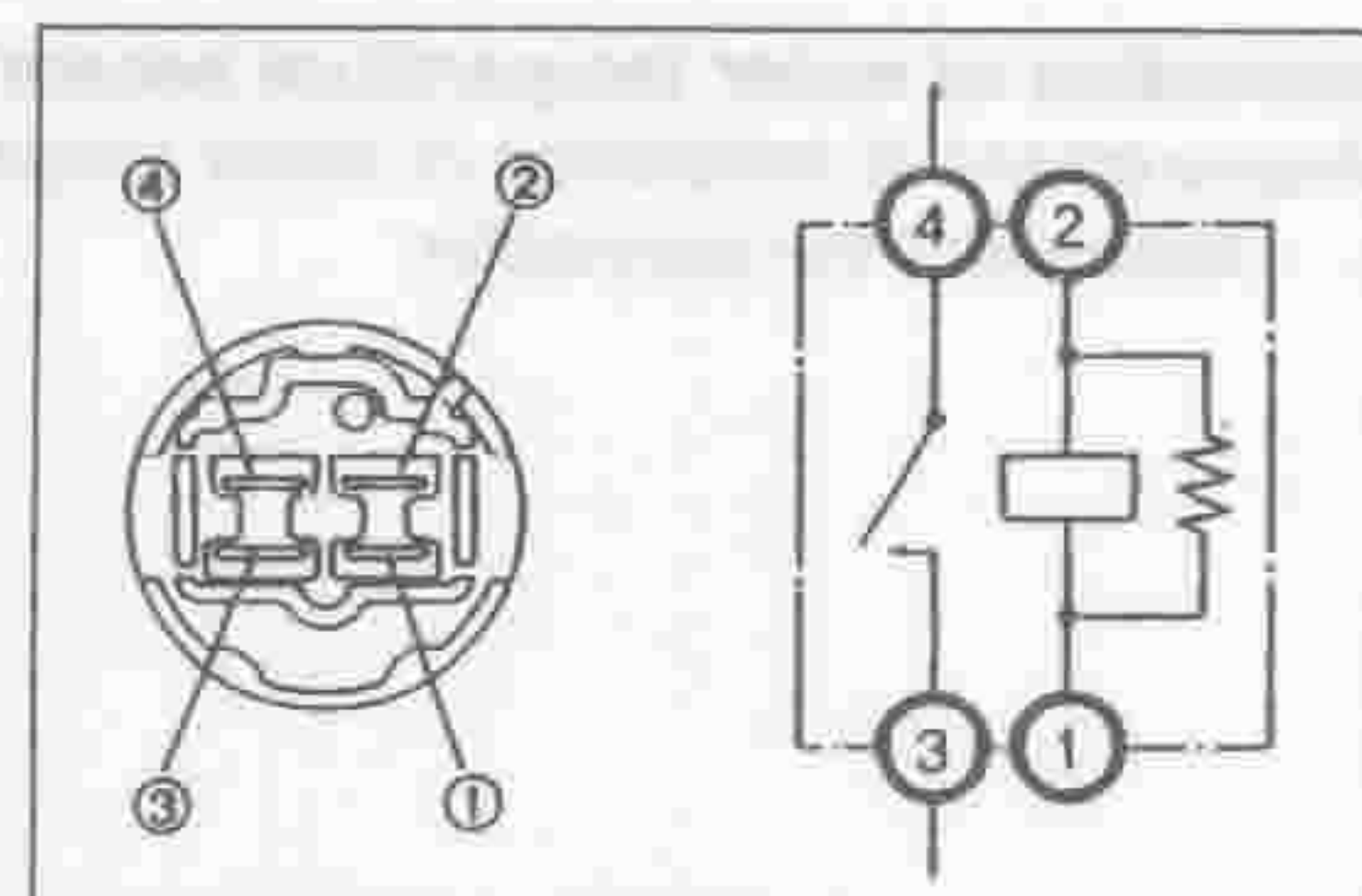
Resistance: 40 - 100 Ω

- (2) Check that there is no continuity between the terminals ③ and ④.

- (3) Check that there is no continuity between the terminals ① and ③ and also between the terminals ① and ④.

- (4) Check that there is no continuity between the terminals ② and ③ and also between the terminals ② and ④.

If the continuity test results do not conform to specifications, replace the relay.



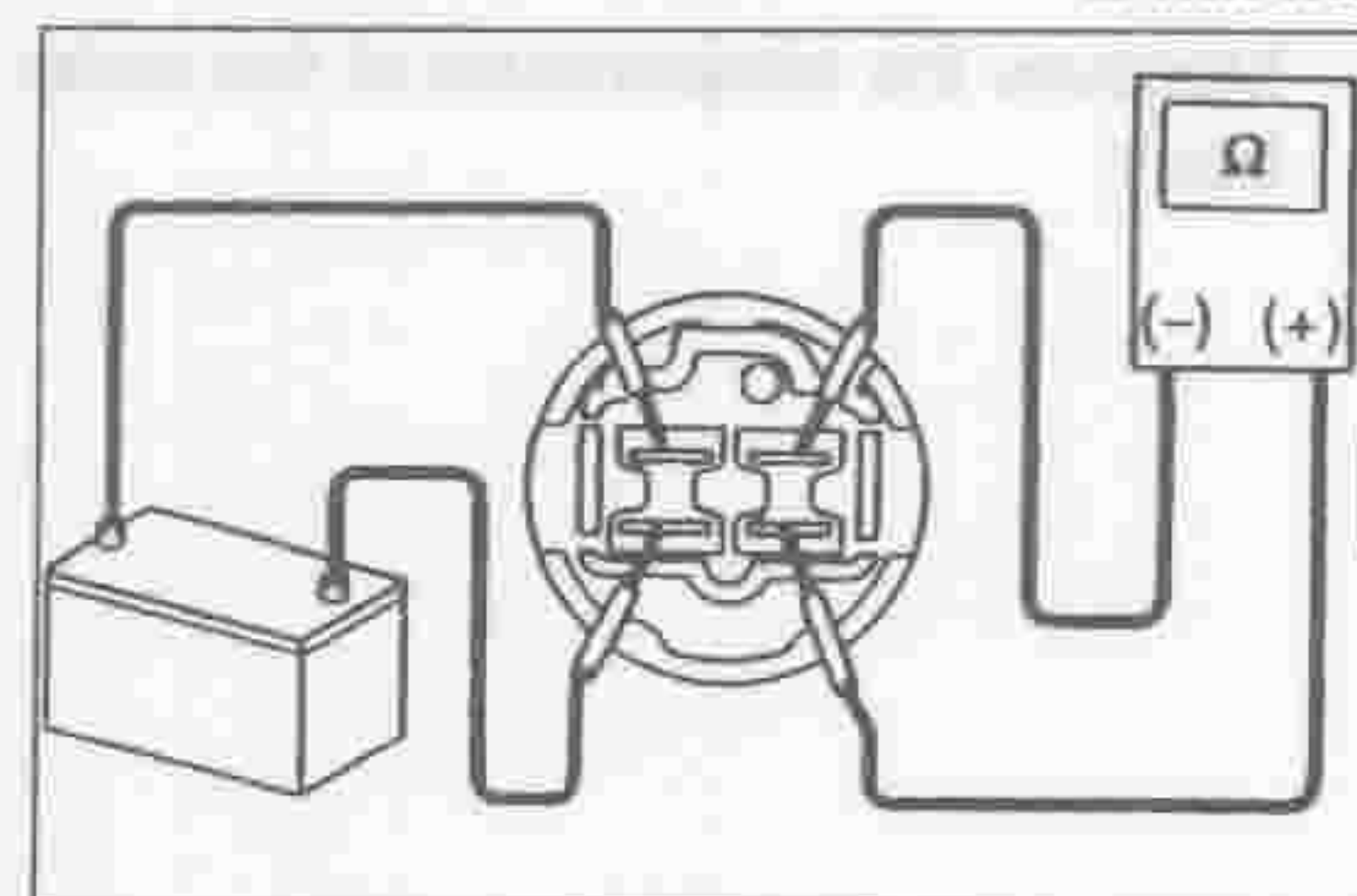
LEF00089-00061

3. Inspection of relay operation

- (1) Apply the battery voltage across the terminals ① and ②.

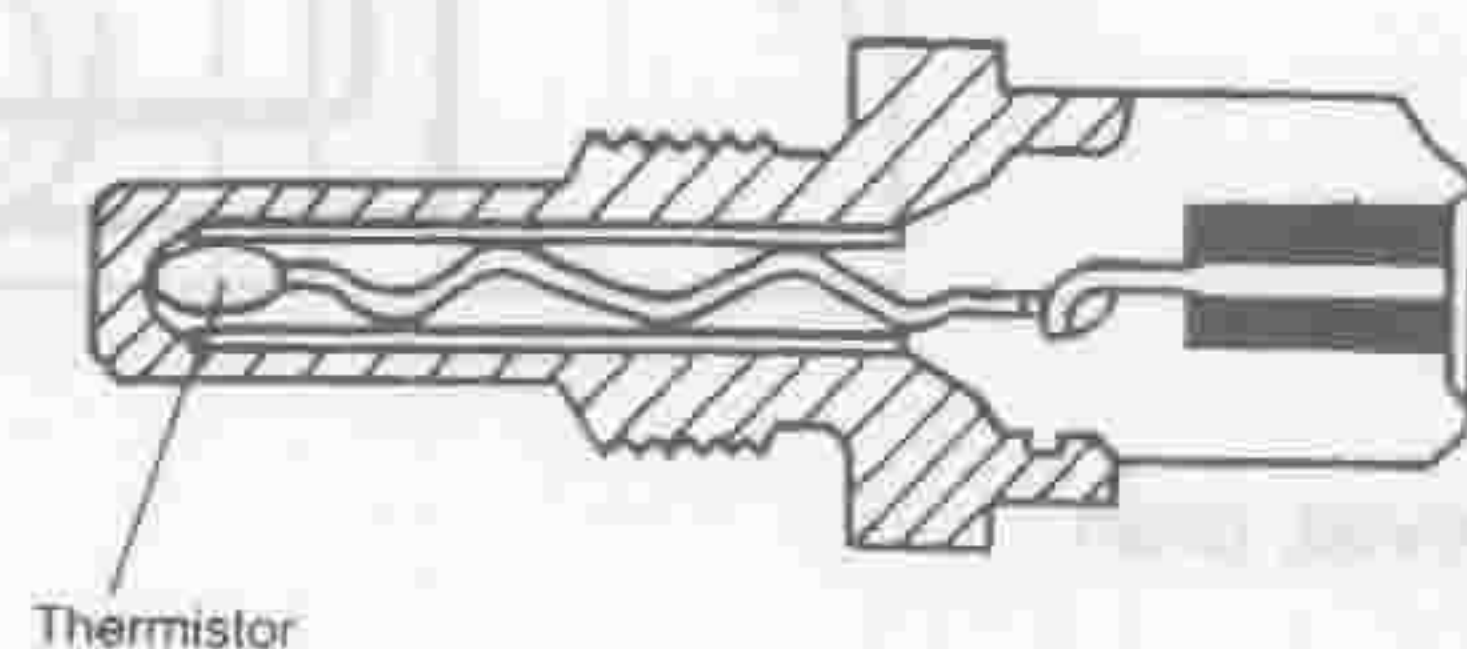
- (2) Check that there is continuity between the terminals ③ and ④.

If the operation test results do not conform to specifications, replace the relay.

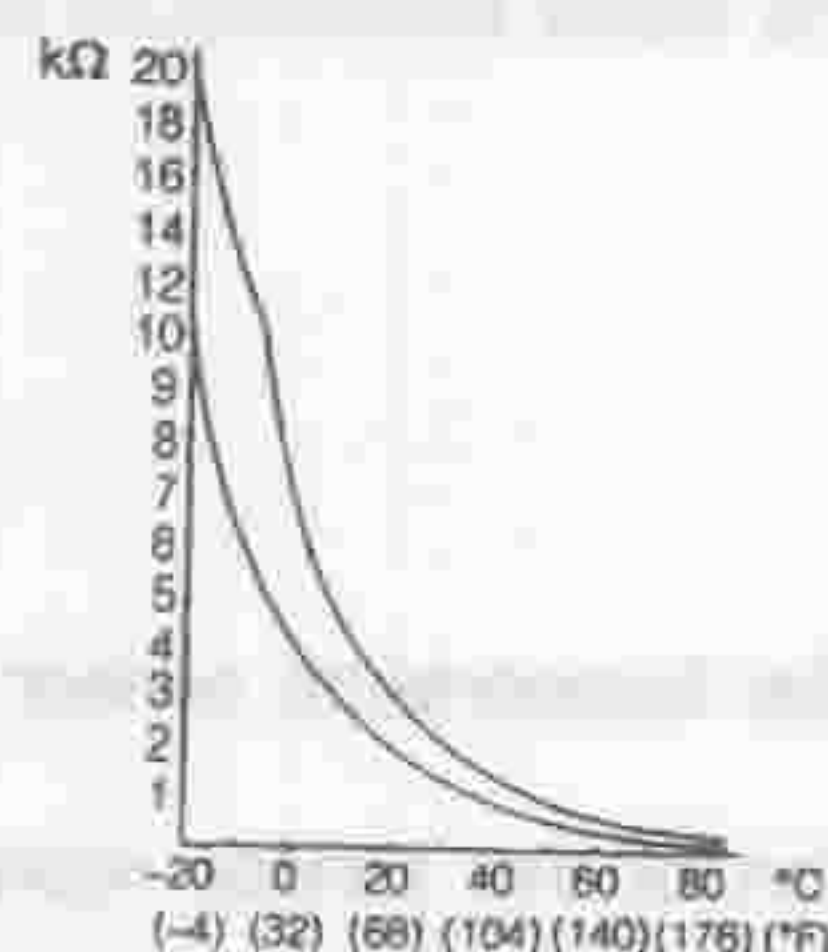


LEF00090-00062

WATER TEMPERATURE SENSOR



Thermistor



LEF00091-00063

Inspection of water temperature sensor

Measurement of resistance of water temperature sensor.

1. Disconnect the connector.



2. Measure the temperature of the water temperature sensor body.



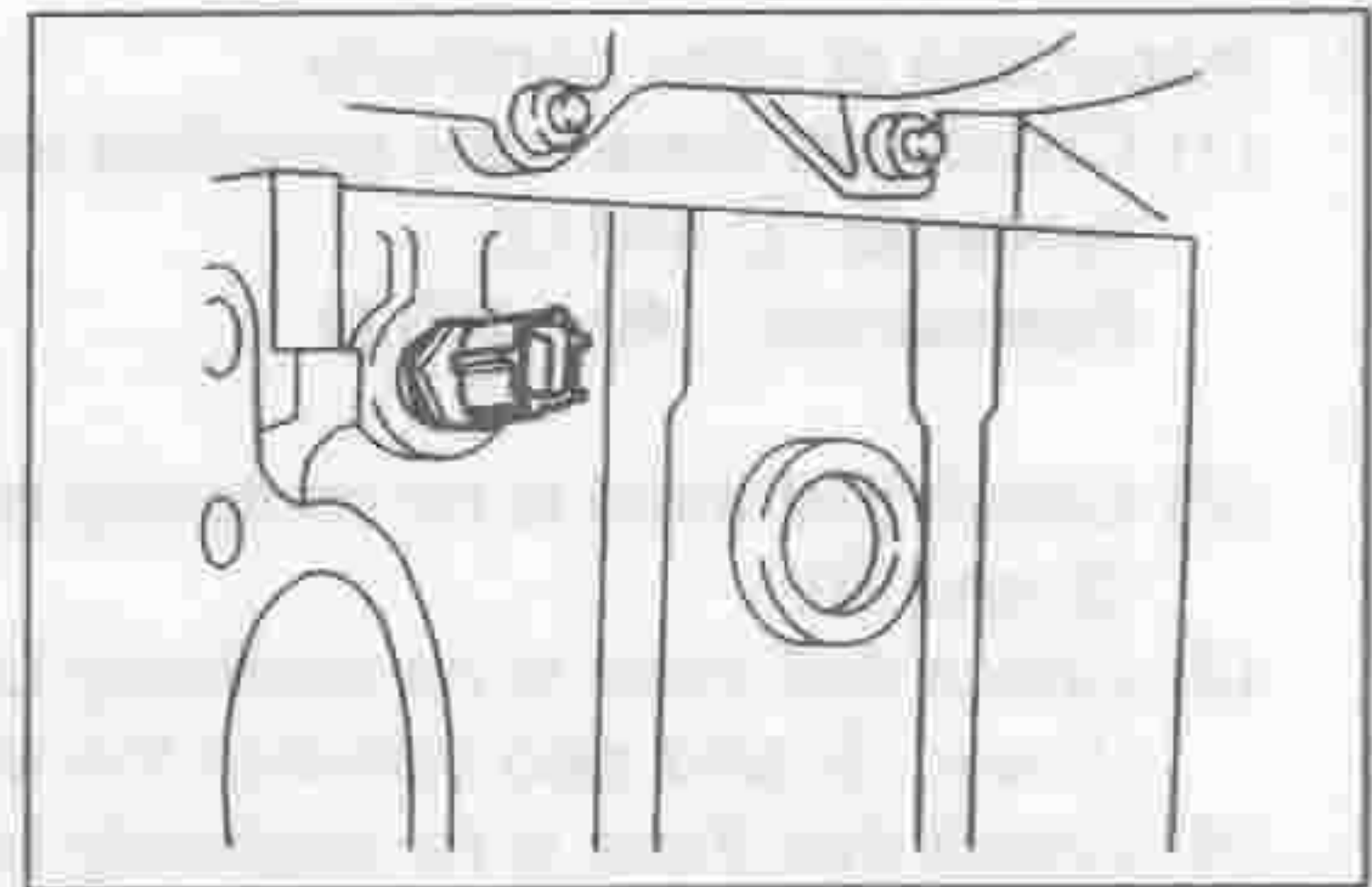
3. Measure the resistance between the terminals of the water temperature sensor.

Resistance: About 2.45 k Ω (at 20°C)

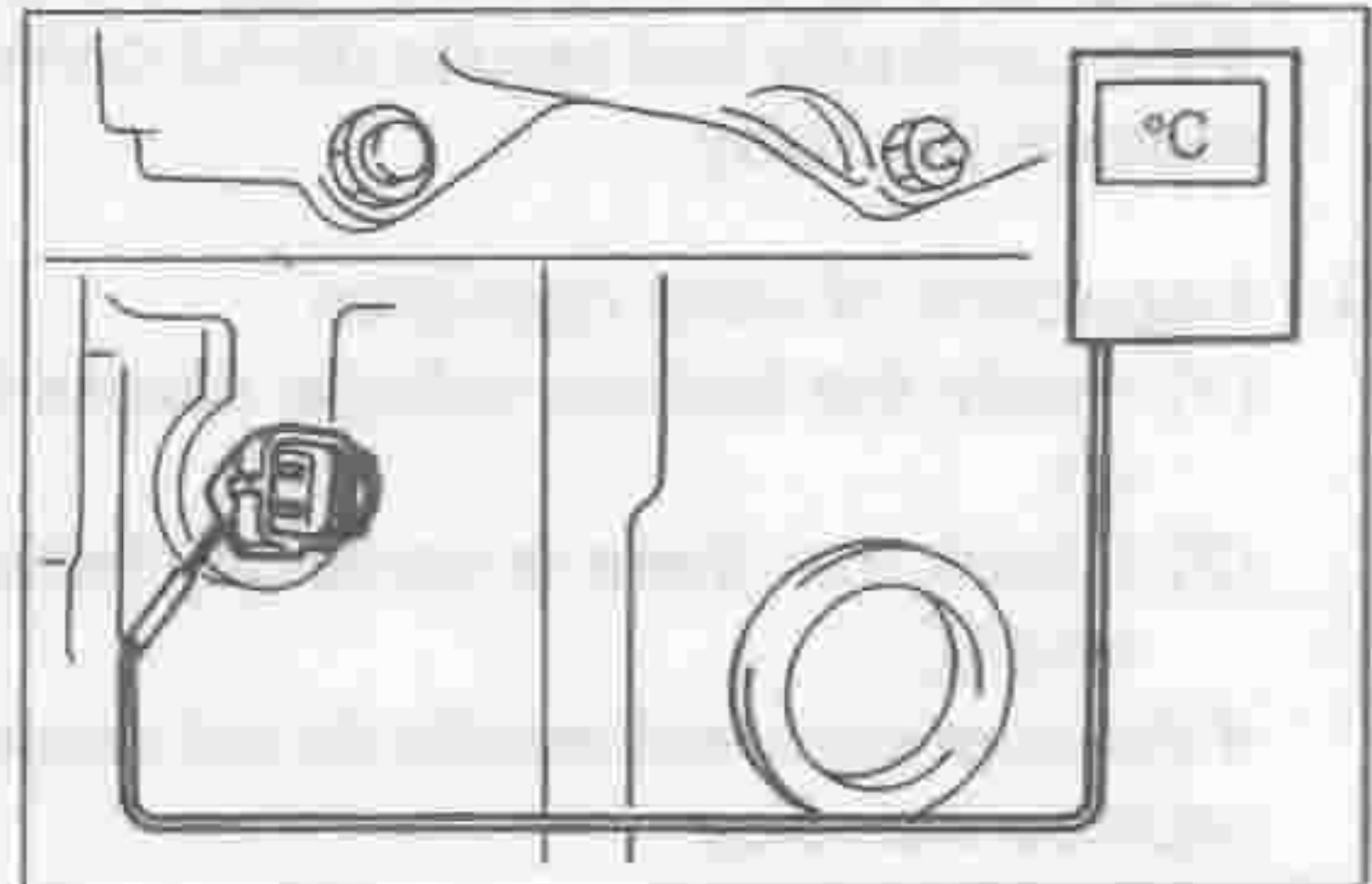
If the measured resistance does not conform to the specification, replace the water temperature sensor.

NOTE:

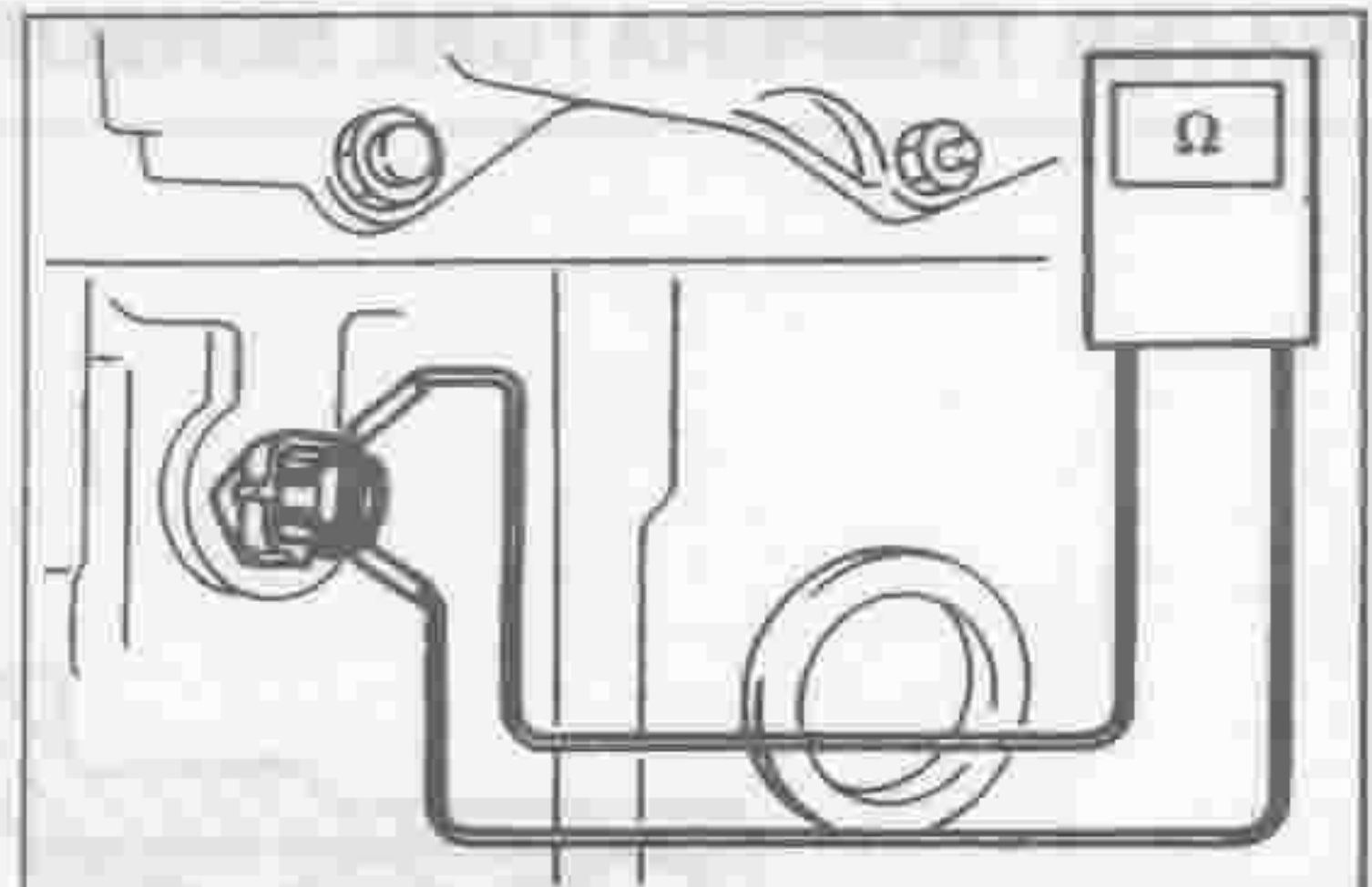
- Before the water temperature sensor is removed, drain the coolant.
- After completion of the sensor replacement, refill the coolant.



LEF00092-00064



LEF00093-00065



LEF00094-00066

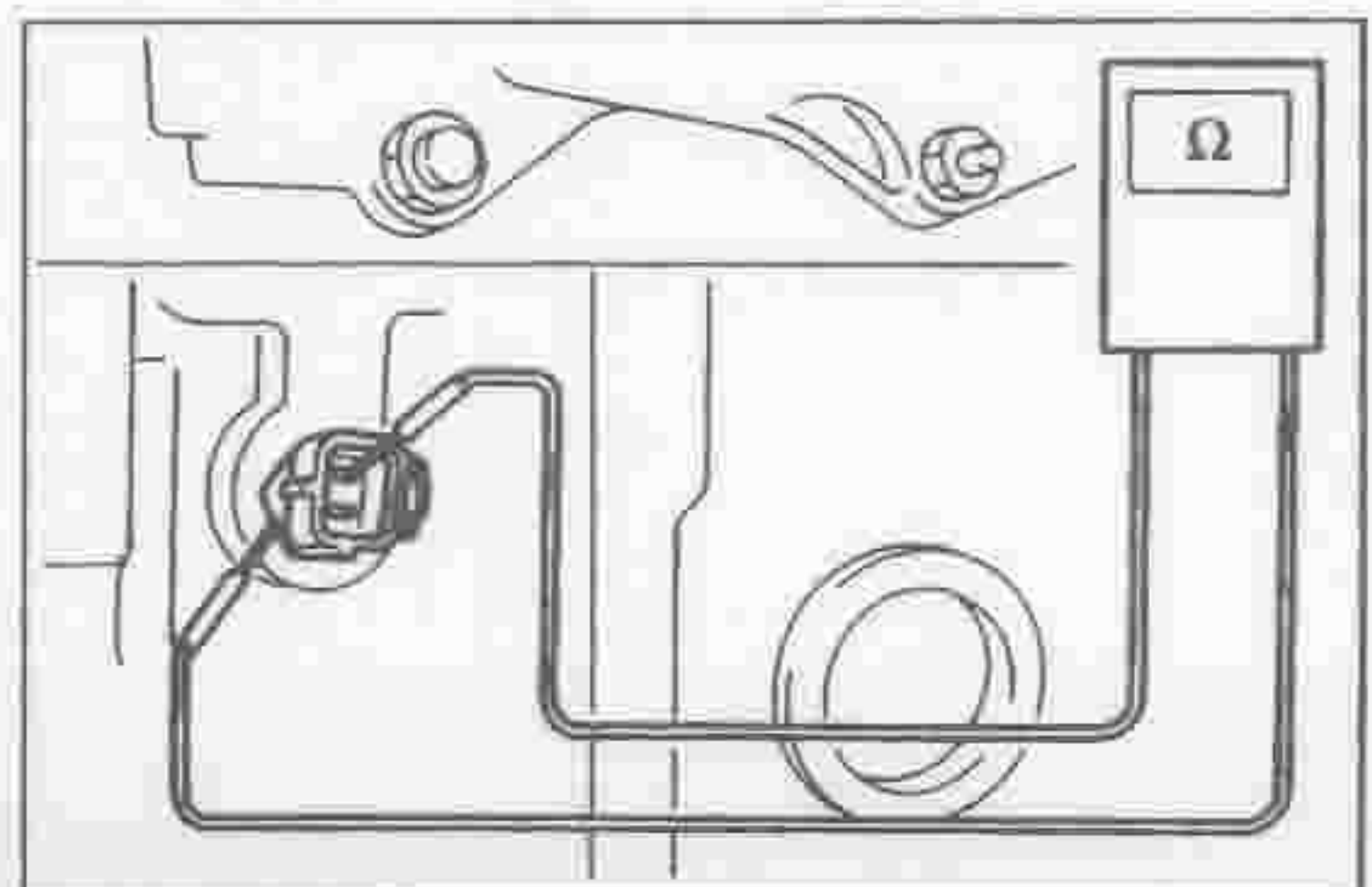
LEF00095-00000

4. Check that there is no continuity between each terminal of the water temperature sensor and the body.

If there is continuity, replace the water temperature sensor.

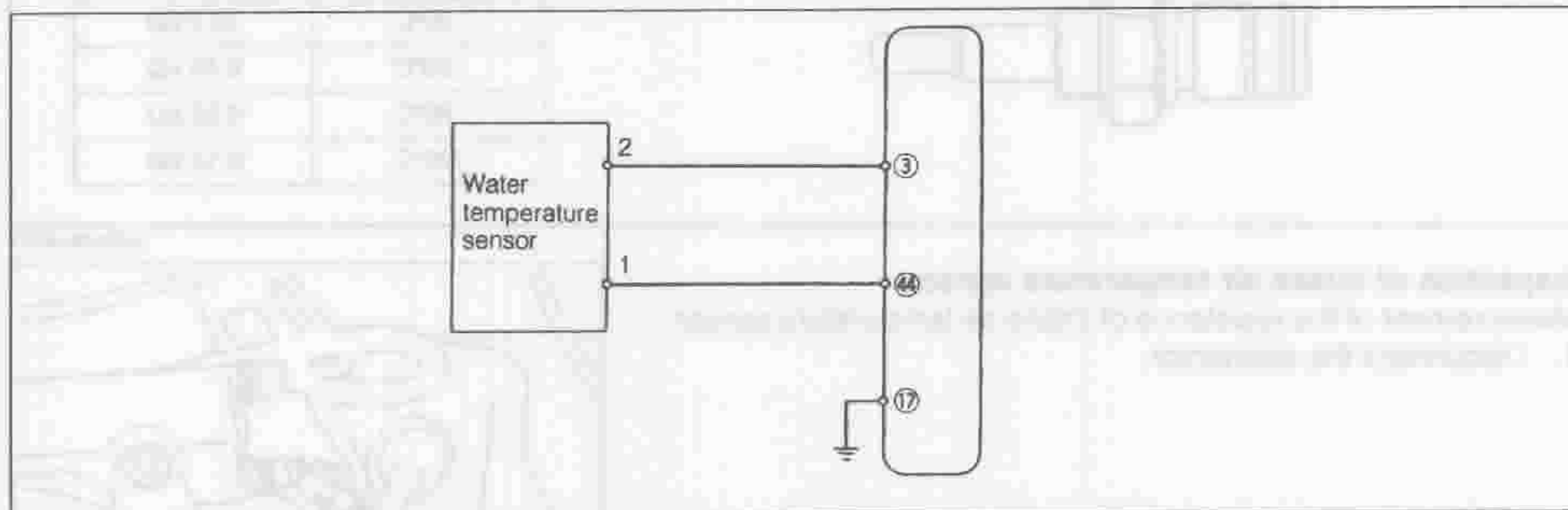
NOTE:

- Before the water temperature sensor is removed, drain the coolant.
- After completion of the sensor replacement, refill the coolant.



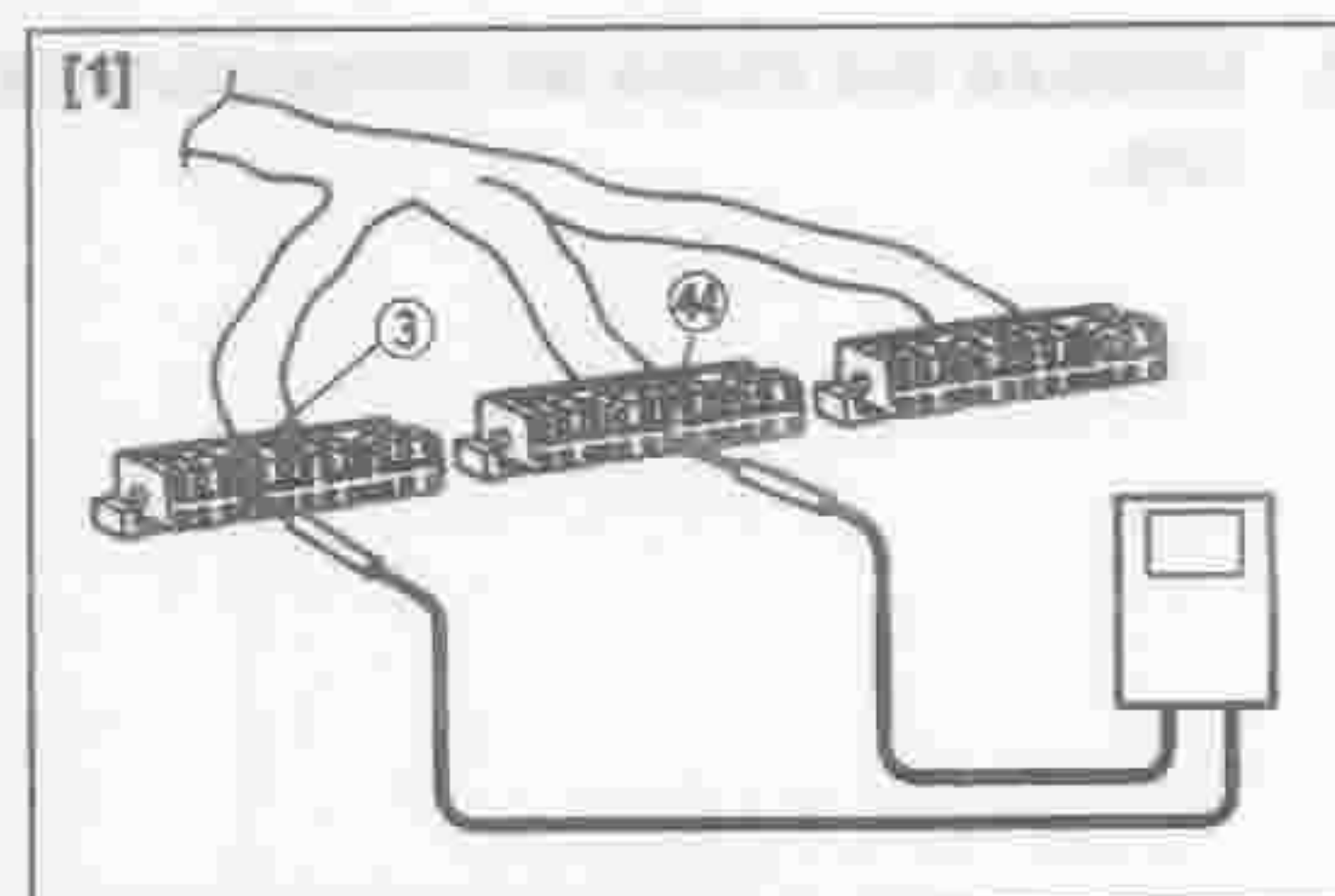
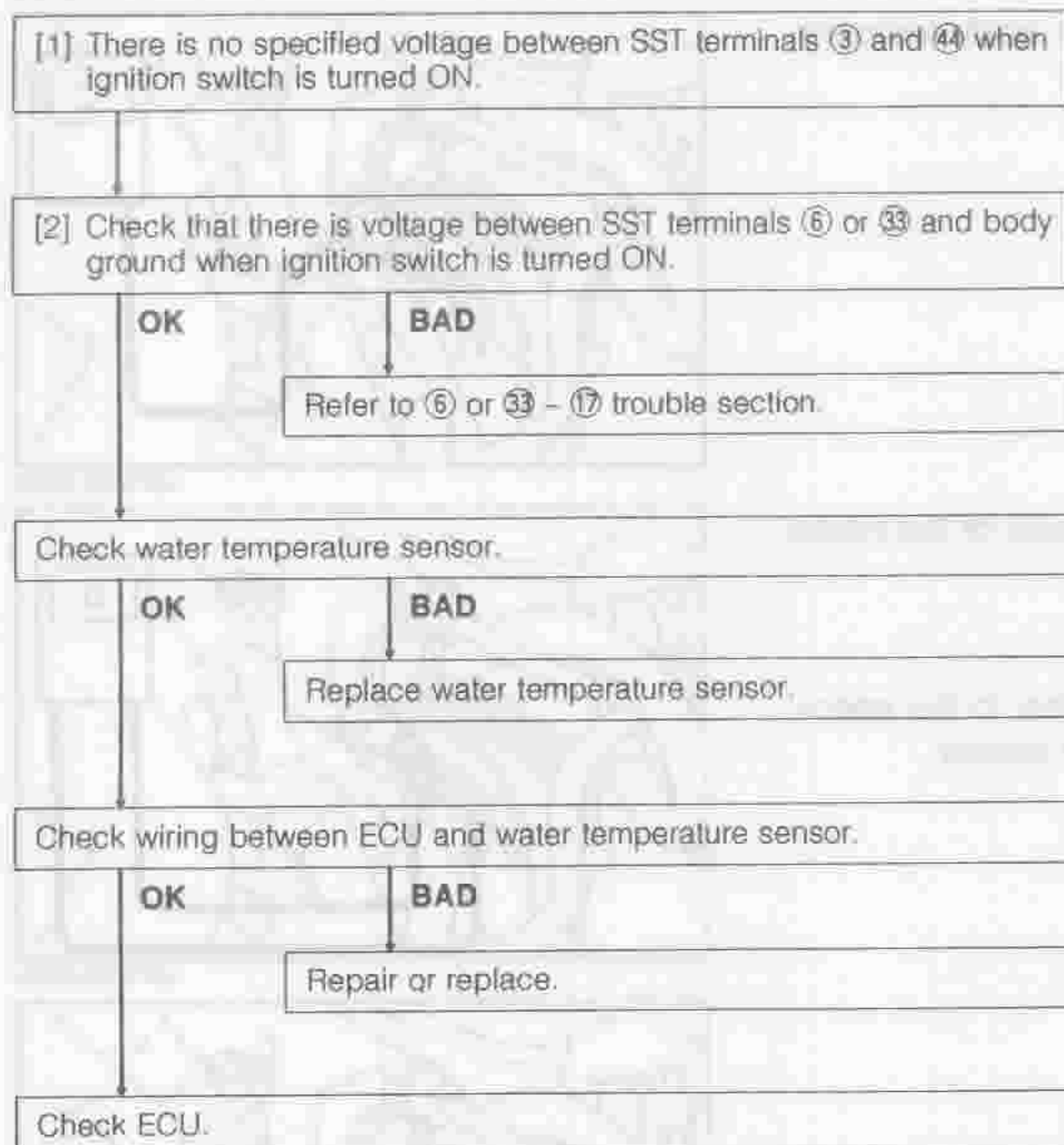
LEF00096-00067

Terminals	Trouble	Conditions		STD voltage
③ - ④④	No voltage	Ignition switch ON	Coolant temperature 20°C	About 0.9 - 3.0

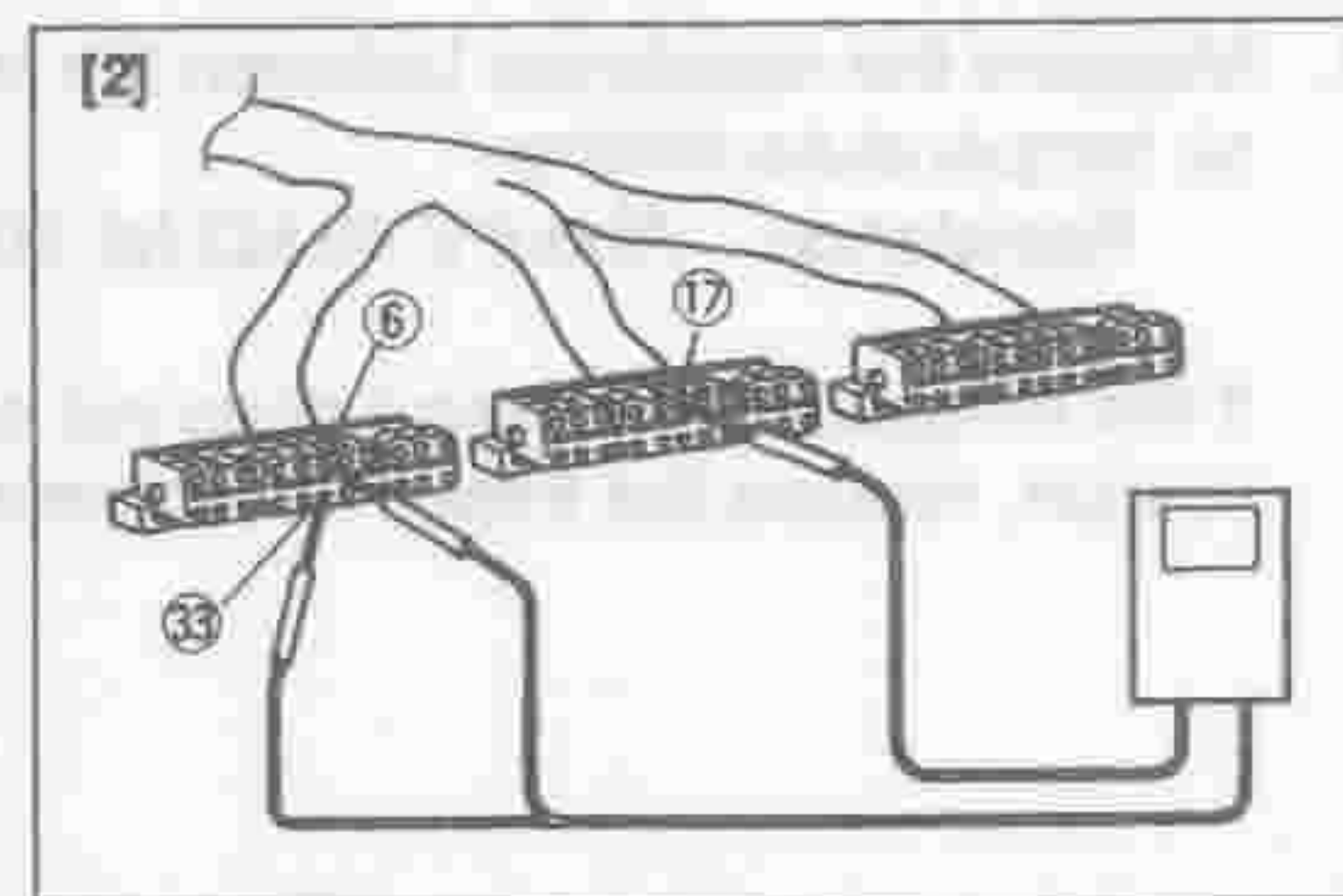


LEF00097-00068

If the SST (09842-87502-000) has not been installed yet, install the SST, referring to the section under "Preparation of Trouble-shooting" at page EF-30.

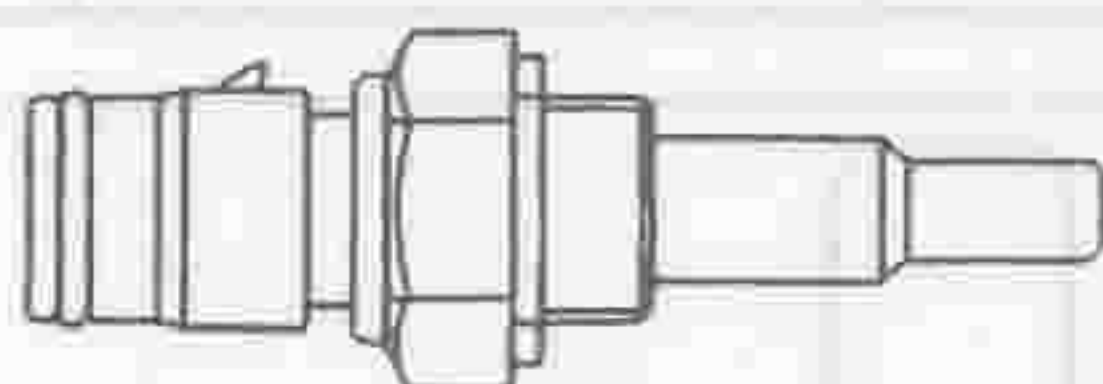


LEF00000-00069



LEF00098-00070

INTAKE AIR TEMPERATURE SENSOR (ED-20 Engine Only)



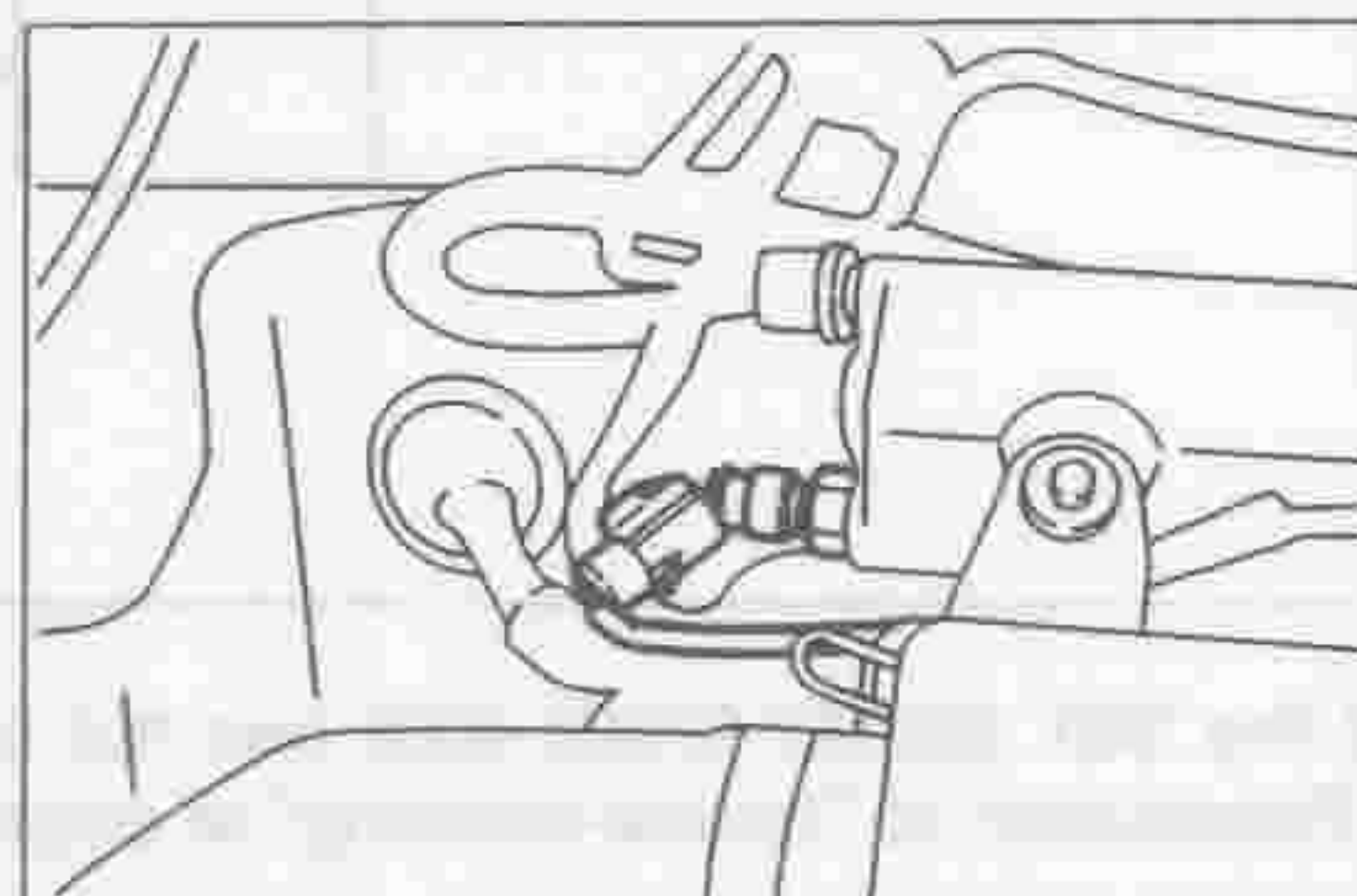
Temperature	Resistance
-30°C	28.6 kΩ
-20°C	16.2 kΩ
20°C	2.45 kΩ
80°C	0.32 kΩ
120°C	0.12 kΩ

LEF00099-00071

Inspection of intake air temperature sensor

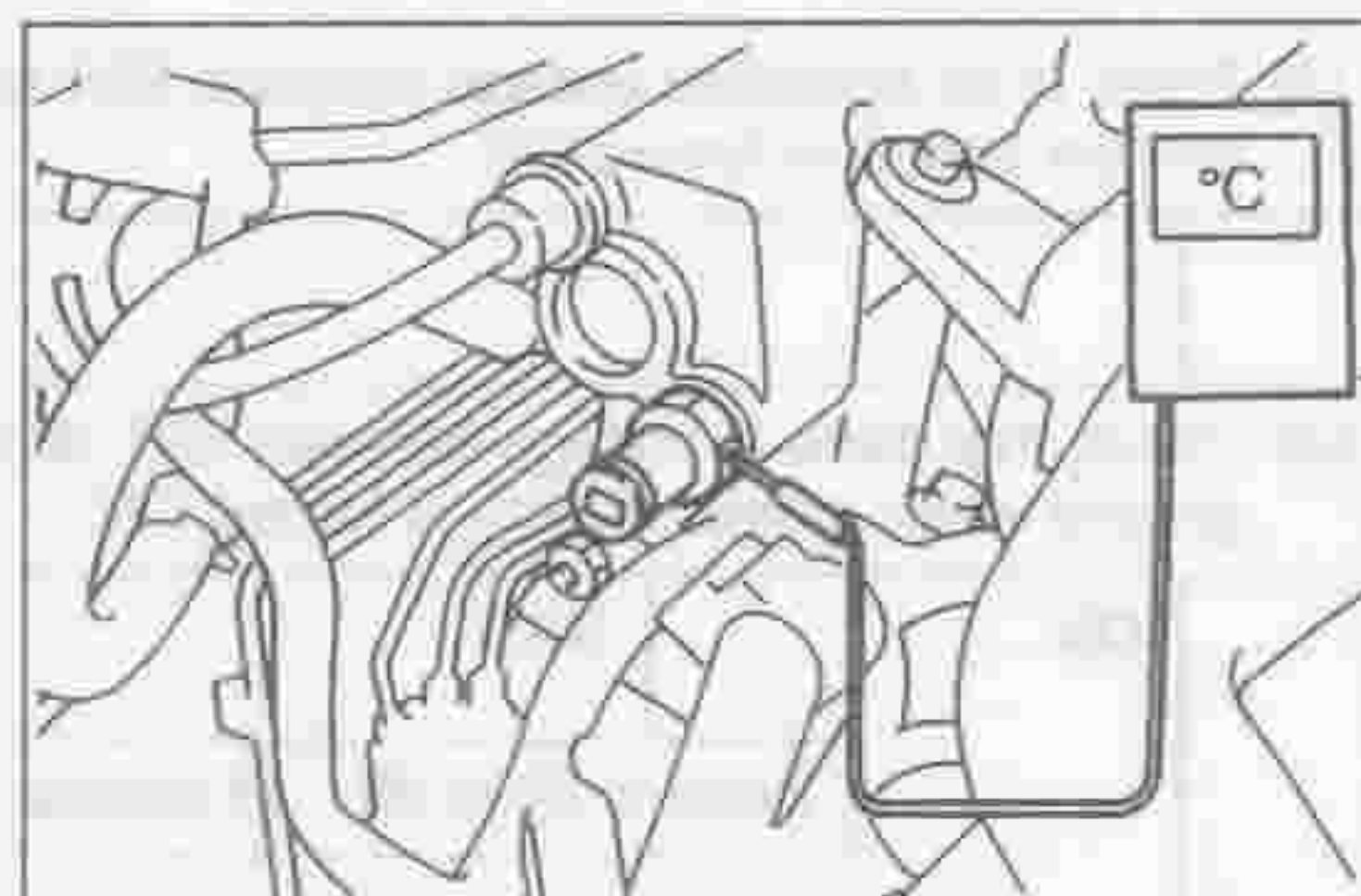
Measurement of the resistance of intake air temperature sensor

1. Disconnect the connector.



LEF00100-00072

2. Measure the intake air temperature sensor body temperature.

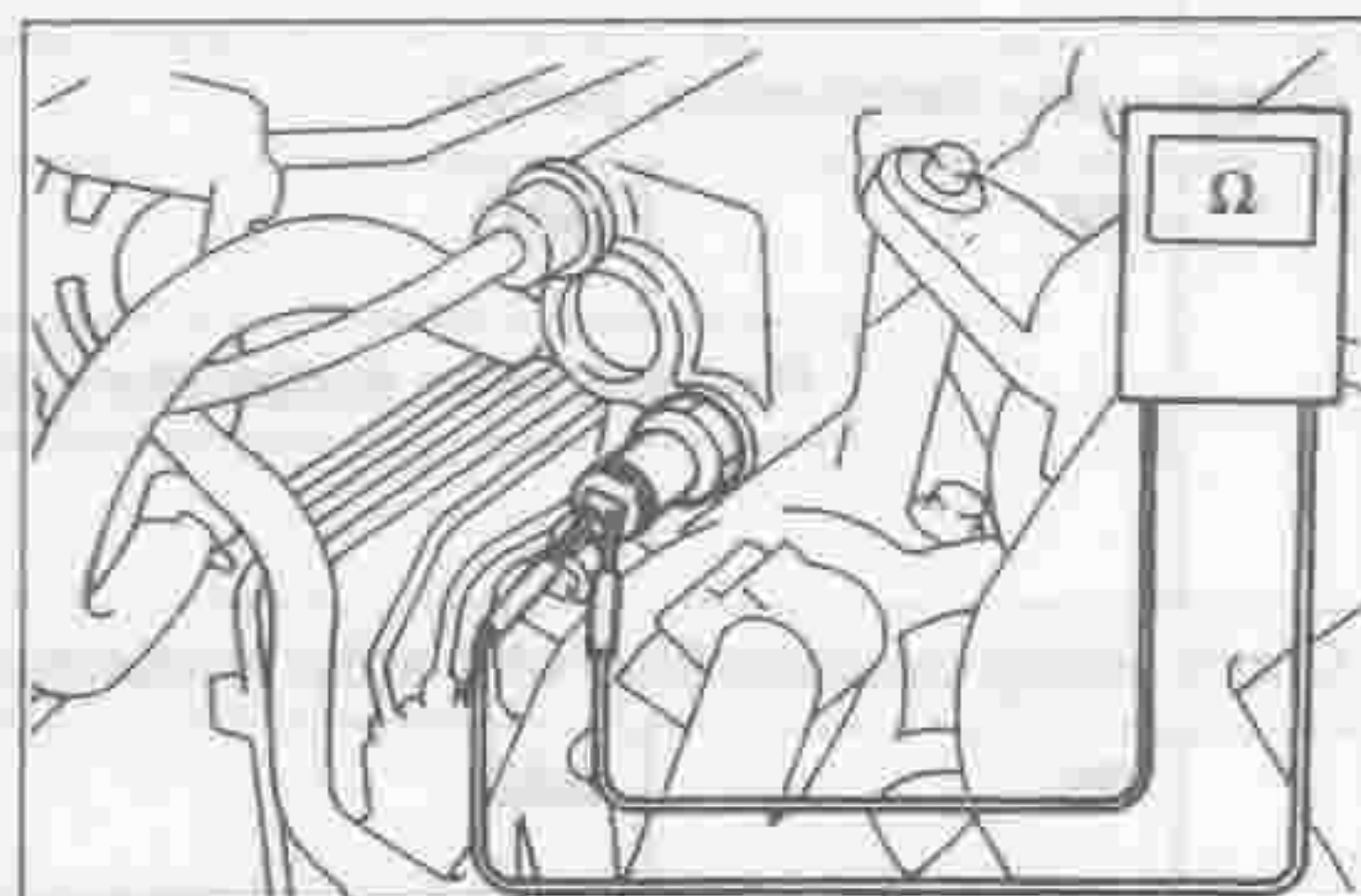


LEF00101-00073

3. Measure the resistance between the terminals of the intake air temperature sensor.

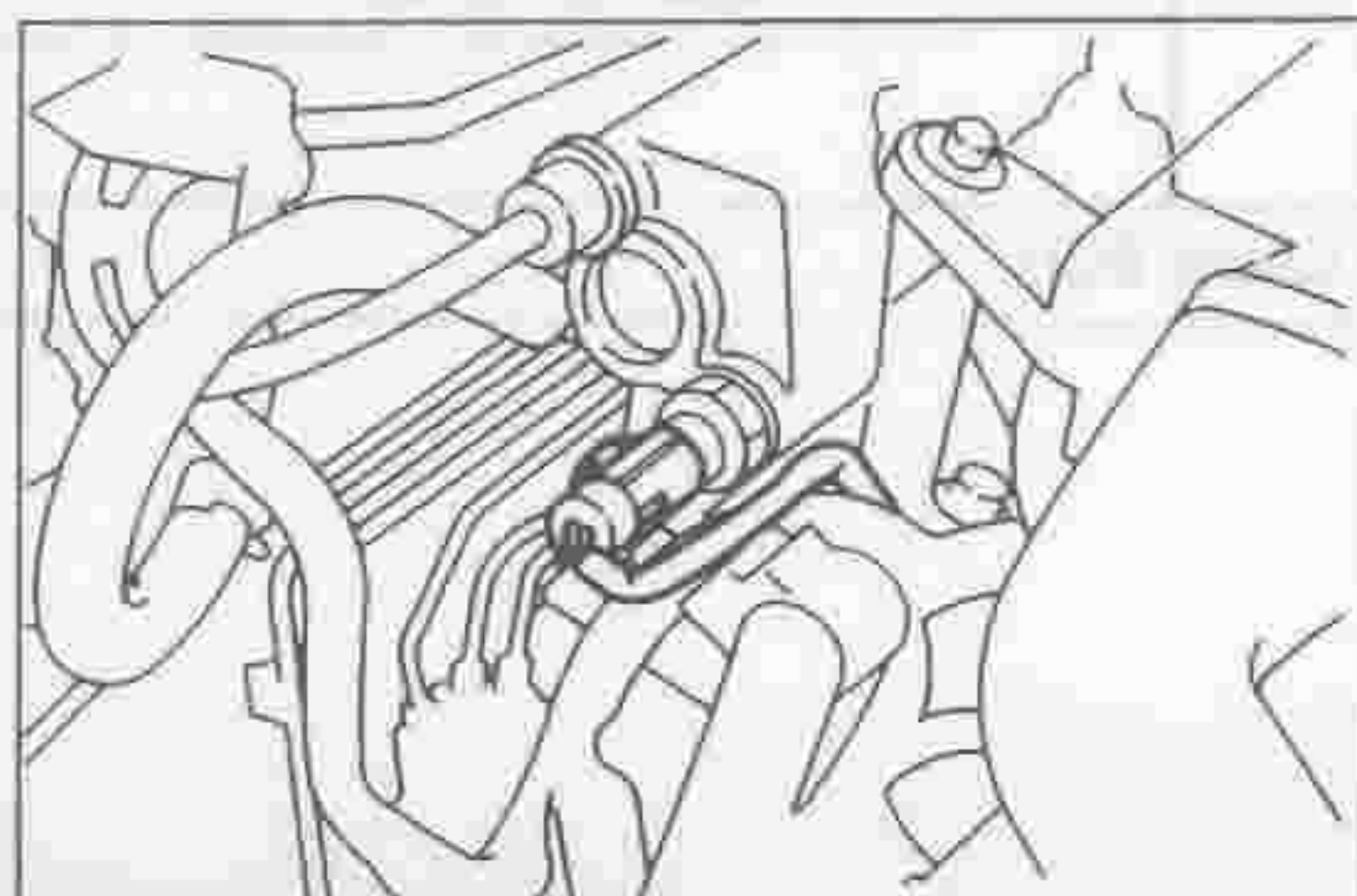
Resistance: About 2.45 kΩ (at 20°C)

If the measured resistance does not conform to the specification, replace the intake air temperature sensor.



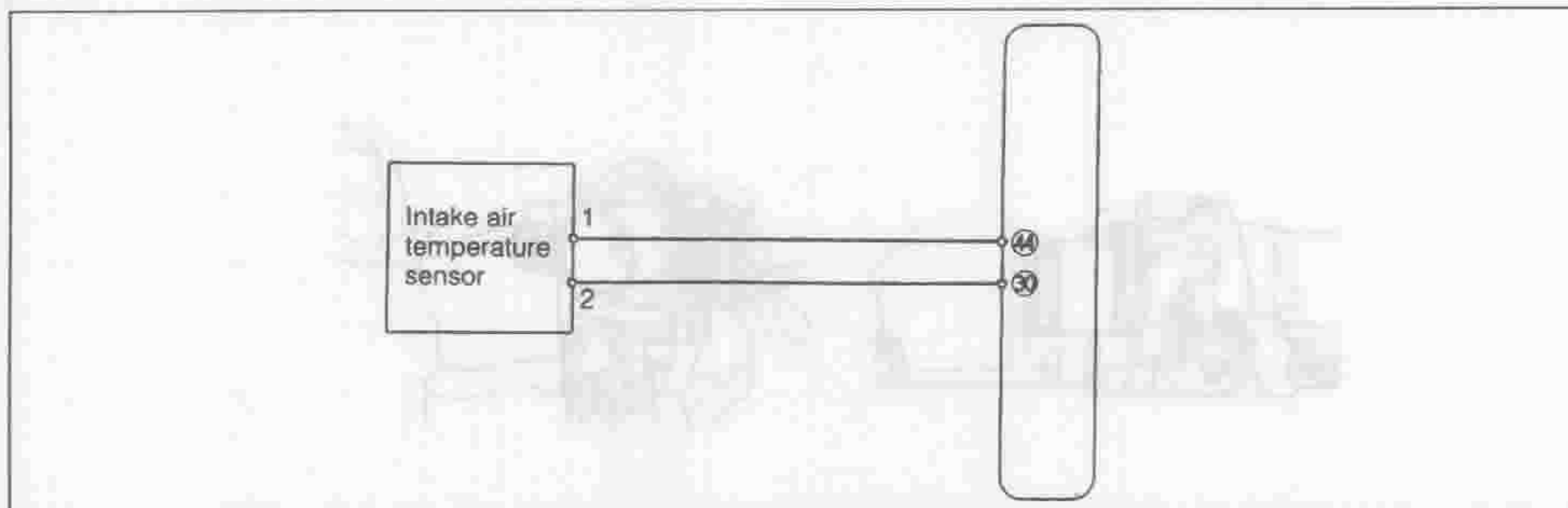
LEF00102-00074

4. Connect the connector.



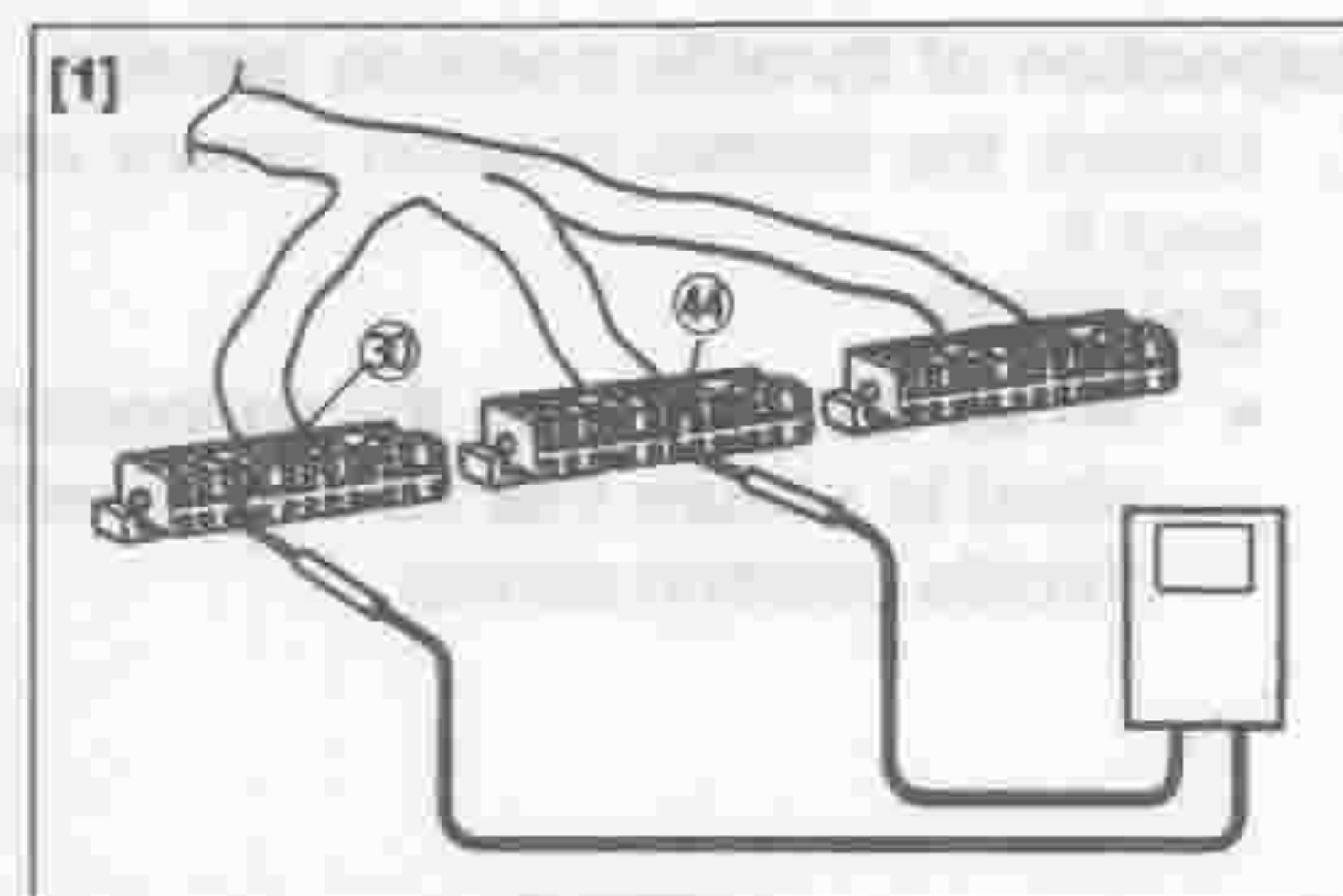
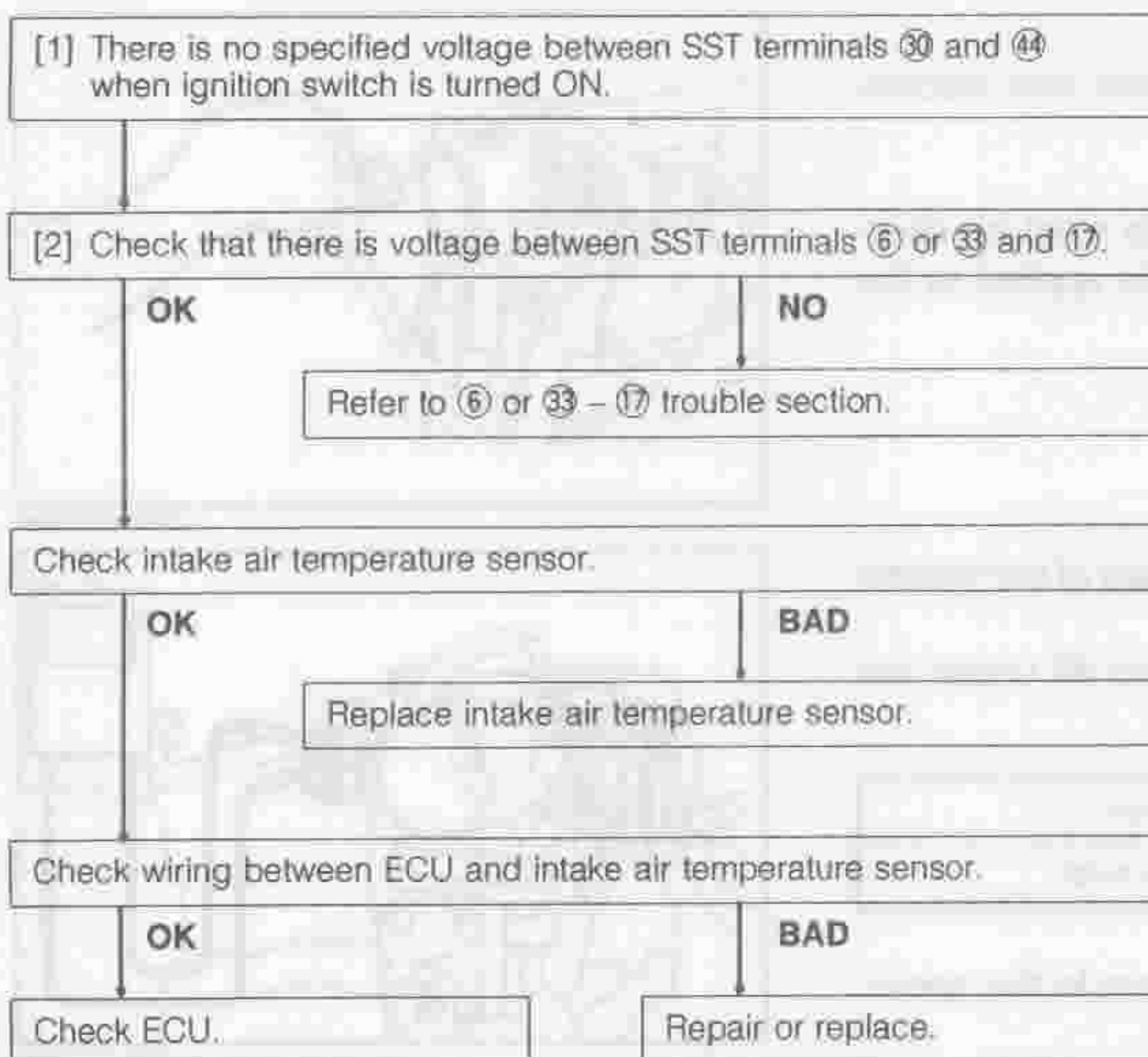
LEF00103-00075

Terminal	Trouble	Conditions		STD voltage
③ - ④④	No voltage	Ignition switch ON	Intake air temperature 20°C	About 0.9 - 3.0

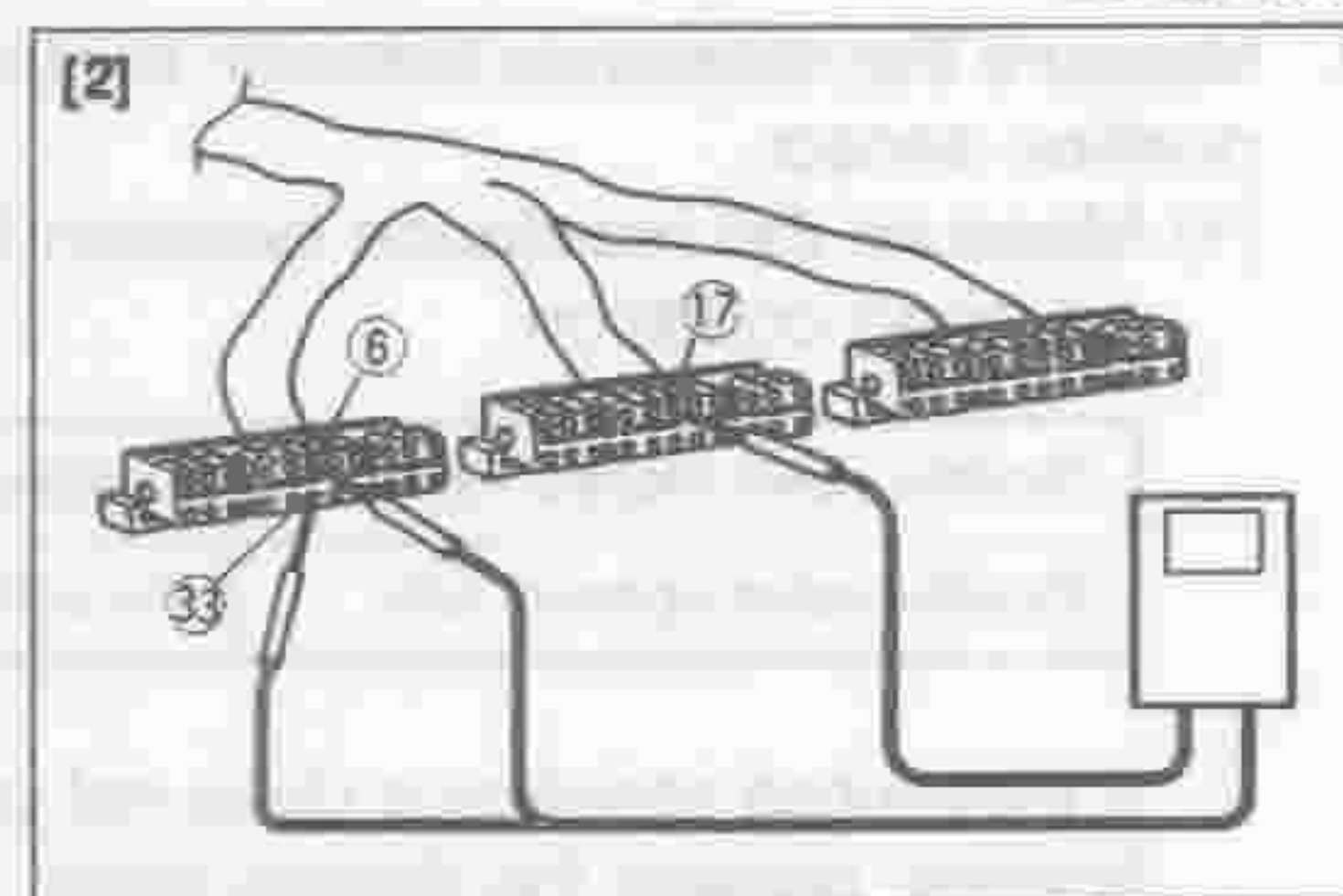


LEF00104-00076

If the SST (09842-87502-000) has not been installed yet, install the SST, referring to the section under "Preparation of Trouble-shooting" at page EF-30.

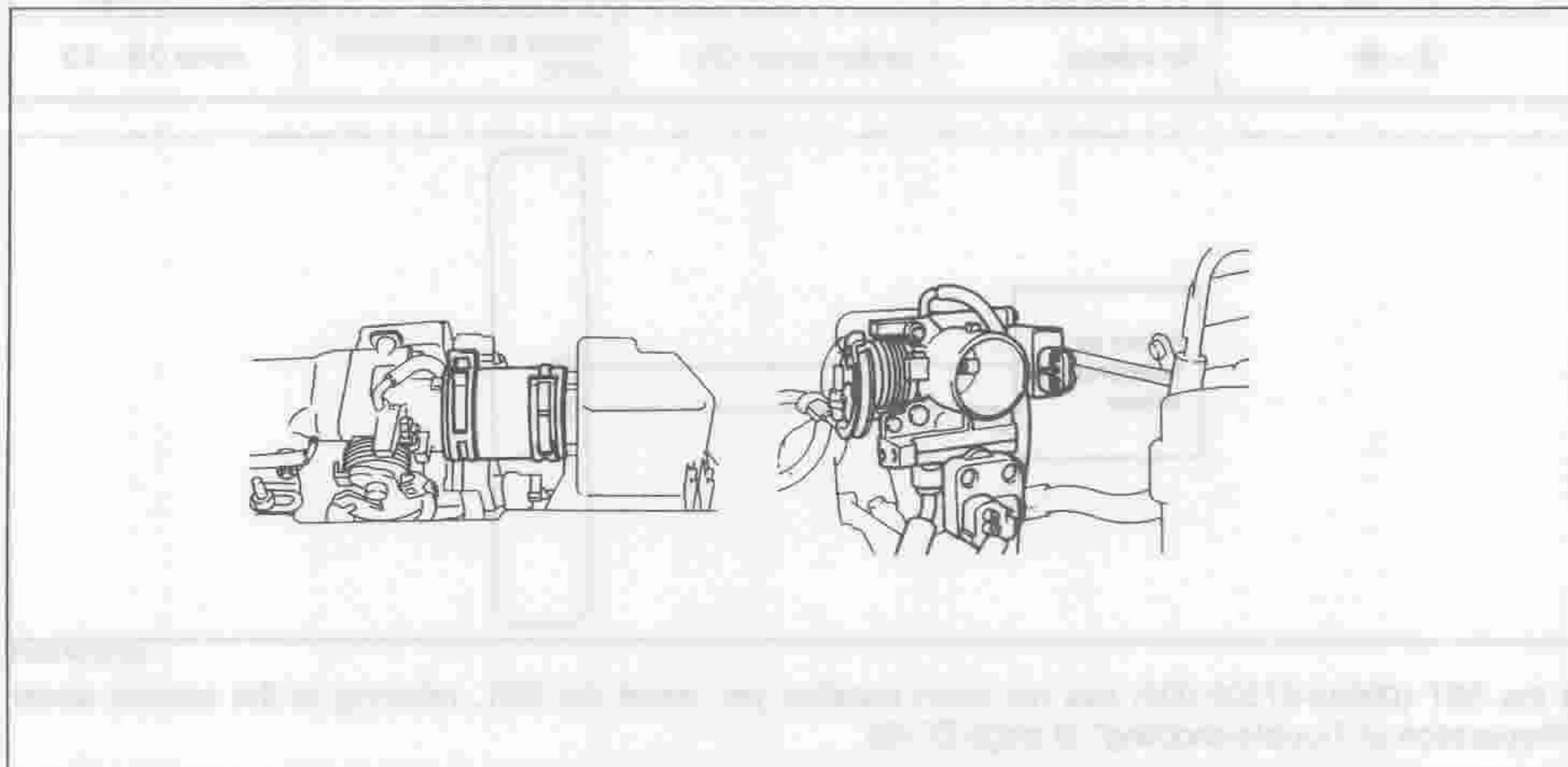


LEF00000-00077



LEF00105-00078

THROTTLE POSITION SENSOR



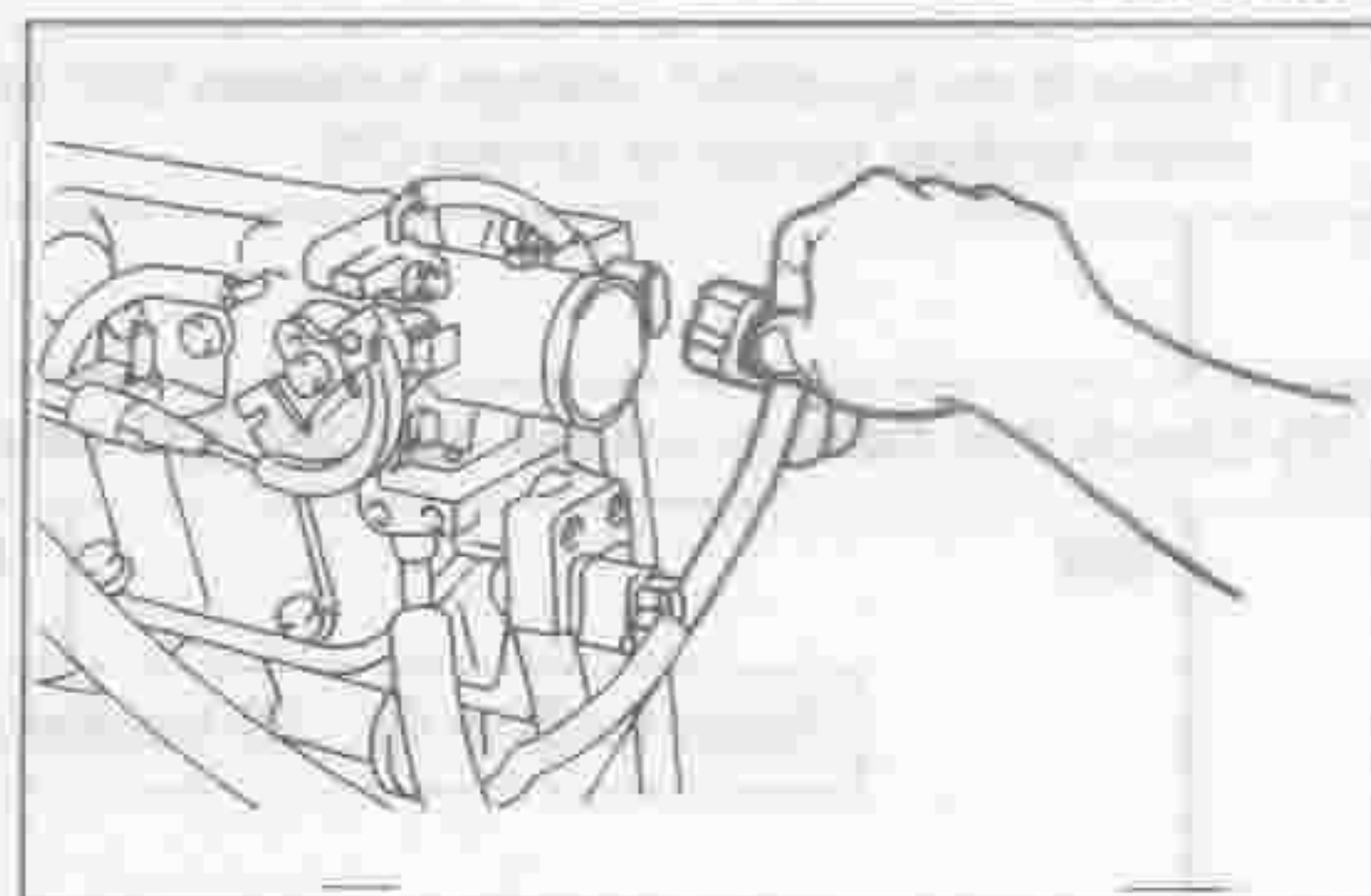
LEF00106-00079

Inspection of throttle position sensor

1. Unlock the throttle position sensor connector and disconnect it.

CAUTION:

- When disconnecting the connector, care must be exercised to ensure that no excessive load is applied to the throttle position sensor.



LEF00107-00080

2. Measure the resistance between the terminals of the throttle position sensor.

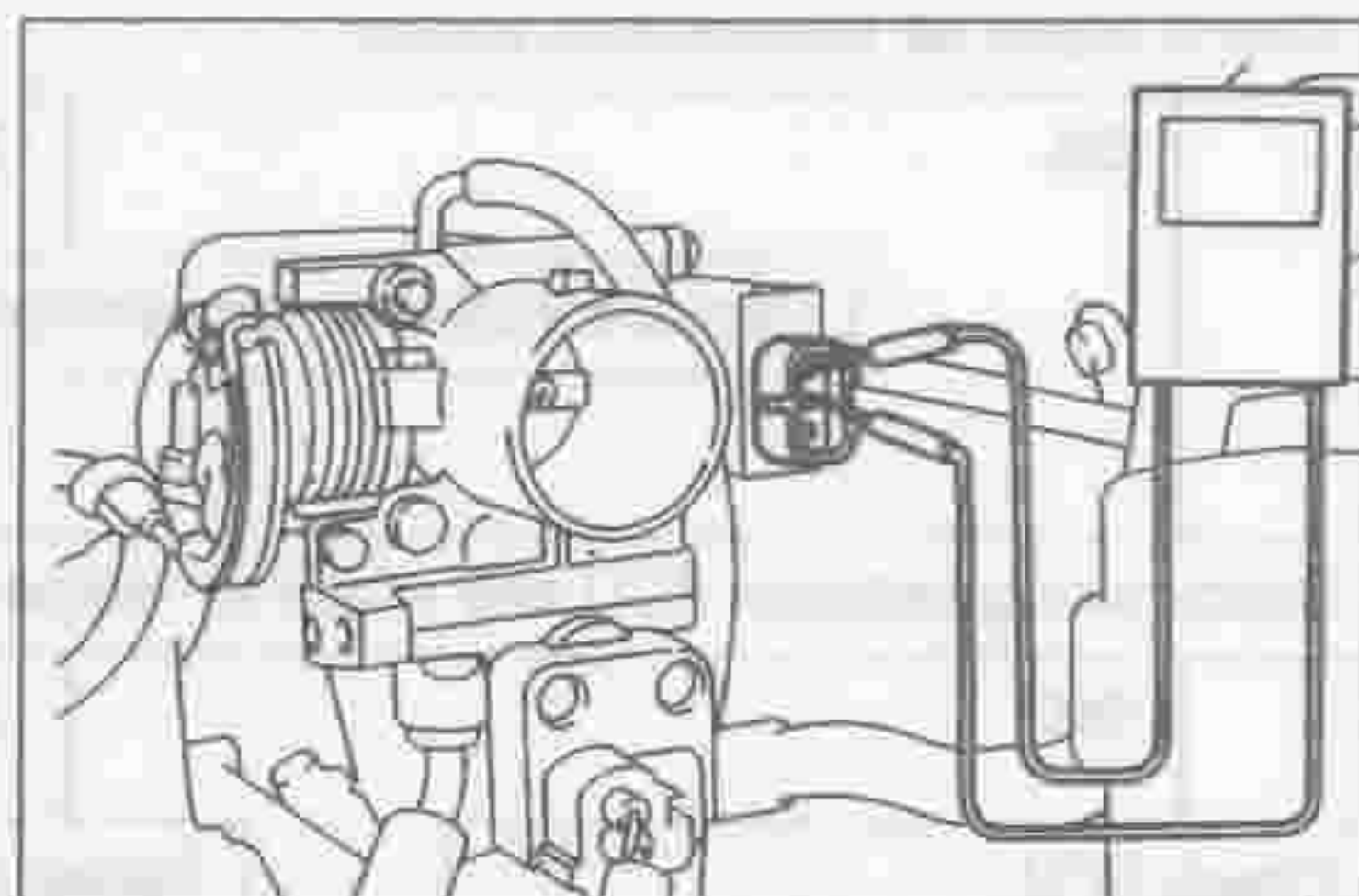
- (1) Measure the resistance between ⑮ and ④④ under the following condition.

Throttle valve closed fully	Continuity exist
Throttle valve opened fully	No continuity exist

If measured resistance does not conform to the specification, replace the throttle body.

CAUTION:

- Be very careful not to damage the terminal.



LEF00108-00081

- (2) Measure the resistance between ④⑤ and ④④ under the following condition.

Throttle valve closed fully	No continuity exist
Throttle valve opened fully	Continuity exist

If measured resistance does not conform to the specification, replace the throttle body.

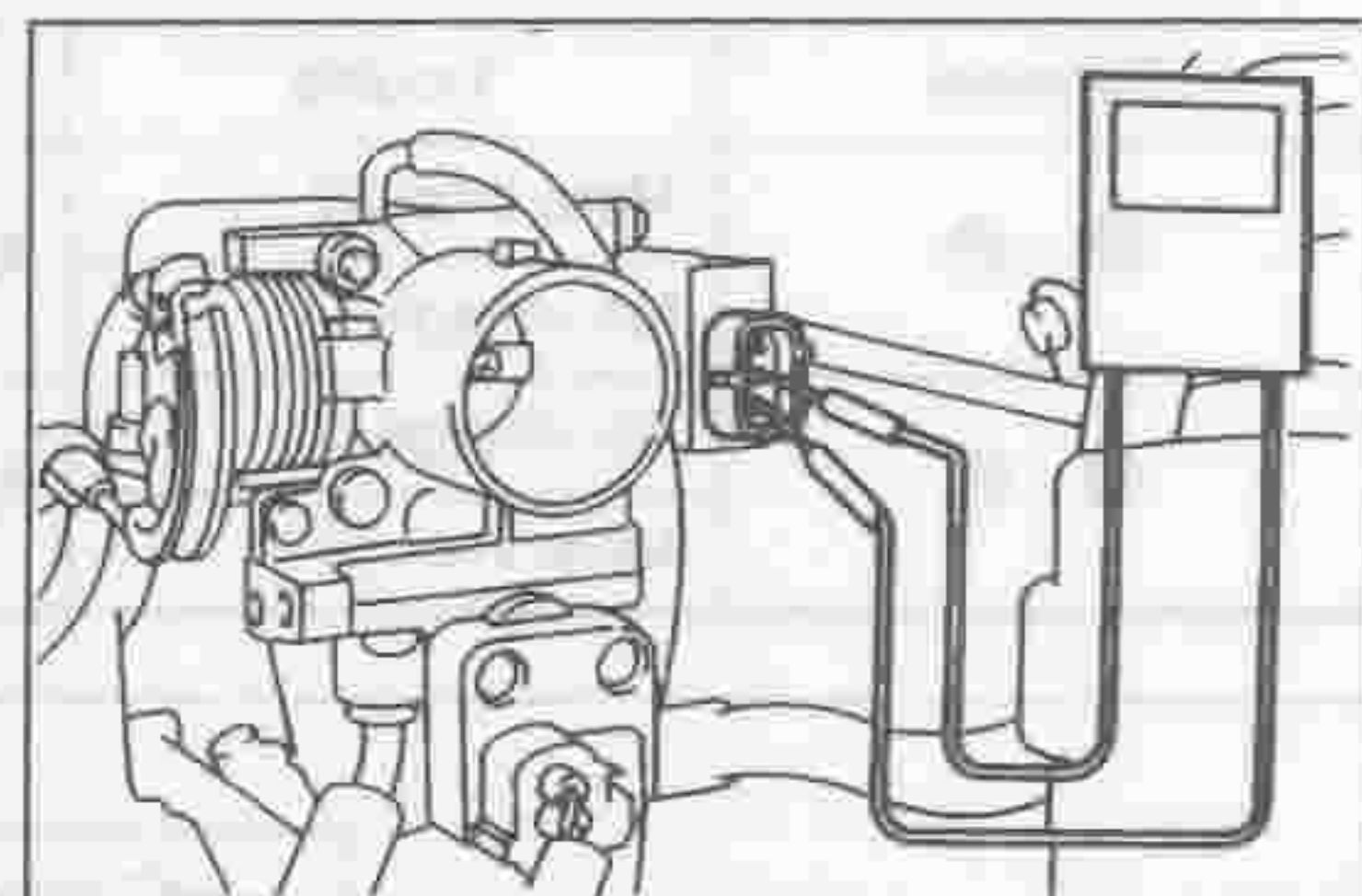
CAUTION:

- Be very careful not to damage the terminal.

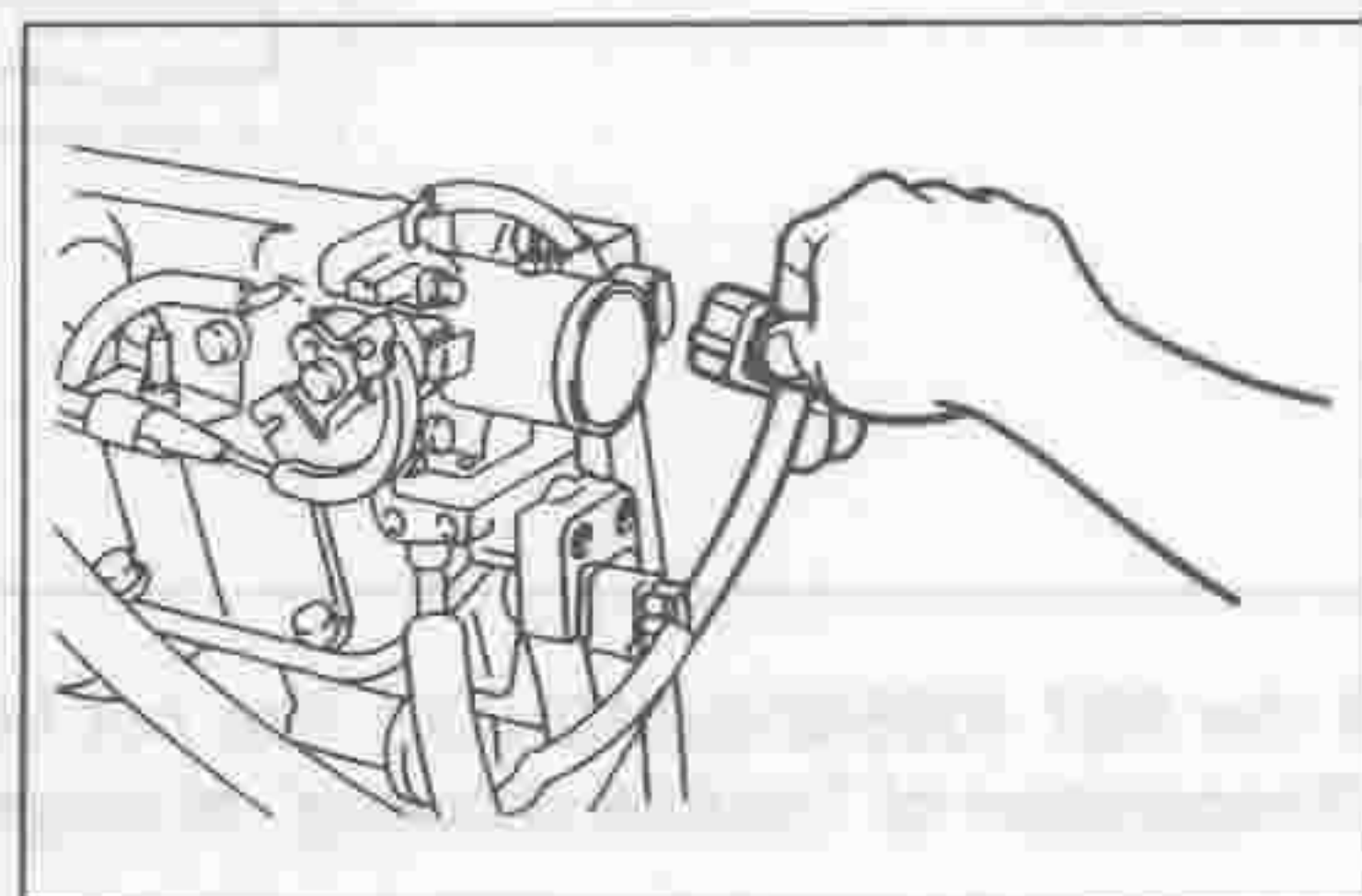
3. Connect the throttle position sensor connector.

CAUTION:

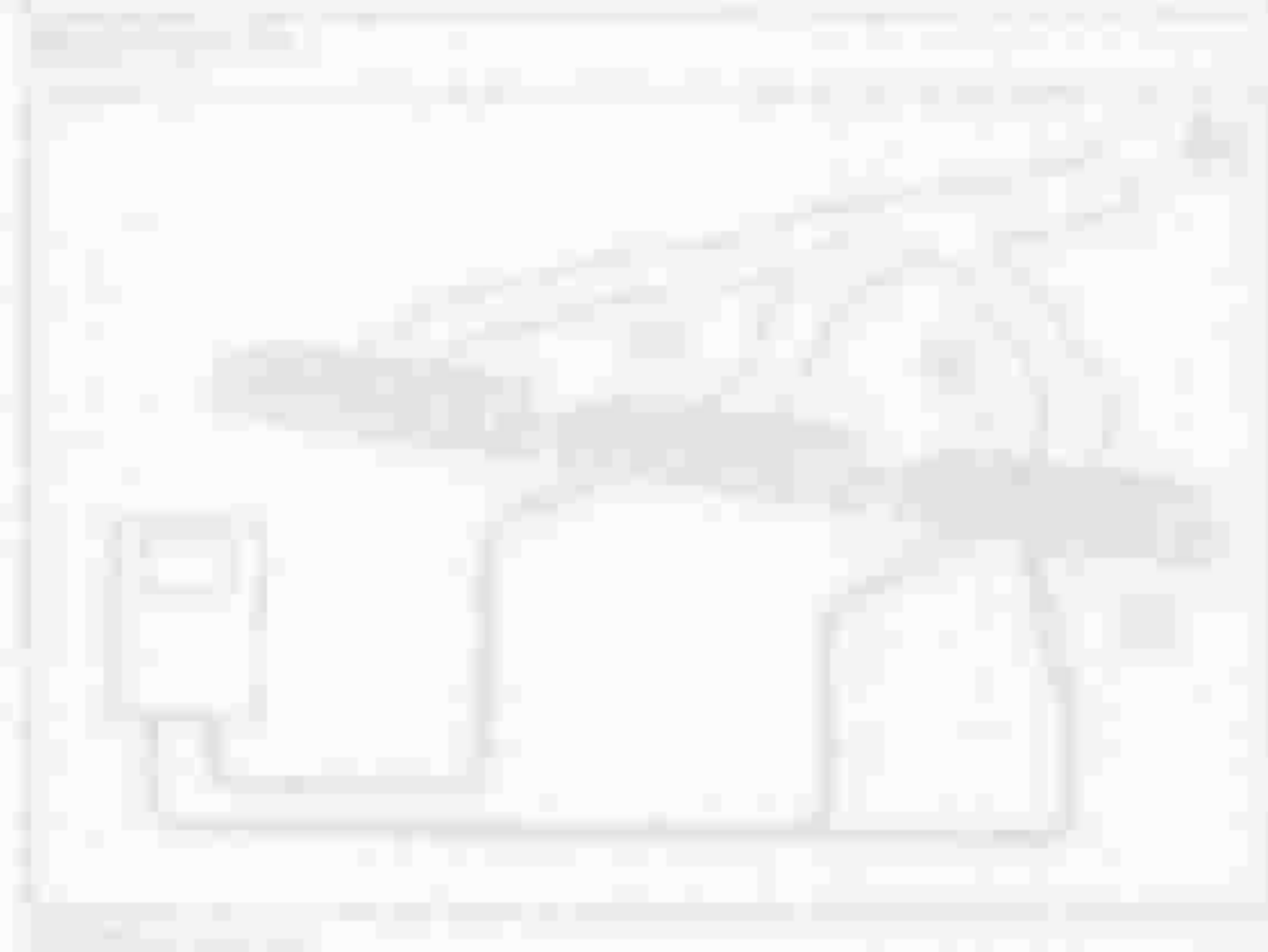
- When connecting the connector, care must be exercised to ensure that no excessive load is applied to the throttle position sensor.

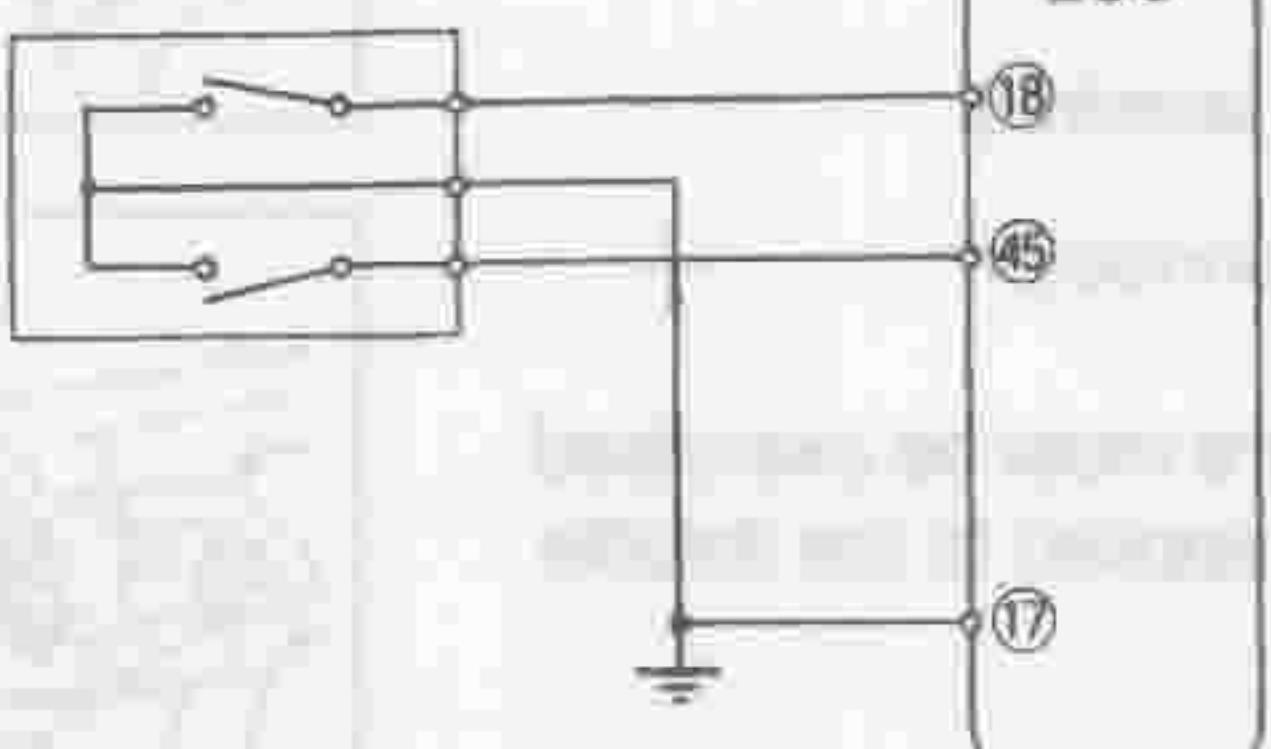


LEF00109-00082



LEF00110-00083

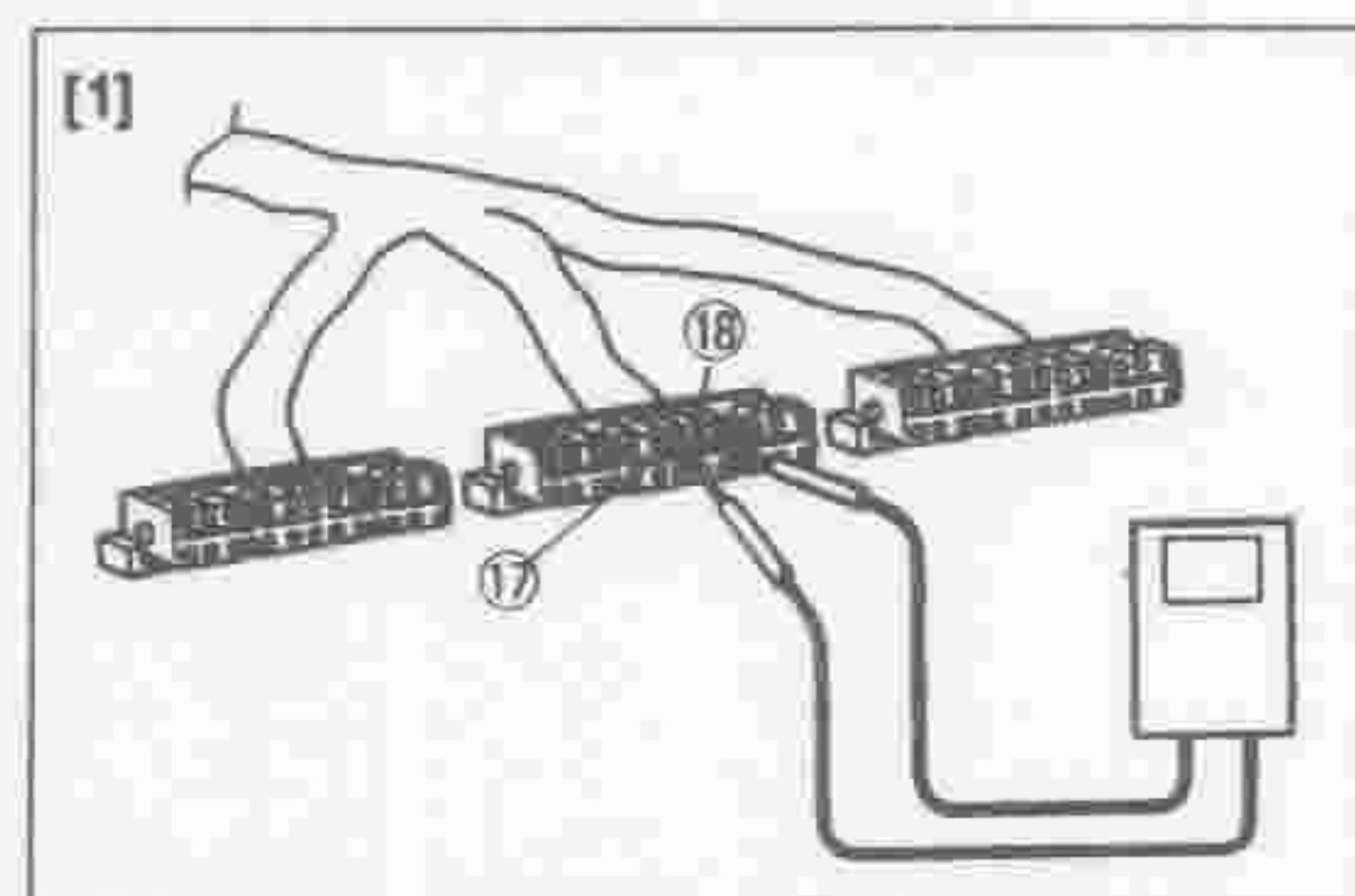
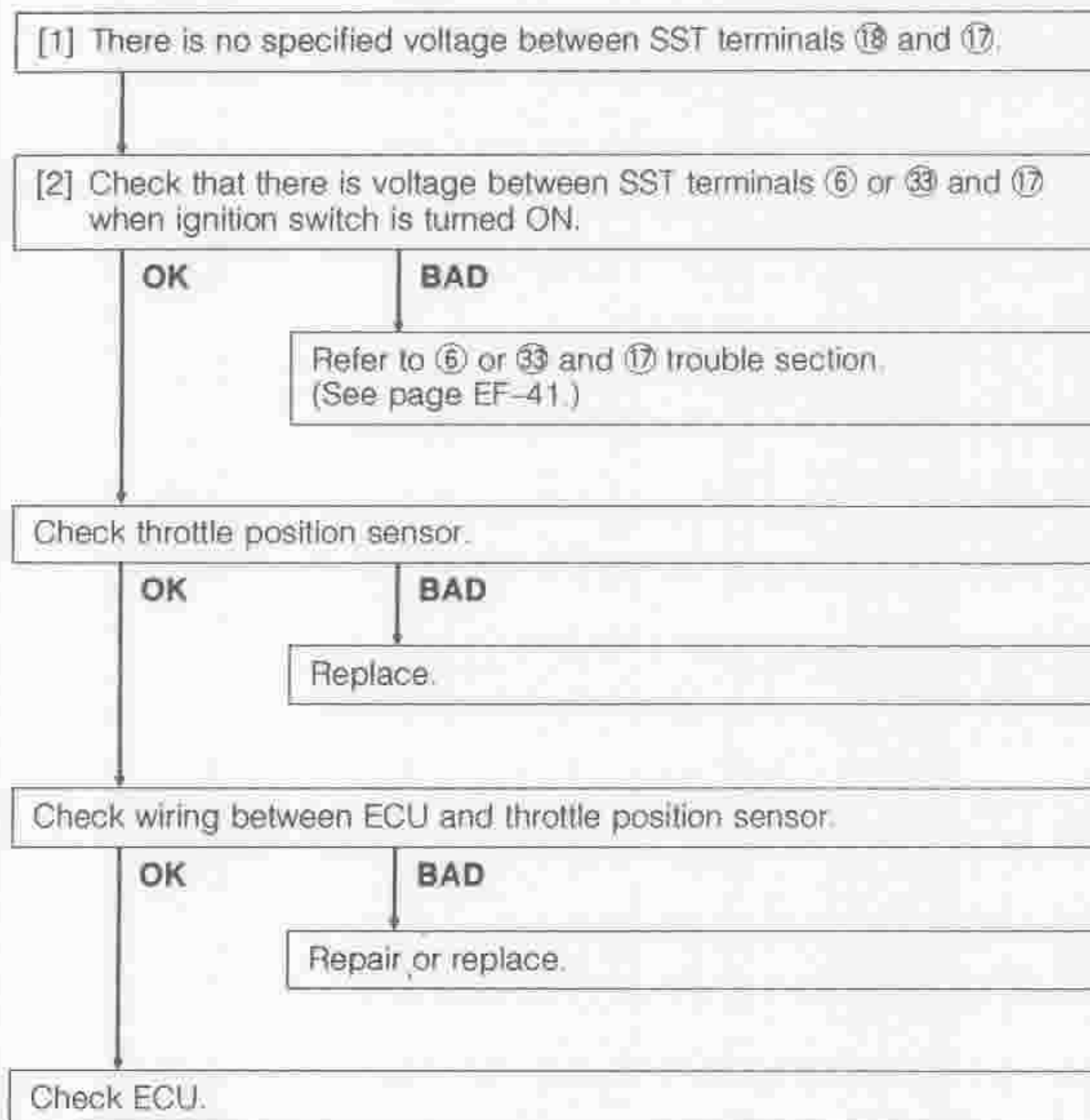


Terminal	Trouble	Condition	STD voltage
		ECU	

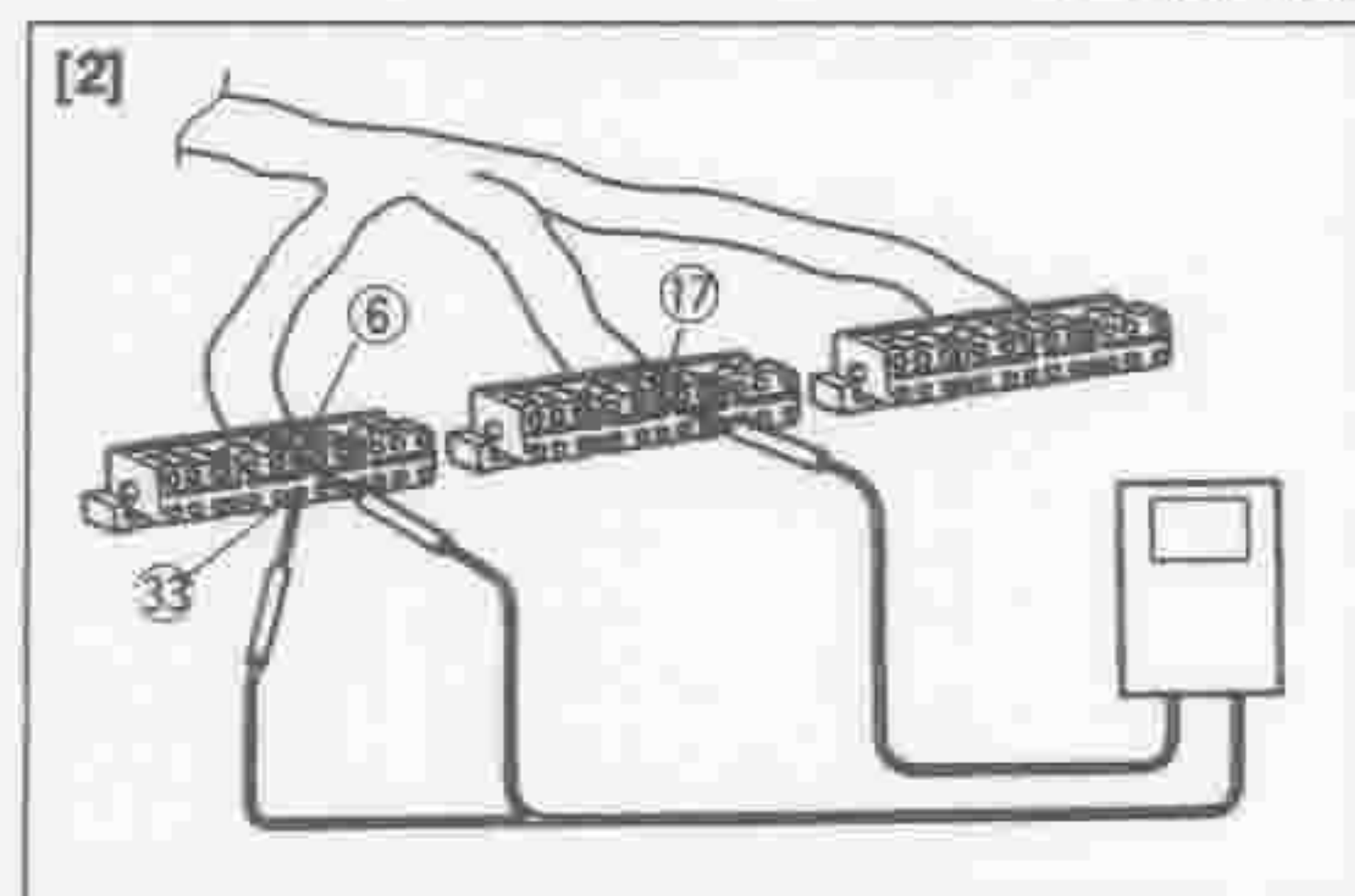
LEF00111-00064

If the SST (09842-87502-000) has not been installed yet, install the SST, referring to the section number "Preparation of Trouble-shooting" at page EF-30.

• 18 - 44

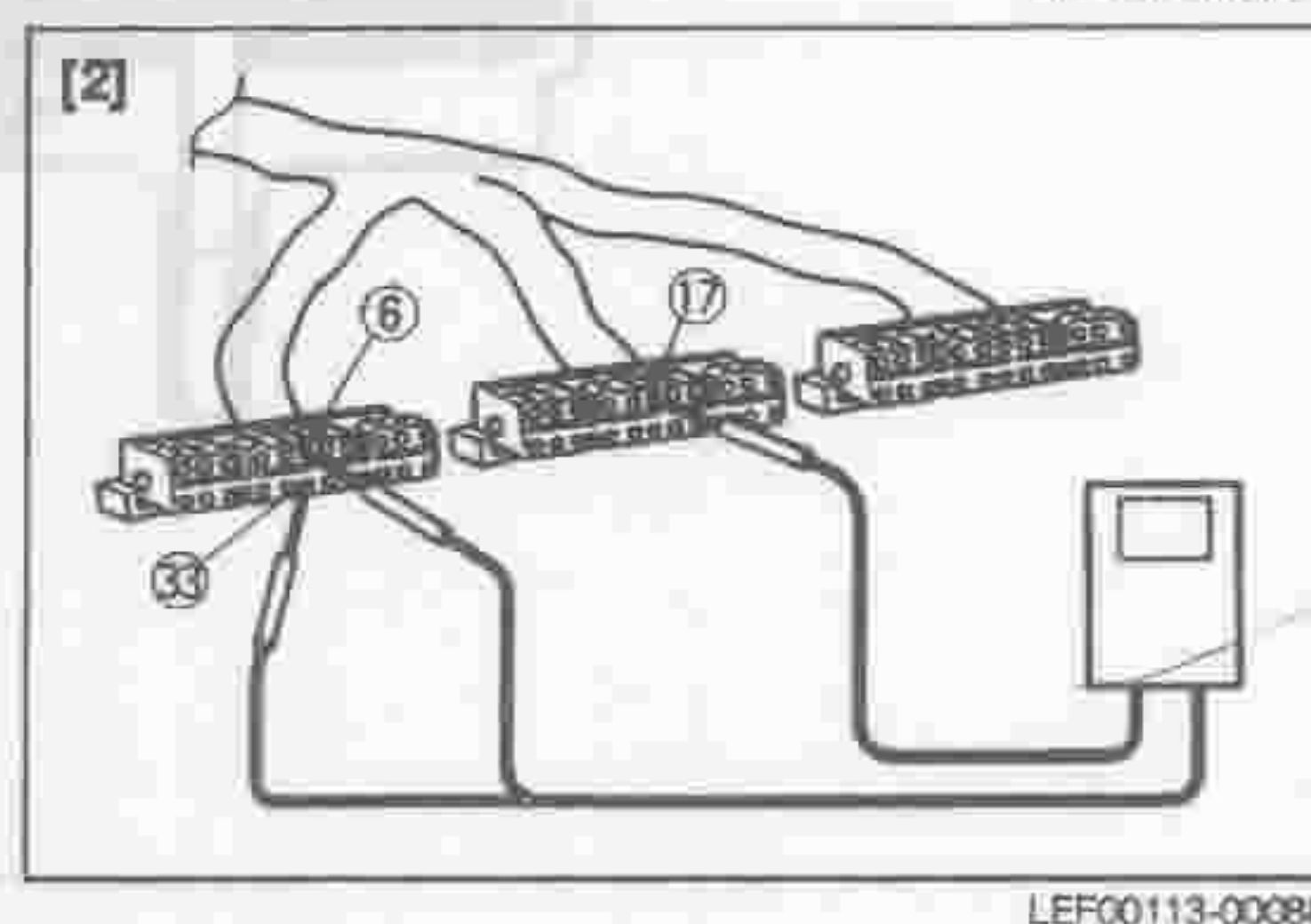
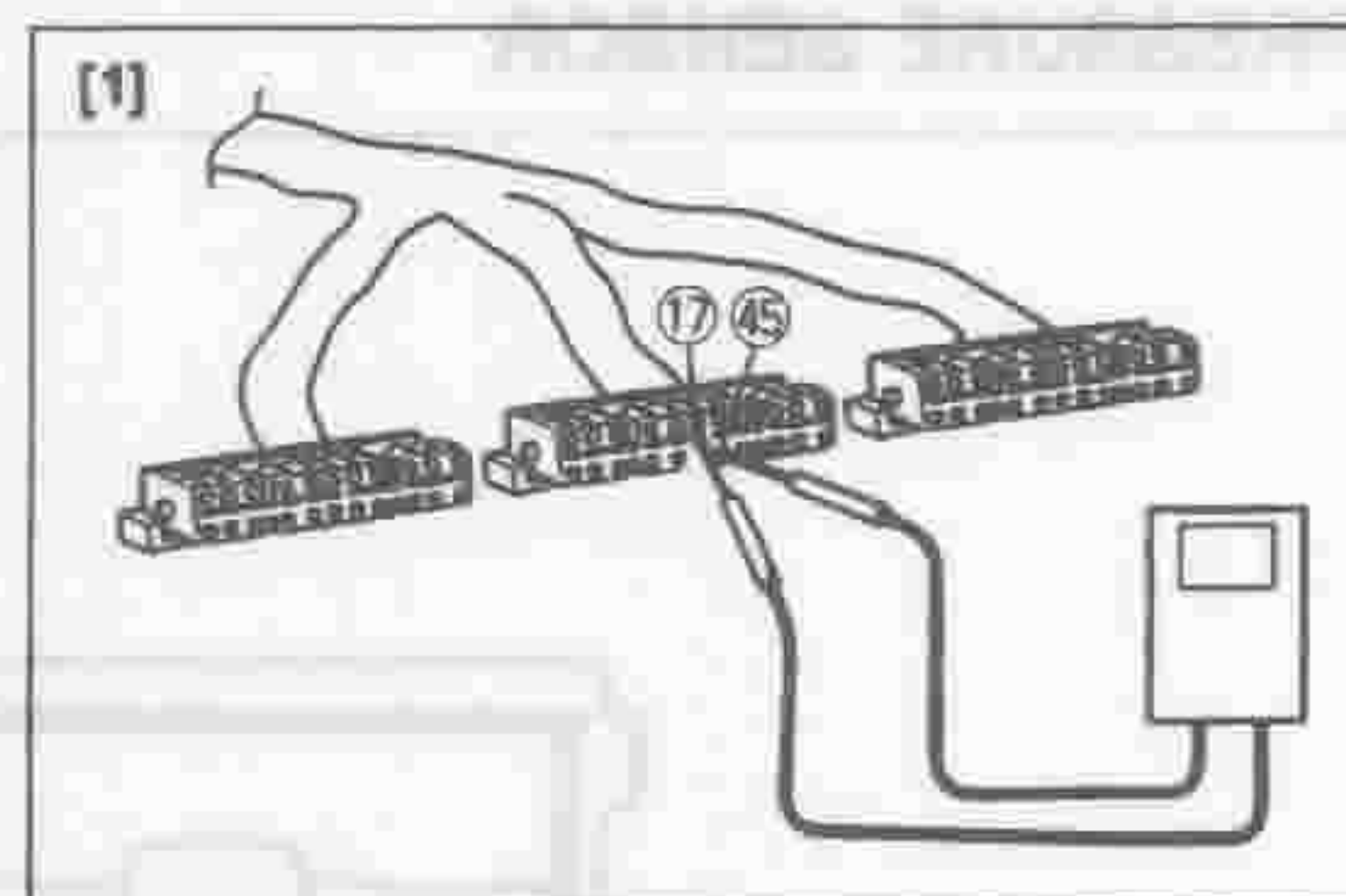
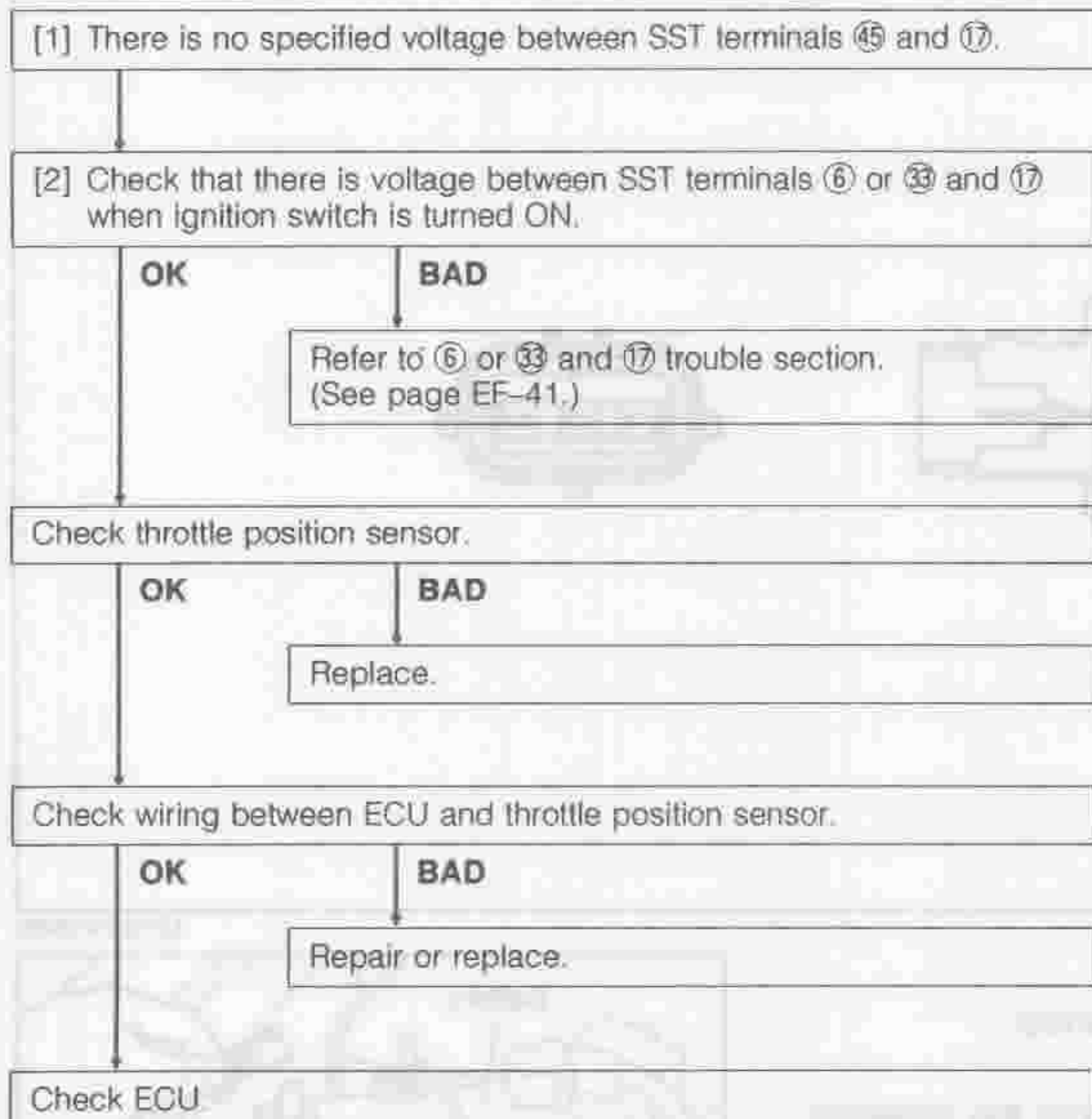


LEF00000-00065

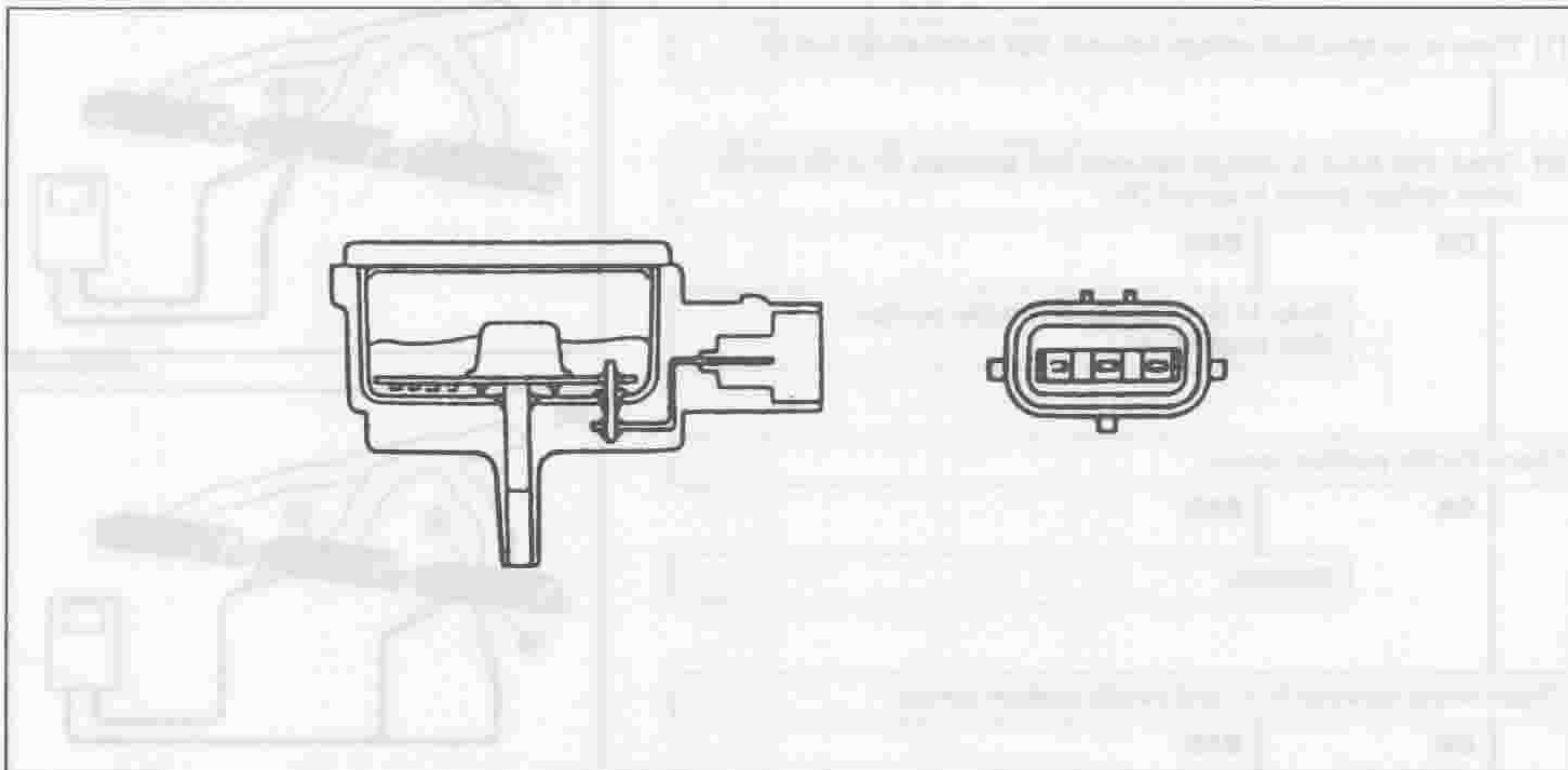


LEF00112-00066

• ④⑤ - ①⑦



PRESSURE SENSOR



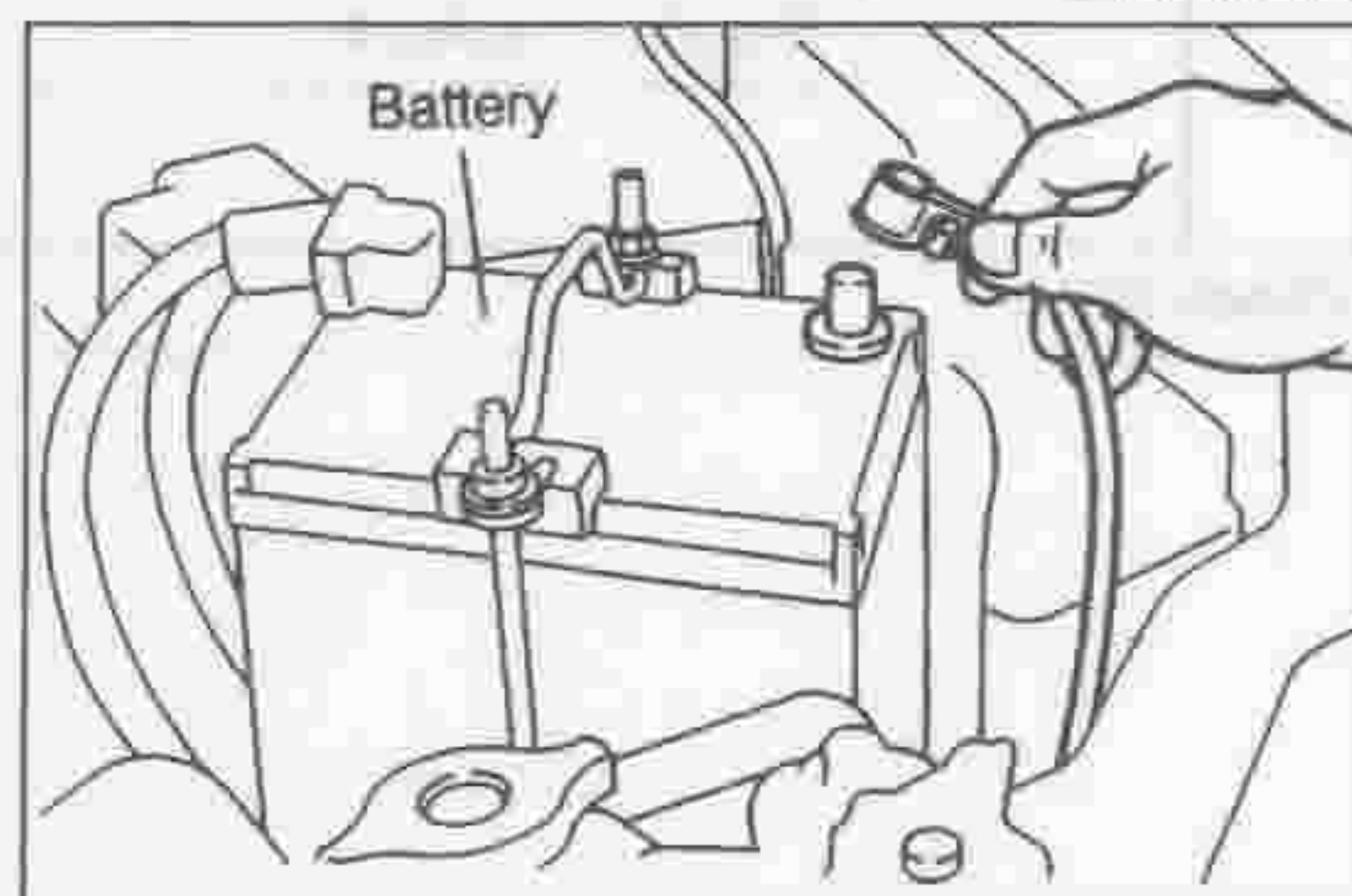
LEF00114-00089

Inspection of pressure sensor

Measurement of output voltage of pressure sensor

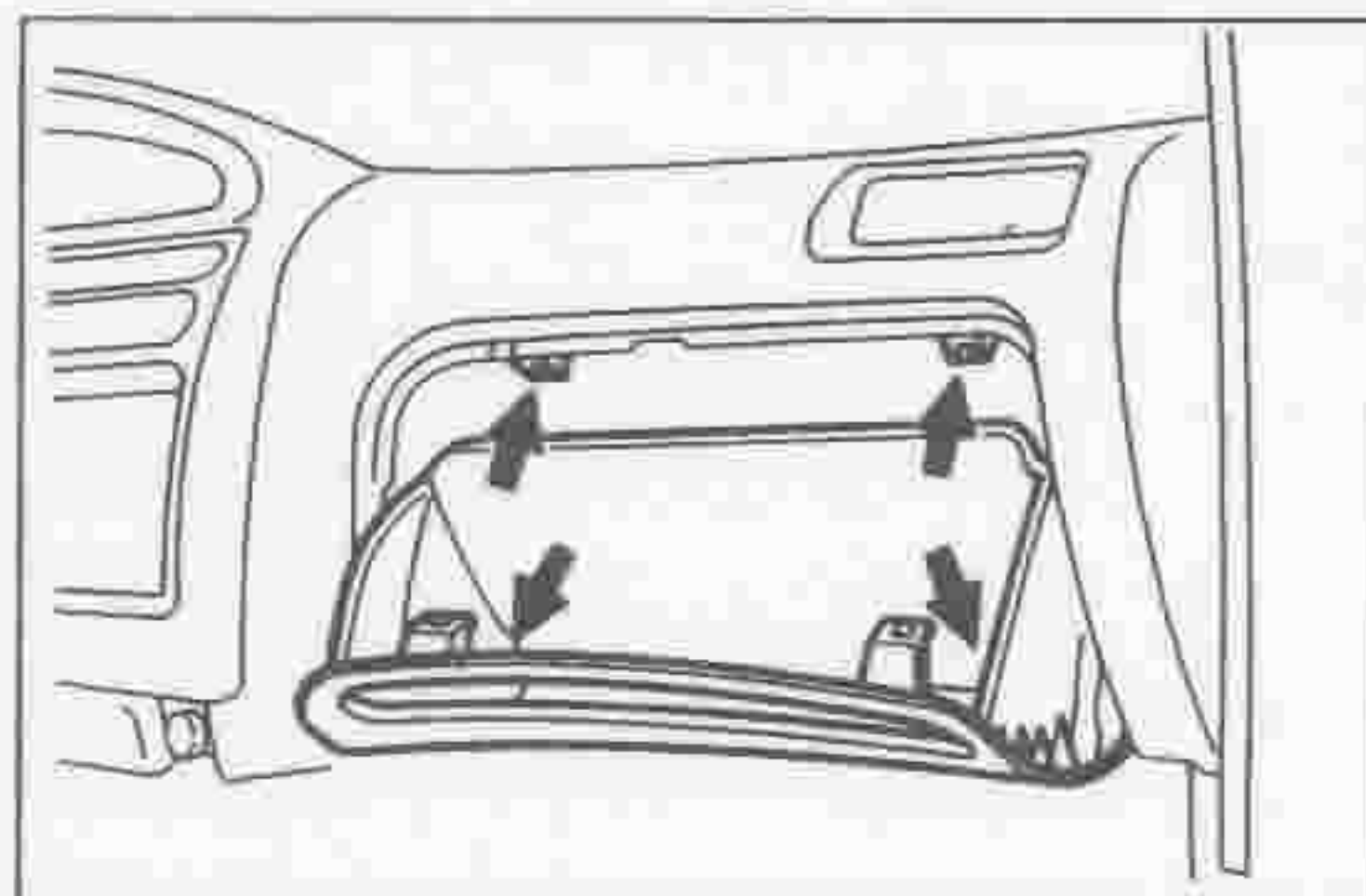
1. Connection of SST

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



LEF00115-00090

- (2) Remove the dashboard undertray.



LEF00116-00091

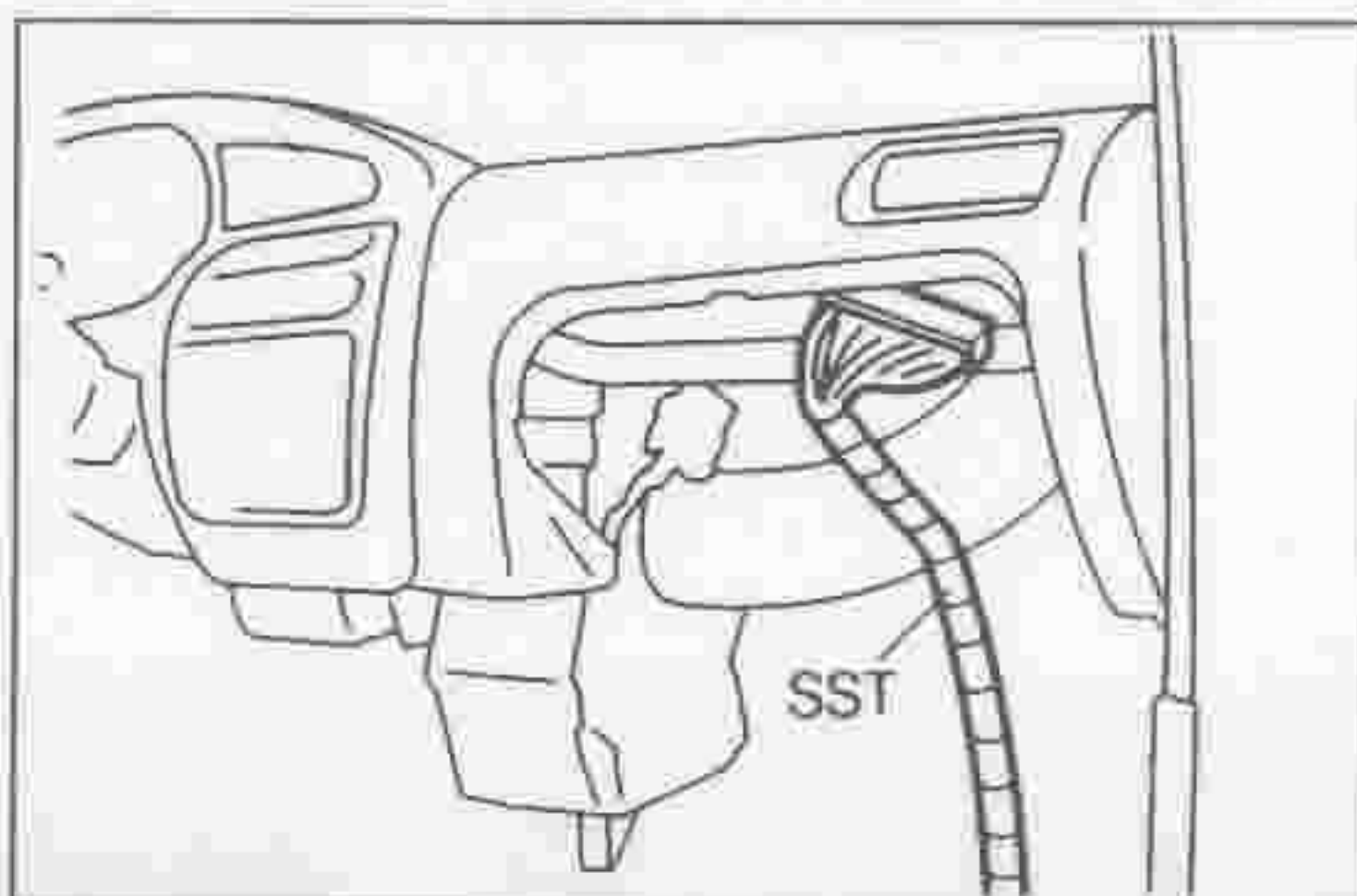
- (3) Connect the following SST between the ECU and the engine wire.

SST: 09842-87502-000

NOTE:

- Before the SST is installed, be sure to perform continuity and short tests between SST terminals.

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



LEF00117-00092

2. Check of output of pressure sensor

- (1) Measure the voltage between the SST terminals ② and ④④ when the ignition switch is turned ON.

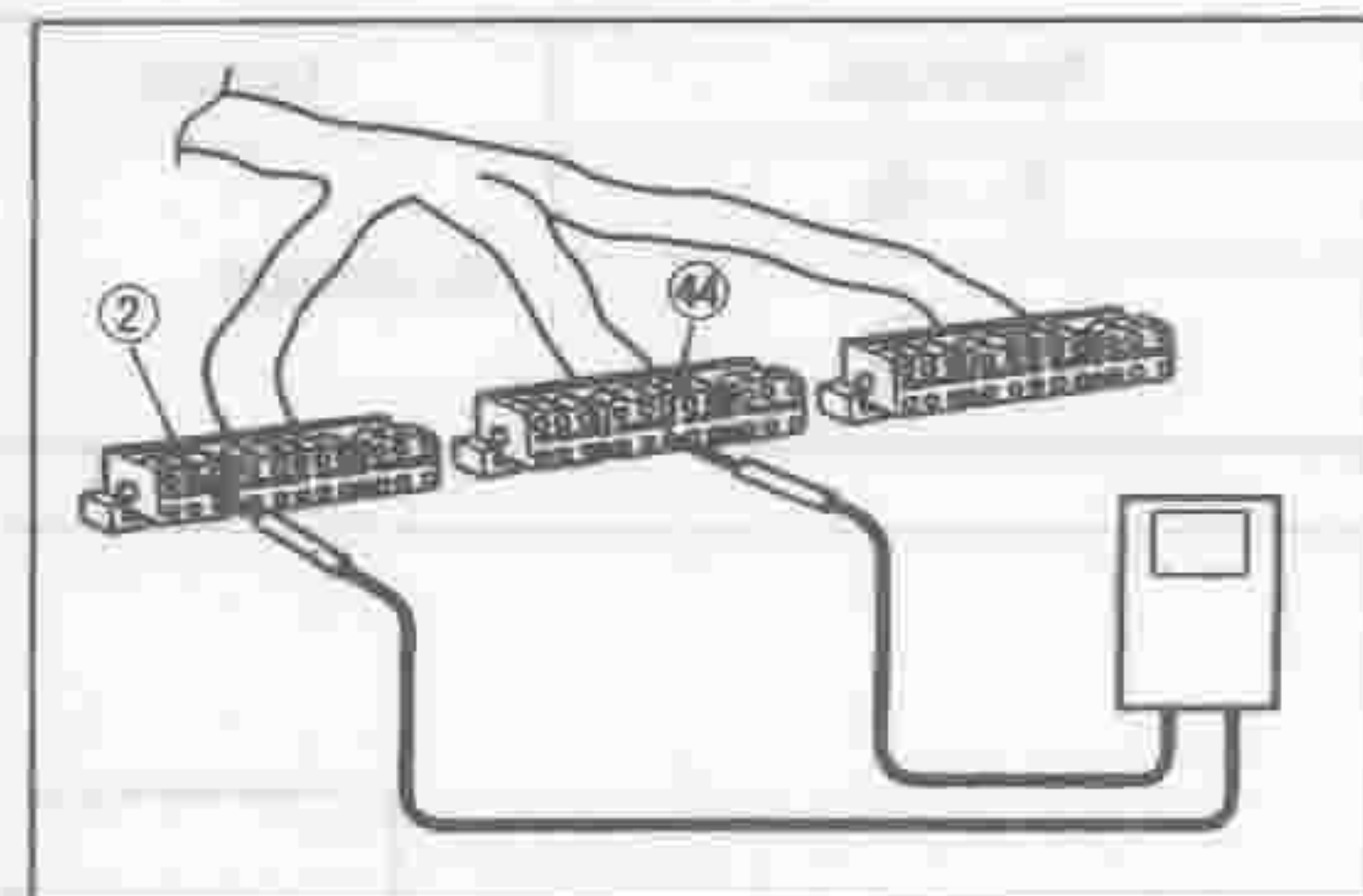
Specified value

Measuring point	Atmospheric pressure kPa (mmHg)	Voltage V
Altitude (height above sea level) m		
0	101.3 (760)	2.3 - 3.0
500	95.5 (716)	2.2 - 2.8
1,000	89.9 (674)	2.1 - 2.7

If the measured voltage does not conform to the specification, measure the voltage between the SST terminals ① and ④④. Ensure that the measured voltage is within a range of 4.5 to 5.5 volts. Then, proceed to replace the pressure sensor.

When the pressure sensor is replaced, it is necessary to replace the gas filter and air filter, too.

If the measured voltage between the SST terminals ① and ④④ does not conform to the specification, check the wiring between the ECU and the pressure sensor.



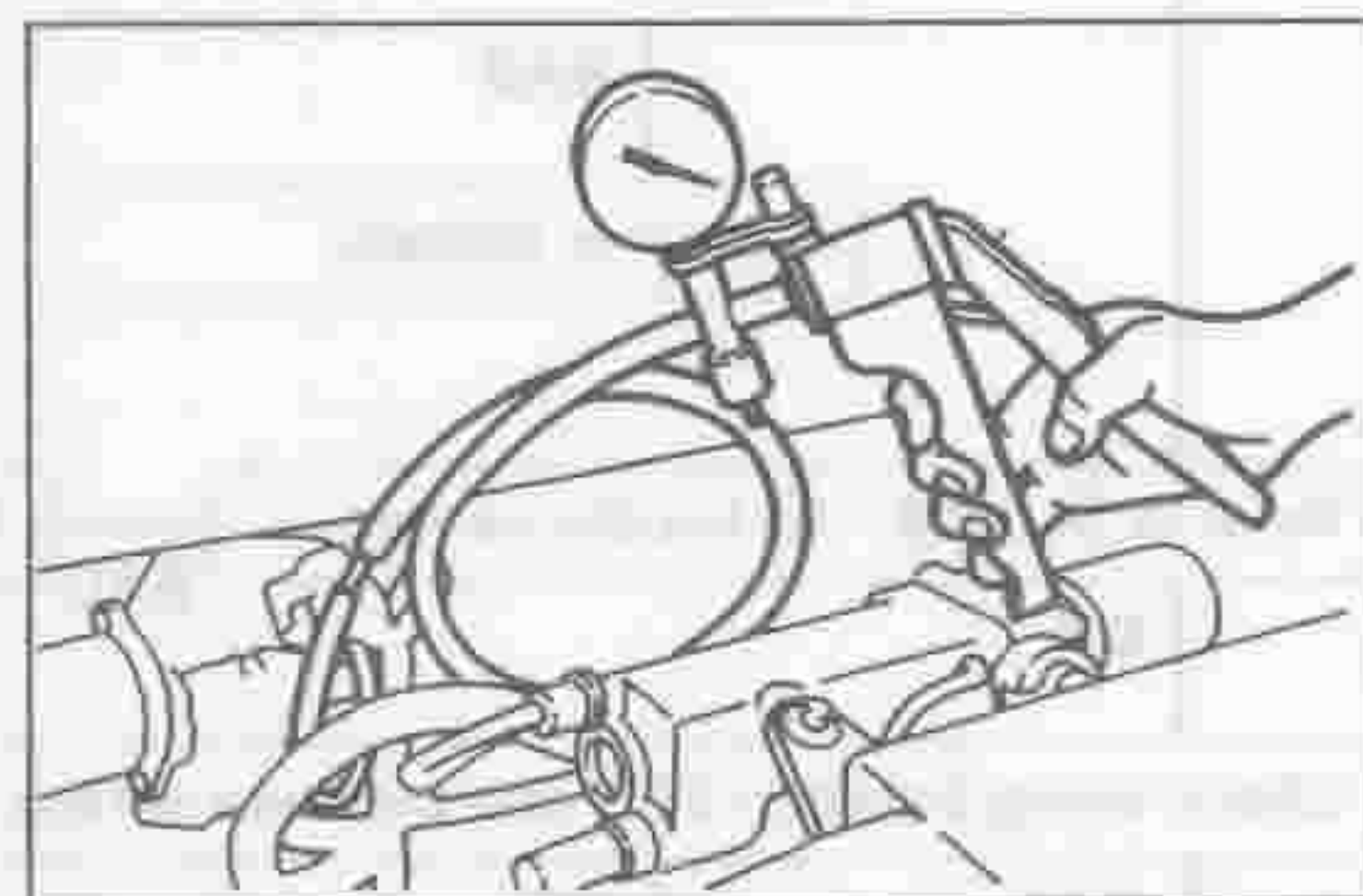
LEF00118-00093



- (2) Disconnect the rubber hose connected to the pressure sensor. Apply a negative pressure of 26.7 kPa (200 mmHg) to the disconnected hose, using a Mity-Vac. Check that the measured voltage between the SST terminals ② and ④④ drops by 0.25 to 0.75 volt.

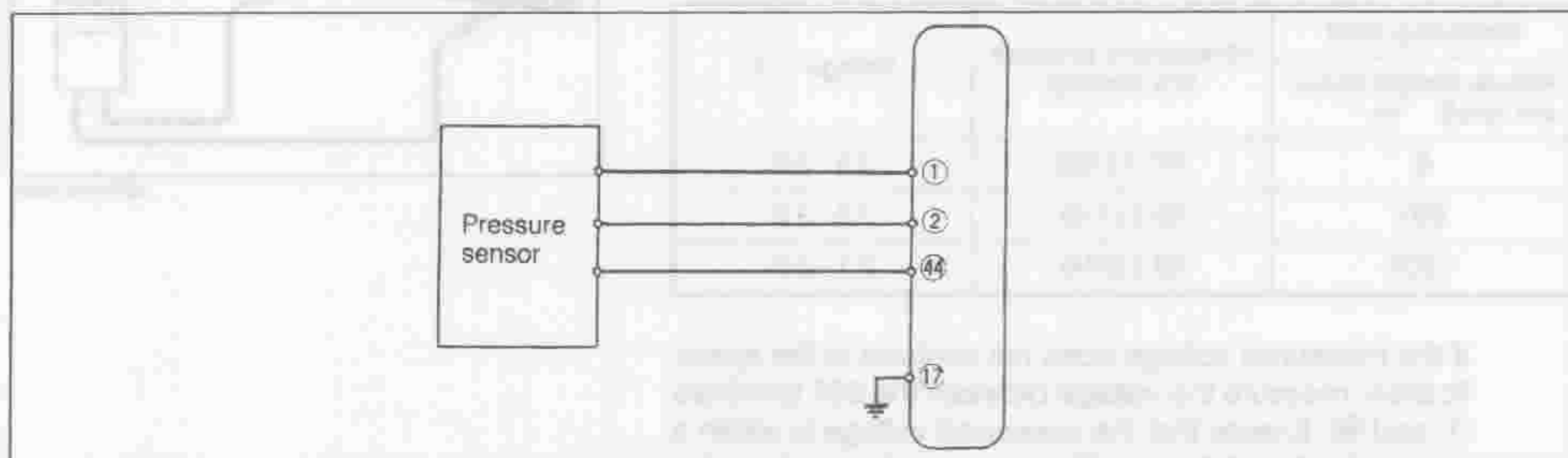
If the measured voltage fails to drop by the specified value, replace the pressure sensor.

When the pressure sensor is replaced, it is necessary to replace the gas filter too.



LEF00119-00094

Terminals	Trouble	Conditions	STD voltage
① - ④④	No voltage	Ignition switch ON	4.5 - 5.5
② - ④④		Ignition switch ON At time of atmospheric pressure of 101.3 kPa (760 mmHg)	2.3 - 3.0



LEF00120-00095

If the SST (09842-87502-000) has not been installed yet, install the SST, referring to the section under "Preparation of Trouble-shooting" at page EF-30.

• ① - ④④

[1] There is no voltage between SST terminals ① and ④④.

[2] Check that there is voltage between SST terminal ⑥ or ③③ and body ground when ignition switch is turned ON.

NO

OK

Check wiring between SST terminal ①⑦ and body ground.

BAD

Repair or replace.

Refer to ⑥ or ③③ - ④④ trouble section.

BAD

Repair or replace.

OK

Check wiring between ECU and pressure sensor.

BAD

OK

Check pressure sensor.

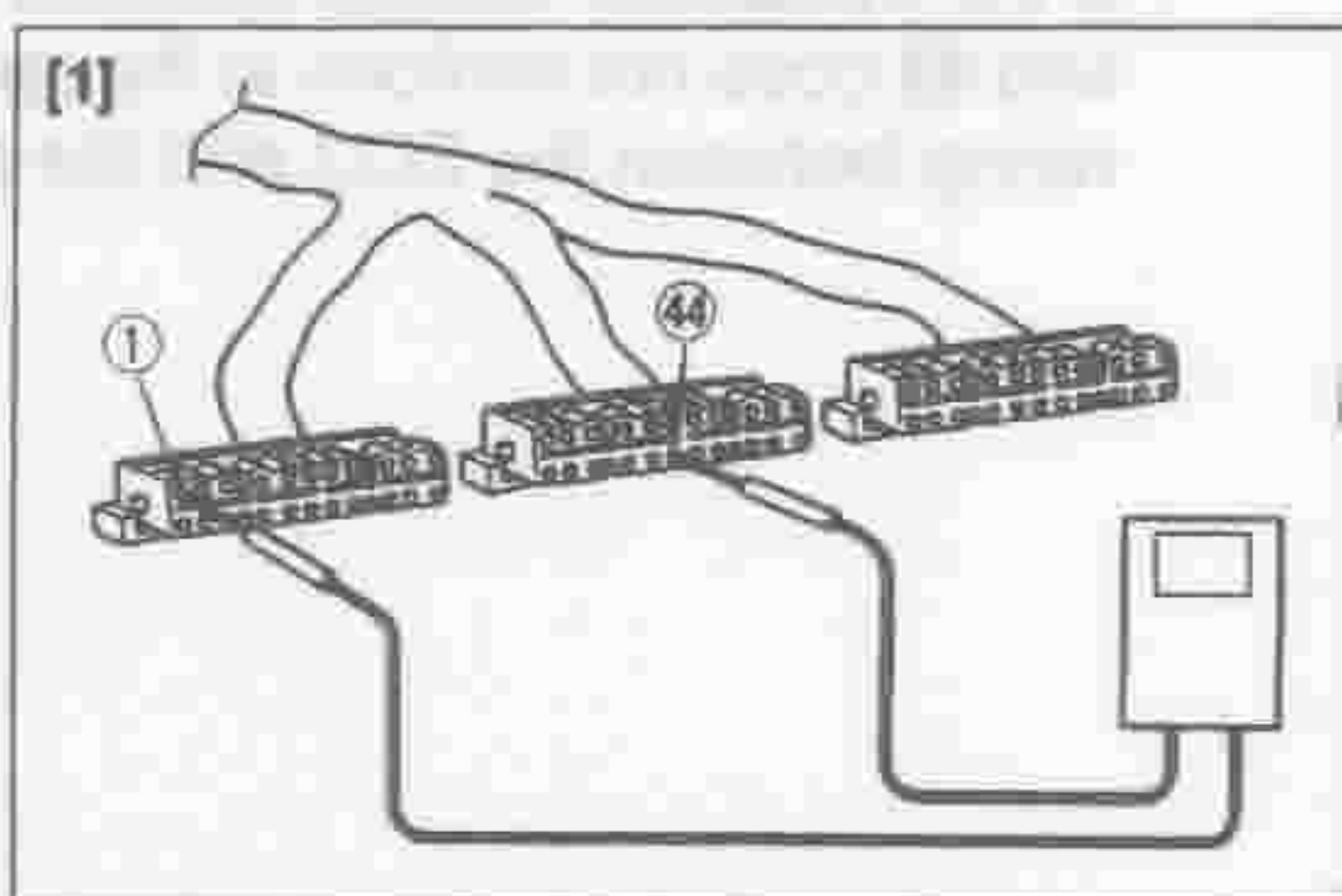
BAD

Replace.

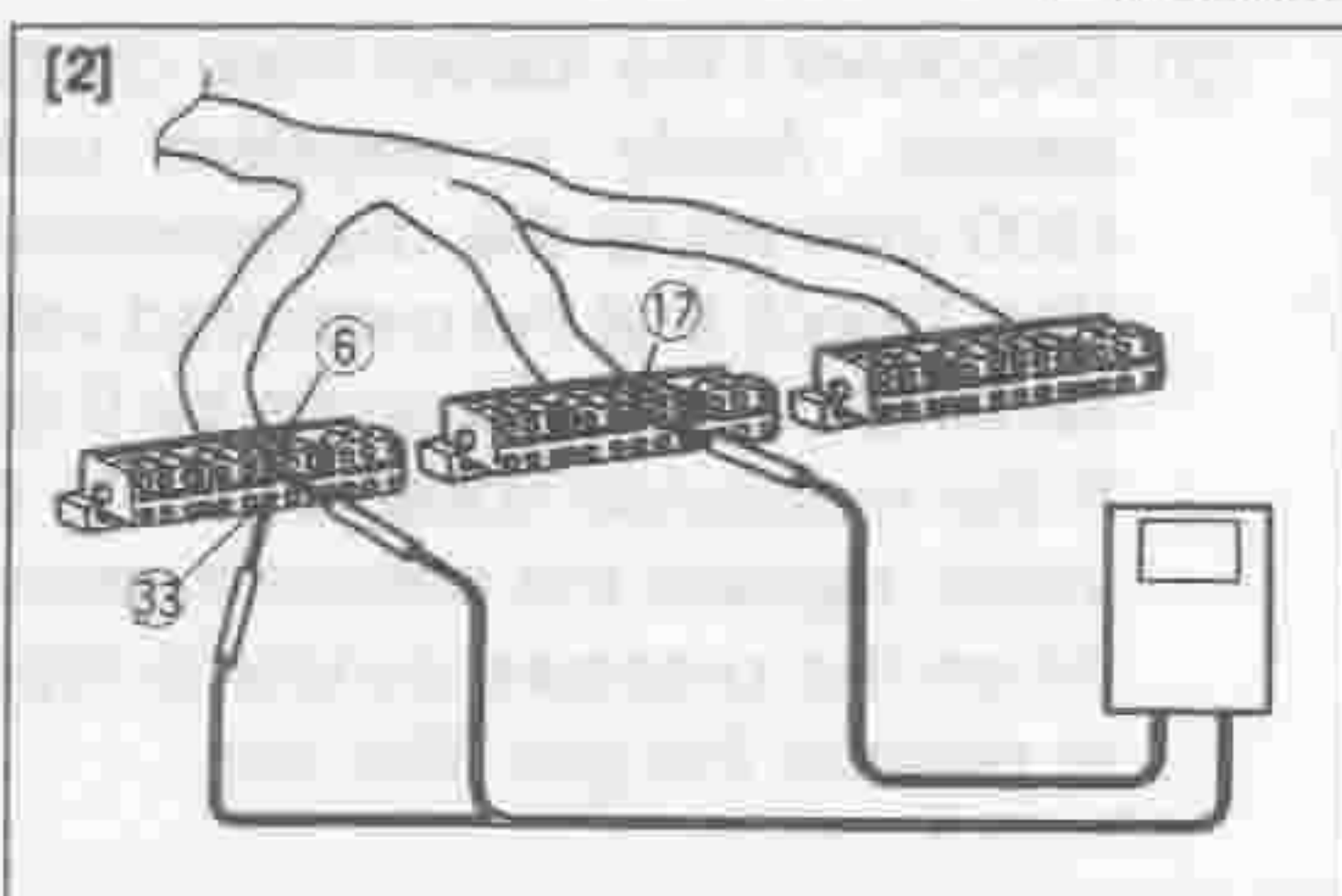
OK

Check ECU.

Repair or replace.

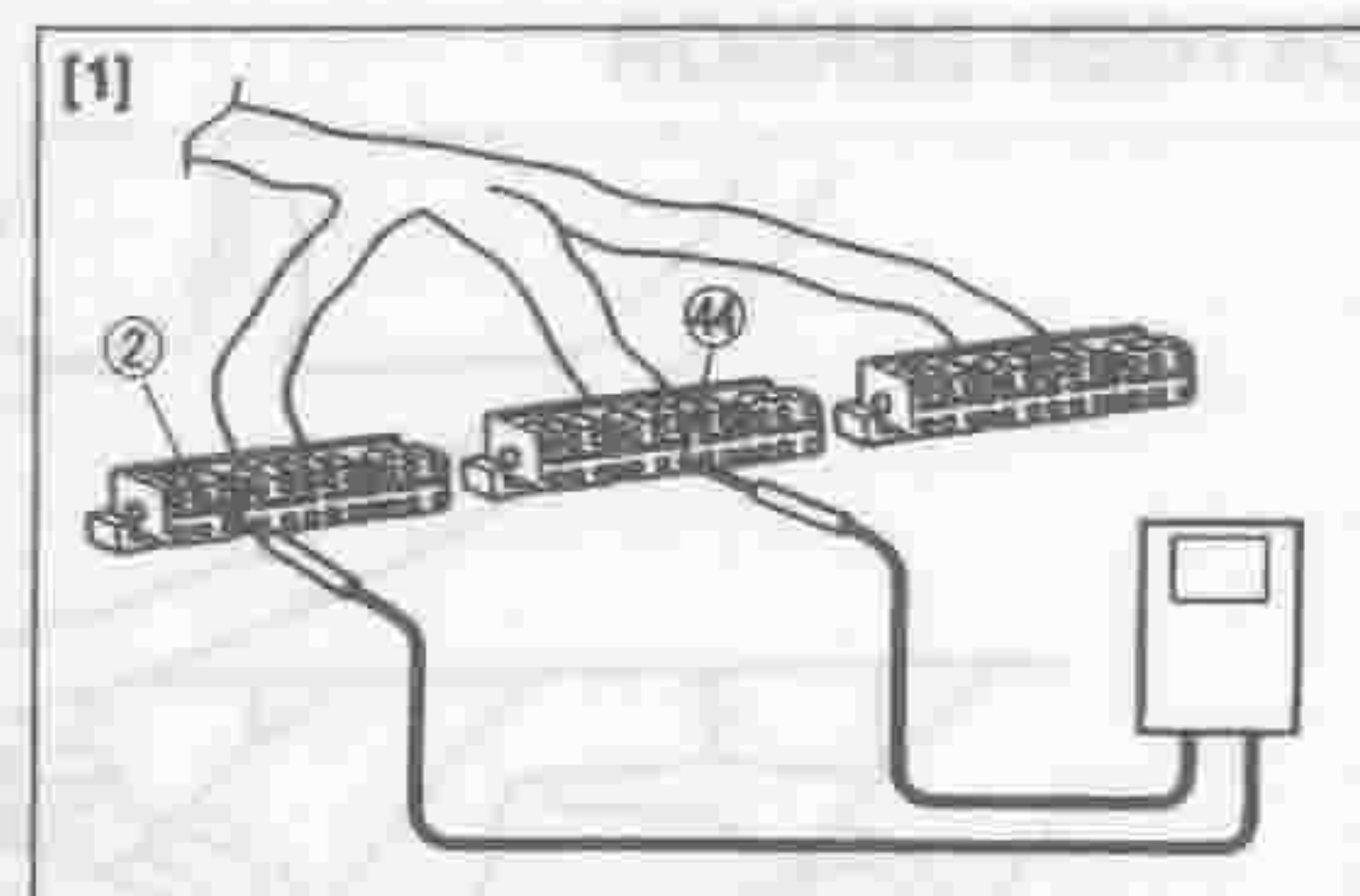
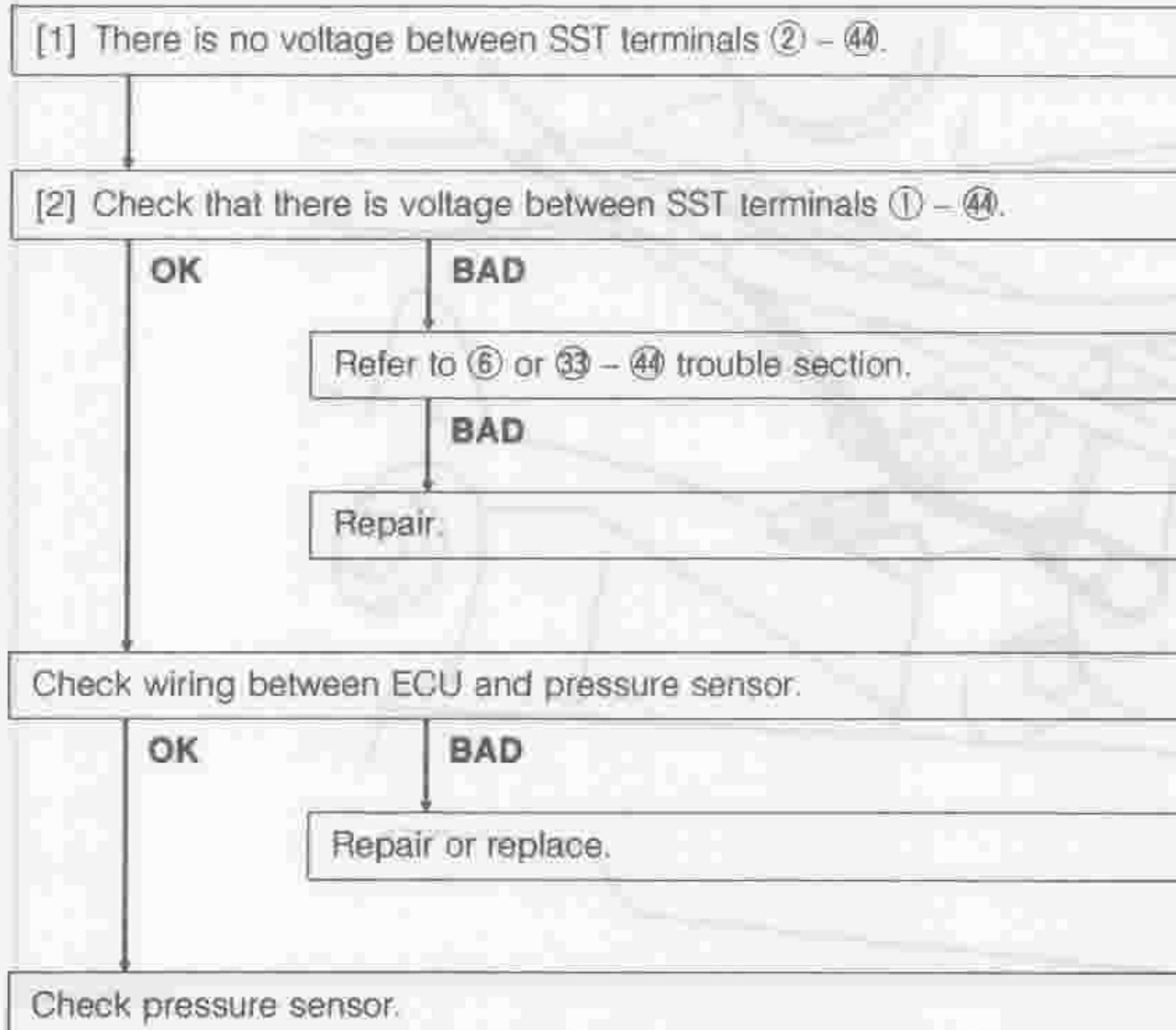


LEF00000-00095

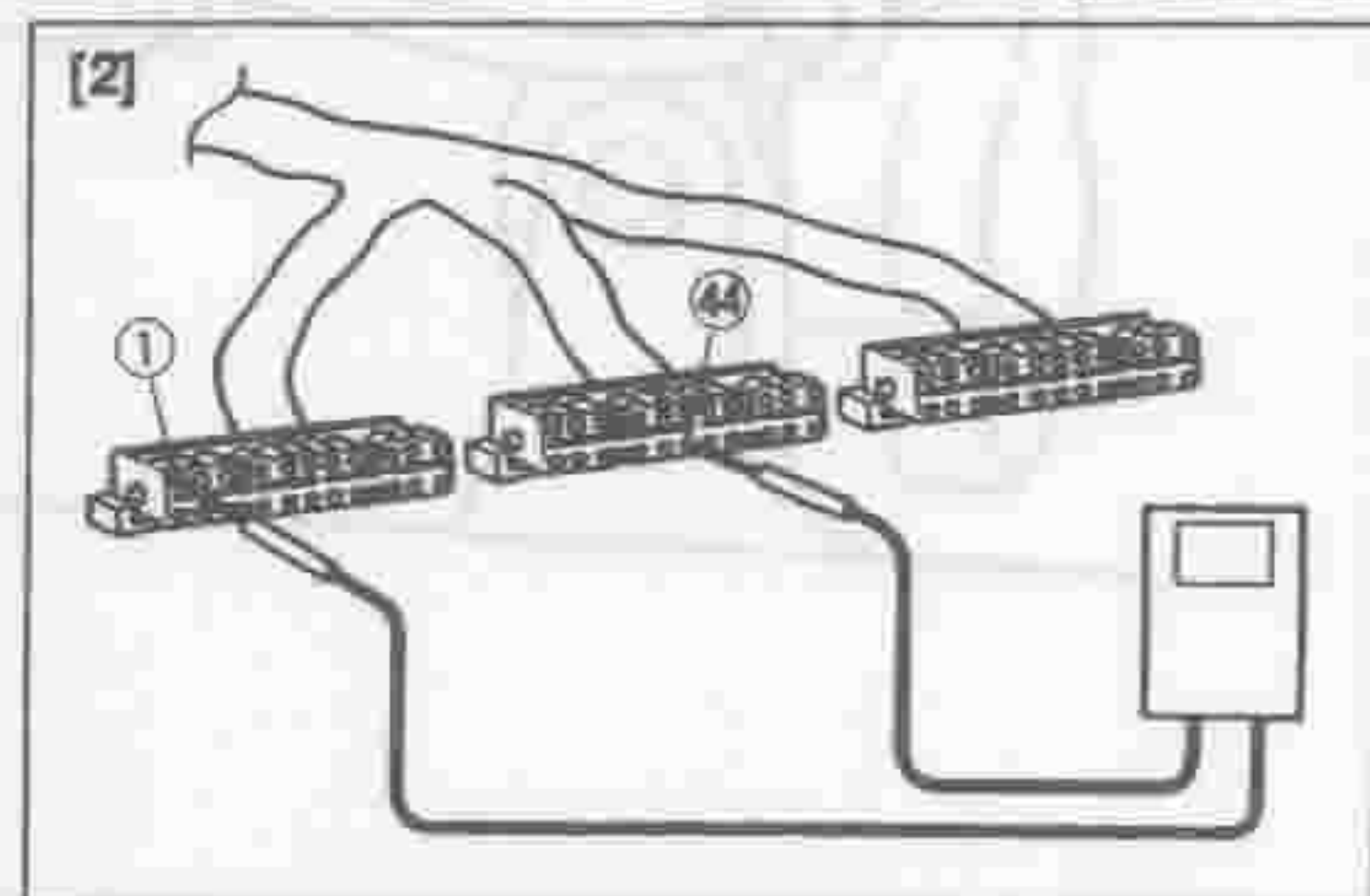


LEF00121-00097

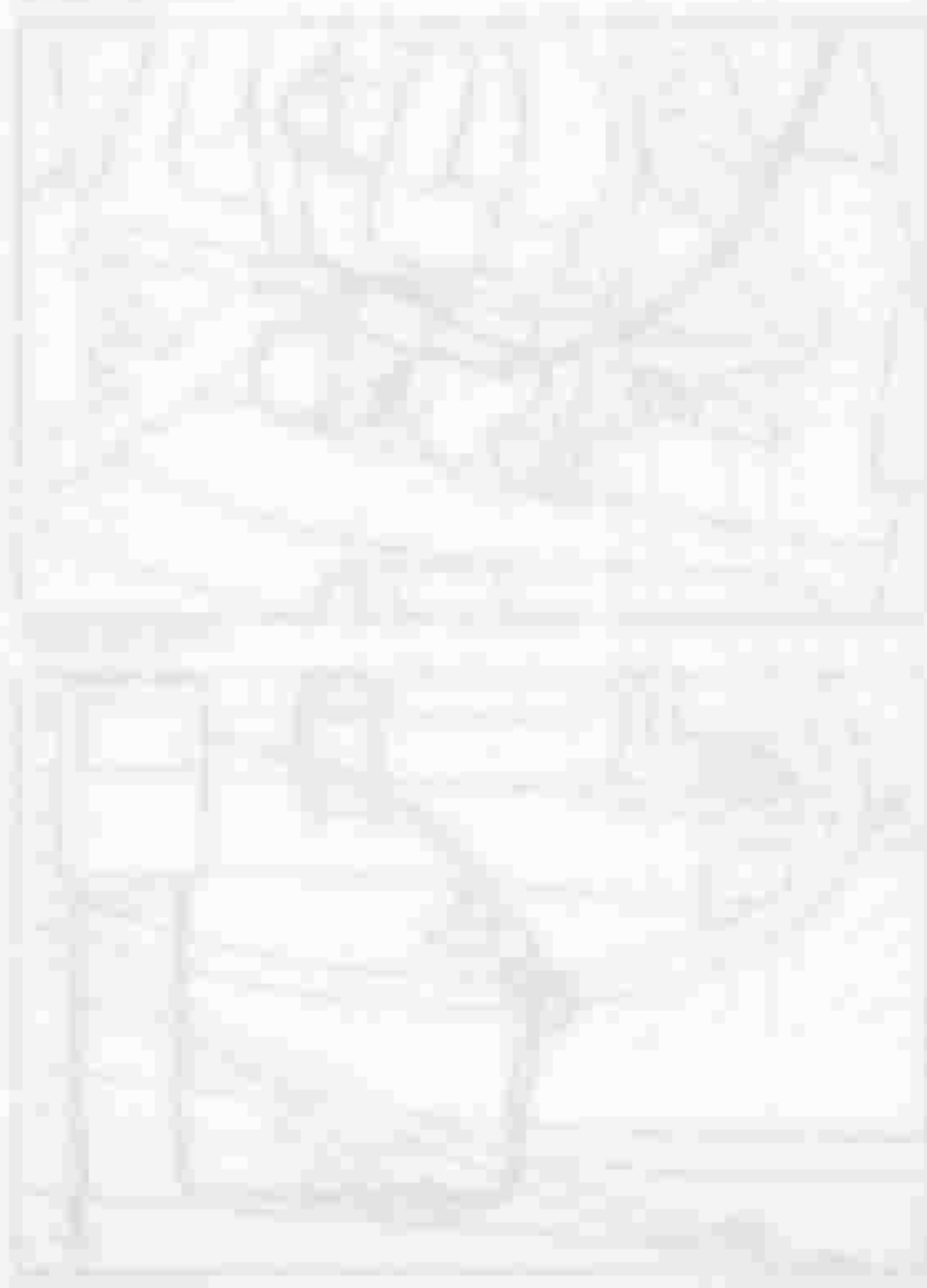
• ② - ④④



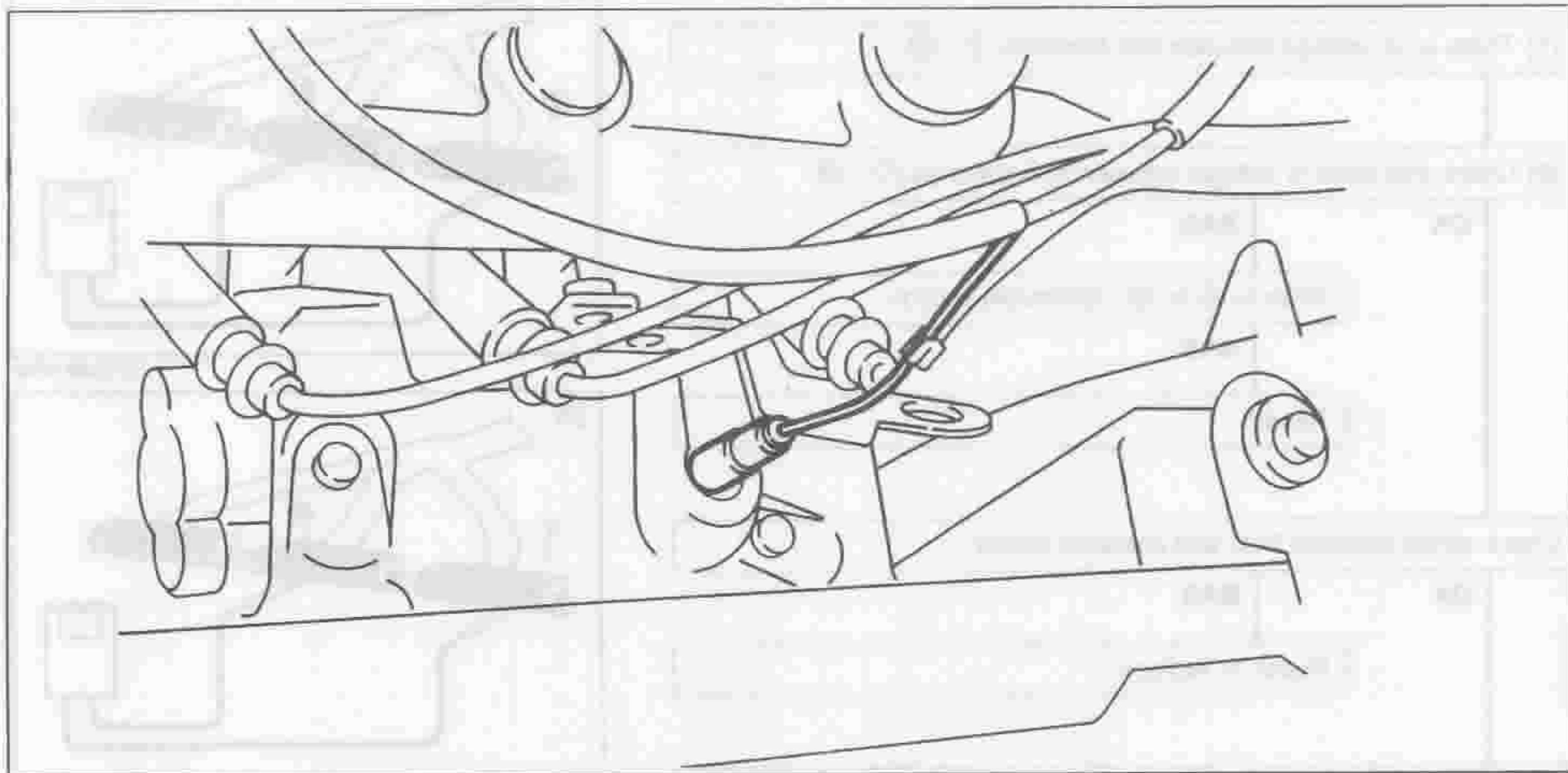
LEF00000-00098



LEF00122-00099



OXYGEN SENSOR



Inspection of oxygen sensor

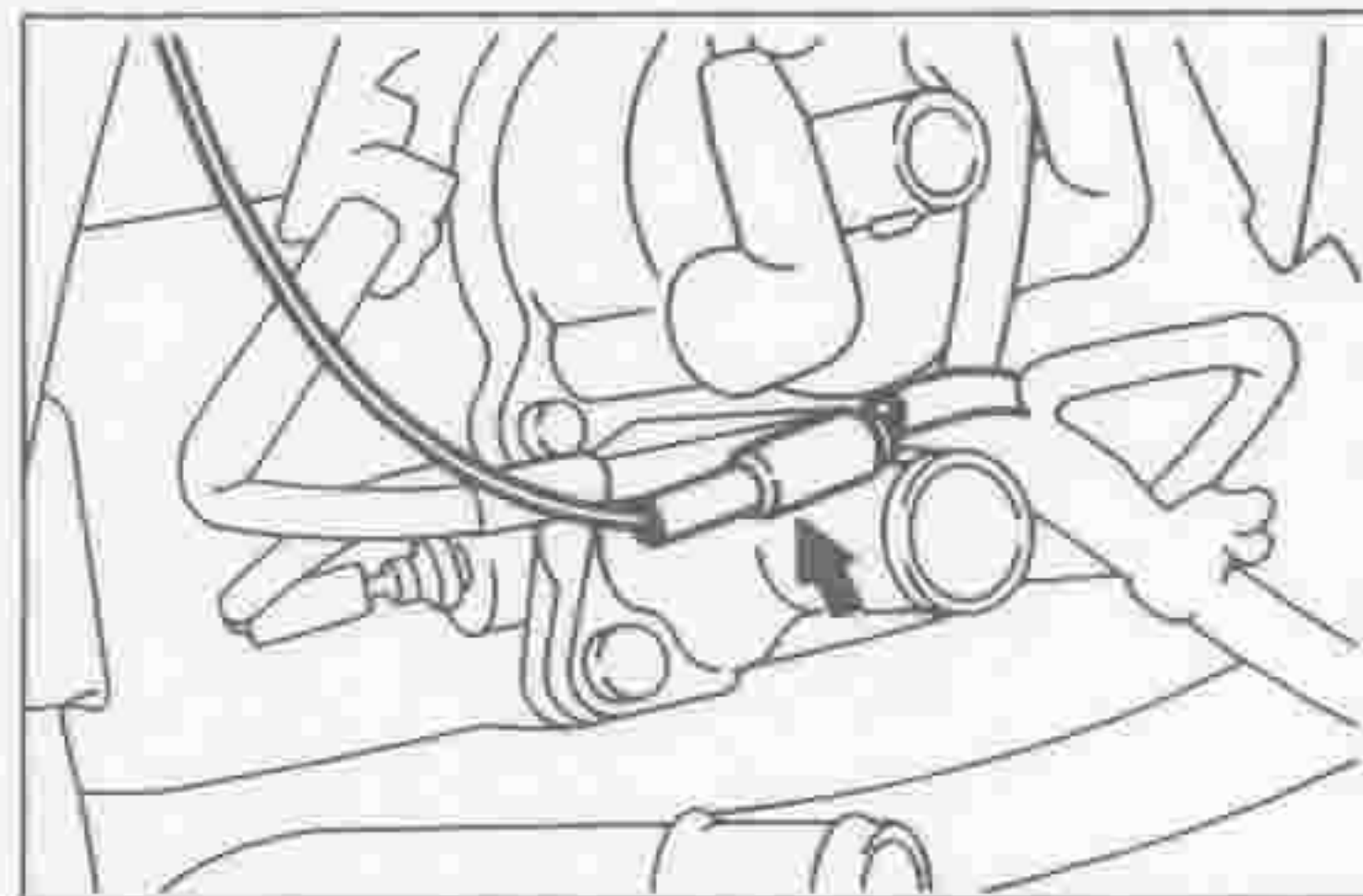
1. Unit inspection of oxygen sensor

CAUTION:

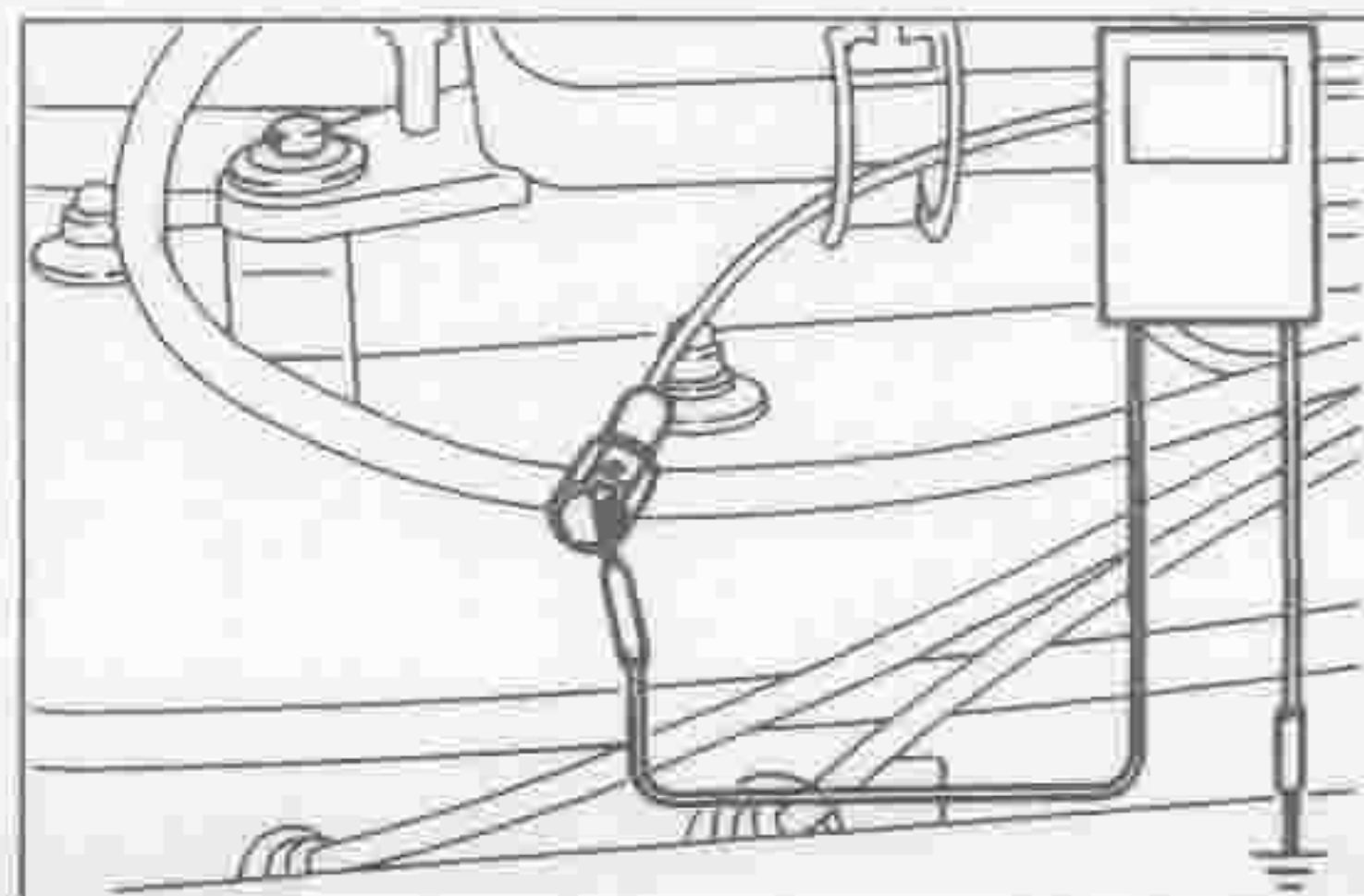
- The inspection procedure should be employed only when the engine idle speed and acceleration performance are normal.
- When unstable engine idling or poor acceleration is taking place, it is impossible to determine whether the oxygen sensor is normal or not, using this procedure. In this case, perform the system inspection.

LEF00124-00000

(1) Disconnect the oxygen sensor connector.

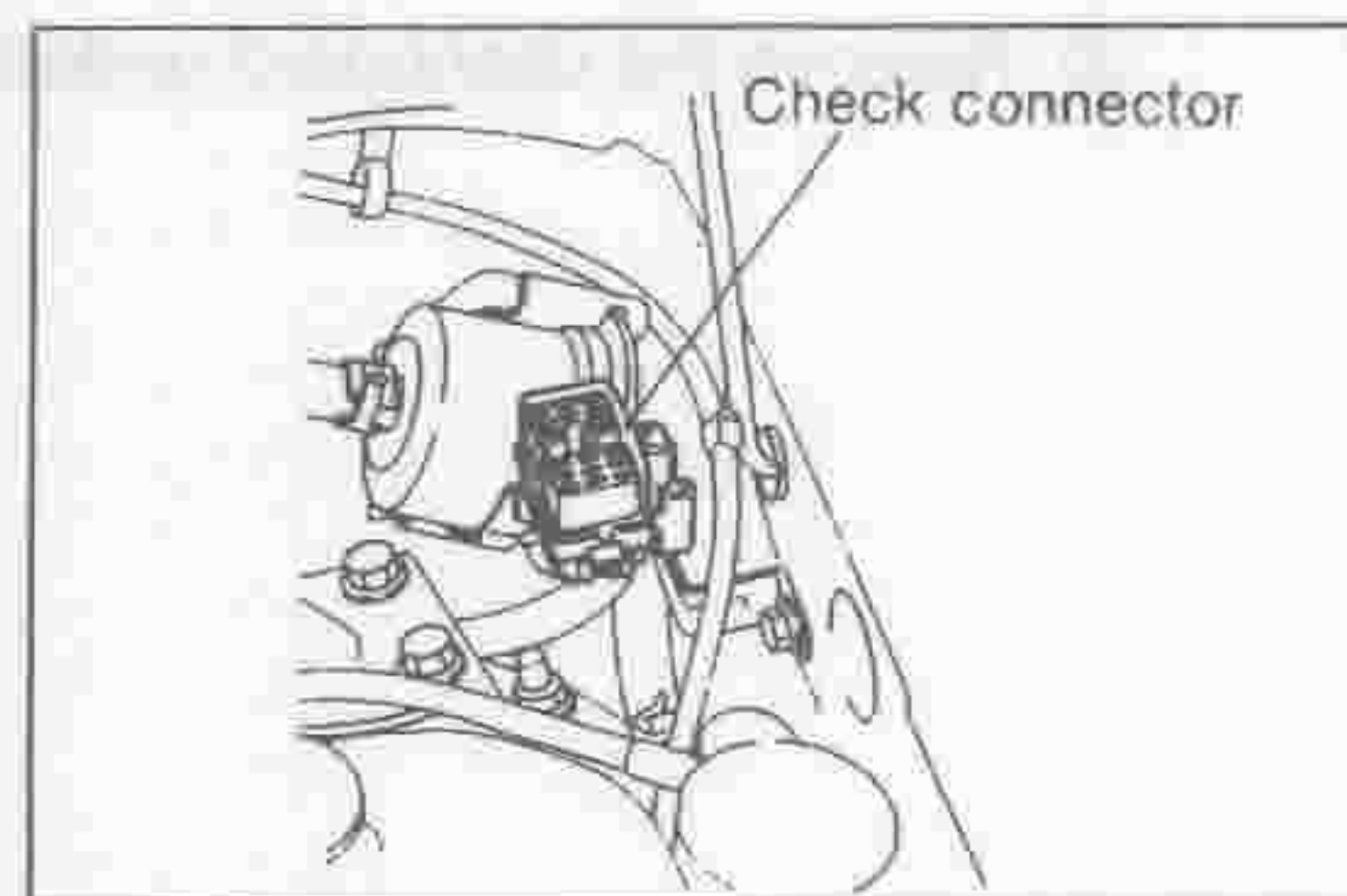


- (2) Start and warm up the engine completely.
- (3) Connect a voltmeter to the connector terminal of the oxygen sensor.
- (4) Depress the accelerator pedal and hold the engine speed at about 3000 rpm. At this time, ensure that the reading of the voltmeter registers 0.45 V or more. Replace the oxygen sensor with a new part if the reading will not register 0.45 V or more.
- (5) Remove the voltmeter from the oxygen sensor connector terminal.
- (6) Reconnect the oxygen sensor connector.
- (7) Connect the connector to the connector clamp.



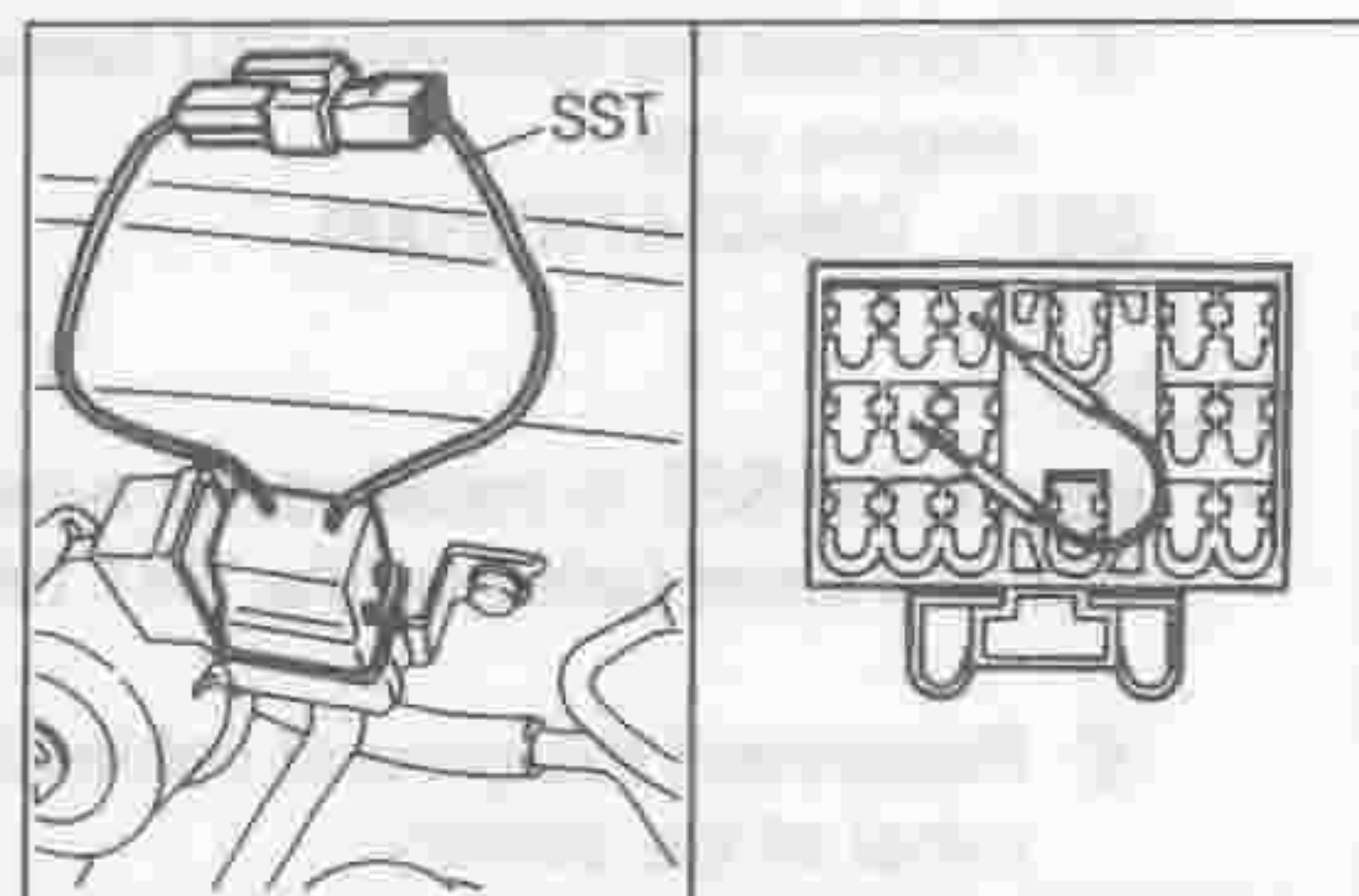
2. Inspection of oxygen sensor system

- (1) Remove the cap of the check connector. Connect the following SST to the diagnosis connector.
SST: 09991-87210-000



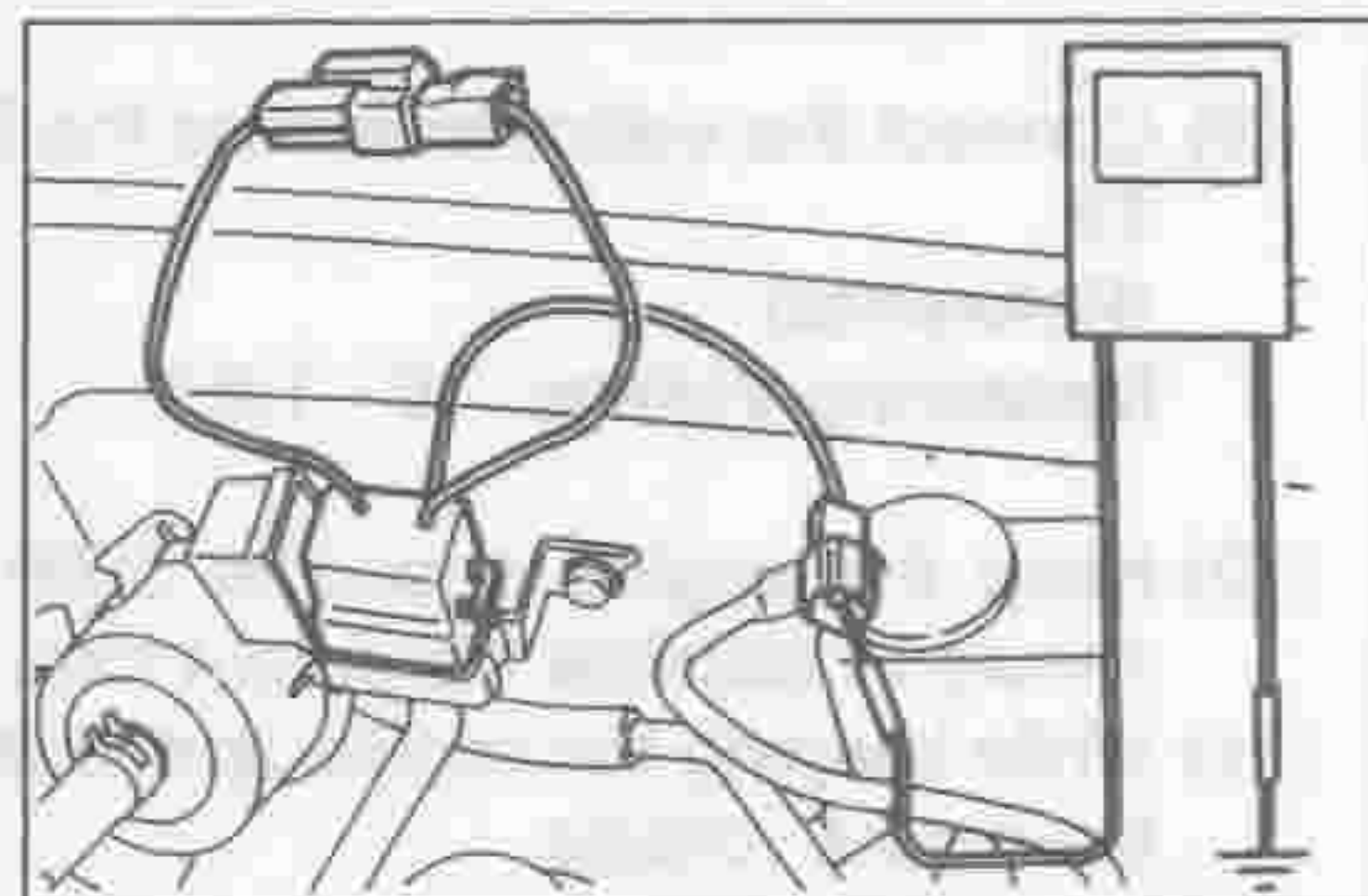
LEF00127-00103

- (2) Start and warm up the engine completely.
- (3) Connect the test terminal and ground terminal of the SST.



LEF00128-00104

- (4) Connect a voltmeter to the SST VF monitor terminal.
(Reference)
Output Voltage: 0 or 0.5 V



LEF00129-00105

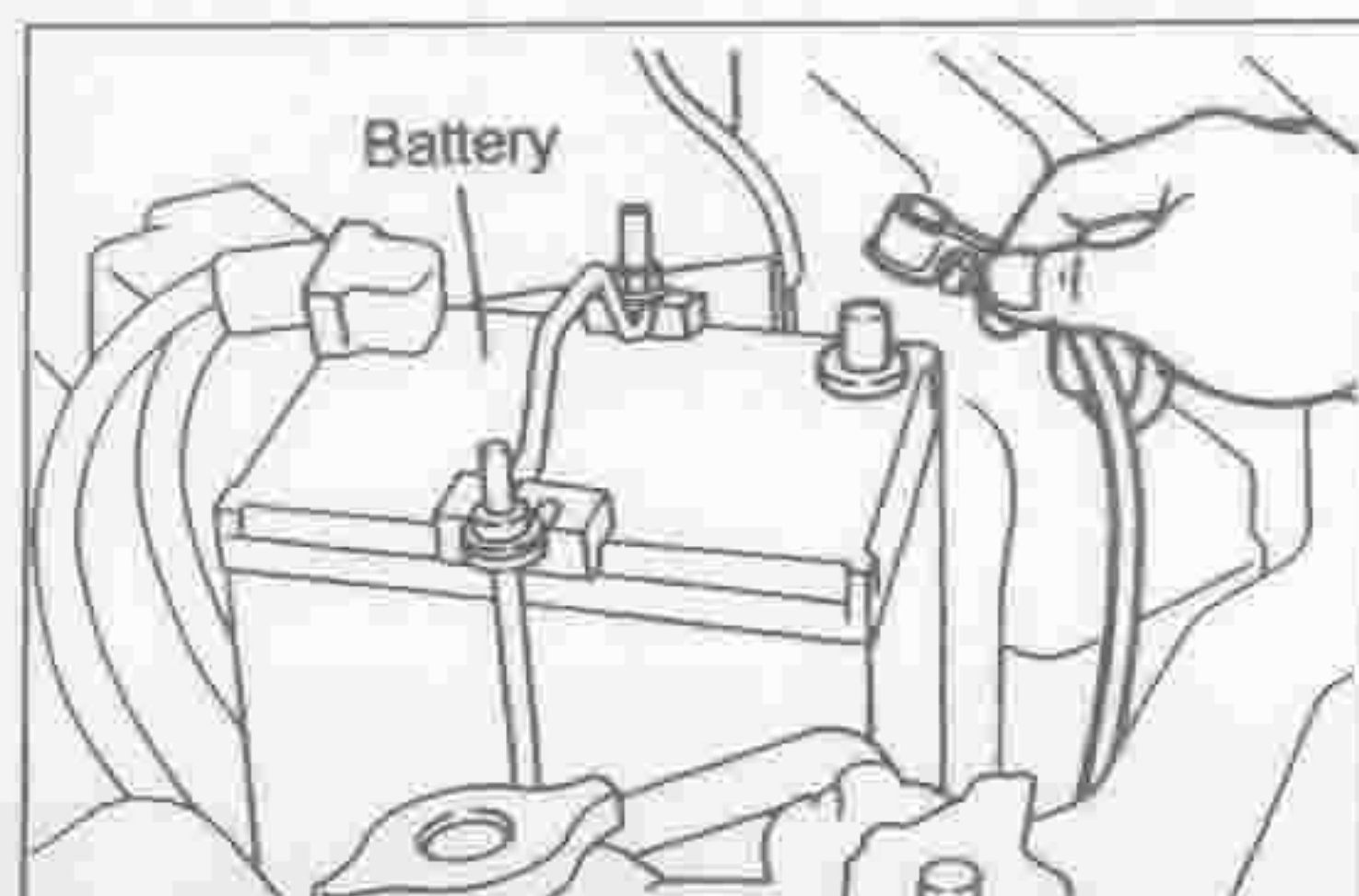
- (5) Keep the engine speed at 3000 rpm for about one minute to stabilize the output form of the SST VF monitor terminal.
- (6) While keeping the engine speed at 3000 rpm, count how many times the pointer of the voltmeter swings within 10 seconds.
8 times or more: Normal — Proceed to step (15)
0 - 7 times: Proceed to step (7)

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.

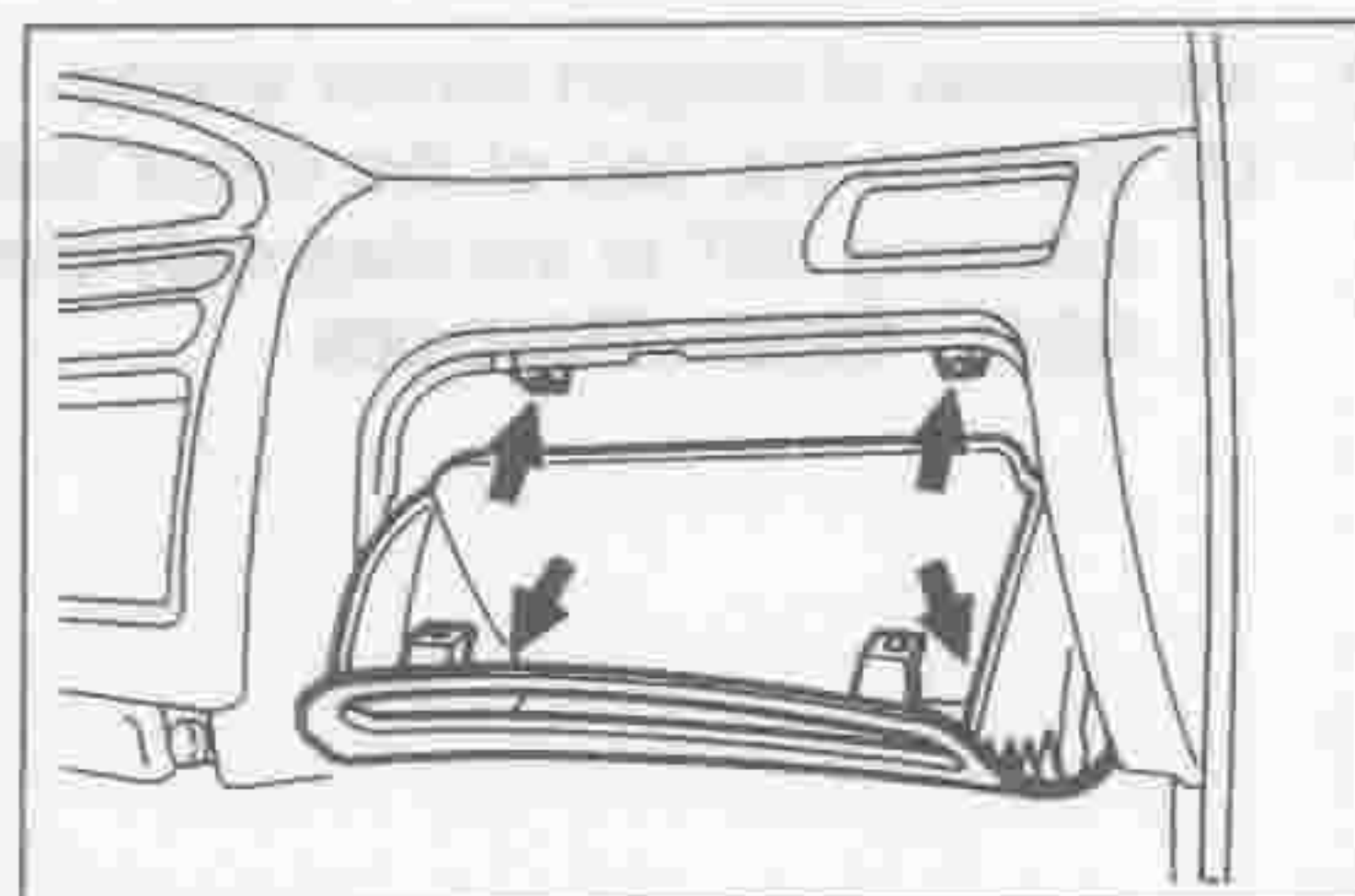
(7) Installation of SST

- ① Disconnect the ground cable from the negative terminal of the battery.



LEF00131-00106

- ② Remove the dashboard undertray.



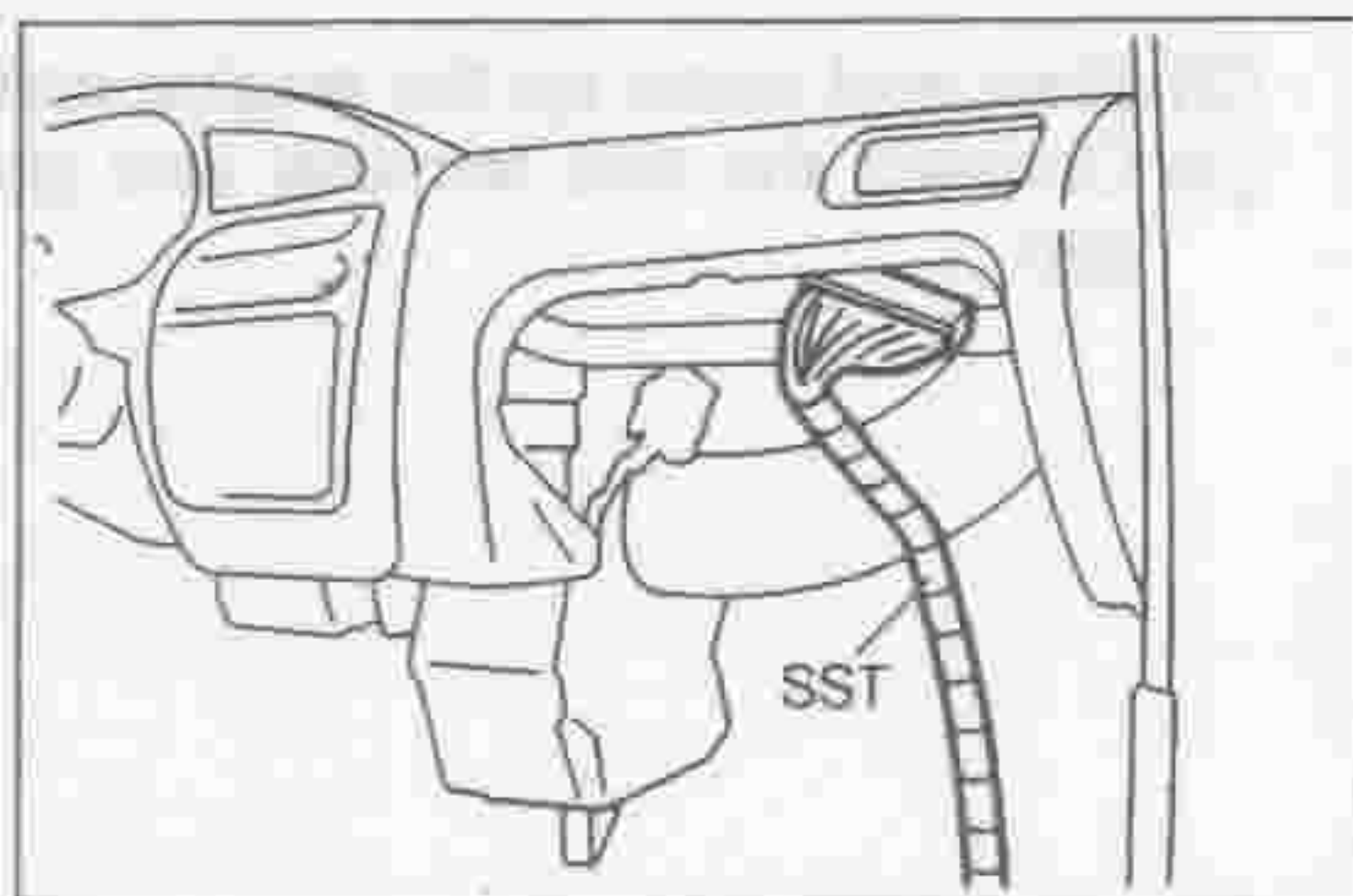
LEF00132-00107

- ③ Connect the following SST between the ECU and the engine wire.

SST: 09842-87502-000

NOTE:

- Before the SST is installed, be sure to perform continuity test and short between the SST terminals.



LEF00133-00108

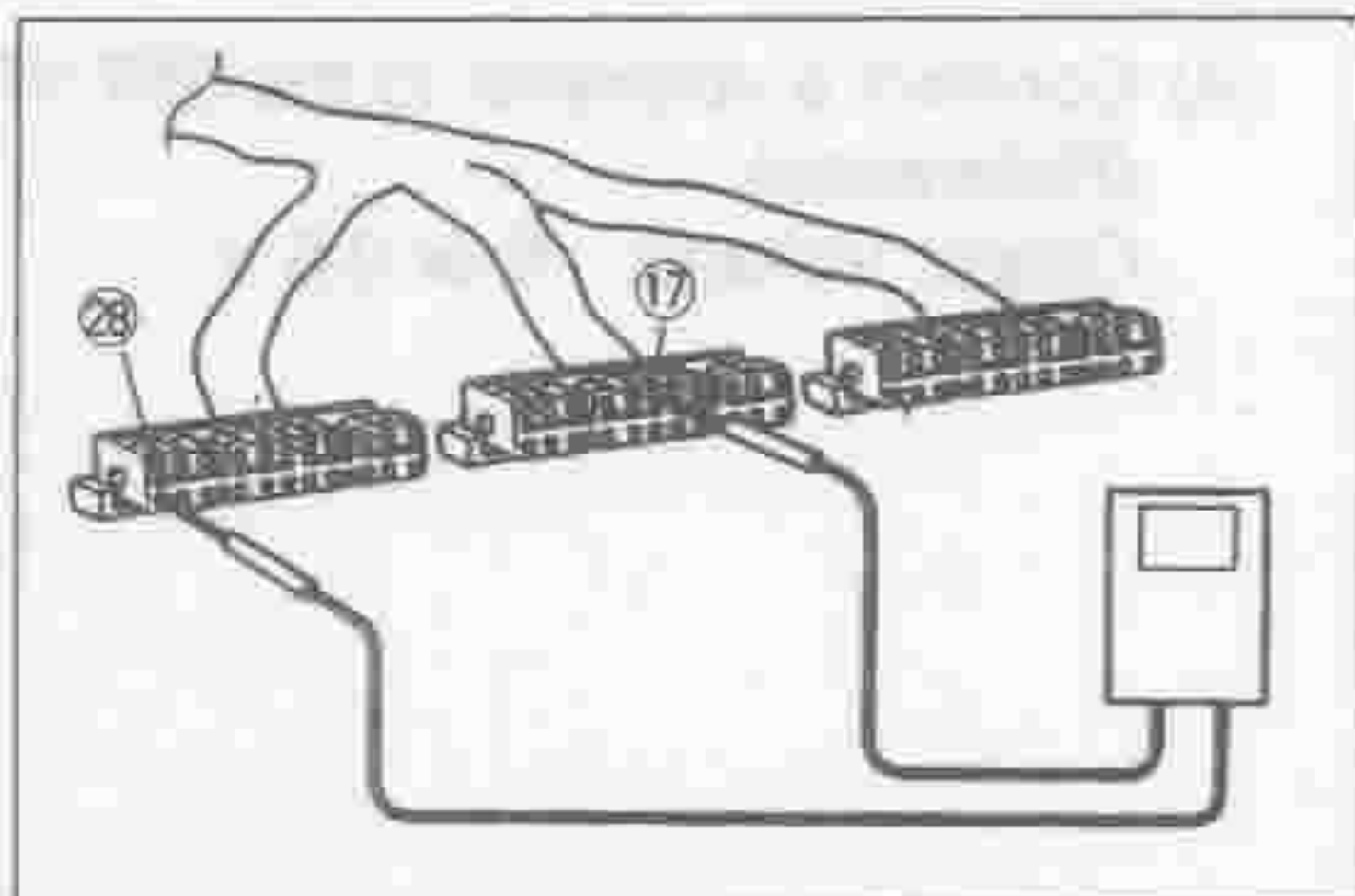
- ④ Reconnect the ground cable to the negative (-) terminal of the battery.

- (8) Start and warm up the engine completely.

- (9) Connect the voltmeter across the SST terminals ⑳ and ⑰.

(Reference)

Measuring Voltage: 0 - 1.0 V



LEF00134-00109

- (10) Keep the engine speed at 3000 rpm for about one minute to stabilize the output form of the voltmeter.

- (11) While keeping the engine speed at 3000 rpm, measure the output voltage.

- (12) Perform the inspection and repair, following the procedure given in the table at next page, according to the measurement results.

LEF00135-00000

Measured voltage	Remedy
	1) Check oxygen sensor circuit for open wire or short circuit. → BAD → Repair or replace. → OK →
• 0 V	2) Remedy causes of too-lean fuel mixture. • Pressure sensor • Pressure regulator • Fuel line • Fuel filter • Fuel pump • Injector → BAD → Repair or replace. → OK → Replace oxygen sensor.
• The measured voltage varies mainly within a range under 0.45 V.	Remedy causes of 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 is low. (The pointer of voltmeter swings less than 8 times within 10 seconds.)	Check ECU → BAD → Repair/replace ECU. → OK → Replace oxygen sensor.
• The measured voltage varies mainly within a range above 0.45 V.	Remedy causes of too-rich fuel mixture. • Pressure sensor • Fuel line • Pressure regulator • Injector
• 1.0 V	Remedy causes of too-rich fuel mixture. • Pressure sensor • Fuel line • Pressure regulator • Injector → BAD → Repair or replace.
• More than 1.0 V	Check oxygen sensor circuit for short circuit with other positive line. → Repair or replace.

LEF00136-00000

(13) Stop the engine.

(14) Removal of SST for ECU

- ① Disconnect the ground cable from the negative (-) terminal of the battery.
- ② Remove the SST by disconnecting its connectors from the ECU and engine wire connectors.
- ③ Connect the engine wire connectors to the ECU.
- ④ Install the glove box.
- ⑤ Reconnect the ground cable to the negative (-) terminal of the battery.

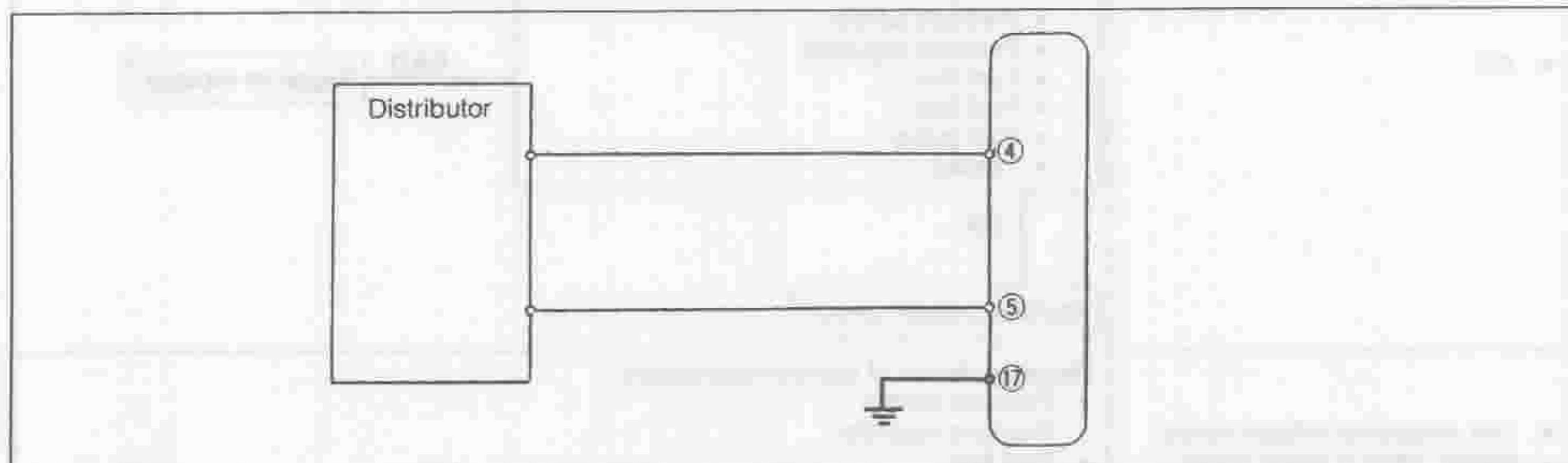
(15) Removal of SST for diagnosis connector

- ① Remove the SST from the diagnosis connector.
- ② Install the cap to the diagnosis connector.

LEF00137-00000

DISTRIBUTOR

Terminal	Trouble	Conditions	STD voltage
④ - ⑰	No voltage	Ignition switch ON	0.5 - 1.5
⑤ - ⑰	No voltage	Ignition switch ON	0.5 - 1.5



LEF00138-00110

If the SST (09842-87502-000) has not been installed yet, install the SST, referring to the section under "Preparation of Trouble-shooting" at page EF-30.

• ④ - ⑤

[1] There is no AC voltage between SST terminals ④ and ⑤ when ignition key switch is turned ON.

[2] Check that there is a voltage of about 0.5 - 1.5 Volt between the following terminals of SST terminal when ignition switch is turned ON. Namely between ④ and ⑰, and between ⑤ and ⑰, respectively.

OK

BAD

Check wiring between ECU and distributor.

OK

BAD

Repair or replace.

Check distributor.

BAD

Replace distributor.

Check distributor.

OK

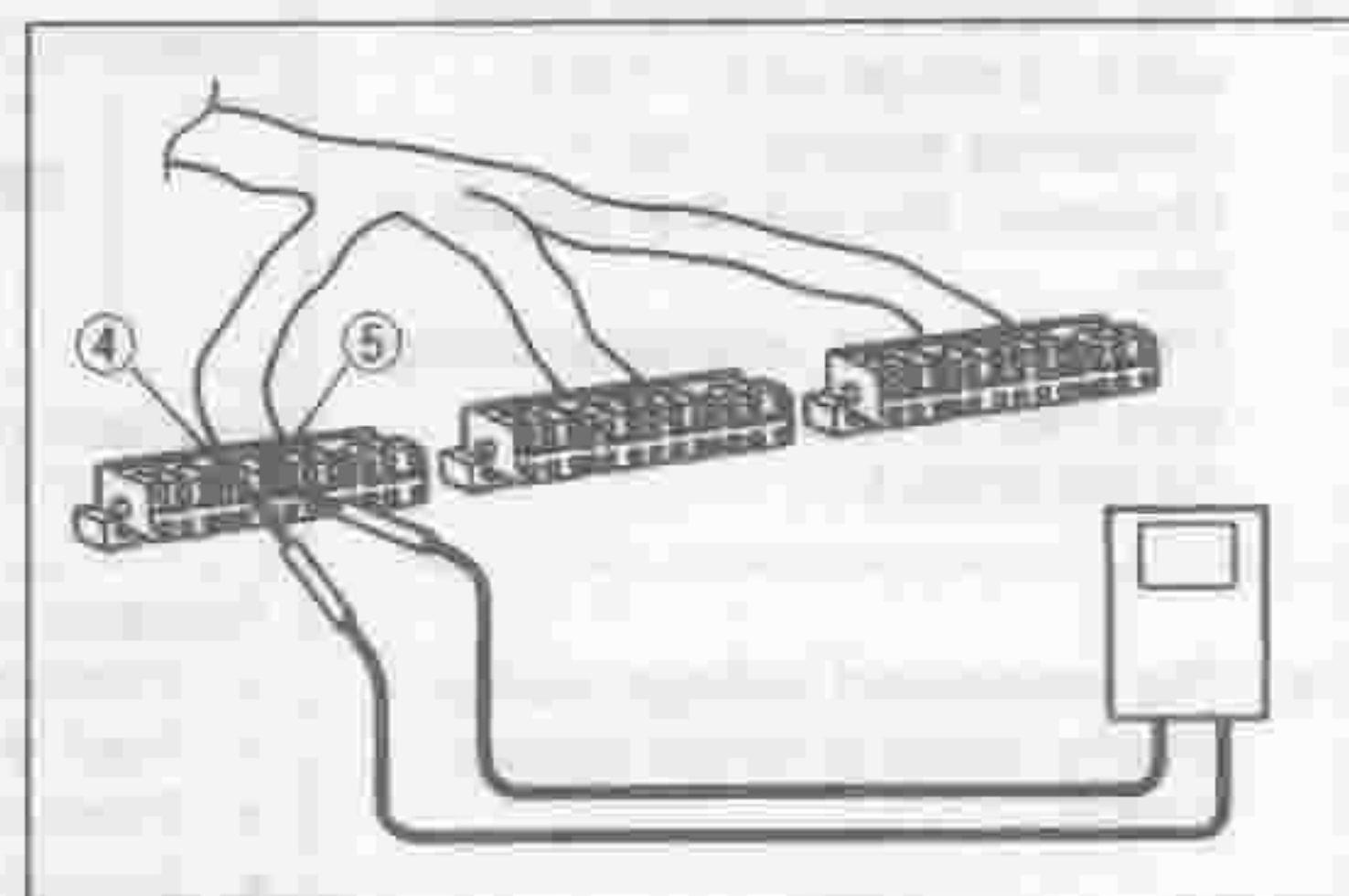
Refer to ⑥ or ③③ - ⑰ trouble section.

BAD

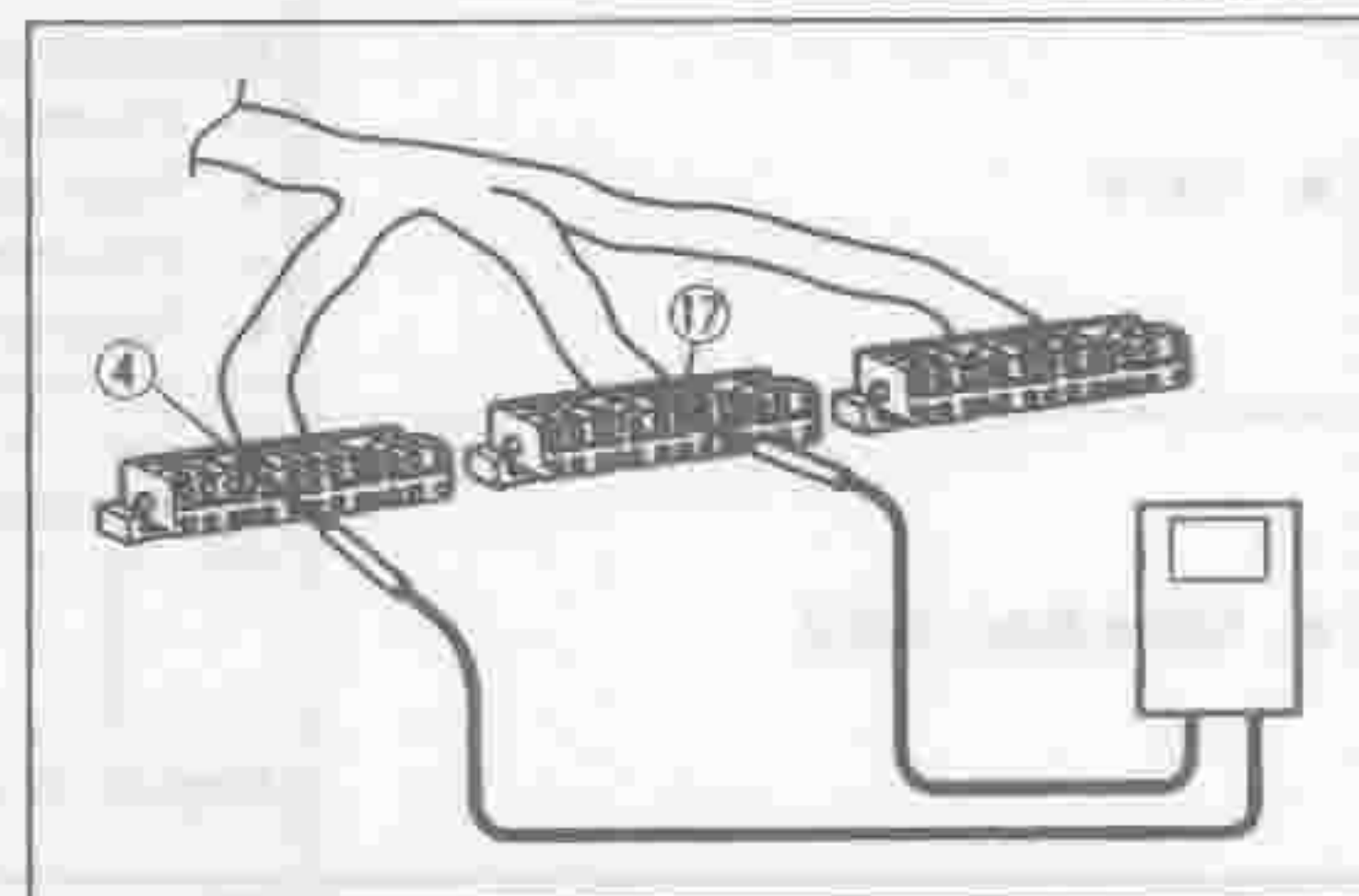
Repair or replace.

OK

Check ECU.



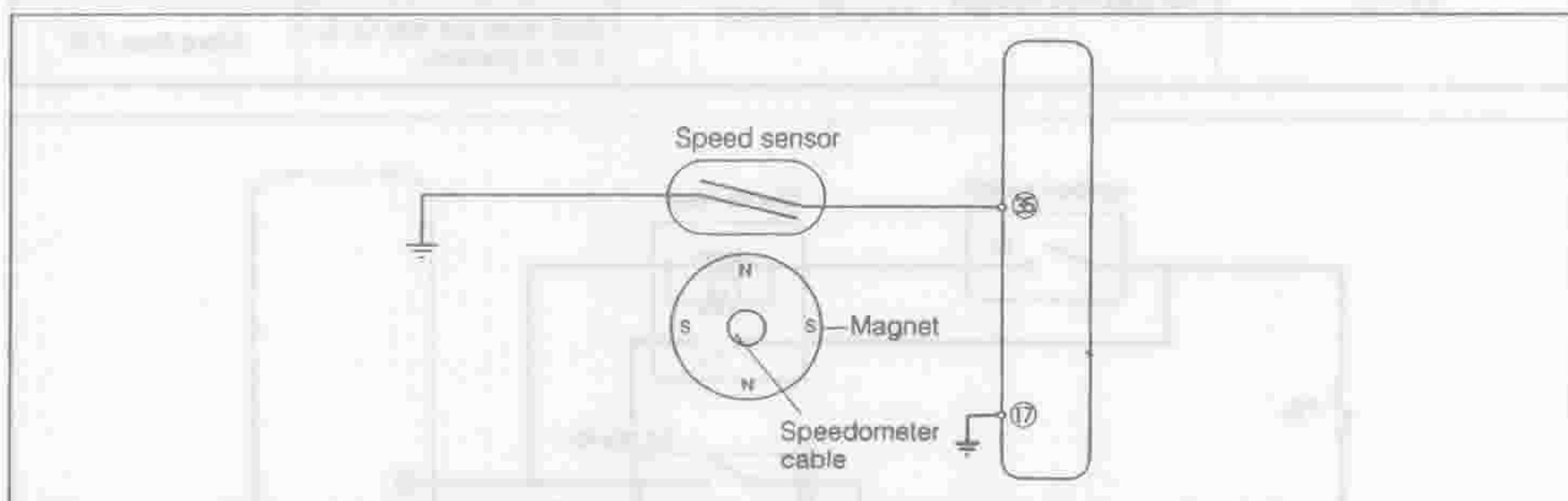
LEF00000-00111



LEF00139-00112

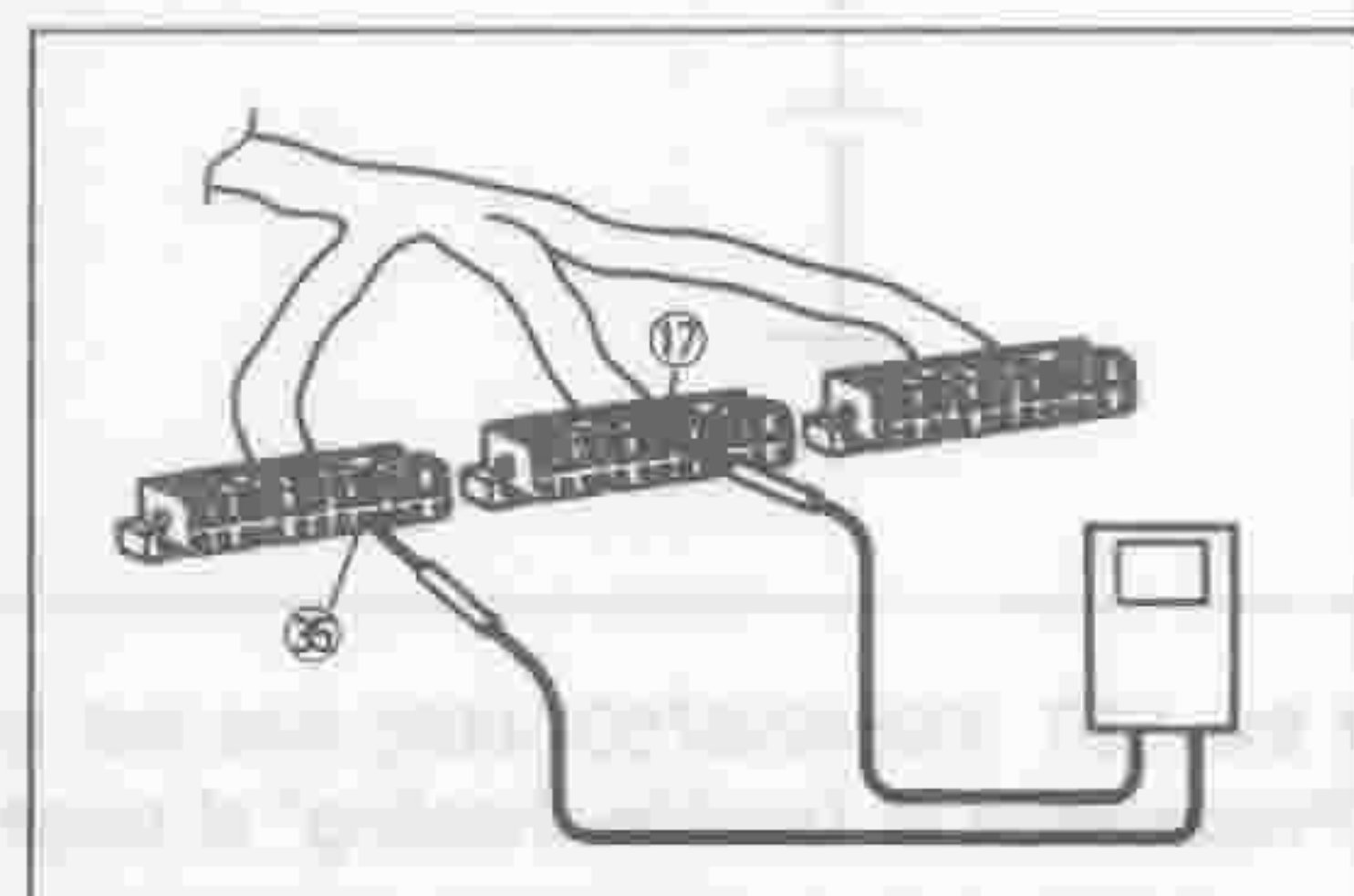
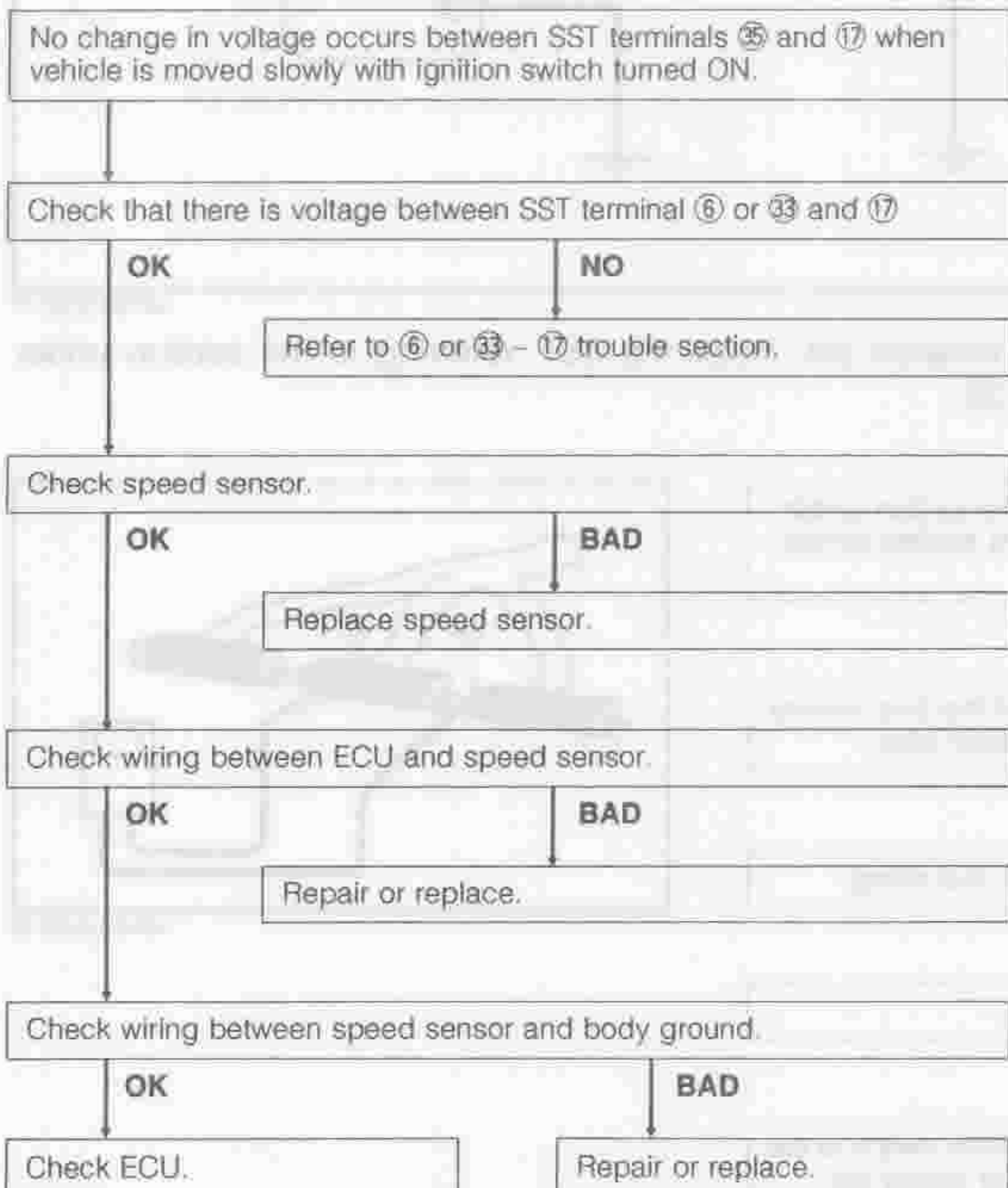
SPEED SENSOR

Terminal	Trouble	Conditions	STD voltage
③⑤ - ①⑦	No voltage changes	Ignition switch ON When vehicle is moved slowly:	0 to 4.5 - 5.5



LEF00140-00113

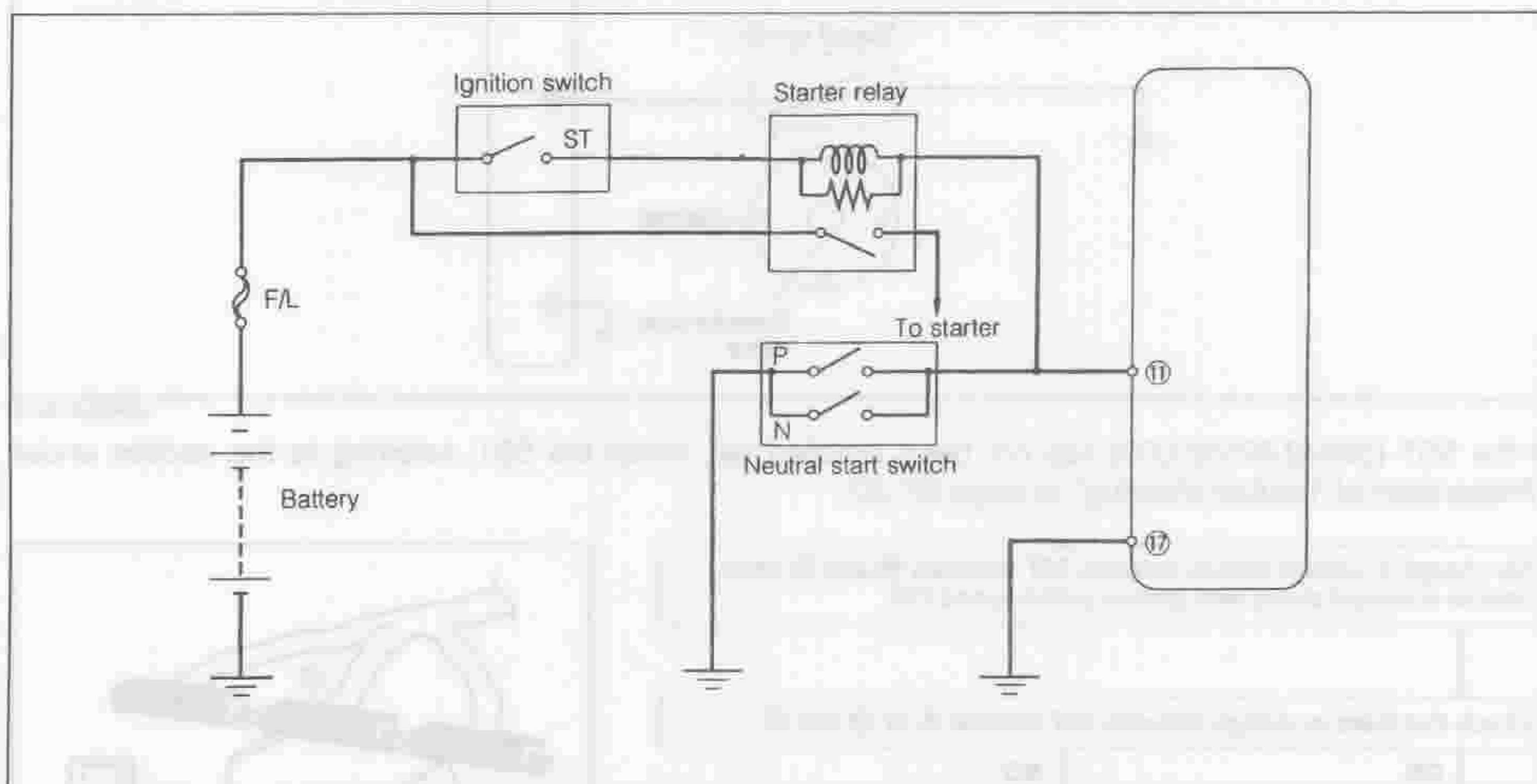
If the SST (09842-87502-000) has not been installed yet, install the SST, referring to the section under "Preparation of Trouble-shooting" at page EF-30.



LEF00141-00114

NEUTRAL START SWITCH (Only for AT vehicle)

Terminal	Trouble	Conditions	STD voltage
⑪ - ⑰	No specified voltage	When ignition switch turns ST position	Shift lever put into N or P position Less than 1.0
			Shift lever put into D, 2, L or R position More than 7.0



LEF00142-00115

If the SST (09842-87502-000) has not been installed yet, install the SST, referring to the section under "Preparation of Trouble-shooting" at page EF-30.

Move the shift lever to the D, 2, L or R range and set the ignition switch to the ST position. At this time, ensure that no voltage is applied across the terminals ⑪ and ⑰ of the SST.

NO YES

Set the ignition switch to the ST position. At this time, ensure that the battery voltage is applied to the starter relay.

YES

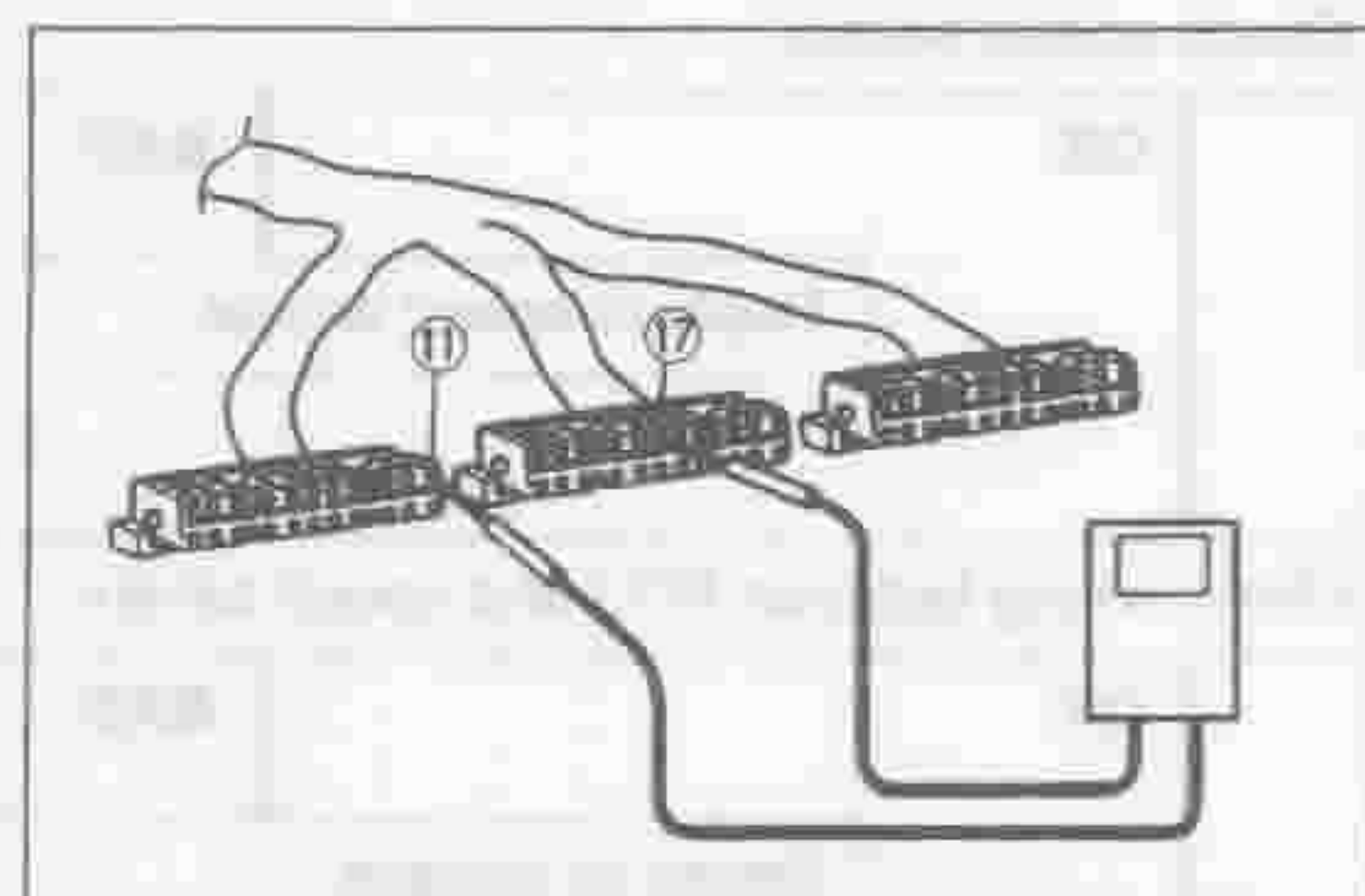
NO

Repair or replace the IG switch and wiring.

Repair or replace the starter relay.

Move the shift lever to the P or N range and set the ignition switch to the ST position. At this time, ensure that a voltage is applied across the terminals ⑪ and ⑰ of the SST.

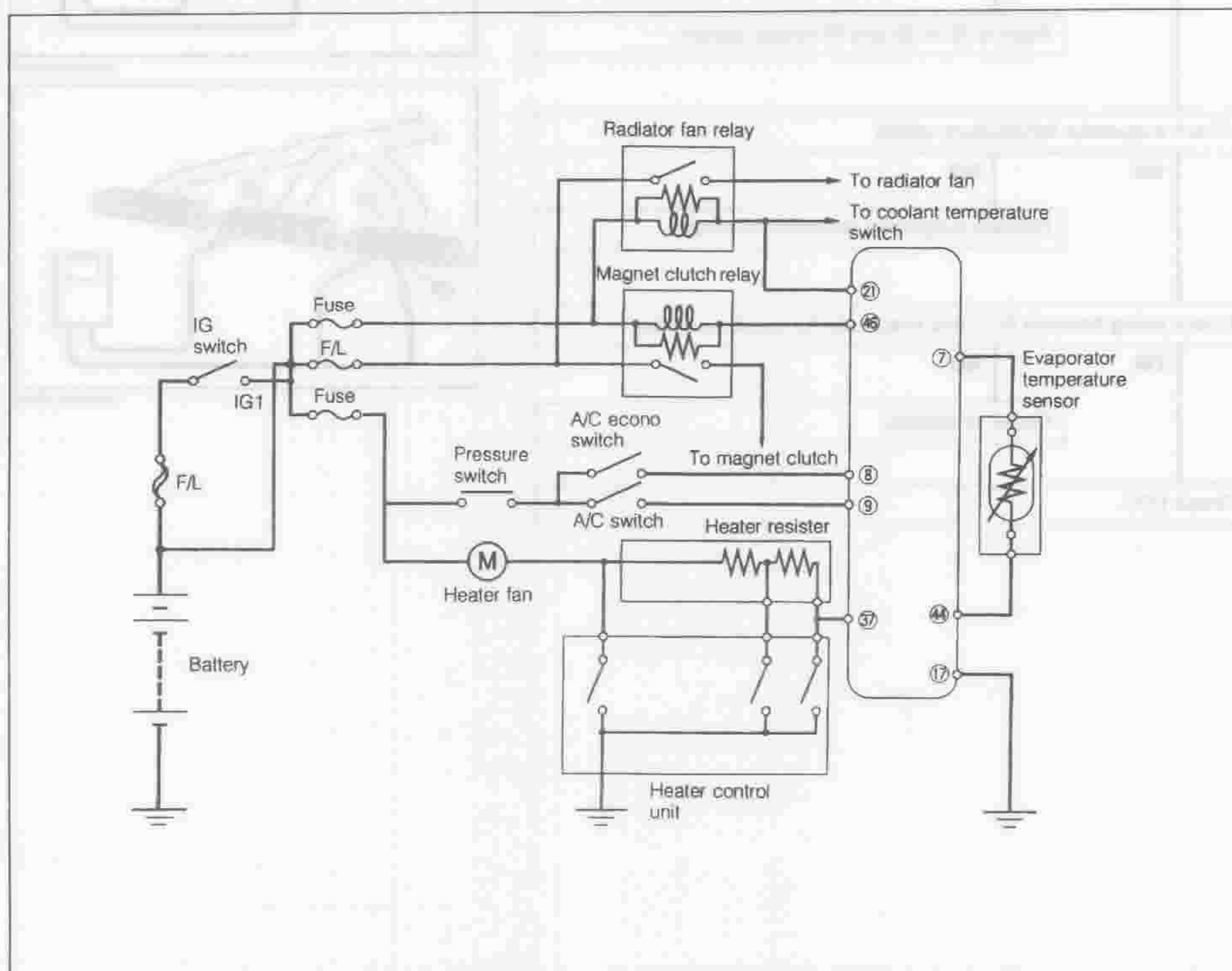
Repair or replace the neutral start switch and wiring.



LEF00143-00116

AIR CONDITIONER (EF-EL Engine Only)

Terminal	Trouble	Conditions	STD voltage
⑦ - ④④	No voltage	Ignition switch is turned ON	About 0.9 - 3.0
⑧ - ①⑦	No voltage	Air conditioner econo switch is turned ON while engine is running	More than 7.0
⑨ - ①⑦	No voltage	Air conditioner switch is turned ON while engine is running	More than 7.0



LEF00144-00117

If the SST (No. 9842-87502-000) has not been installed yet, install the SST, referring to the section under "Preparation of Trouble-Shooting" at page EF-30.

• ⑦ - ④④

[1] There is no voltage between SST terminals ⑦ - ④④ when ignition switch is turned ON.

[2] Check that there is voltage between SST terminals ⑥ or ③③ and ①⑦ .

OK

NO

Refer to ⑥ or ③③ and ①⑦ trouble section.

Check evaporator temperature sensor

OK

NO

Replace evaporator temperature sensor

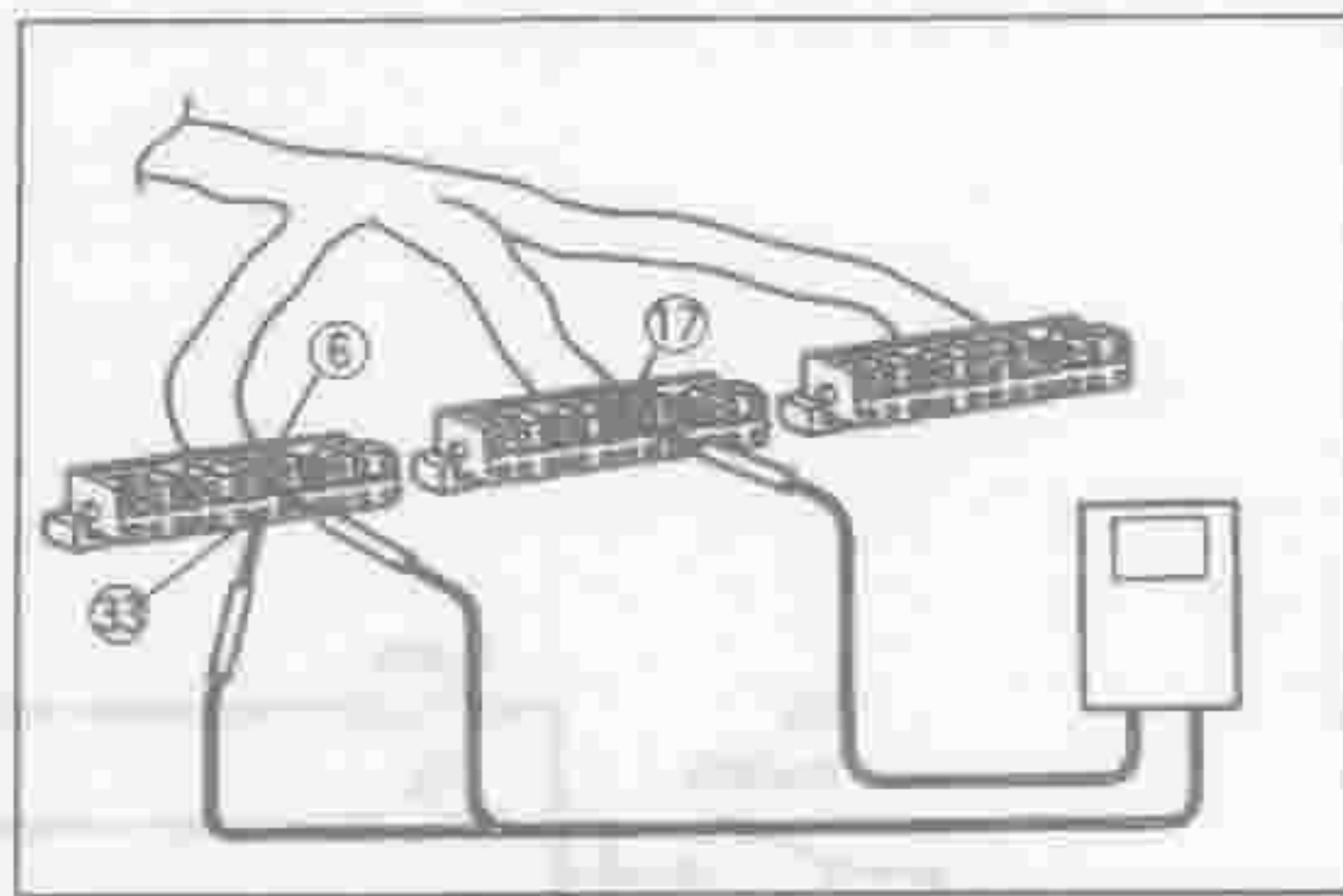
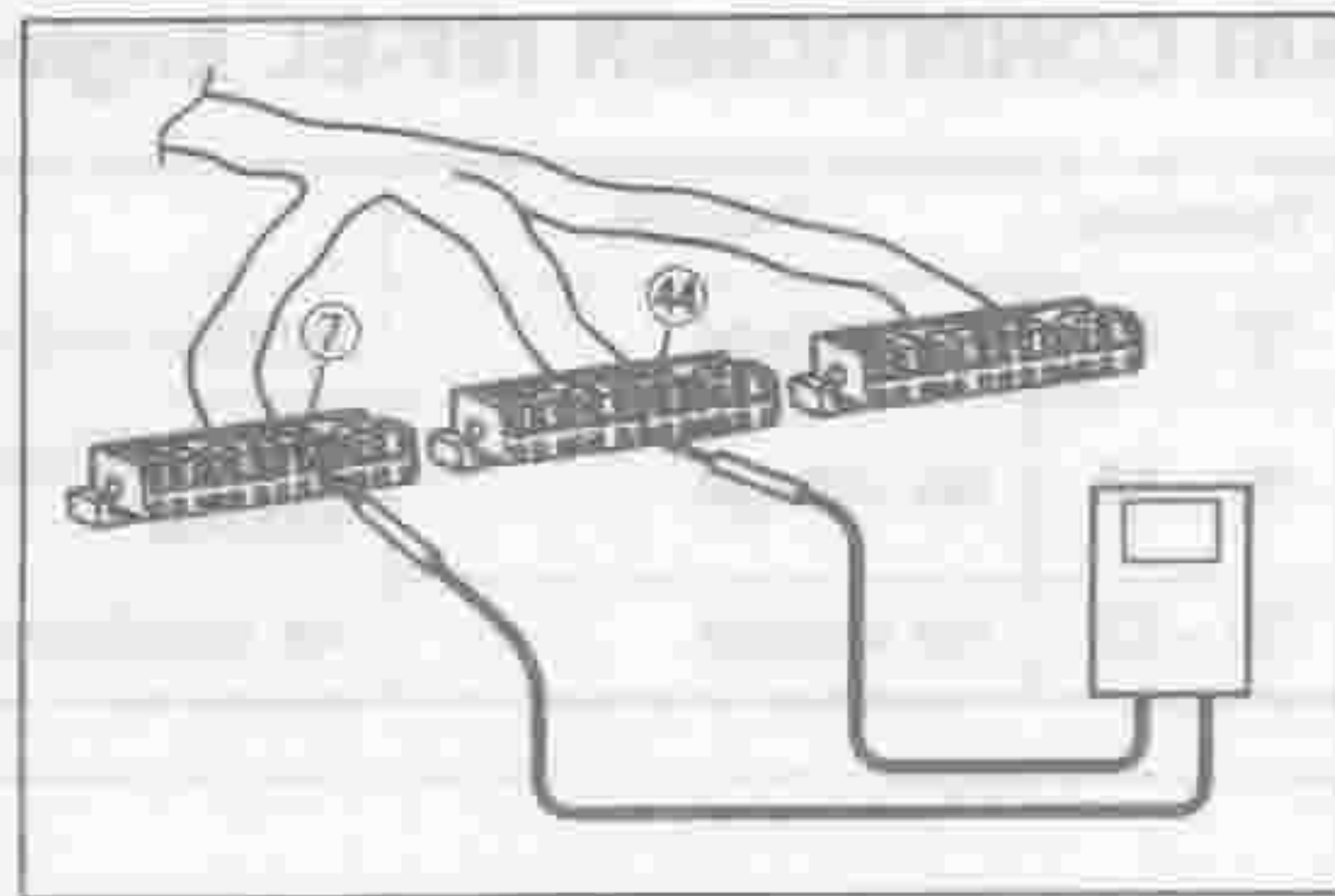
Check wiring between ECU and evaporator temperature sensor.

OK

NO

Repair or replace

Check ECU.



• ⑧ - ⑰

[1] There is no voltage between SST terminals ⑧ - ⑰, when air conditioner econo switch is turned ON while engine is running.

Check that there is voltage between IG1 terminal and engine ground when switch is turned ON.

OK

NO

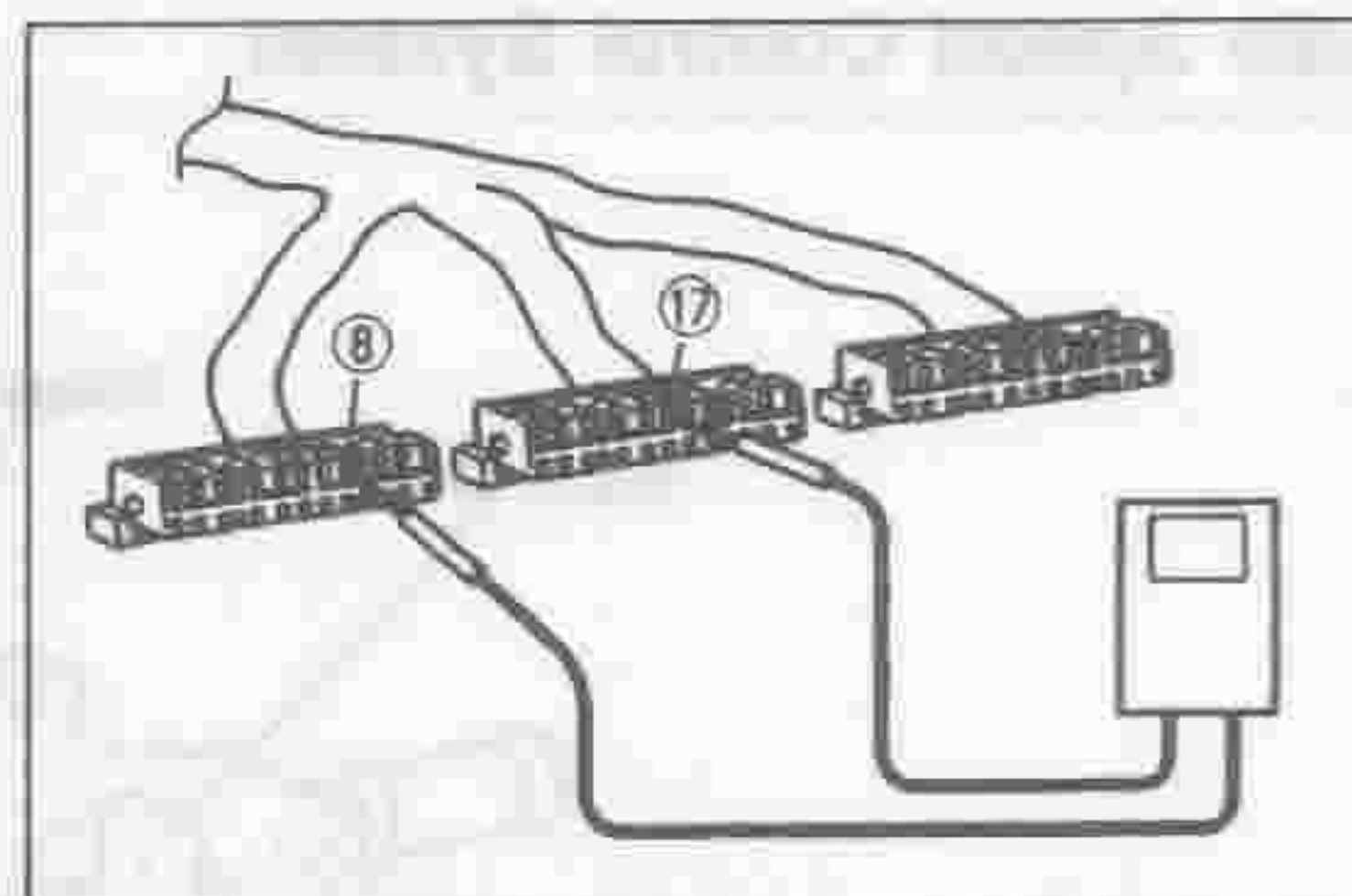
Repair or replace the ignition switch.

Check to see wiring, air conditioner econo switch and pressure switch

OK

Repair or replace

Check ECU.



LEF00146-00120

• ⑨ - ⑰

[1] There is no voltage between SST terminals ⑨ - ⑰ when air conditioner econo switch is turned ON while engine is running.

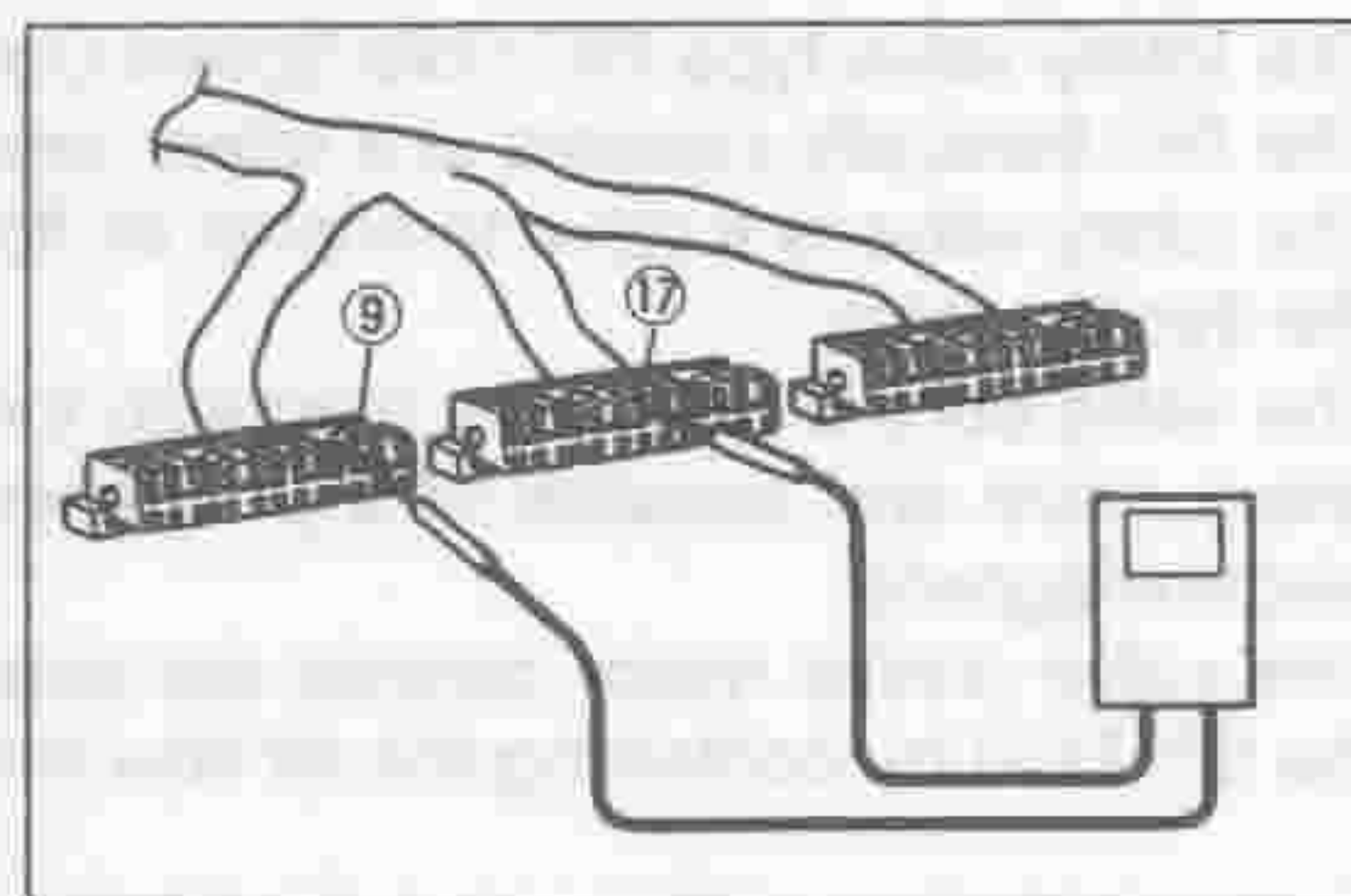
Check that there is voltage between IG1 terminal and engine ground when switch is turned ON.

Repair or replace the ignition switch.

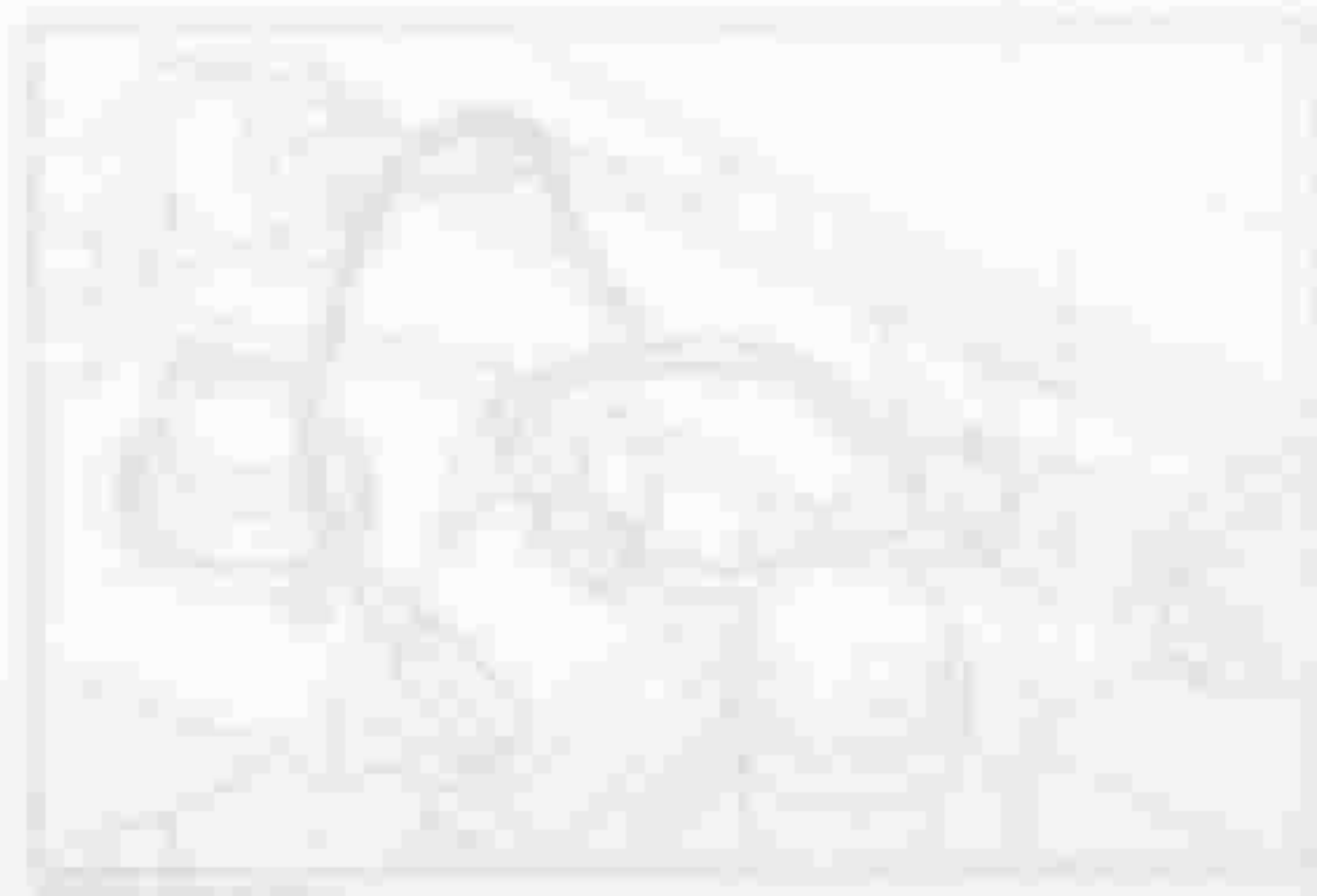
Check to see wiring, air conditioner switch and pressure switch.

Repair or replace

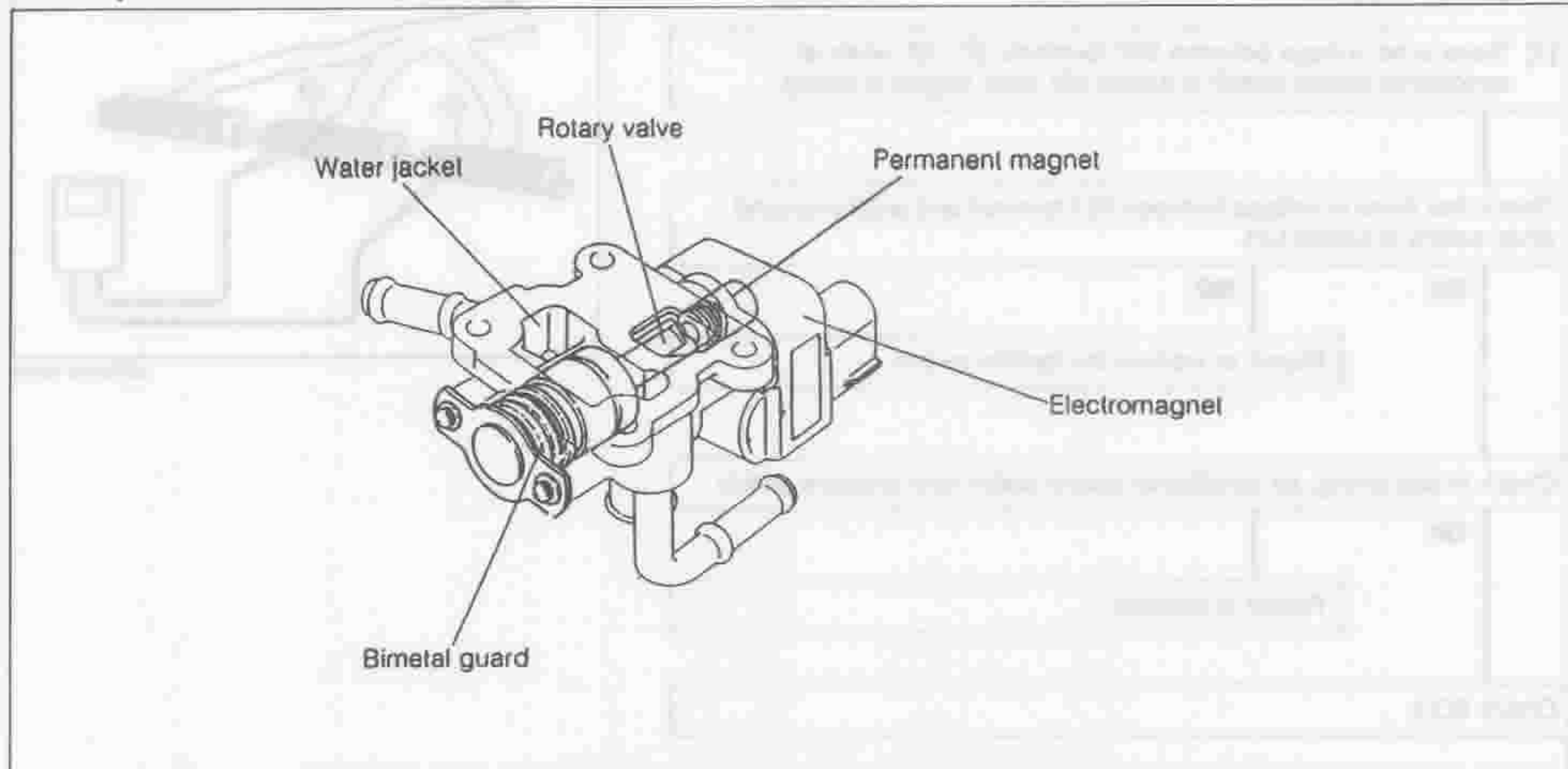
Check ECU.



LEF00147-00121



Idle Speed Control System



LEF00148-00122

The rotary valve type ISC (Idle Speed Control) is employed.

The ISC basically consists of a rotary valve, an opening degree control motor and a bimetal guard.

The rotary valve is a valve to control air flow to the intake manifold at the idling from the air cleaner side over the throttle valve.

The valve control motor is a magnetic force balance type motor which controls the opening degree of the rotary valve and consists of a permanent magnet provided at the end part of the rotary valve and two electromagnets.

This valve control motor controls the engine revolution speed to the target revolution speed memorized in the EFI ECU by controlling the air flow rate by changing the opening rate of the air flow control valve.

Moreover, the valve opening motor is controlled by the current flow rate to each electromagnet inputted from the EFI ECU.

The bimetal guard section is provided for the control valve opening angle to prevent the engine revolution speed from increasing excessively when the electrical control section is not functioning or the rotary valve opening angle is controlled so as to get necessary air flow at engine cold period.

This bimetal detects the temperature of the engine coolant circulating around the bimetal.

LEF00149-00000

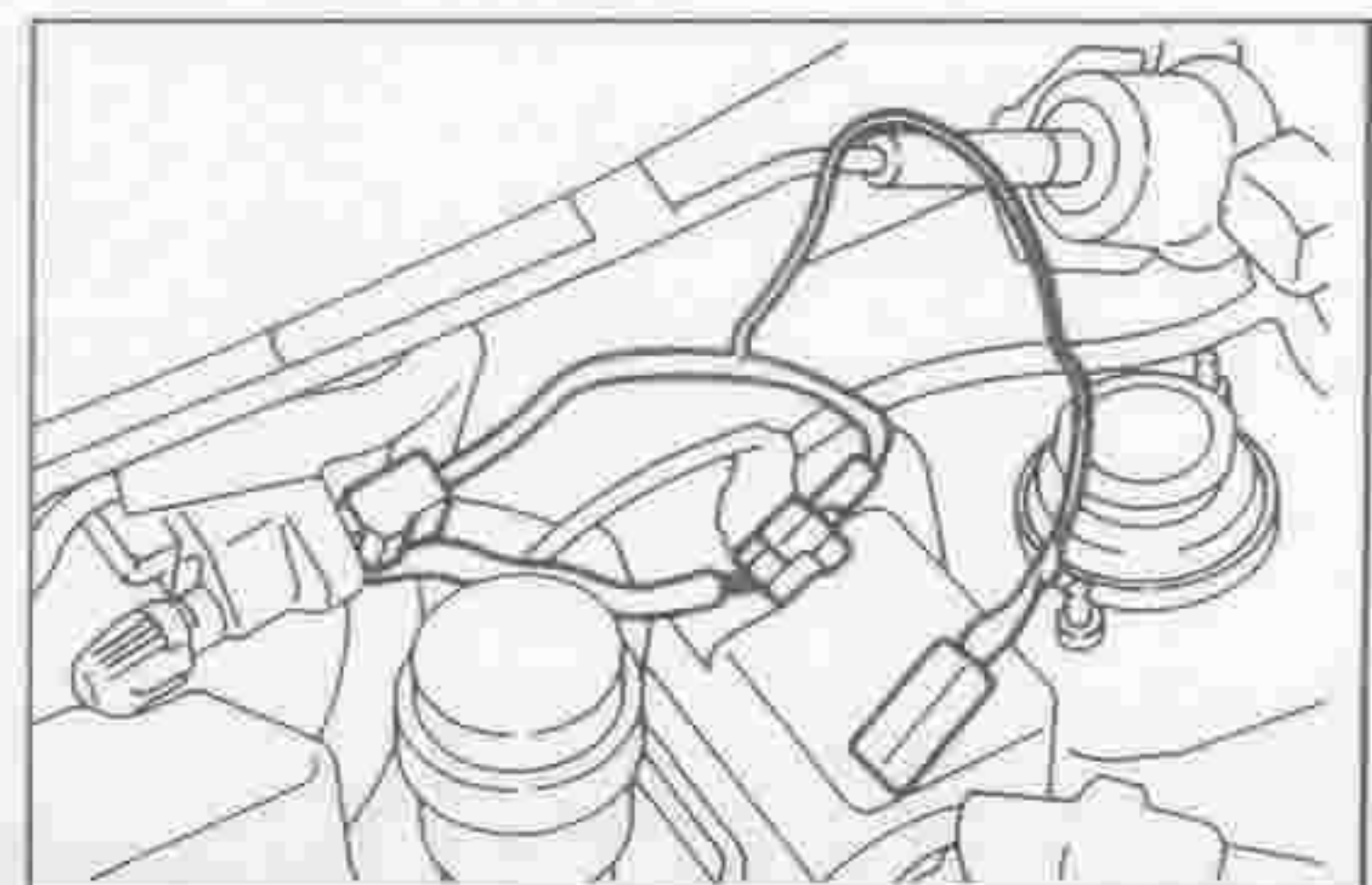
1. Inspection of idle speed

(1) Connection of tachometer

- ① Connect the measuring terminal of the tachometer to the engine.

NOTE:

- If your tachometer is of such a type as to be connected to the negative terminal of the ignition coil, connect the following SST to the distributor connector. Then, connect the measuring terminal of the tachometer to the SST.
SST: 09991-87604-000



LEF00150-00123

NOTE:

- Be sure to follow the instruction of the manufacturer of the tachometer before you connect it.
- Before the inspection, be sure to prepare the conditions described in the service manual under the section Preparation to be made prior to idle speed adjustment.

CAUTION:

- Never allow the tachometer terminal to touch ground, as it could result in damage to the ignition coil.
- As some tachometers are not compatible with this ignition system, it is imperative to confirm the compatibility of your meter before it is used.

(2) Start the engine and warm-up the engine fully.

(3) Ensure that the engine idle speed is the specified value.

Specified Engine Idle Speed:

EF-EL Engine ... 800 rpm

ED-20 Engine ... 800 rpm (MT), 850 rpm (AT)

Unit Inspection of ISCV

1. Turn OFF the ignition switch.
2. Disconnect the ISCV connector.
3. Ensure that the specified resistance exists between the terminals described below.

Terminals	Specified resistance
ISC1 - +B	19.3 - 22.3 Ω
ISC2 - +B	19.3 - 22.3 Ω

NOTE:

- Be sure to perform the inspection under room temperature (20 - 25°C).

4. Start the engine.
5. Ensure that the engine revolution speed drops when the battery voltage is applied to the +B (positive) and ISC 1 (negative).

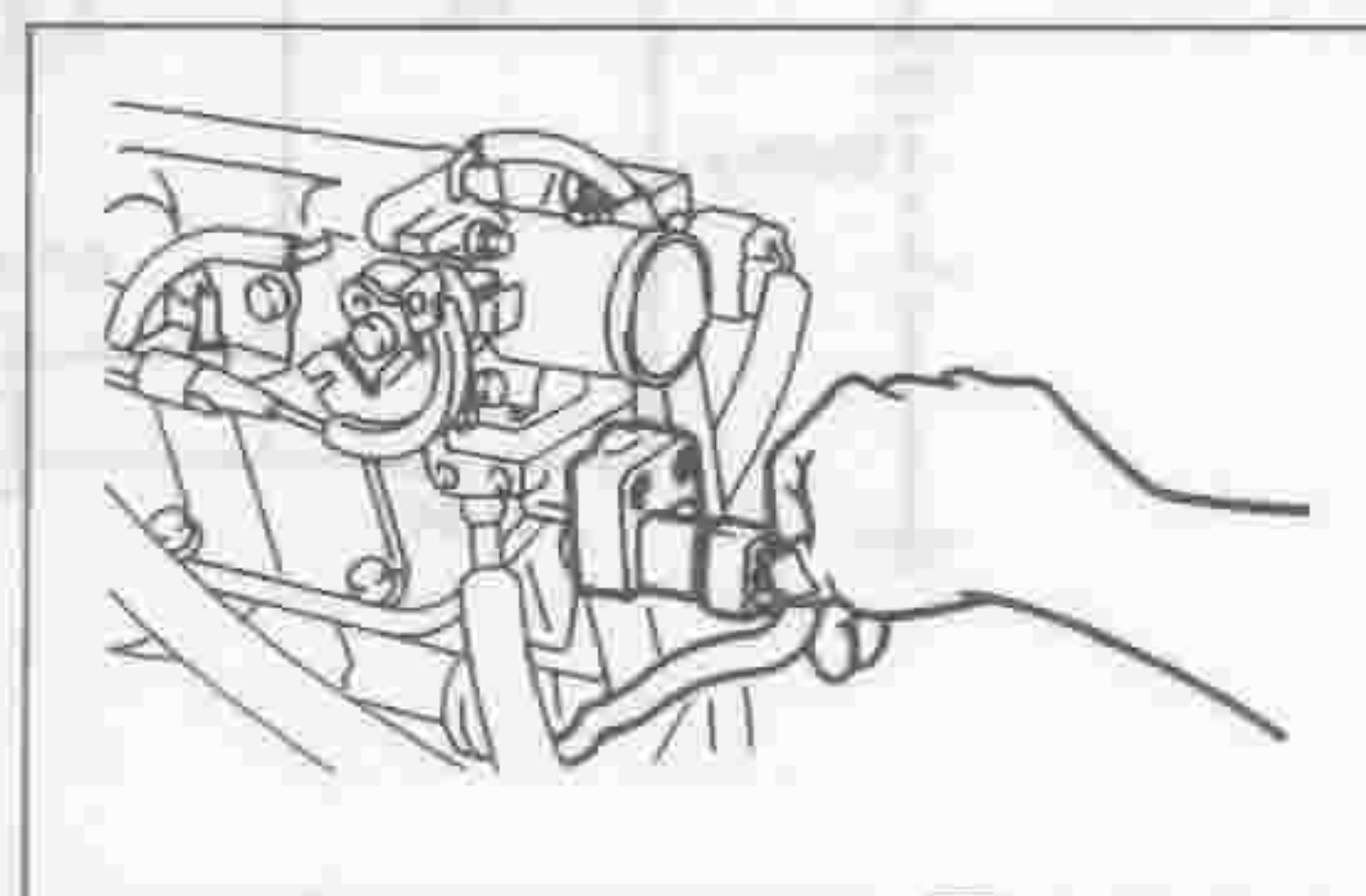
If not, replace the throttle body.

6. Ensure that the engine revolution speed increases when the battery voltage is applied to the +B (positive) and ISC 2 (negative).

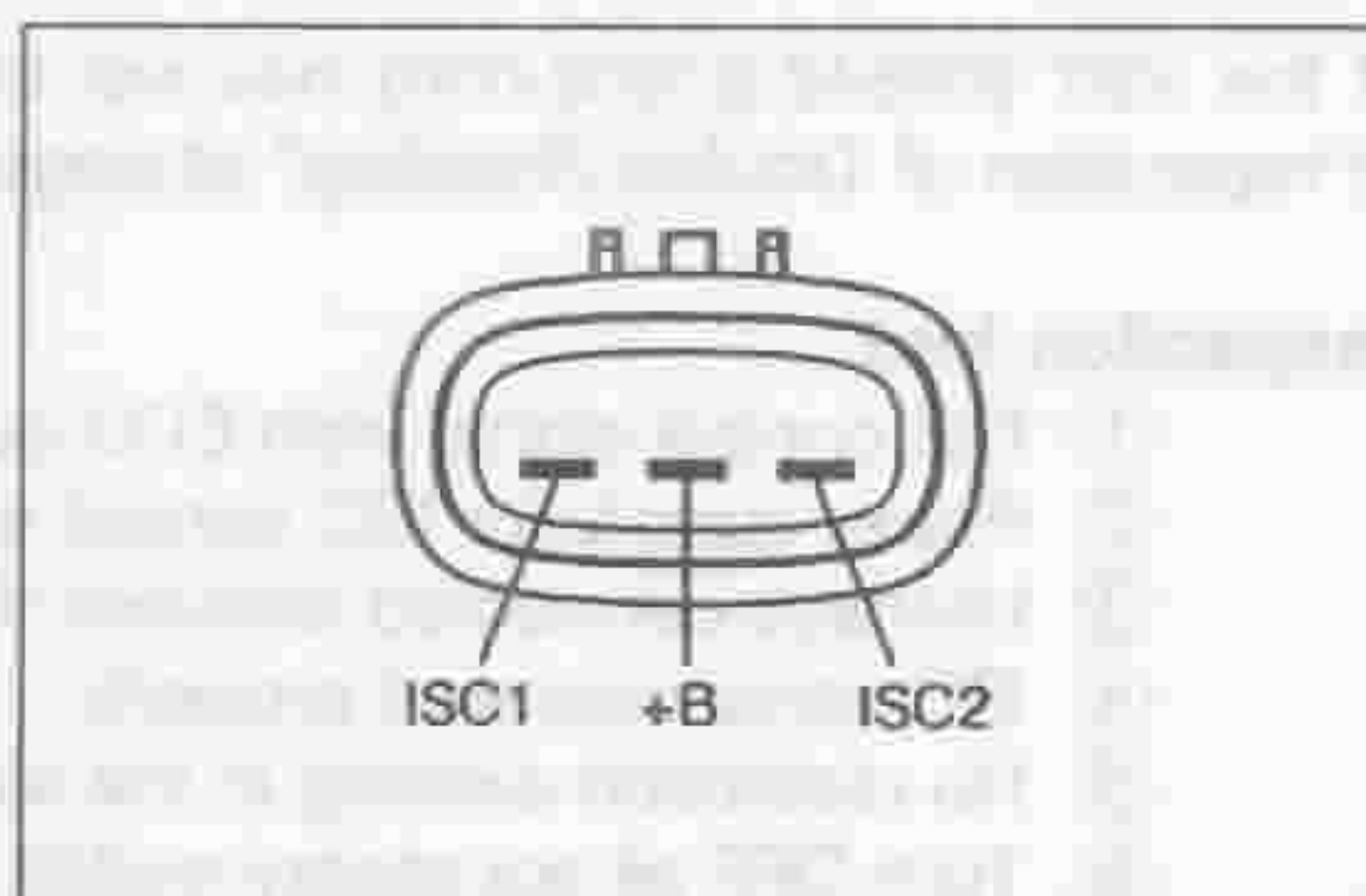
If not, replace the throttle body.

7. Turn OFF the ignition switch.
8. Reconnect the ISCV connector.

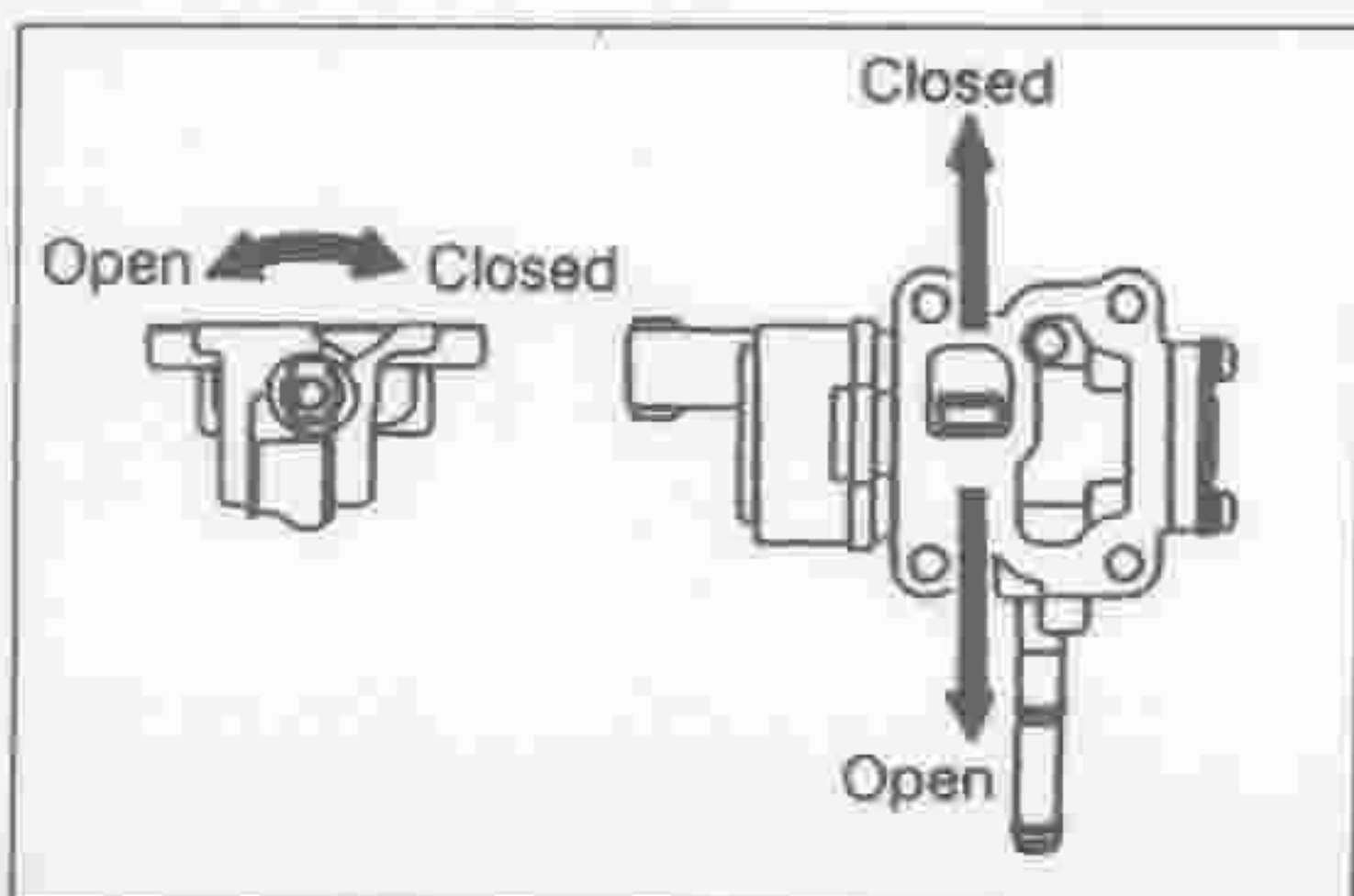
LEF00151-00000



LEF00152-00124

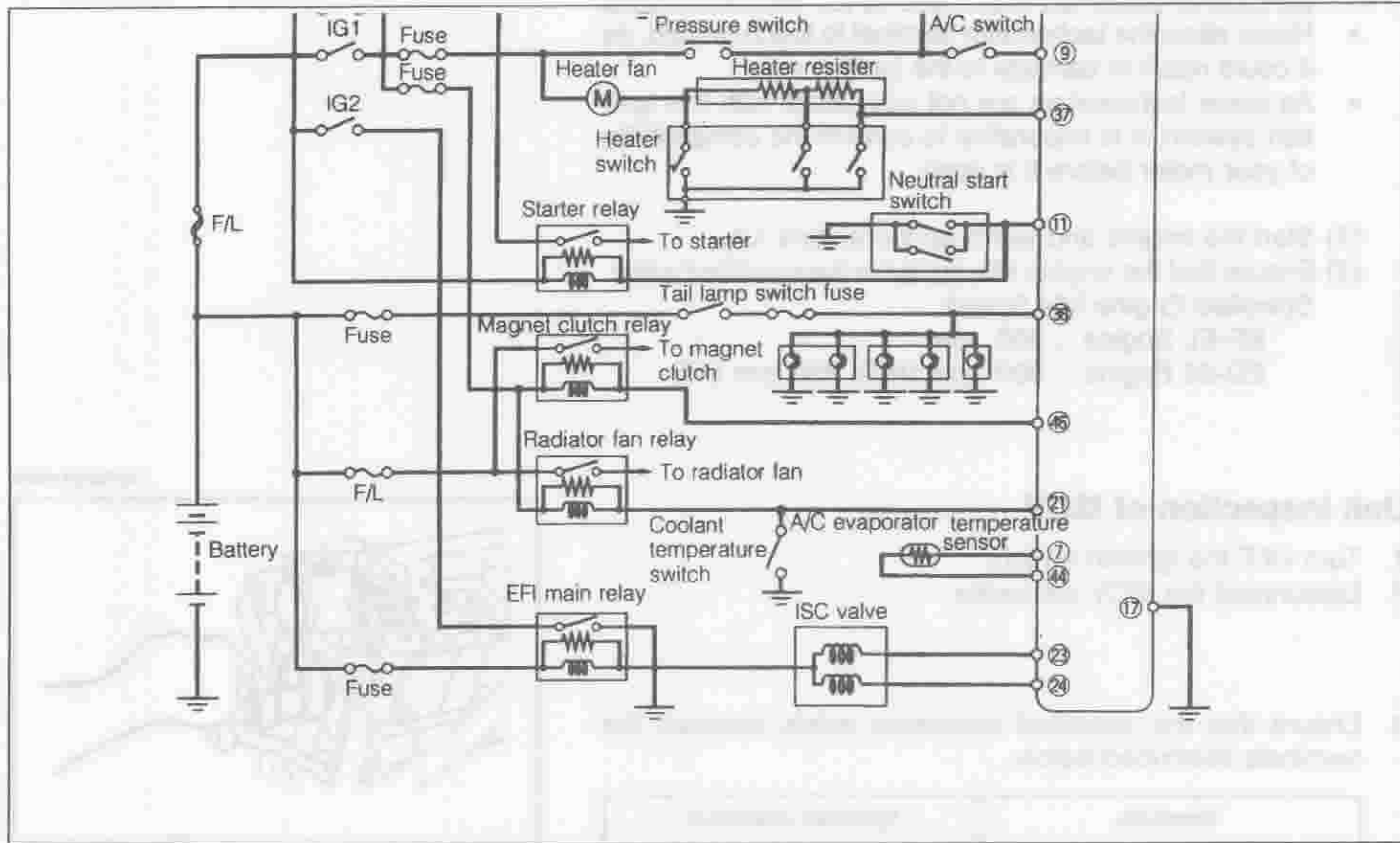


LEF00153-00125



LEF00154-00126

Inspection of ISC System



LEF00155-00127

If the SST (09842-87502-000) has not been installed yet, install the SST, referring to the section under "Preparation of Trouble-Shooting" at page EF-30.

Inspection hint

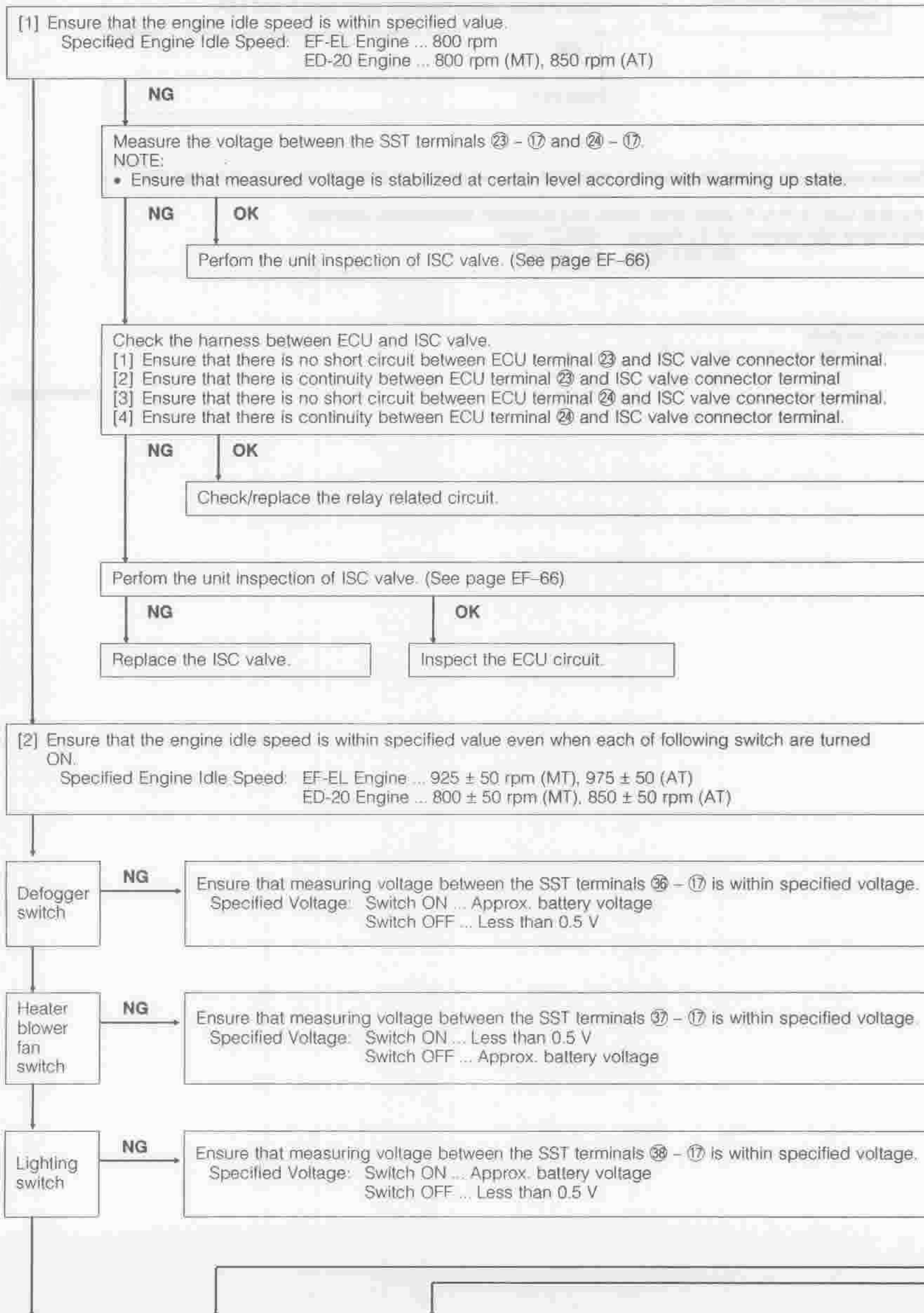
- ① ISC control signal from ECU out putted correctly.
- ② Power supply for ISC control valve applied correctly.
- ③ Harness connected between ISC valve and ECU connected properly.
- ④ ISC valve operated properly.
- ⑤ No restriction existing in the air hose of ISC valve.
- ⑥ Turn OFF all accessory switch before inspection.

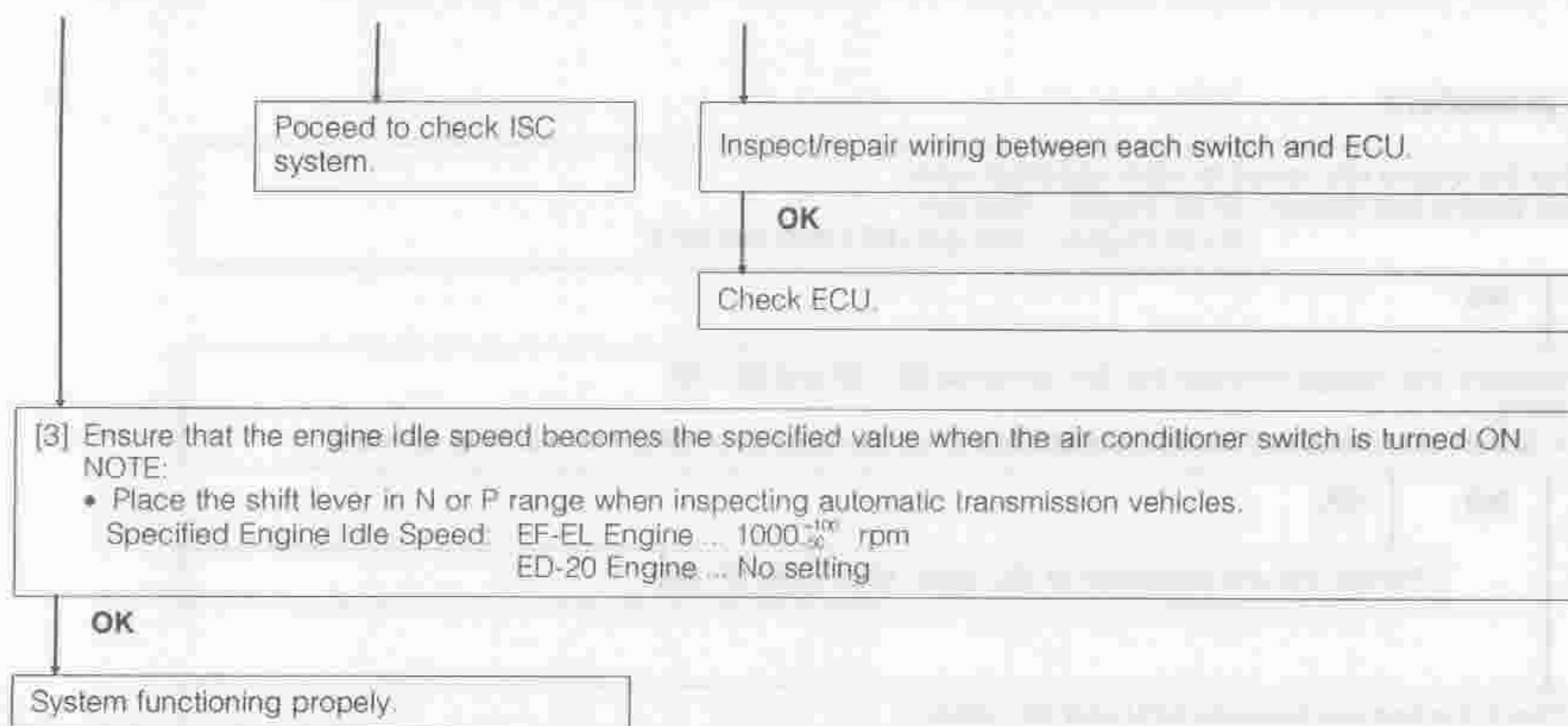
LEF00156-00000



ISC-1

Inspection procedure





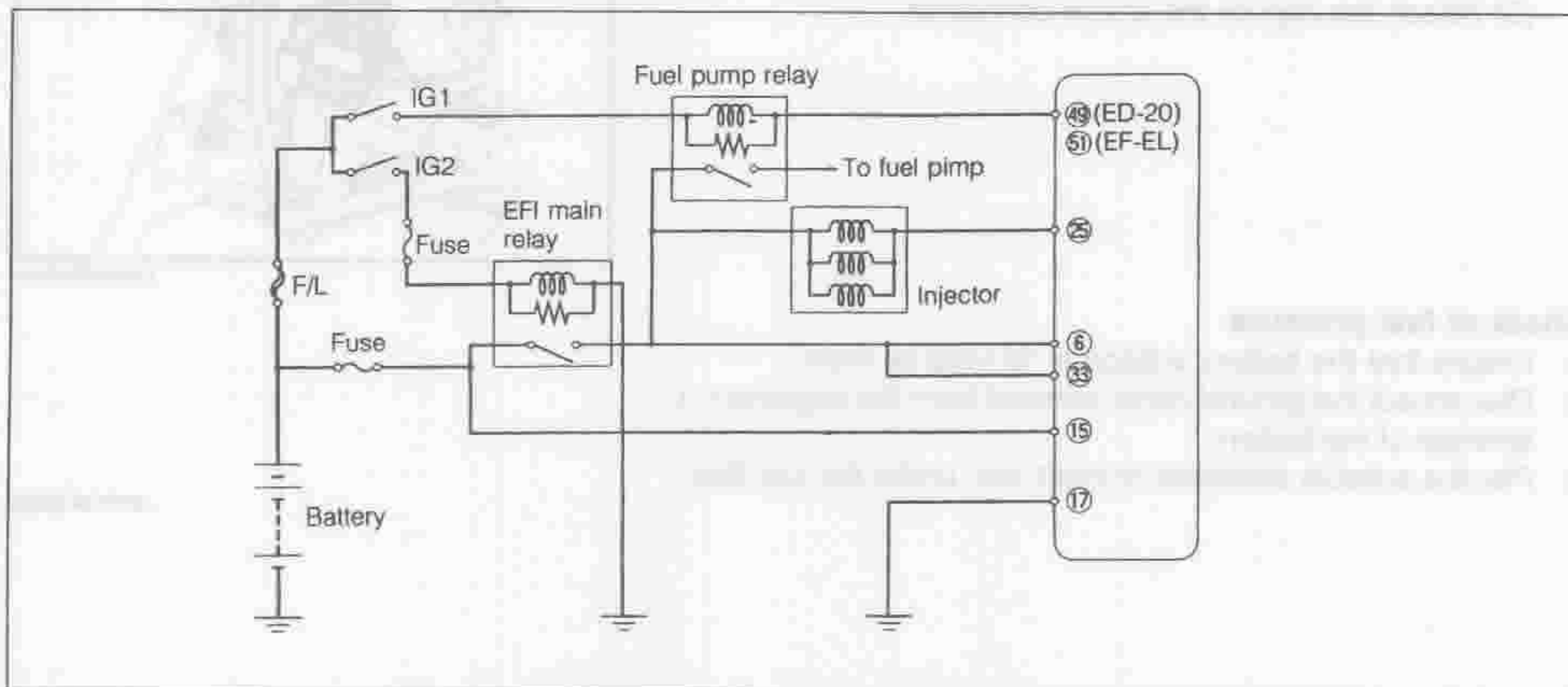
- (4) Fuel filter
- (5) Injectors
- (6) Pressure regulator

WARNING:

- When working on the fuel system, never smoke nor allow any open flame to be brought near the working site.

LEF00158-00000

Fuel system wiring diagram

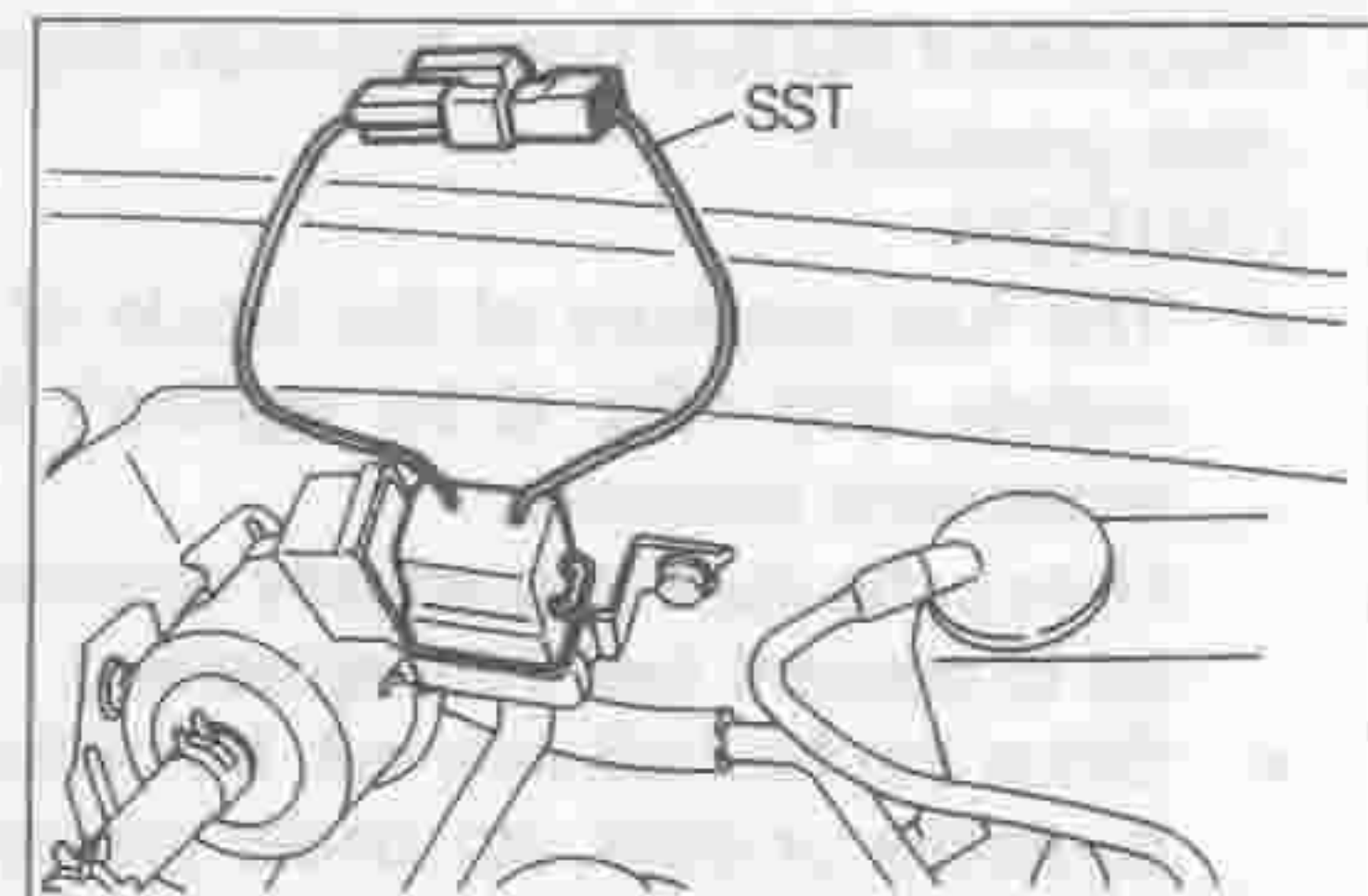


LEF00159-00128

IN-VEHICLE INSPECTION

Check of fuel pump operation

1. Connect the SST to the check connector.
 2. Connect the SST T (test) terminal to the ground terminal.
- SST: 09991-87210-000

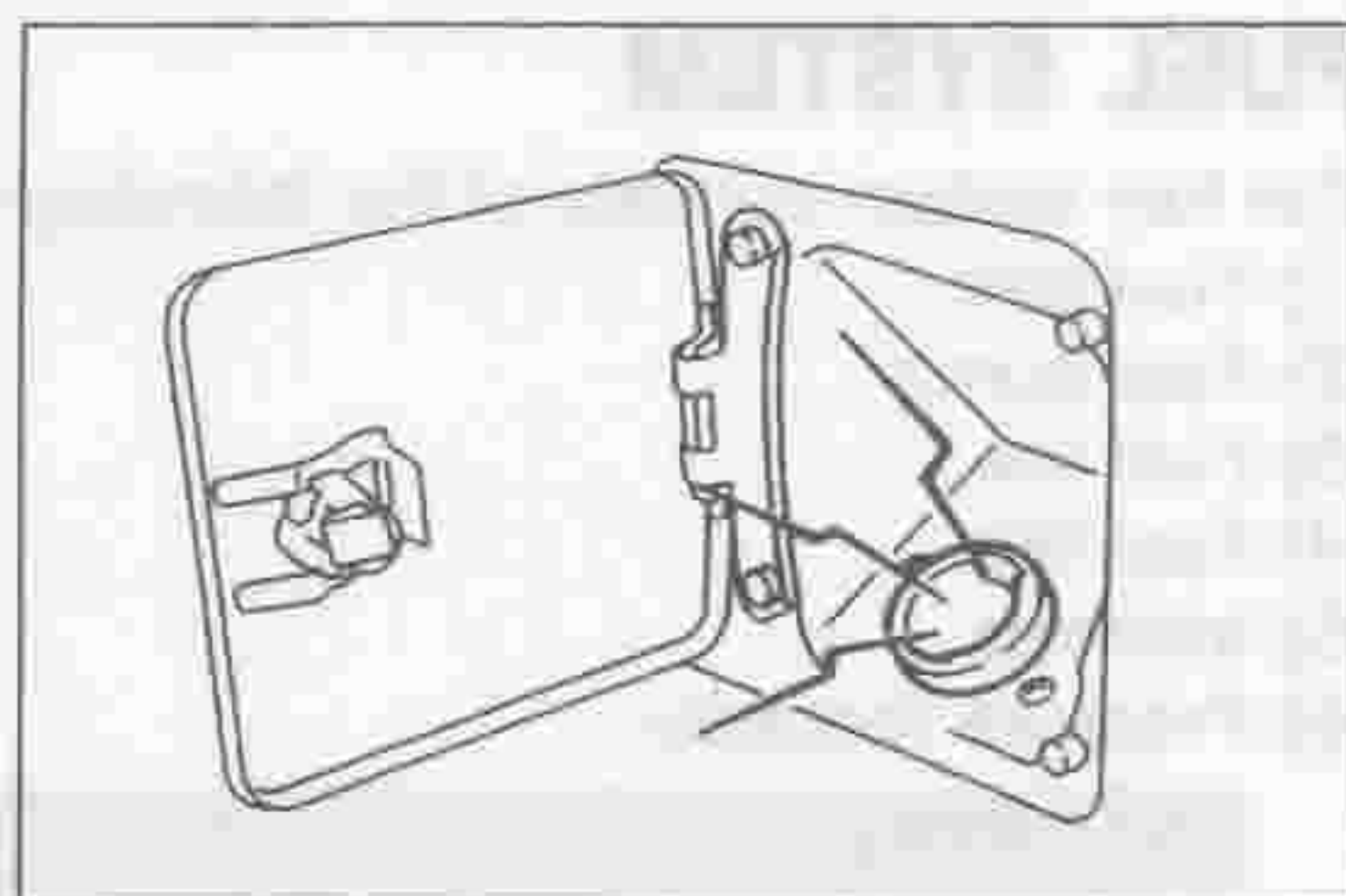


LEF00160-00129

3. Check of fuel flowing sound.
 - (1) Turn on the ignition switch.

LEF00161-00000

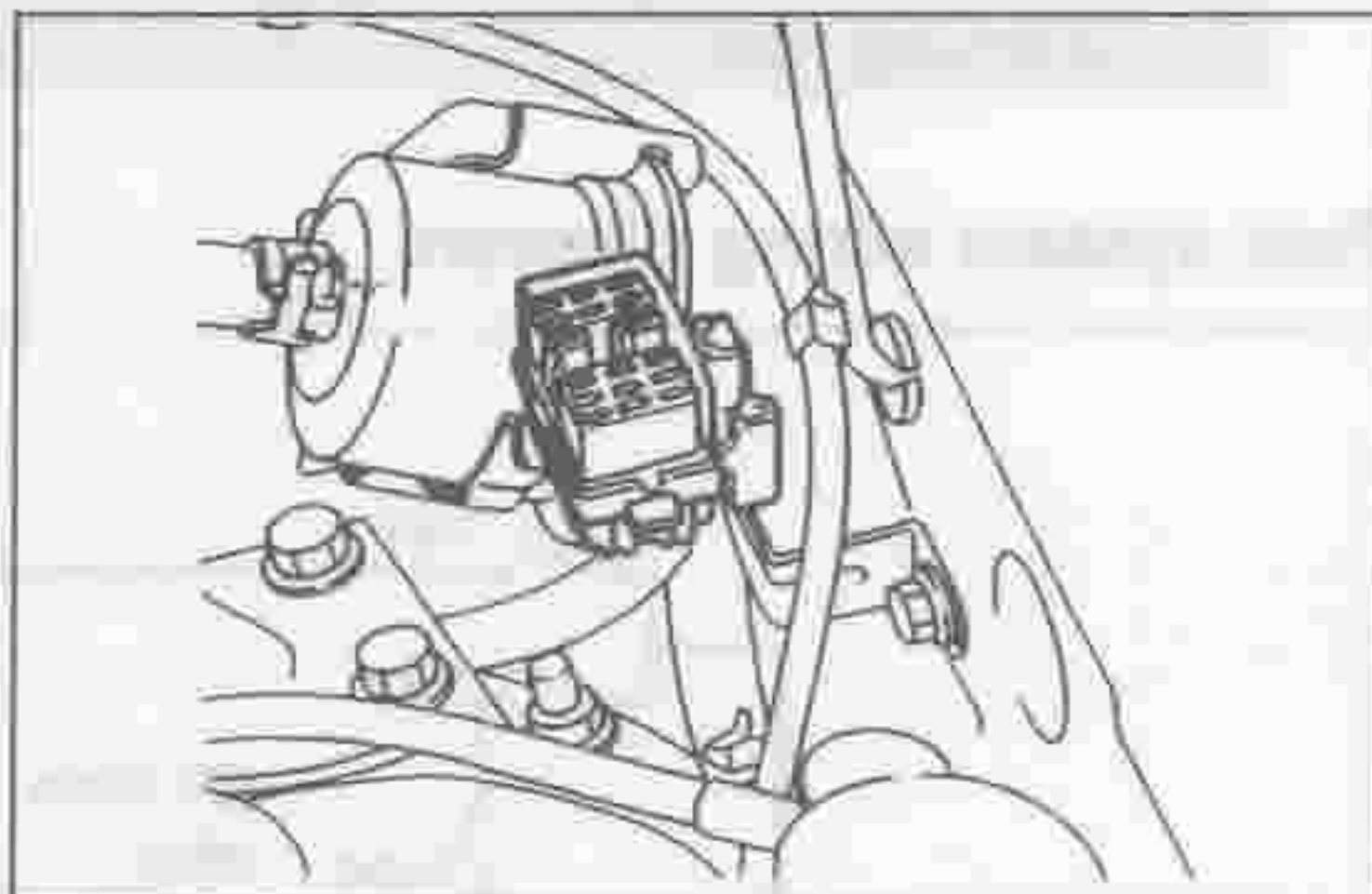
- (2) Check to see if you can hear fuel flowing sound around the pressure regulator.
- (3) If you can hear no fuel flowing sound, check the following parts. Repair them, as required.
 - Fusible links
 - Fuses
 - Main relay
 - Fuel pump relay
 - Fuel pump
 - Wiring and wiring connections



LEF00162-00130

4. Removal of SST

- (1) Turn OFF the ignition switch.
- (2) Remove the SST from the diagnosis connector.
- (3) Attach the cap on the check connector.



LEF00163-00131

Check of fuel pressure

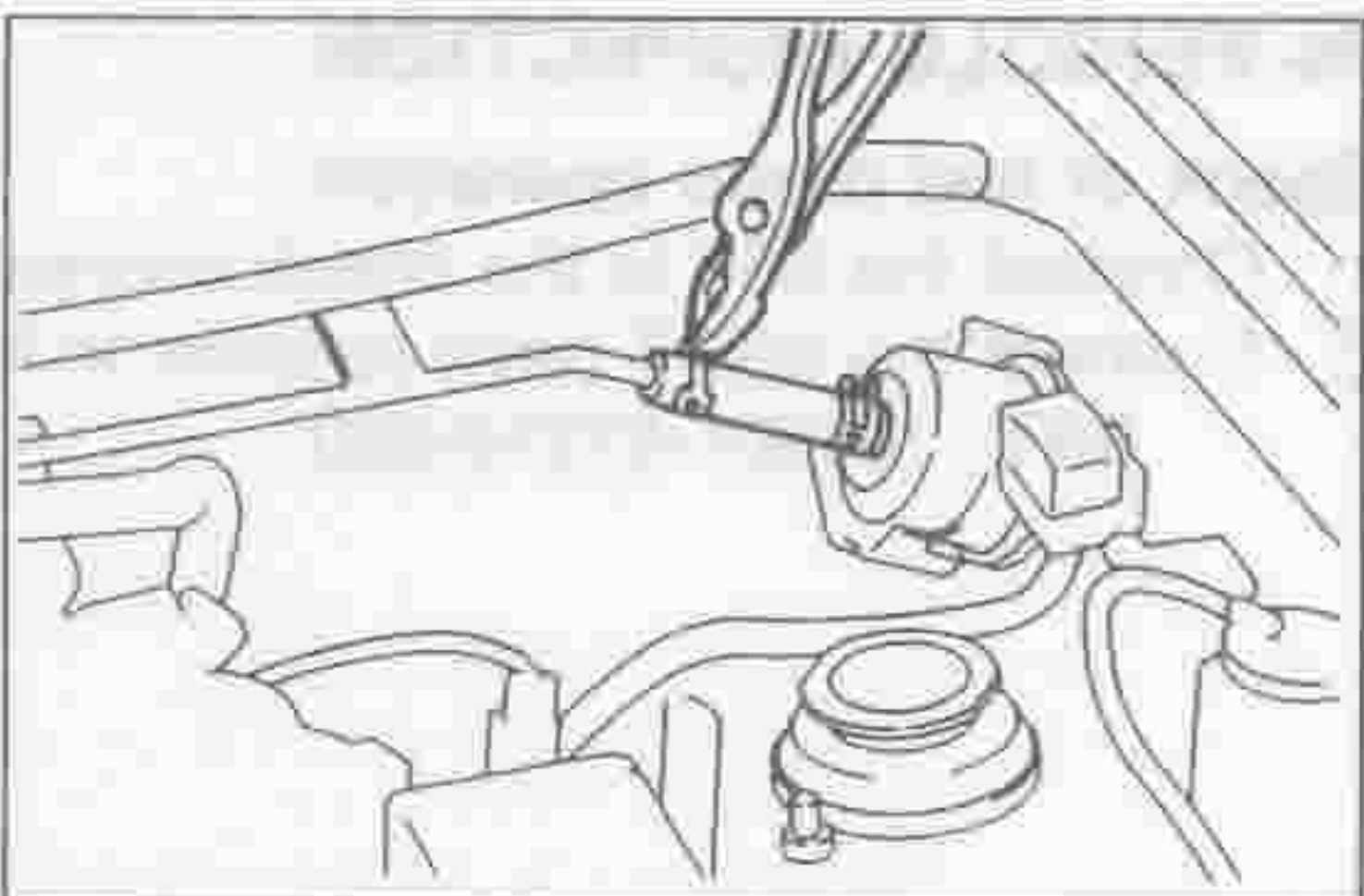
1. Ensure that the battery voltage is 12 volts or more.
2. Disconnect the ground cable terminal from the negative (-) terminal of the battery.
3. Place a suitable container or cloth, etc. under the fuel filter.

LEF00164-00000

4. Disconnect the fuel hose between the fuel filter and the fuel pipe gradually.

CAUTION:

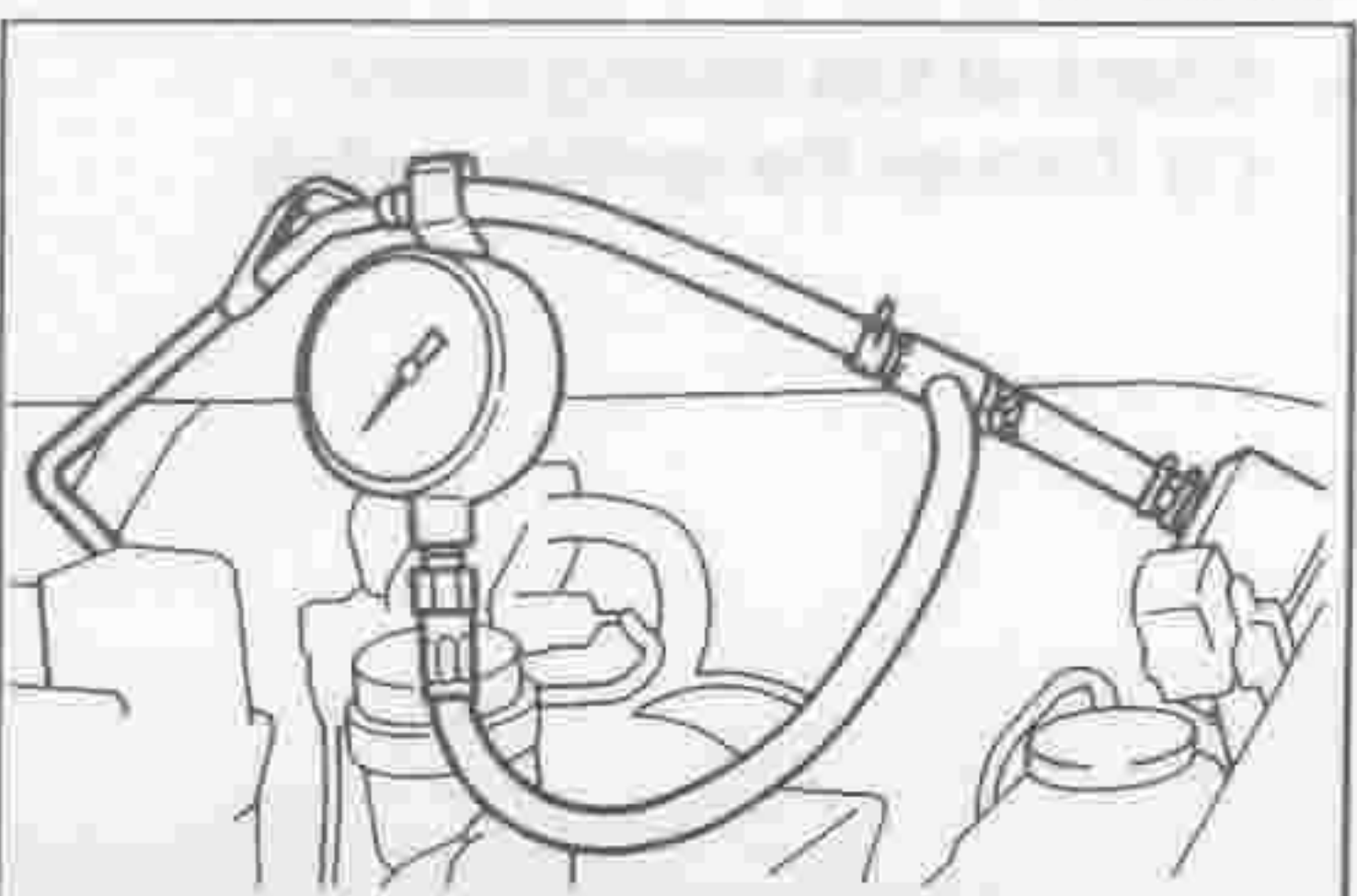
- The fuel pressure at the inside of fuel line is approximately 250 kPa (2.55 kgf/cm²) higher than the atmospheric pressure. Hence, be sure to gradually disconnect the fuel hose so as to prevent fuel from splashing.
- Since the fuel will flow out, be certain to place a suitable container or cloth, etc. under the fuel filter so that no fuel may get to the resin or rubber parts of vehicle.



LEF00165-00132

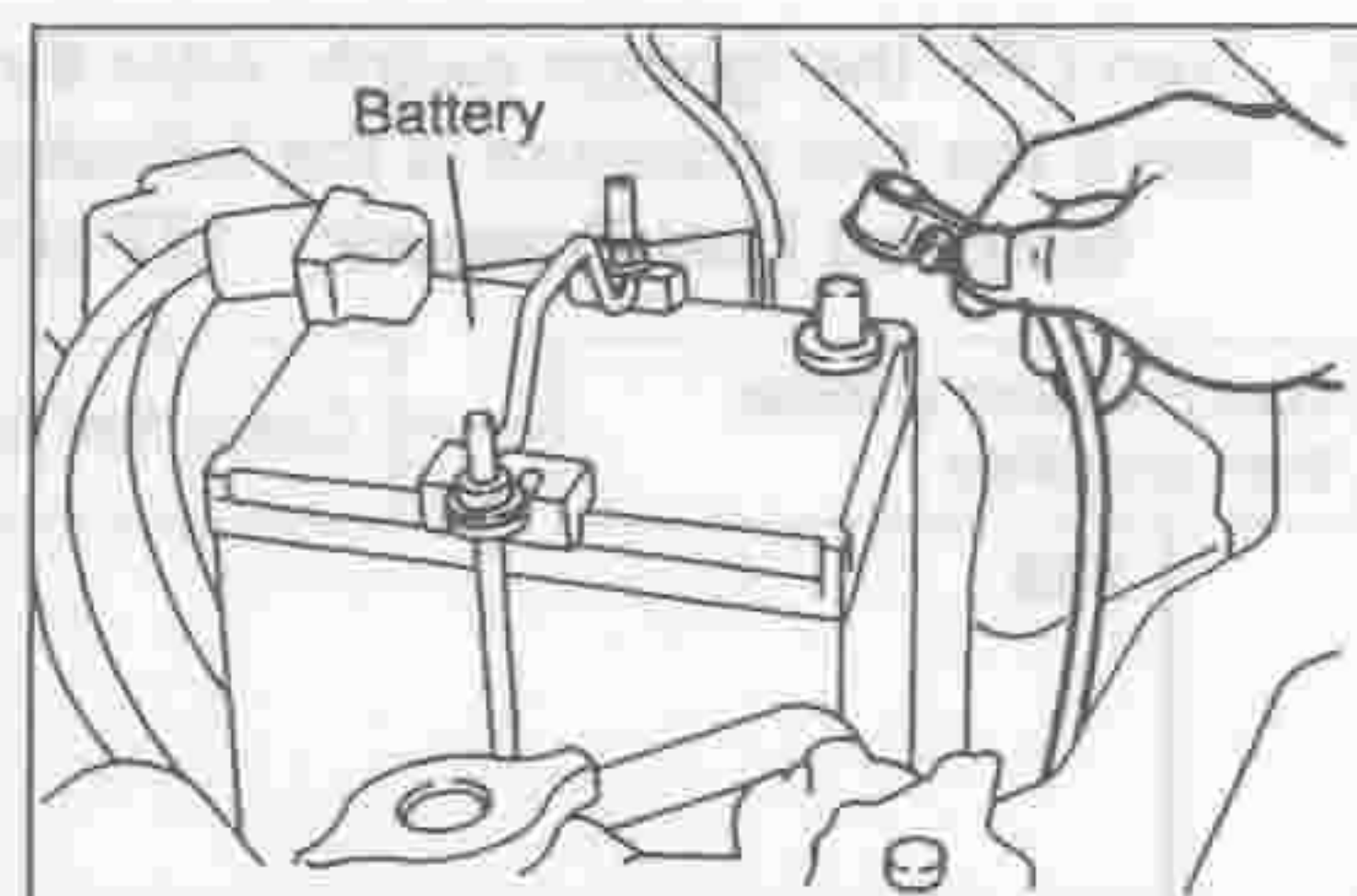
5. Install the SST (fuel pressure gauge) between the fuel filter and the fuel pipe, using the three-way pipe.

SST: 09268-87701-000
09268-87702-000



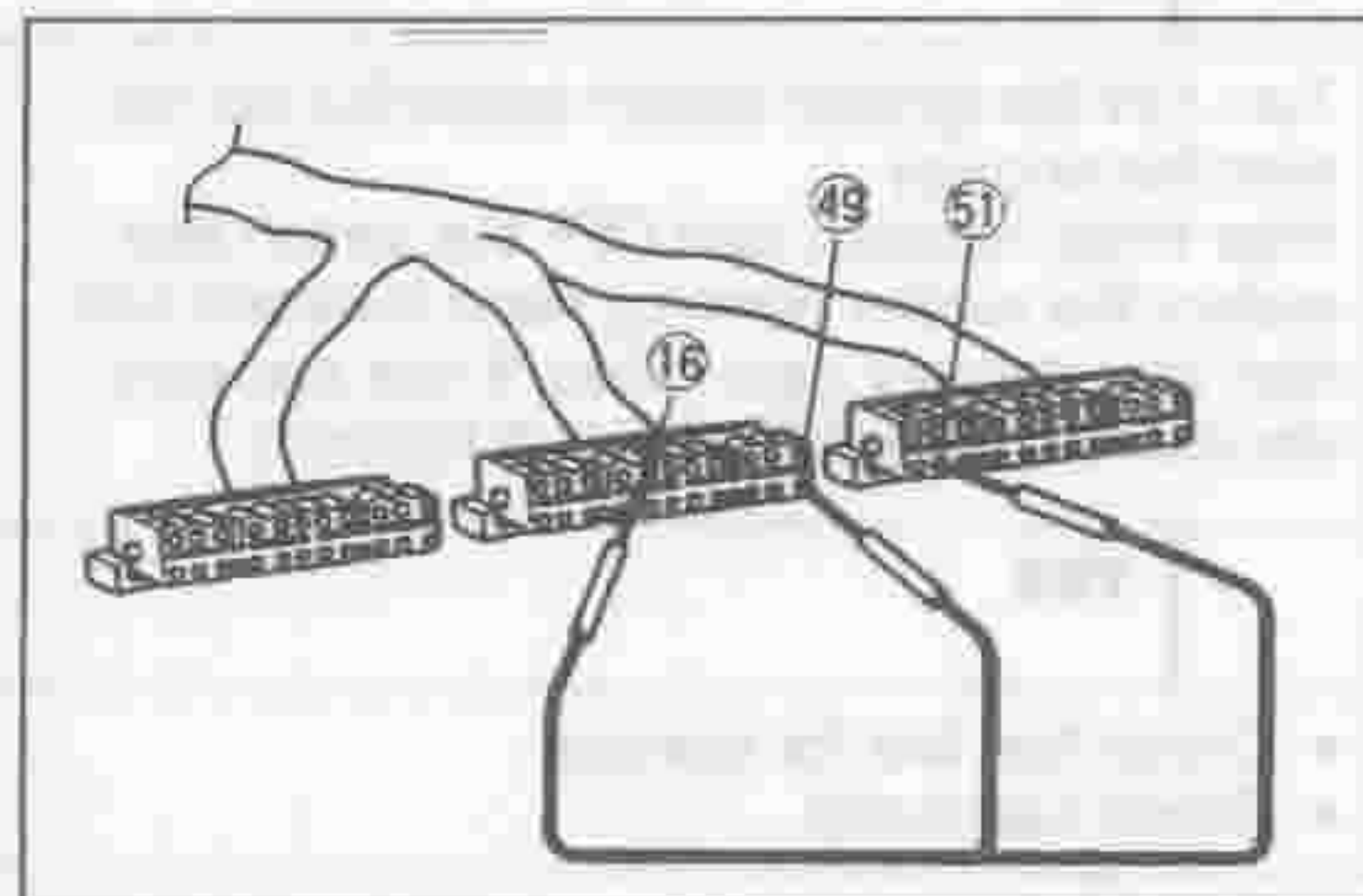
LEF00166-00133

6. Reconnect the ground cable terminal to the negative (-) terminal of the battery.



LEF00167-00134

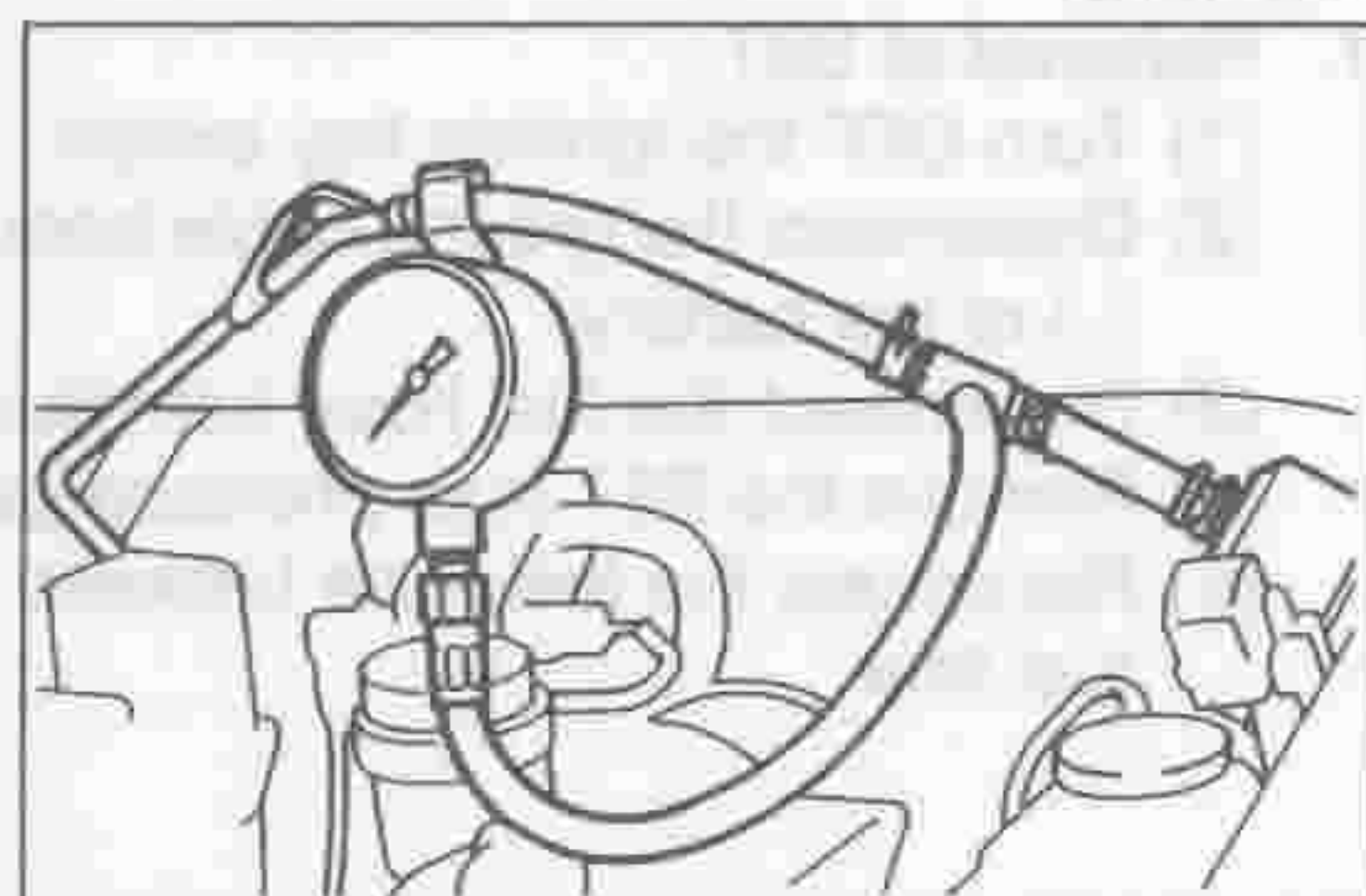
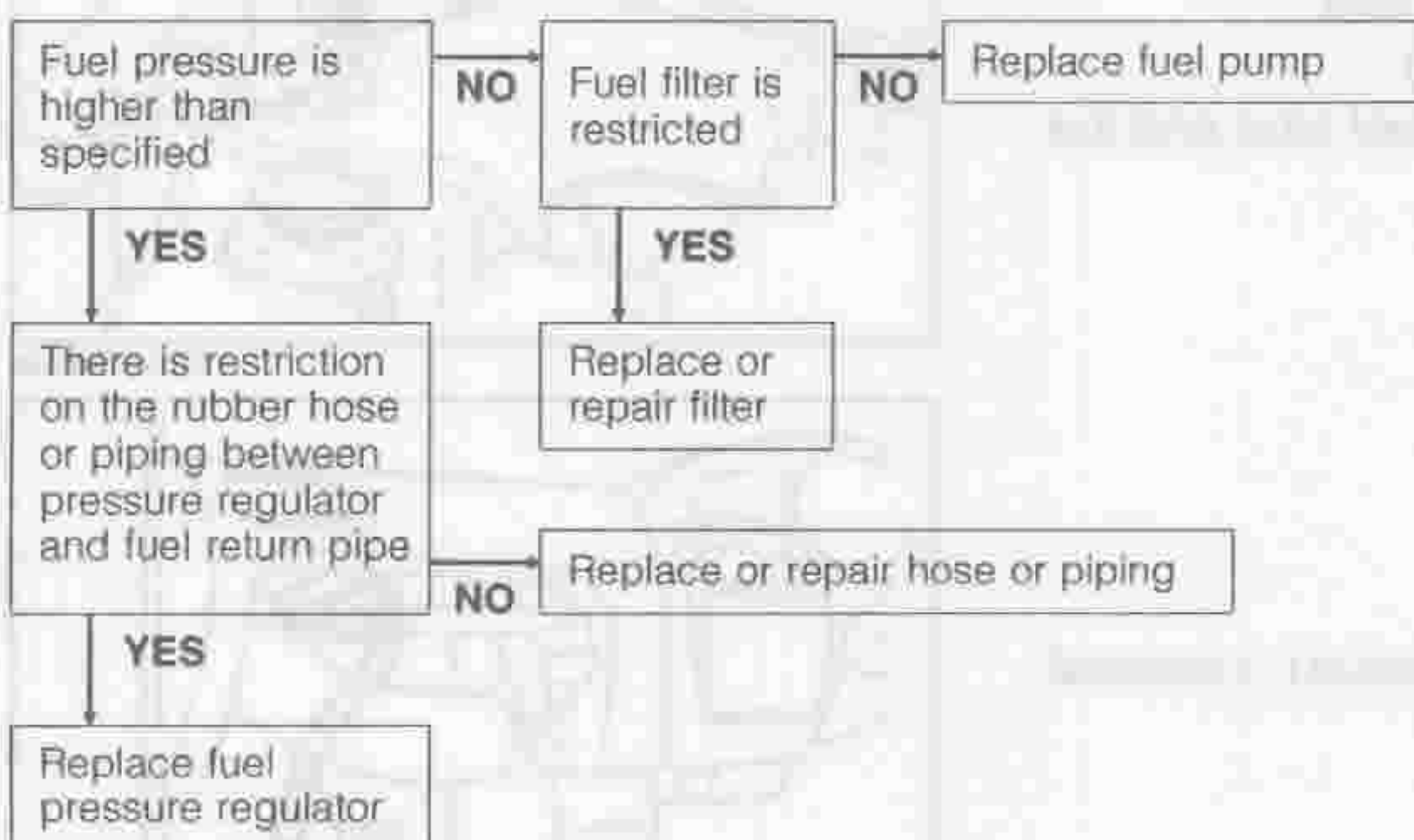
7. Connection of SST
 - (1) Remove the glove box.
 - (2) Connect the SST between the ECU and the engine wire.
SST: 09842-87502-000
 - (3) Connect the SST terminal ⑤① - ①⑥ (EF-EL) or ④⑨ - ①⑥ (ED-20)
8. Turn ON the ignition switch.



LEF00168-00135

9. Check to see if the fuel pressure conforms to the specified pressure.

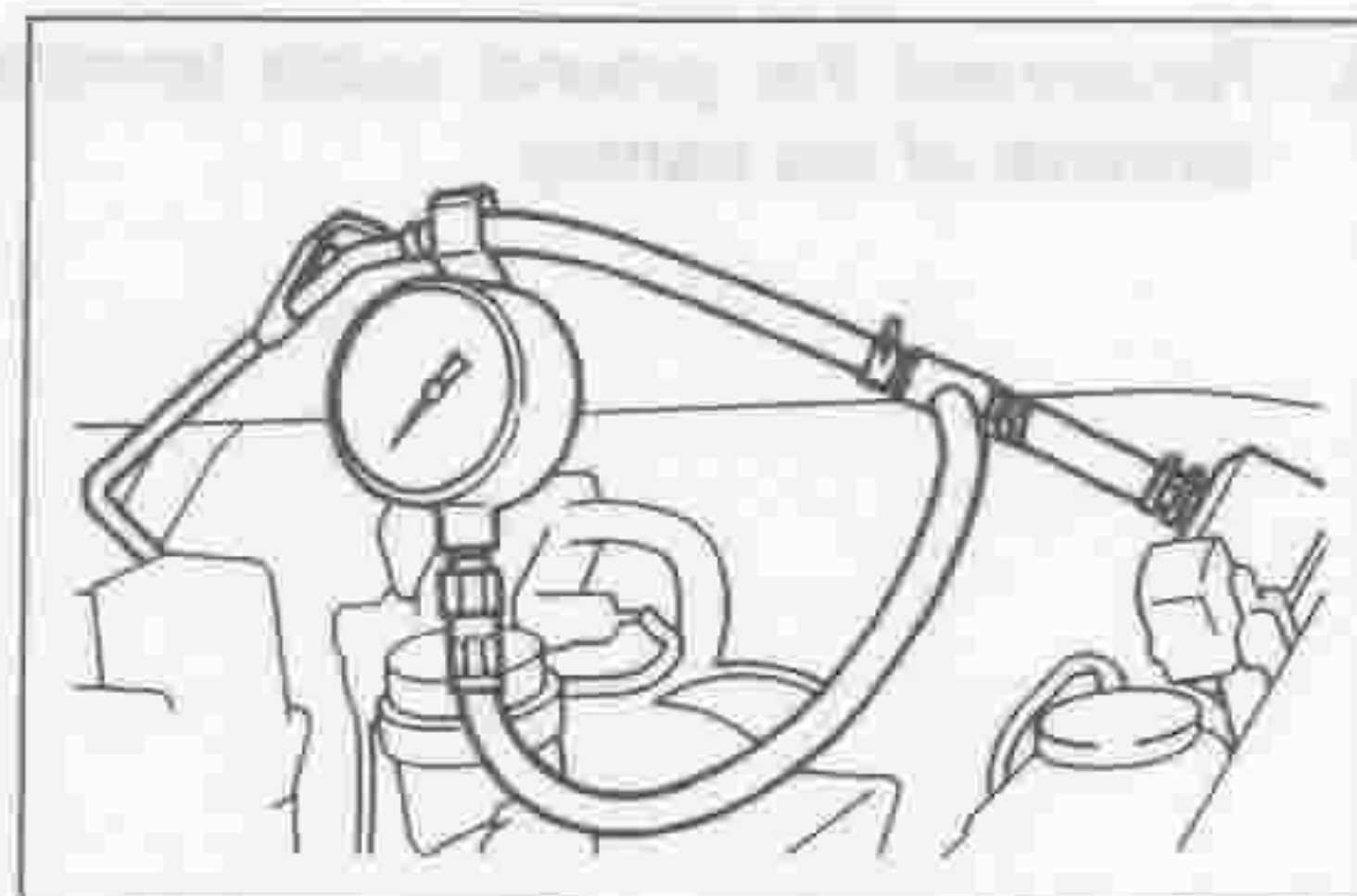
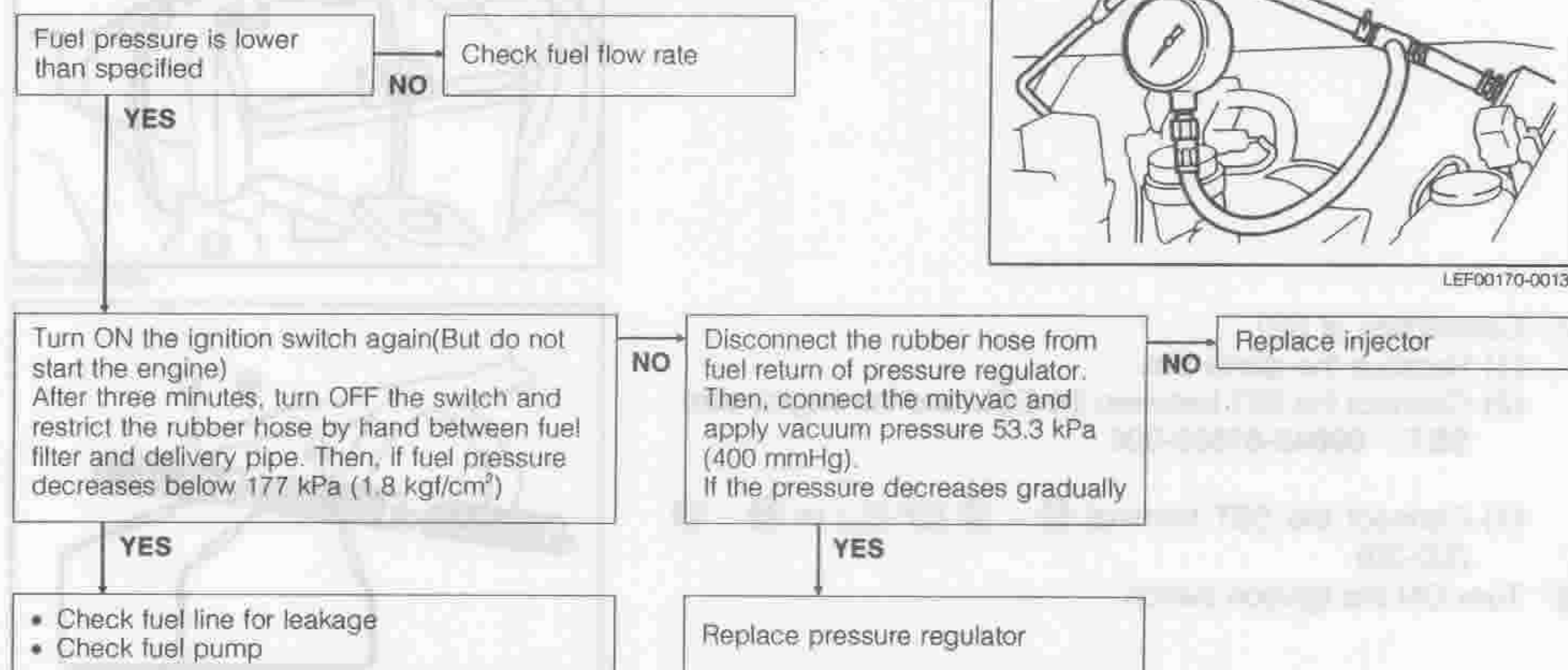
Specified Fuel Pressure:
245 - 255 kPa (2.50 - 2.60 kgf/cm²)



LEF00169-00136

10. Turn OFF the ignition switch. After three minutes, check to see if the fuel pressure is the following specified.

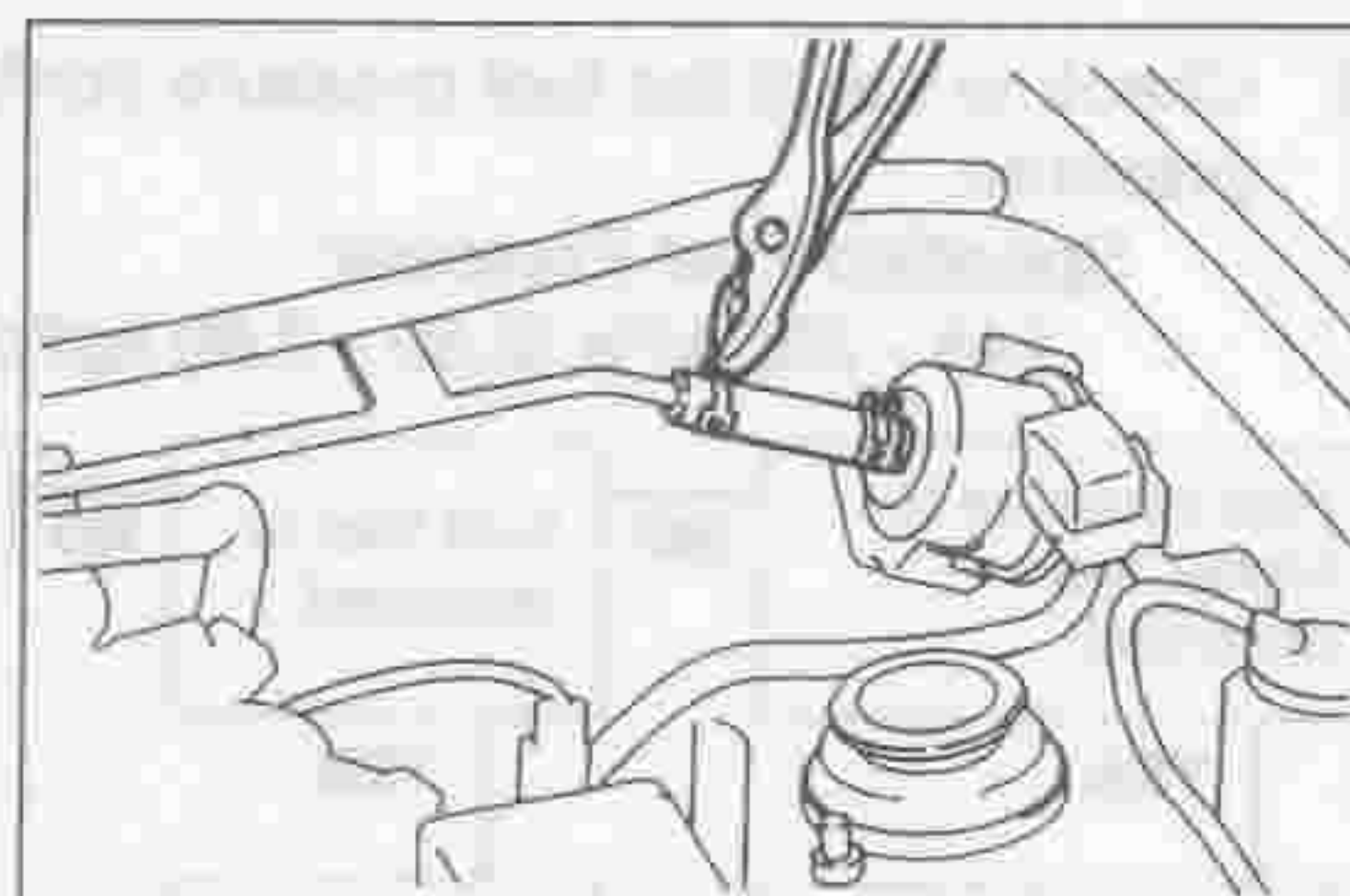
Specified Fuel Pressure: 177 kPa (1.8 kgf/cm²)



LEF00170-00137

11. Removal of SST

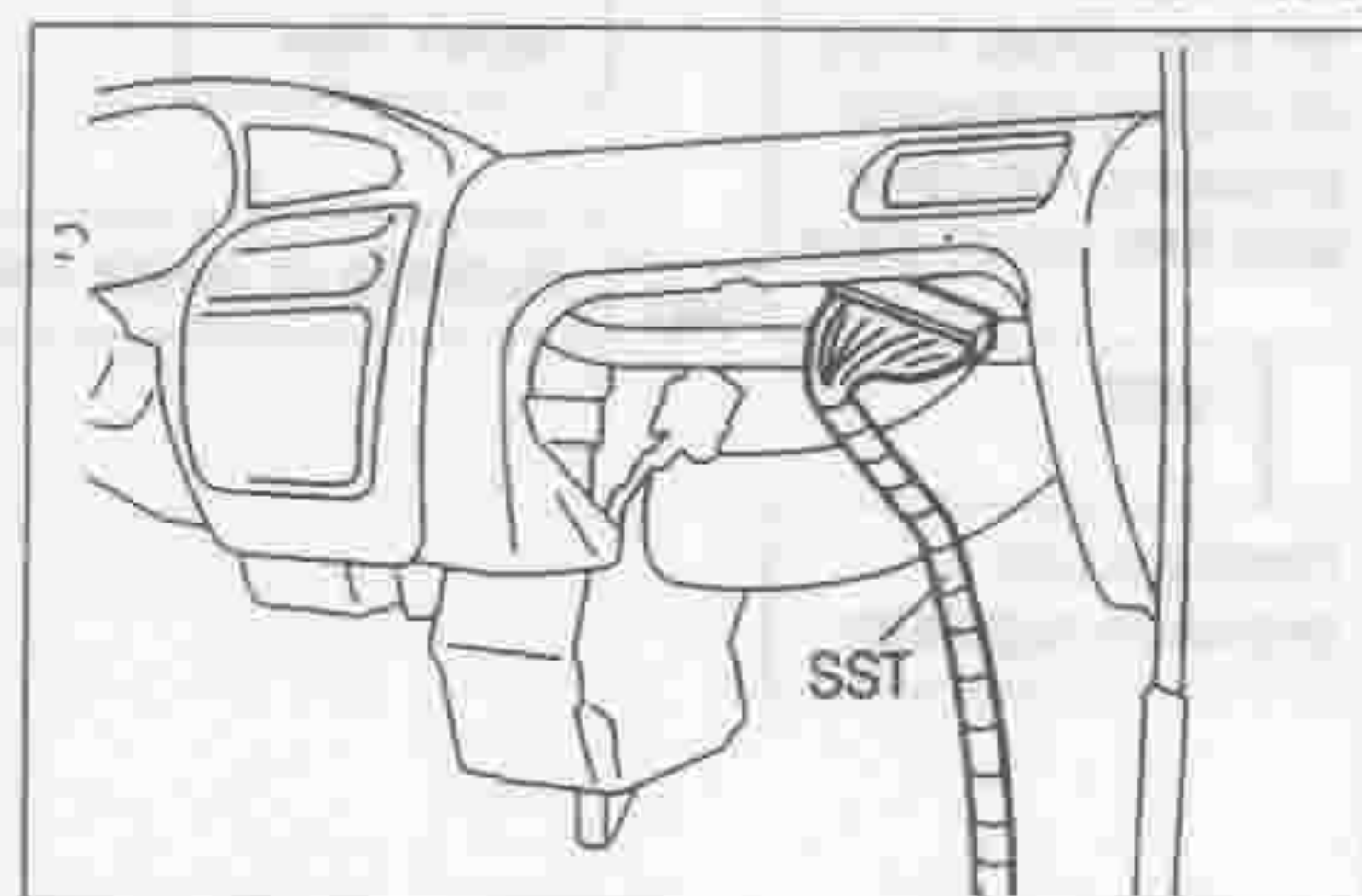
- (1) Turn OFF the ignition key switch.
- (2) Disconnect the ground cable from the negative terminal (-) of the battery.
- (3) Disconnect the fuel hose from the fuel filter.
- (4) Remove the SST (fuel pressure gauge).
- (5) Reconnect the fuel hose between the fuel pipe and the fuel filter.



LEF00171-00138

- (6) Remove the SST from the ECU.
SST: 09842-87502-000

- (7) Connect the engine wire to the ECU.
- (8) Reconnect the ground cable to the negative (-) terminal of the battery.



LEF00172-00139

12. Check of fuel leakage

Start the engine. Check to see if any fuel leakage is present. Repair any defective part if the fuel leakage exists.

LEF00173-00000

Check of fuel flow rate

1. Ensure that the battery voltage is 12 volts or more.
2. Disconnect the ground cable from the negative (-) terminal of the battery.
3. Place a suitable container or cloth, etc. under the pressure regulator.

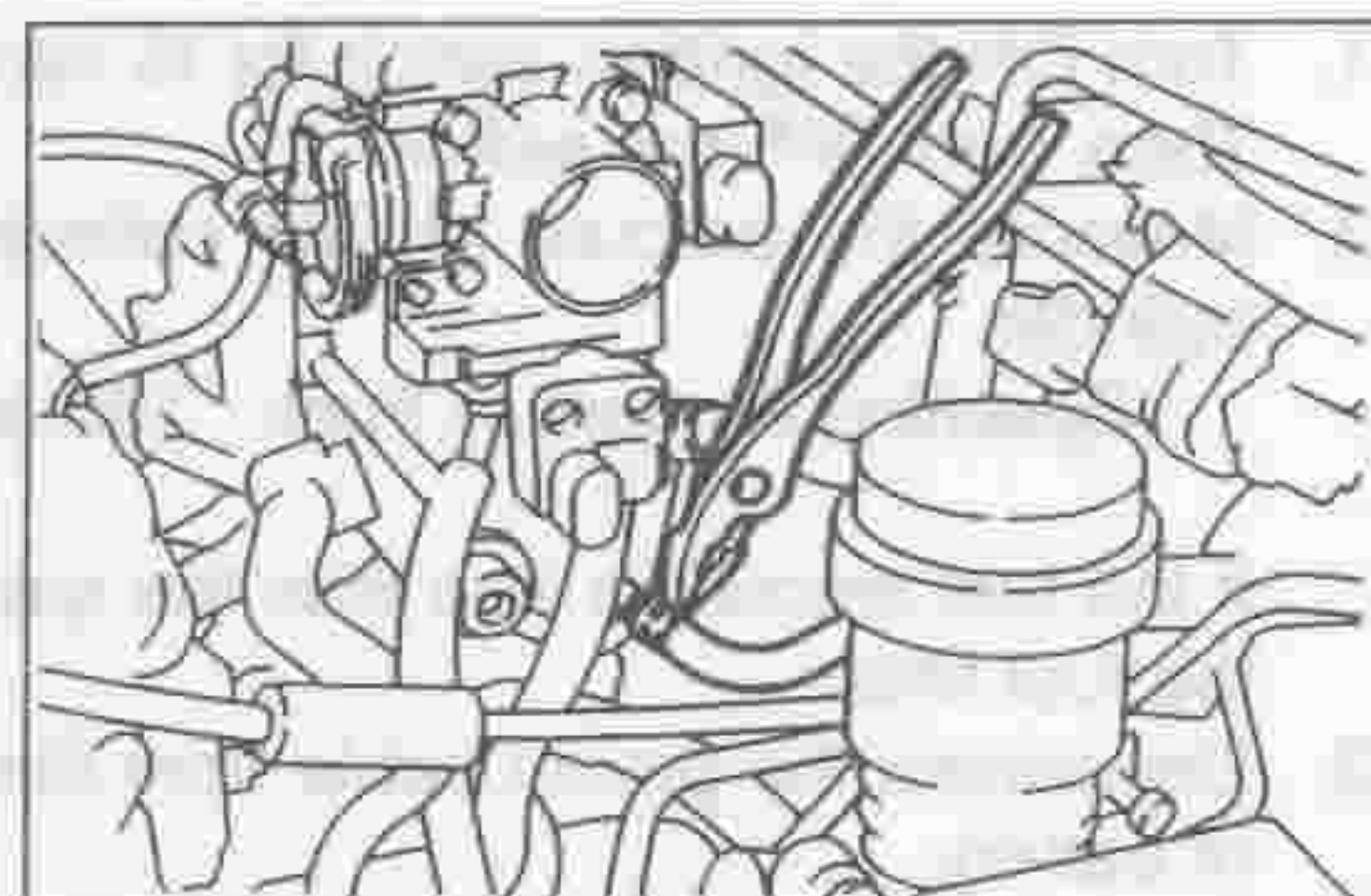


LEF00174-00000

4. Disconnect the fuel return hose connected to the delivery pipe.

CAUTION:

- Since the fuel will flow out, be certain to place a suitable container or cloth, etc. under the pressure regulator so that no fuel may get to the alternator.
- Release the inner pressure of the fuel tank by removing the fuel filler cap in advance.

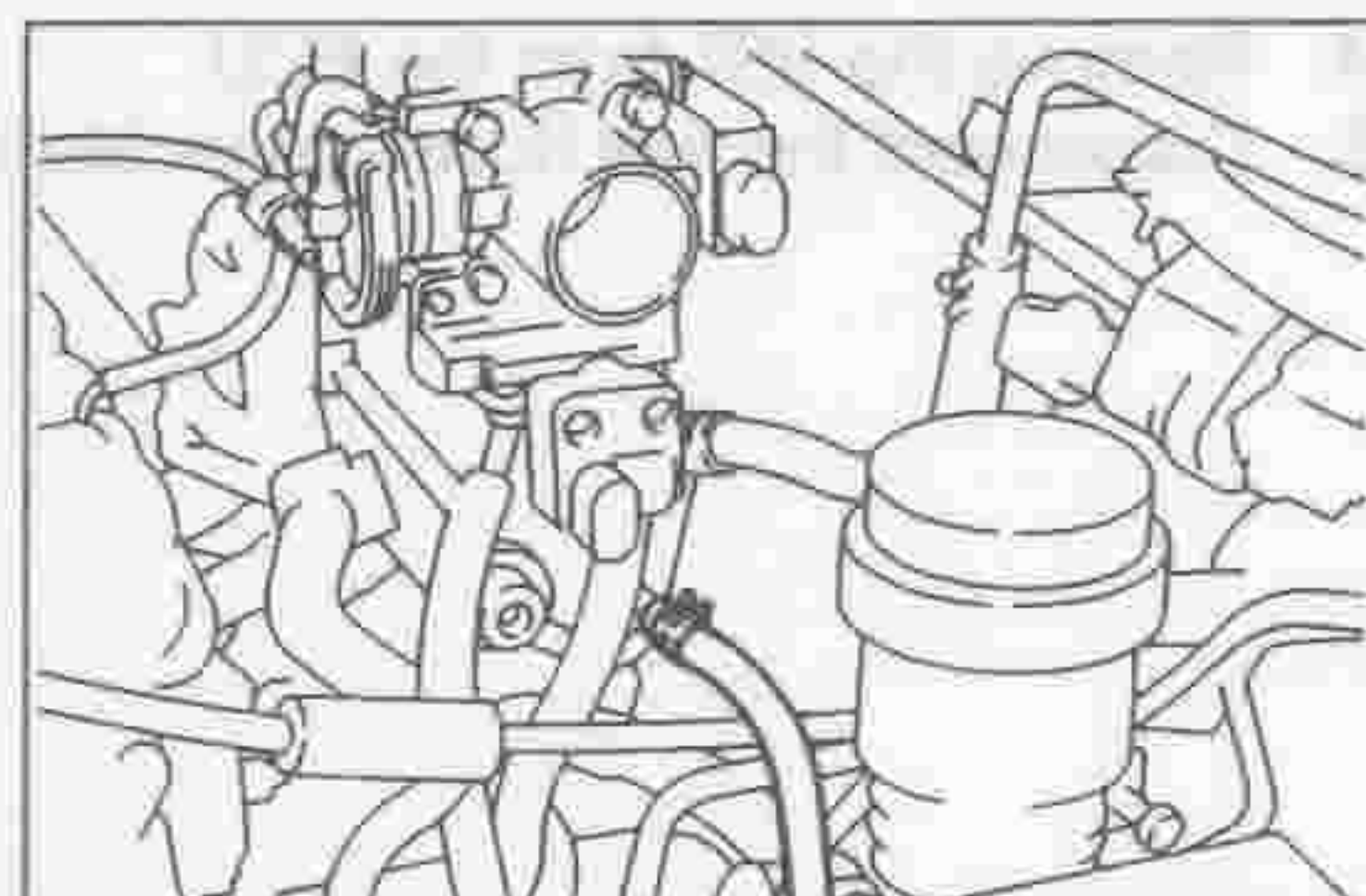


LEF00175-00140

5. Connect a suitable fuel hose (about 2 meter long) to the fuel return pipe.

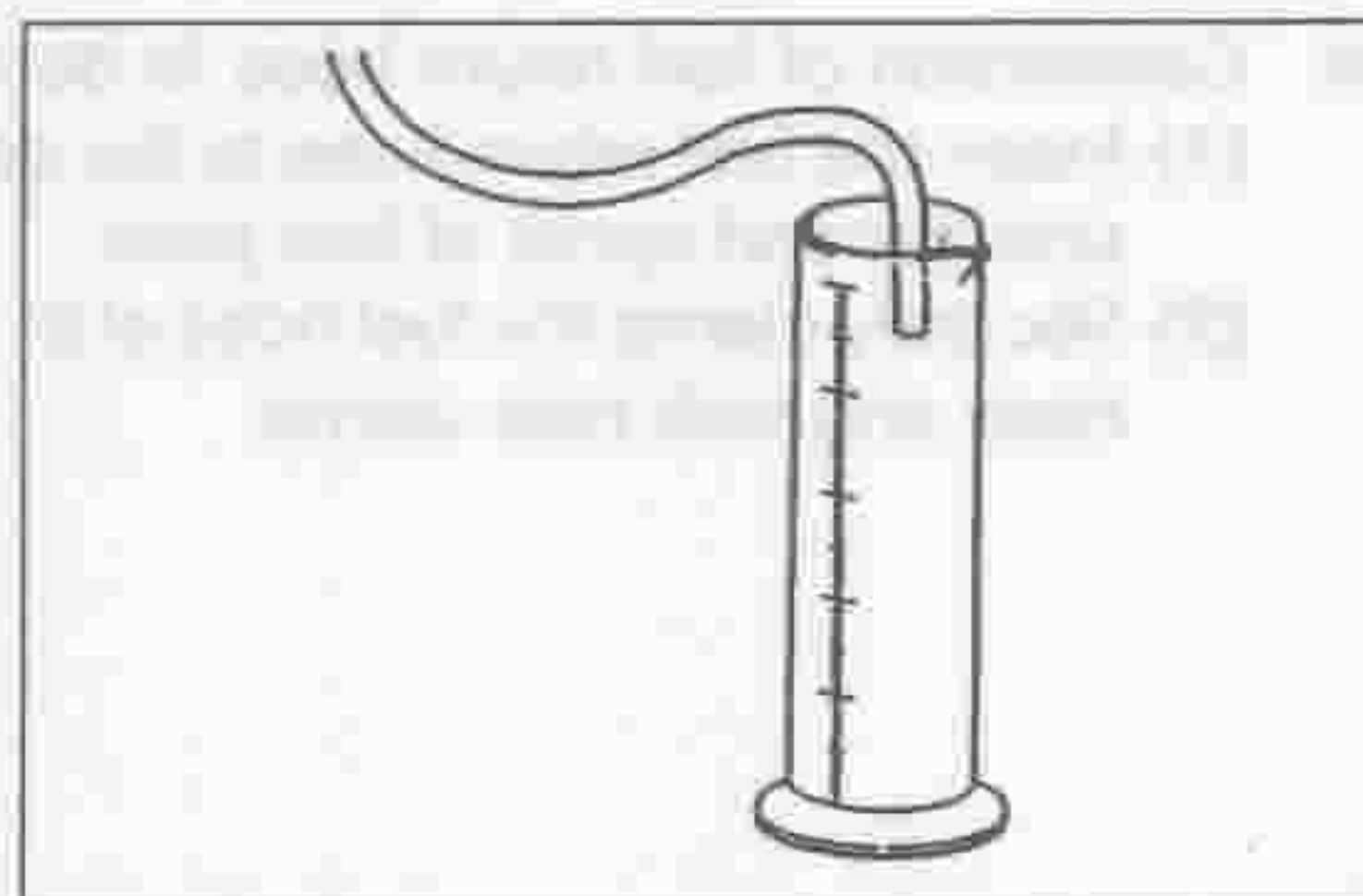
REFERENCE:

- This fuel hose is included in the SST (09268-87702-000).



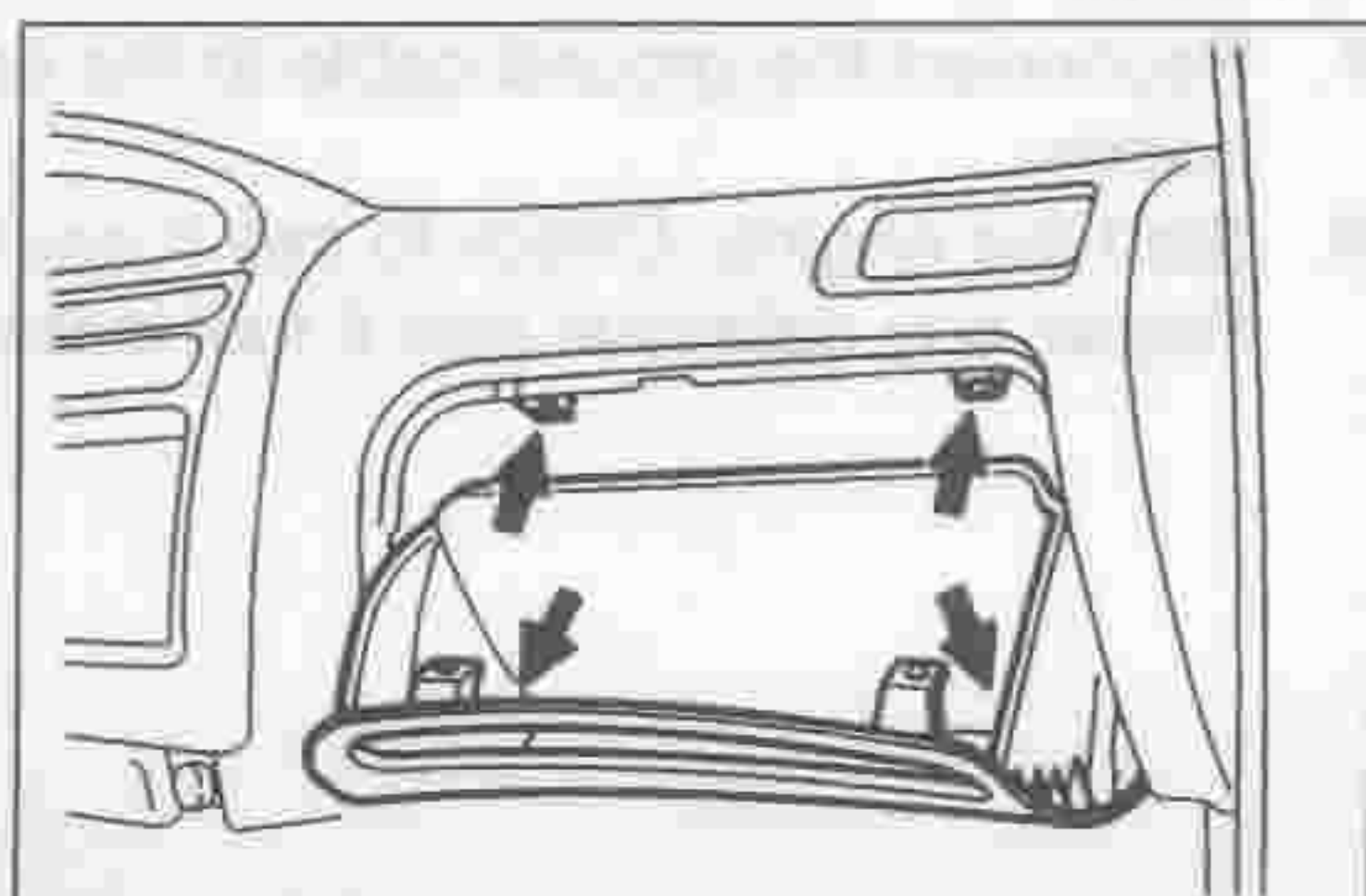
LEF00176-00140

6. Insert one end of the fuel hose in a measuring cylinder.



LEF00177-00142

7. Remove the glove box.



LEF00178-00143

8. Connect the SST between the ECU and the engine wire.
- a. Connect the SST terminals (61) and (16) (FF-EL) or (49) - (16).



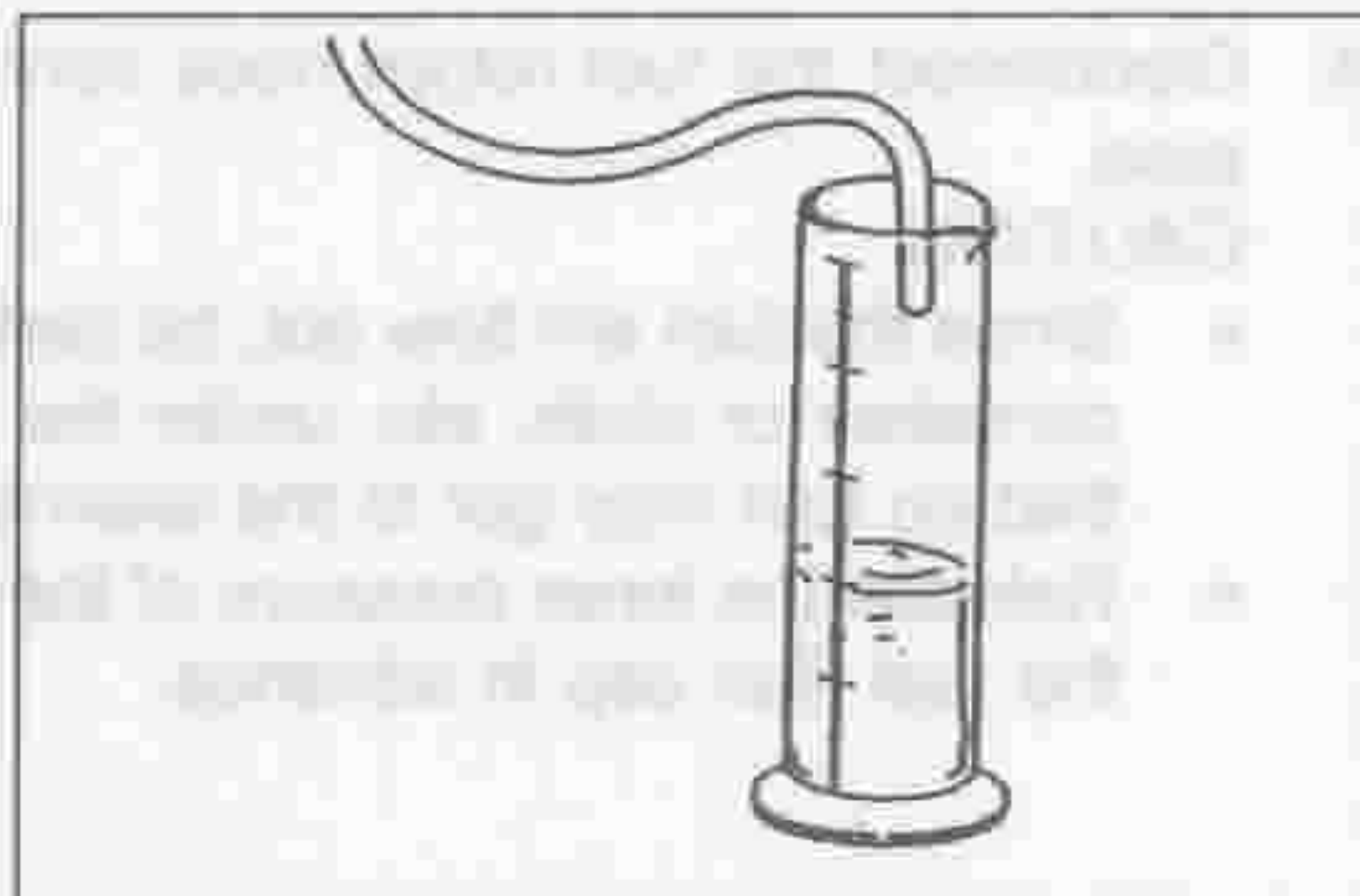
LEF00179-00144

11. Turn ON the ignition switch for 15 seconds.
Then, turn OFF the switch.
12. Measure the amount of fuel collected in the measuring cylinder.

Specified Amount of Fuel: 165 cm³ or more

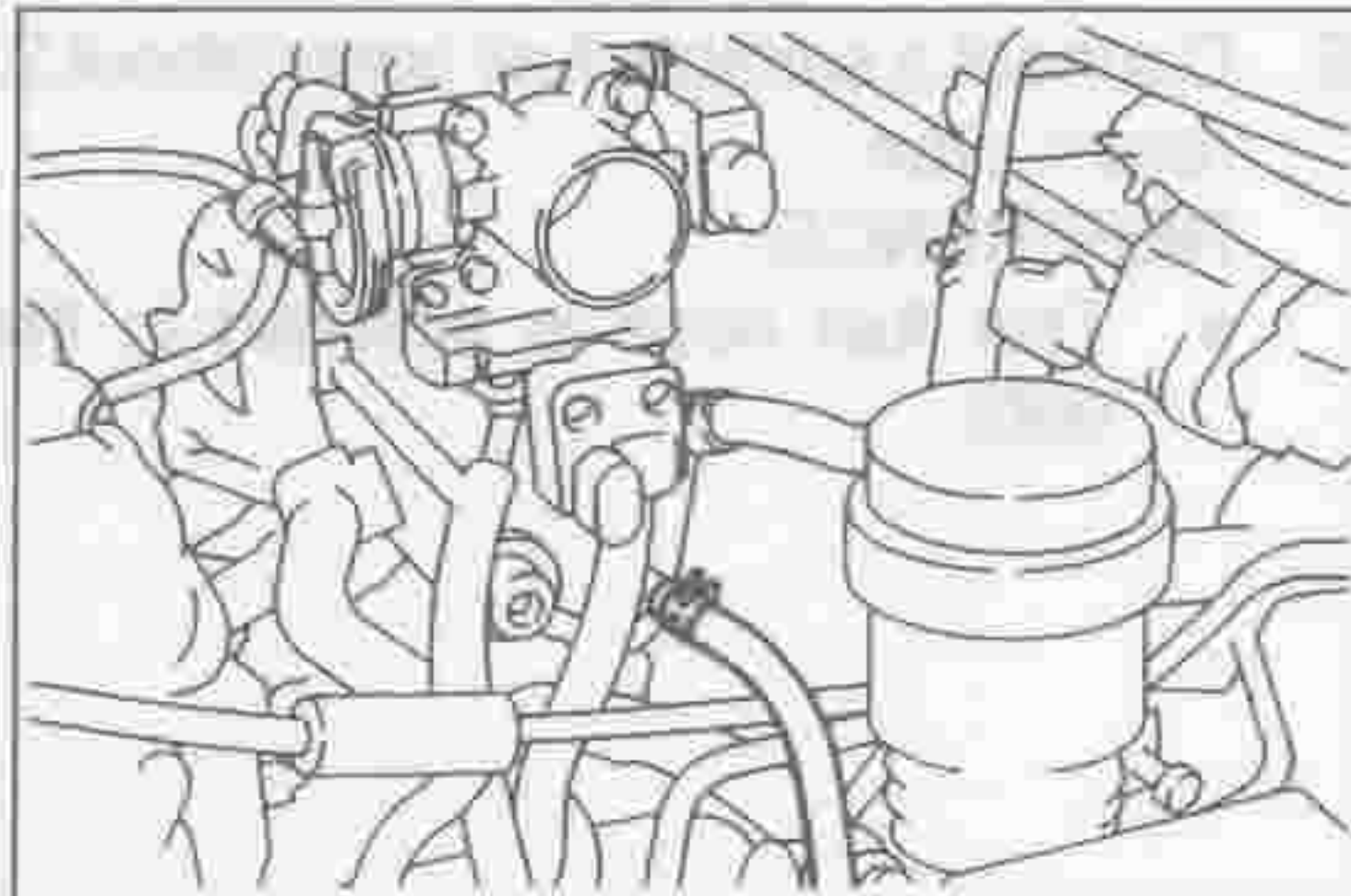
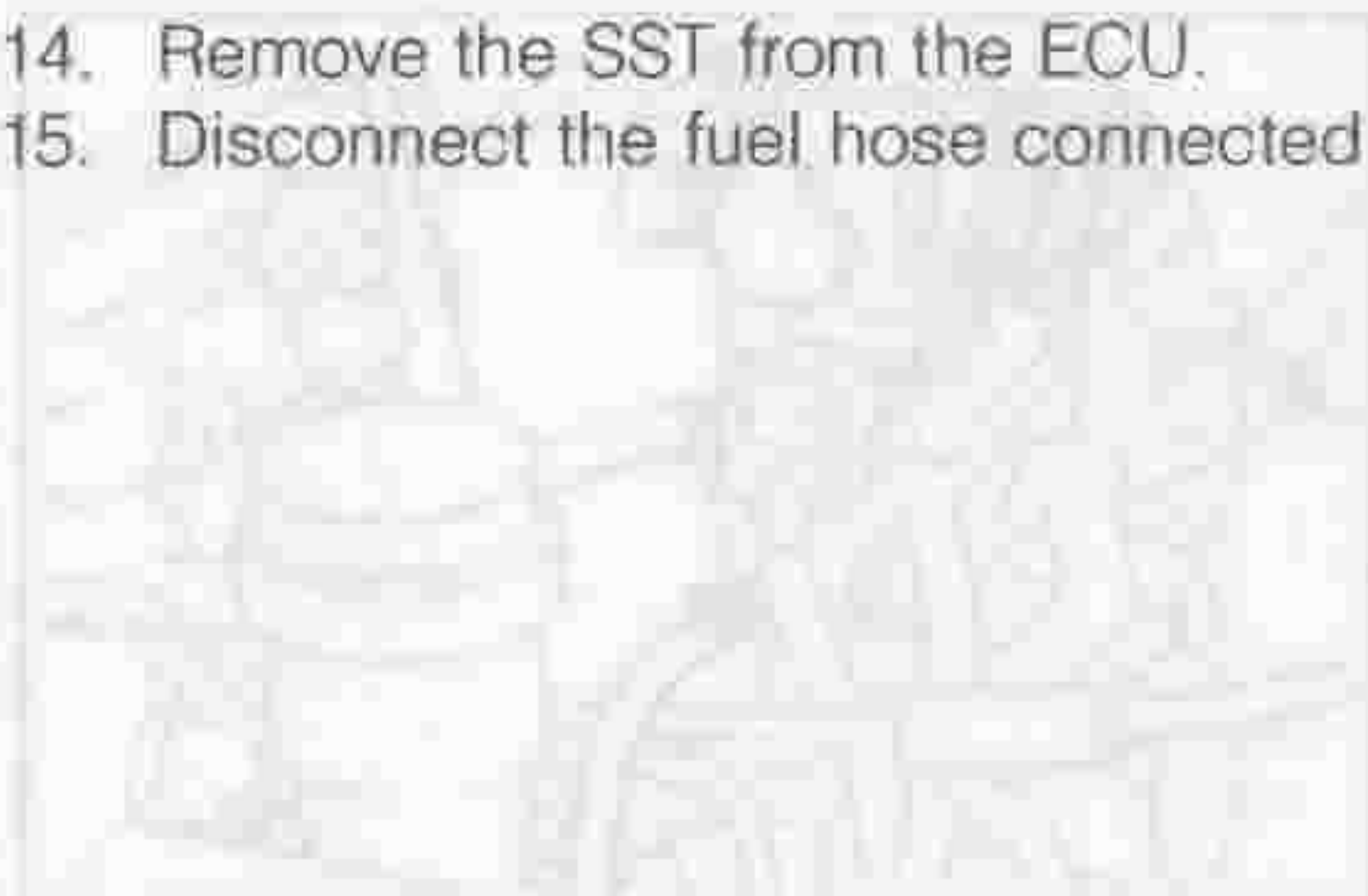
If the fuel amount is less than the specified amount, check the fuel filter.

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



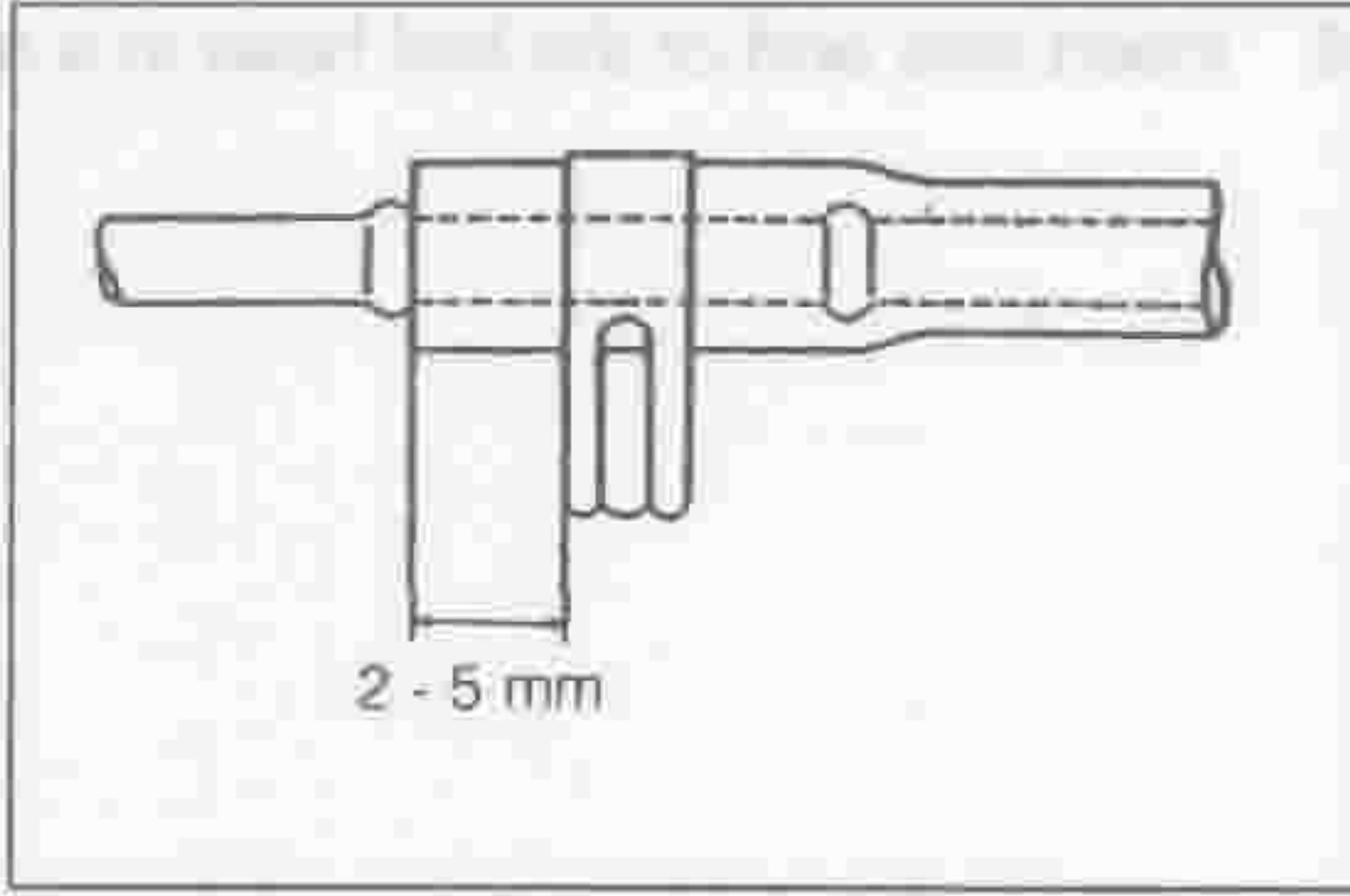
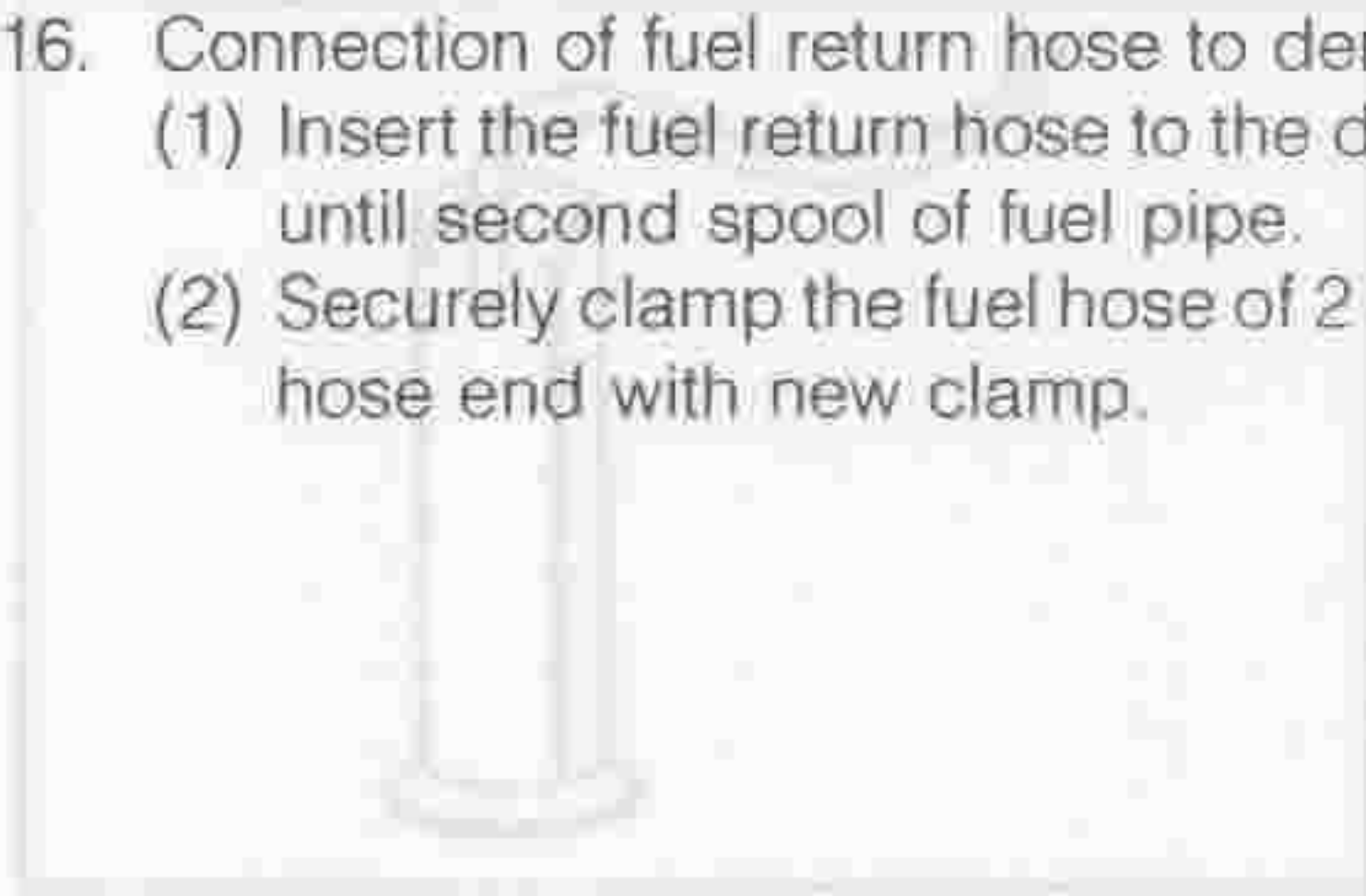
LEF00180-00145

14. Remove the SST from the ECU.
15. Disconnect the fuel hose connected to the delivery pipe.



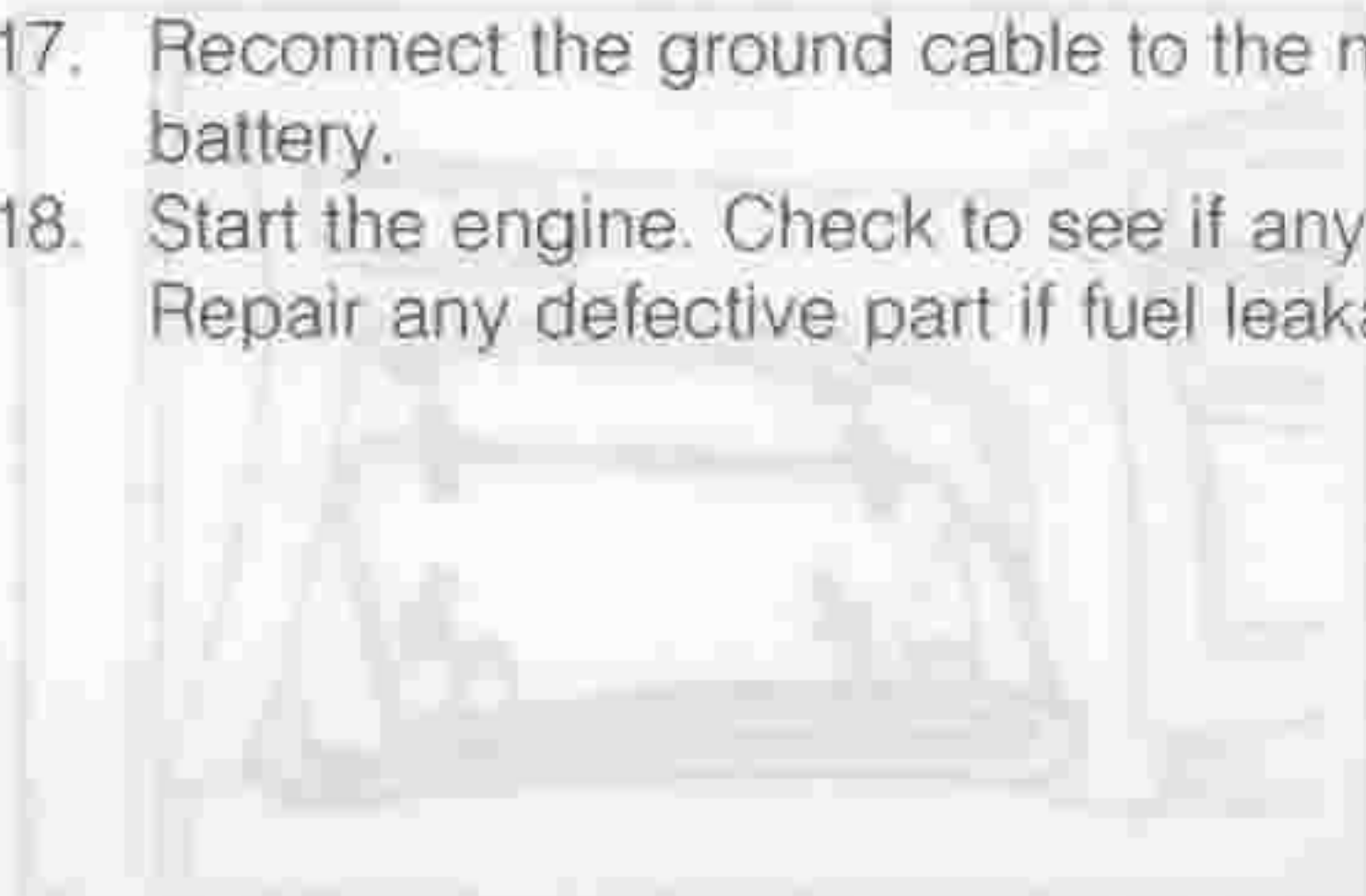
LEF00181-00146

16. Connection of fuel return hose to delivery pipe.
 - (1) Insert the fuel return hose to the delivery pipe, fuel hose until second spool of fuel pipe.
 - (2) Securely clamp the fuel hose of 2 - 5 mm from fuel return hose end with new clamp.



LEF00182-00147

17. Reconnect the ground cable to the negative (-) terminal of battery.
18. Start the engine. Check to see if any leakage is present.
Repair any defective part if fuel leakage exists.



LEF00183-00000

Fuel pressure regulator

[EF-EL]

Delivery pipe

Pressure regulator

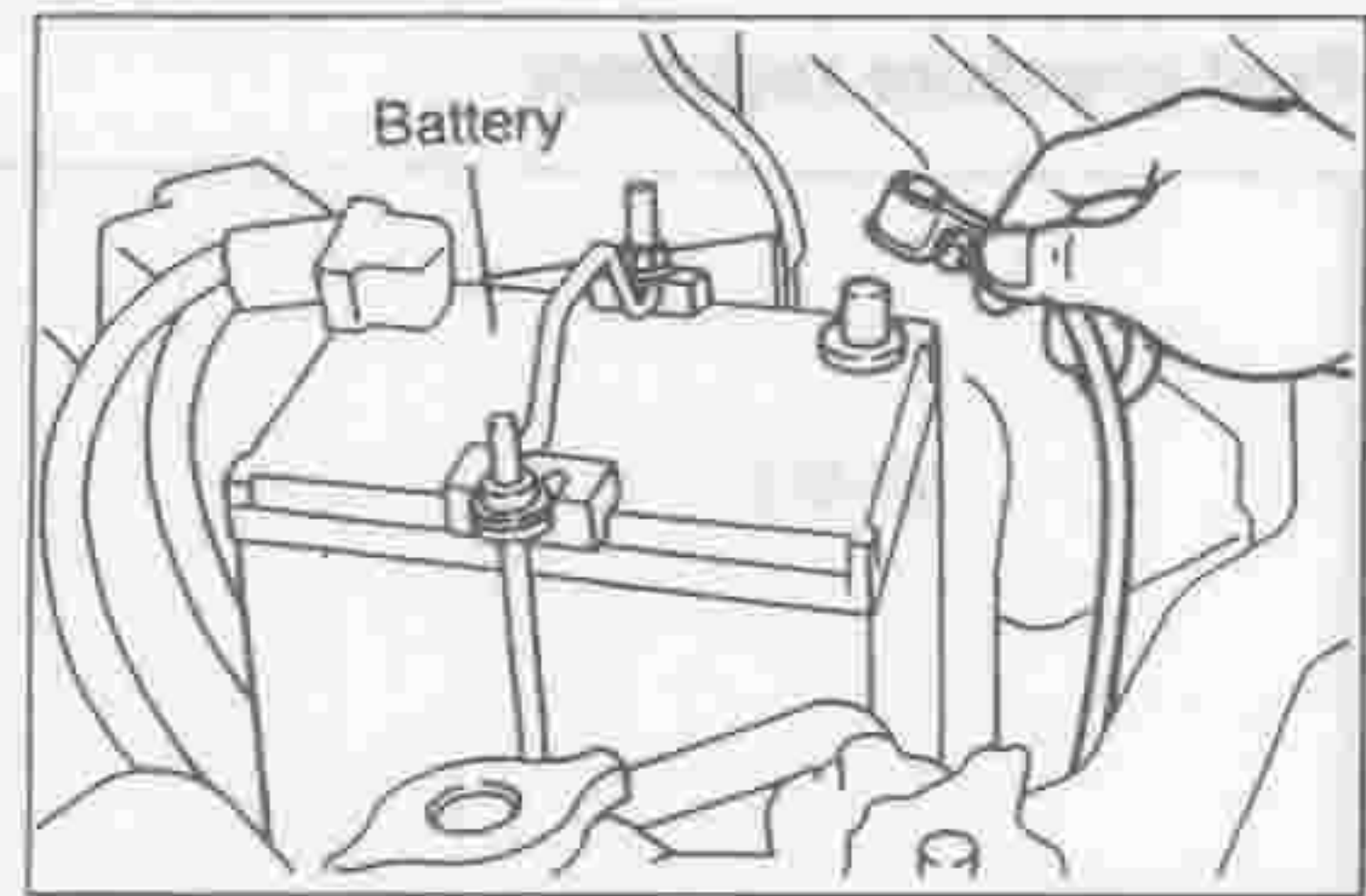
[ED-20]

Delivery pipe

Pressure regulator

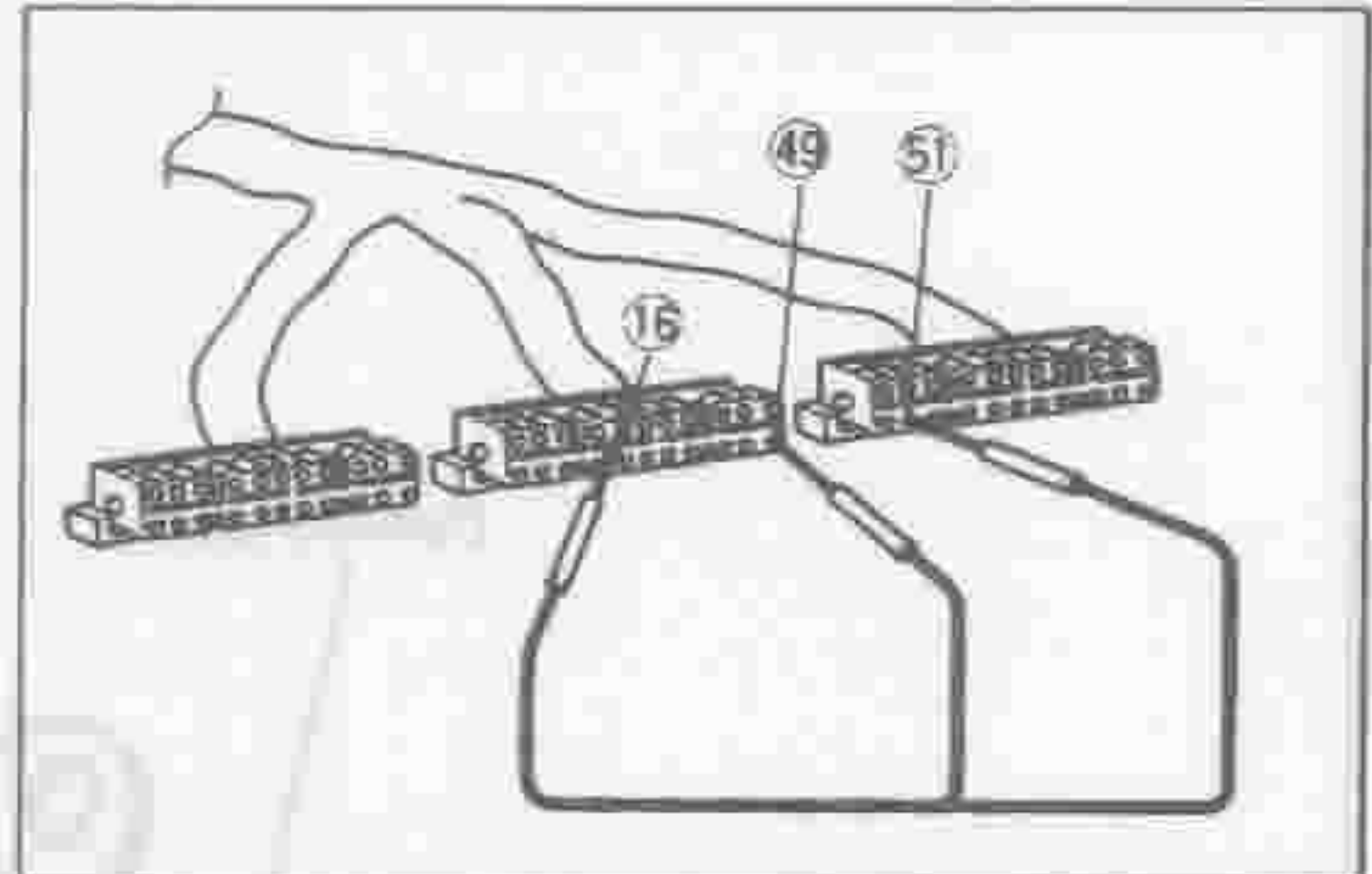
Inspection of pressure regulator

1. Disconnect the ground cable from the negative (-) terminal of battery.
2. Install the SST (fuel pressure gauge) between the fuel pipe and the fuel filter.



LEF00185-00149

3. Connect the SST between the ECU and the engine wire.
SST: 09842-87502-000
4. Reconnect the ground cable to the negative (-) terminal of battery.
5. Turn ON the ignition switch.
6. Connect the SST terminals between ⑤① and ①⑥ (EF-EL) or ④⑨ and ①⑥ (ED-20)



LEF00185-00150

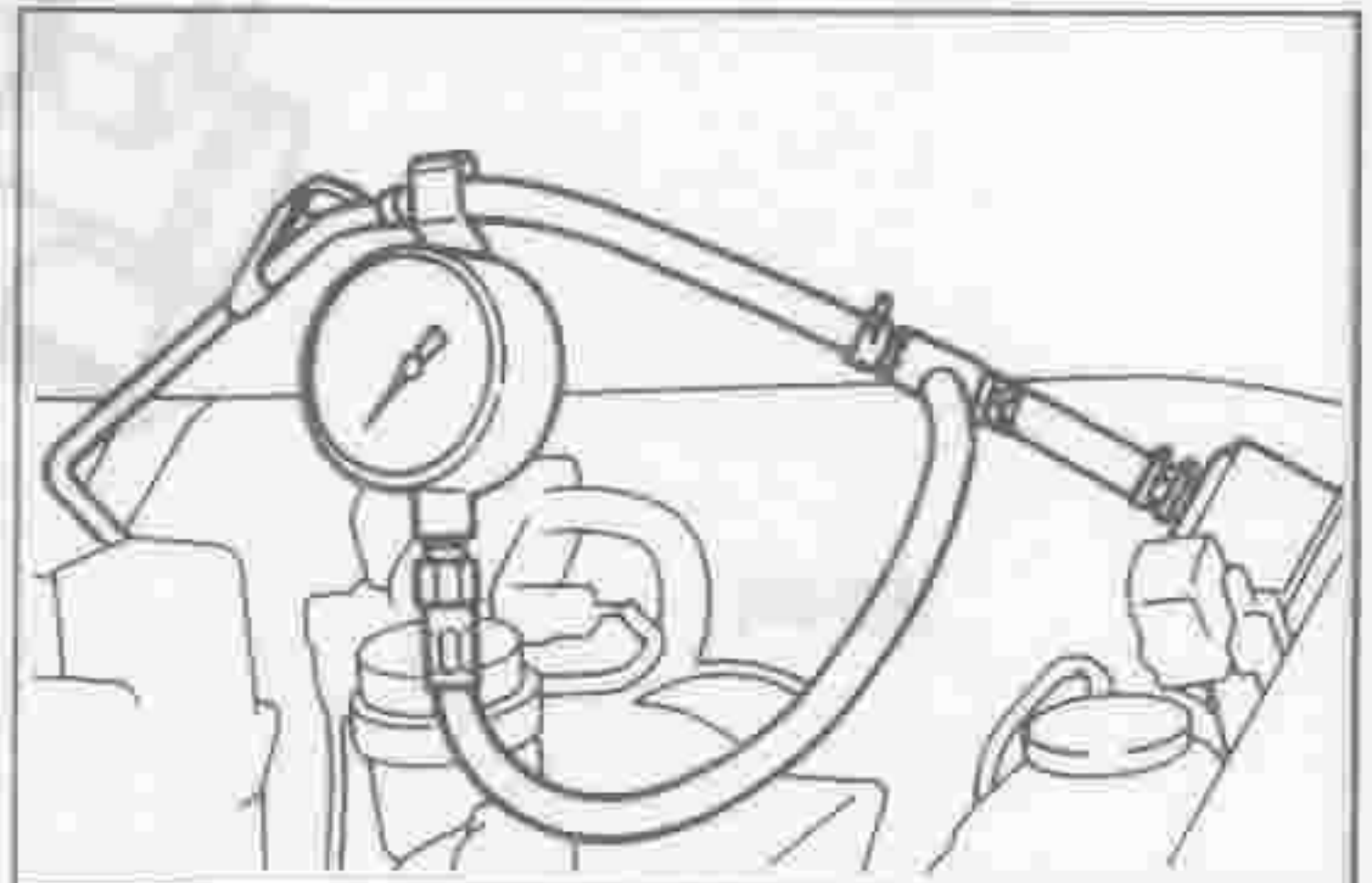
7. Check to see if the fuel pressure conforms to the specification.

Specified Fuel Pressure: 245 - 255 kPa
(2.50 - 2.60 kgf/cm²)

If the fuel pressure fails to conform to the specification, replace the pressure regulator.

NOTE:

- At this stage, ensure that the fuel pump complies with the fuel flow rate requirements.

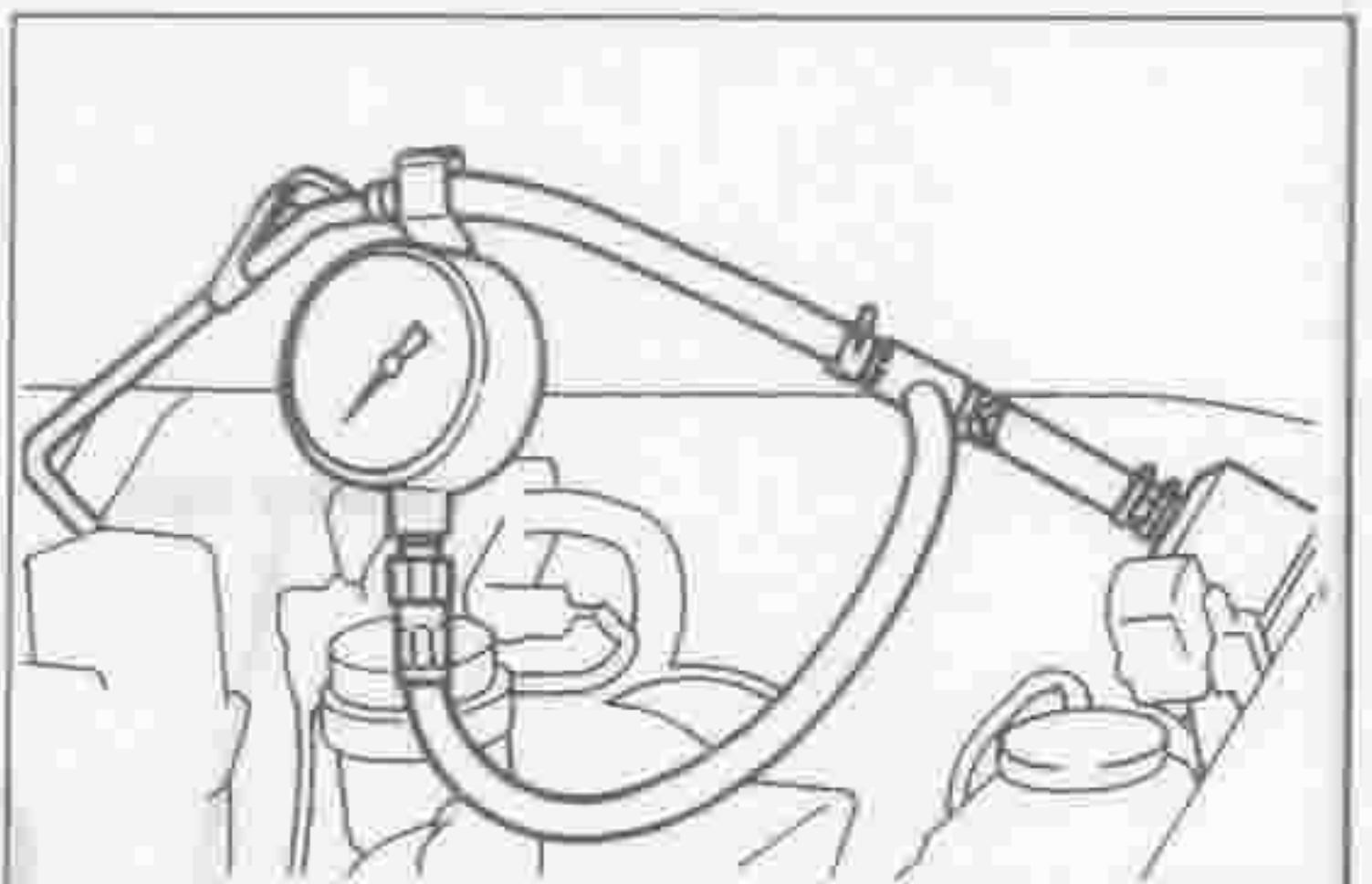


LEF00187-00151

8. Turn OFF the ignition switch.
After a lapse of three minutes, check to see if the fuel pressure is the specified pressure or more.

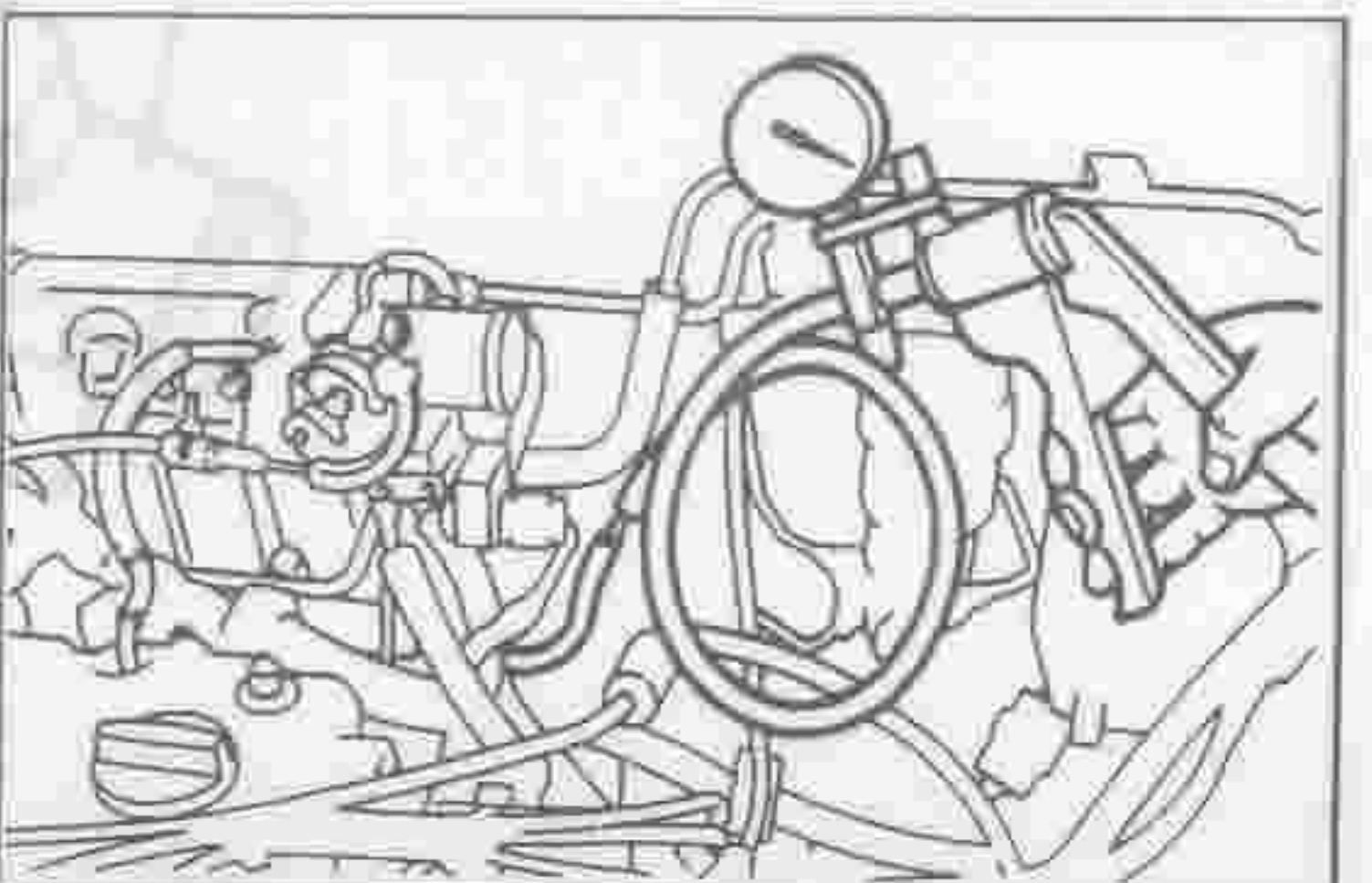
Specified Pressure: 177 kPa (1.8 kgf/cm²) or more

If the fuel pressure fails to conform to the specifications, again perform the operations described in the step 8 afterward.



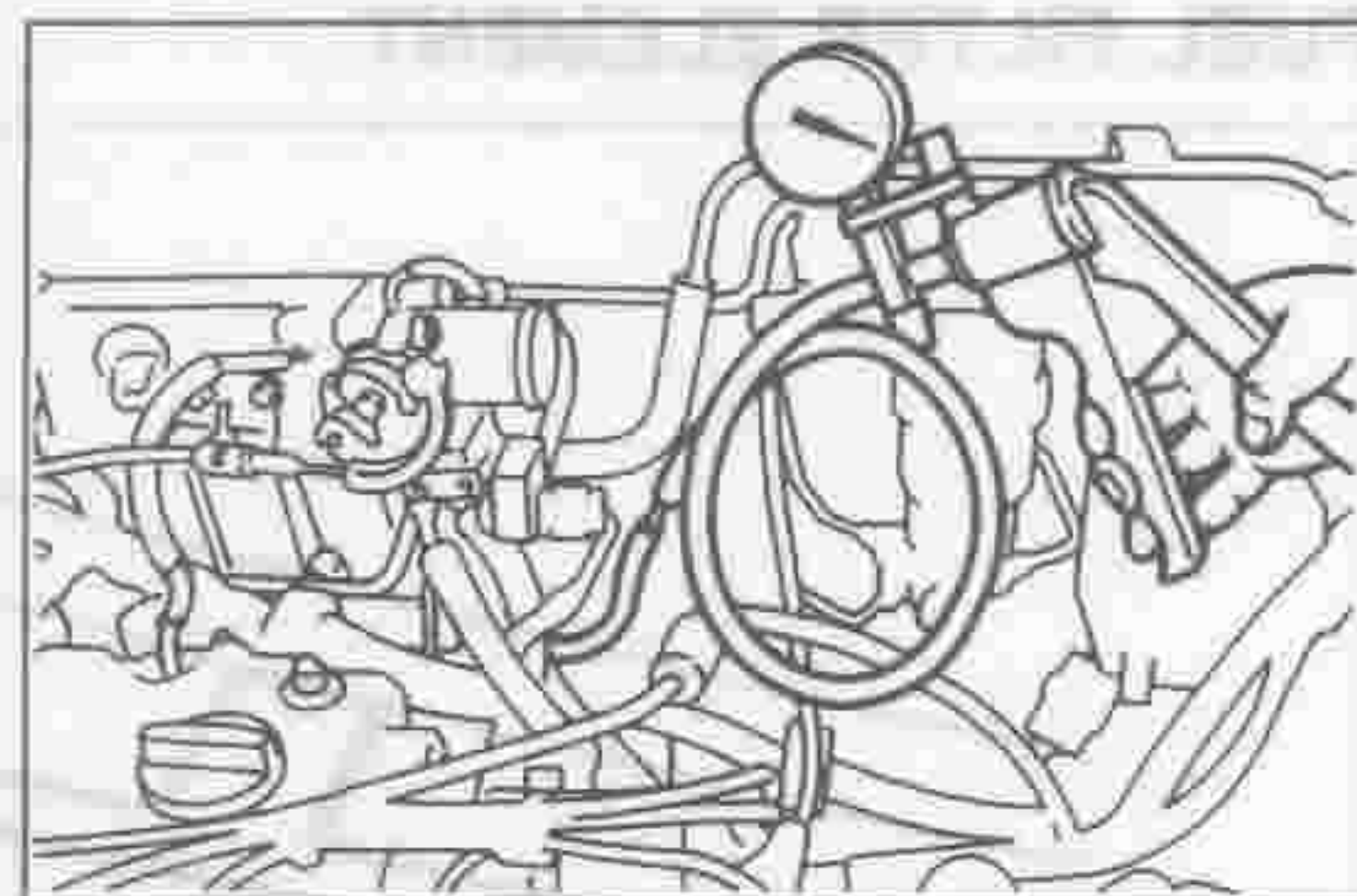
LEF00188-00152

9. Connect a suitable hose to the vacuum hose pipe of the fuel pressure regulator. Connect a Mityvac to the other end of the hose.
10. Turn ON the ignition switch.
11. While observing the fuel pressure, apply a negative pressure, using the Mityvac.
At this time, ensure that the fuel pressure drops corresponding to applied negative pressure.
Replace the fuel pressure regulator if the fuel pressure will not decrease.



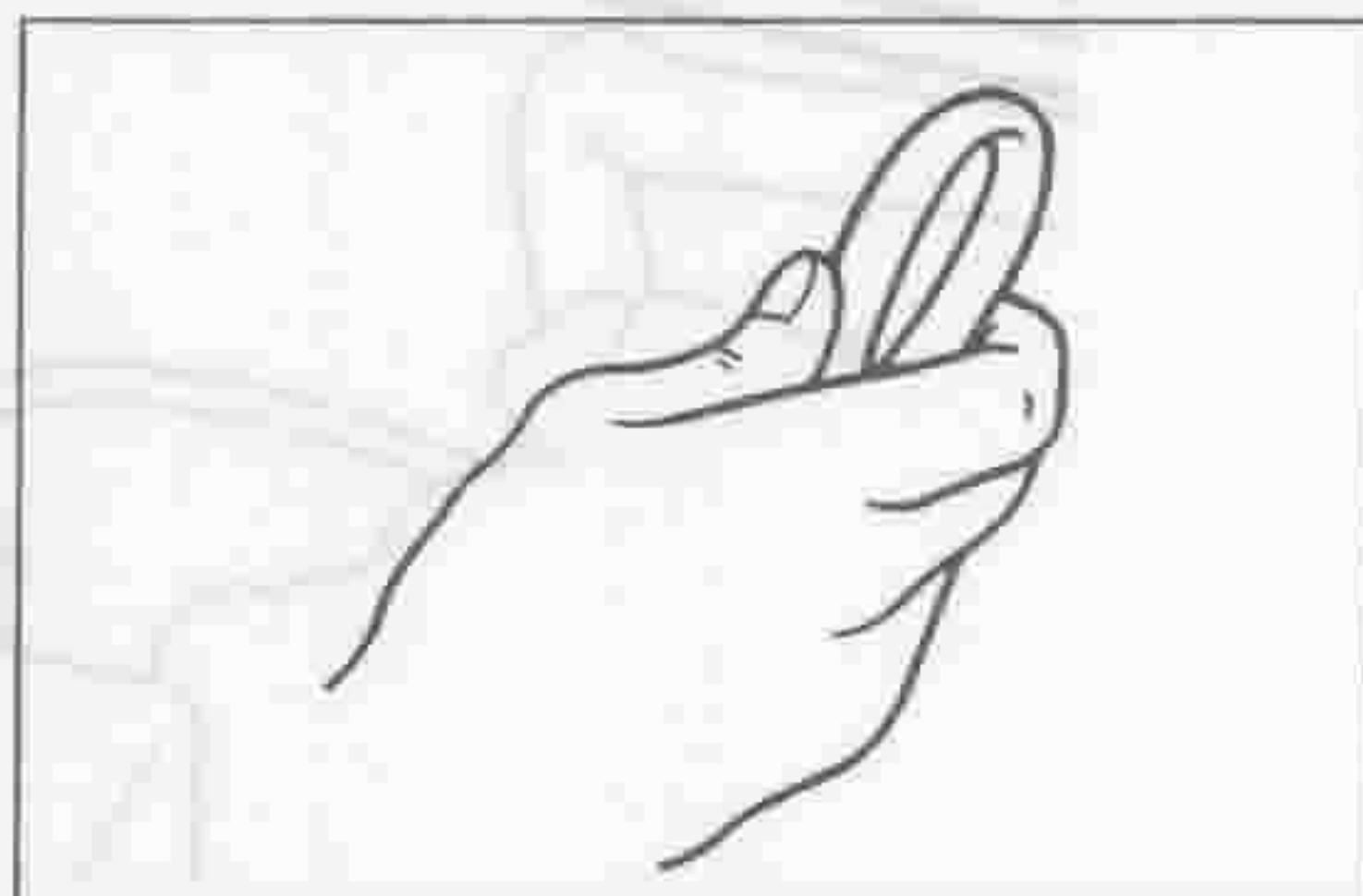
LEF00189-00153

12. Turn OFF the ignition switch.
13. Remove the Mityvac and hose from the fuel pressure regulator.
14. Remove the SST from the ECU.



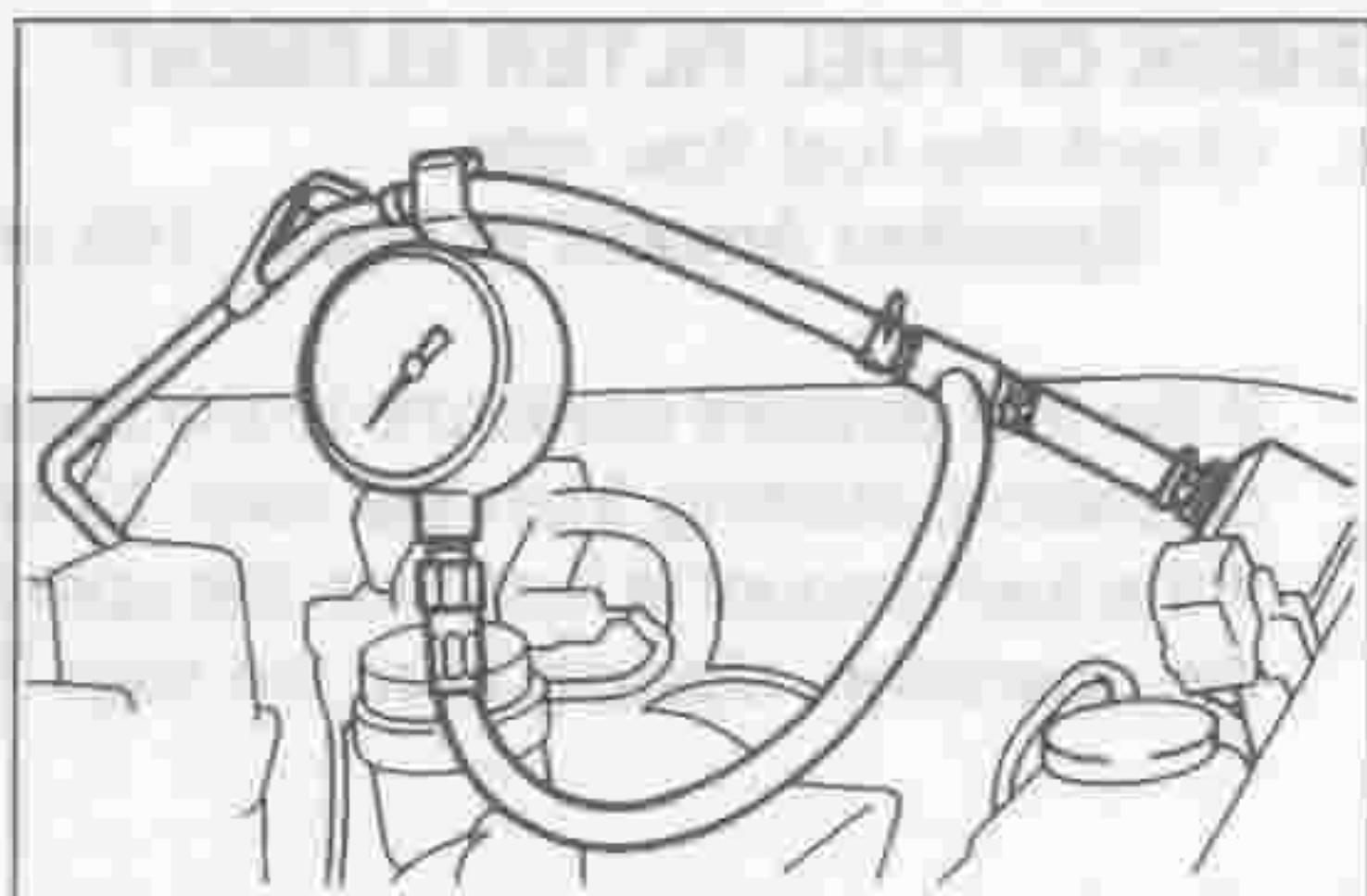
LEF00190-00154

15. Turn OFF the ignition switch after turning ON the ignition switch temporality.
16. Immediately after the operation described above, stop the flowing of the fuel by bending the fuel hose between the fuel filter and the fuel pressure regulator. Read the fuel pressure under this condition.



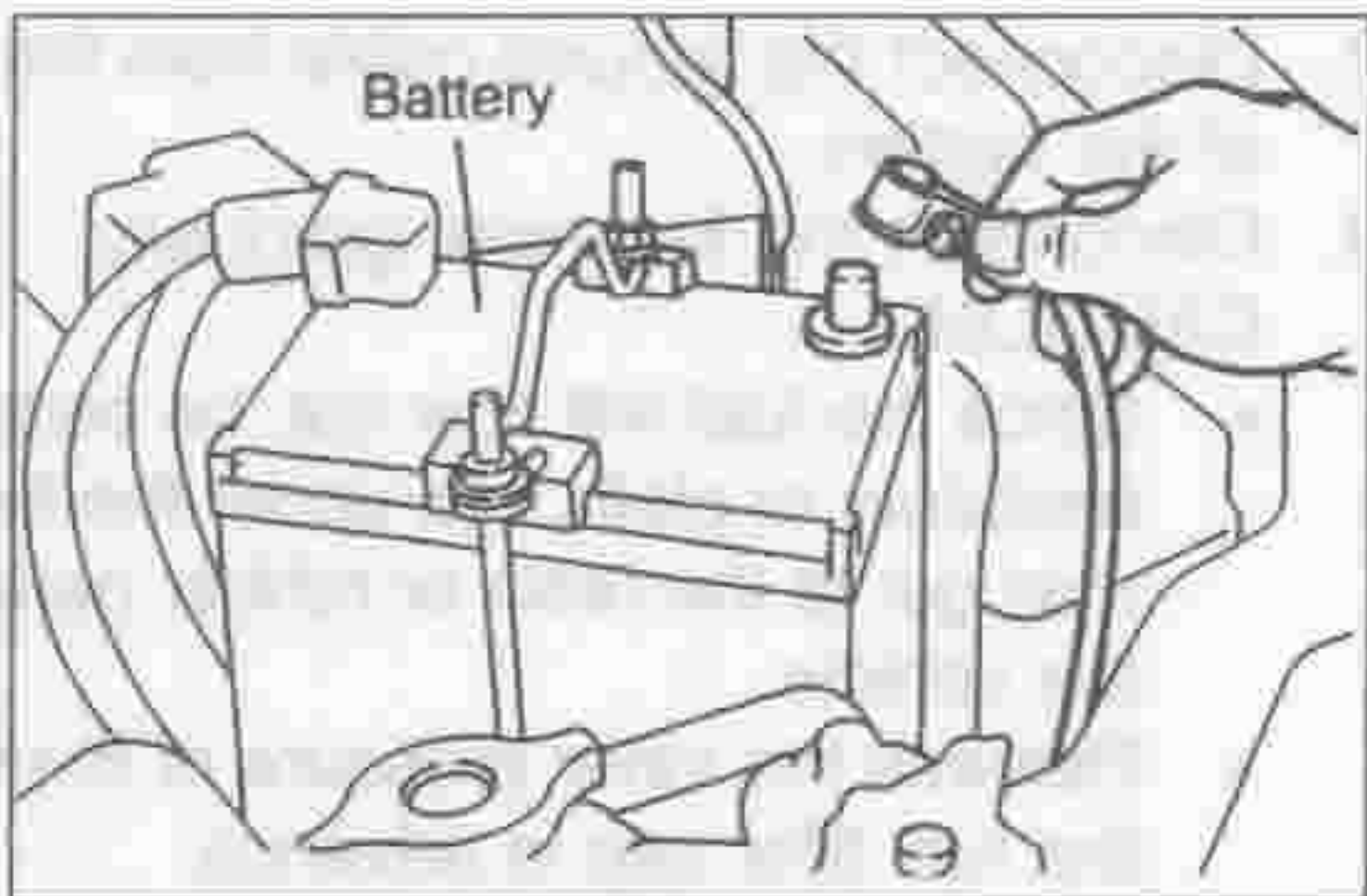
LEF00191-00155

17. After holding the fuel hose in a bend state for three minutes, check that the fuel pressure has dropped compared with that measured in step 15. Replace the fuel pump if the fuel pressure has dropped. Replace the fuel pressure regulator if the fuel pressure will not drop.



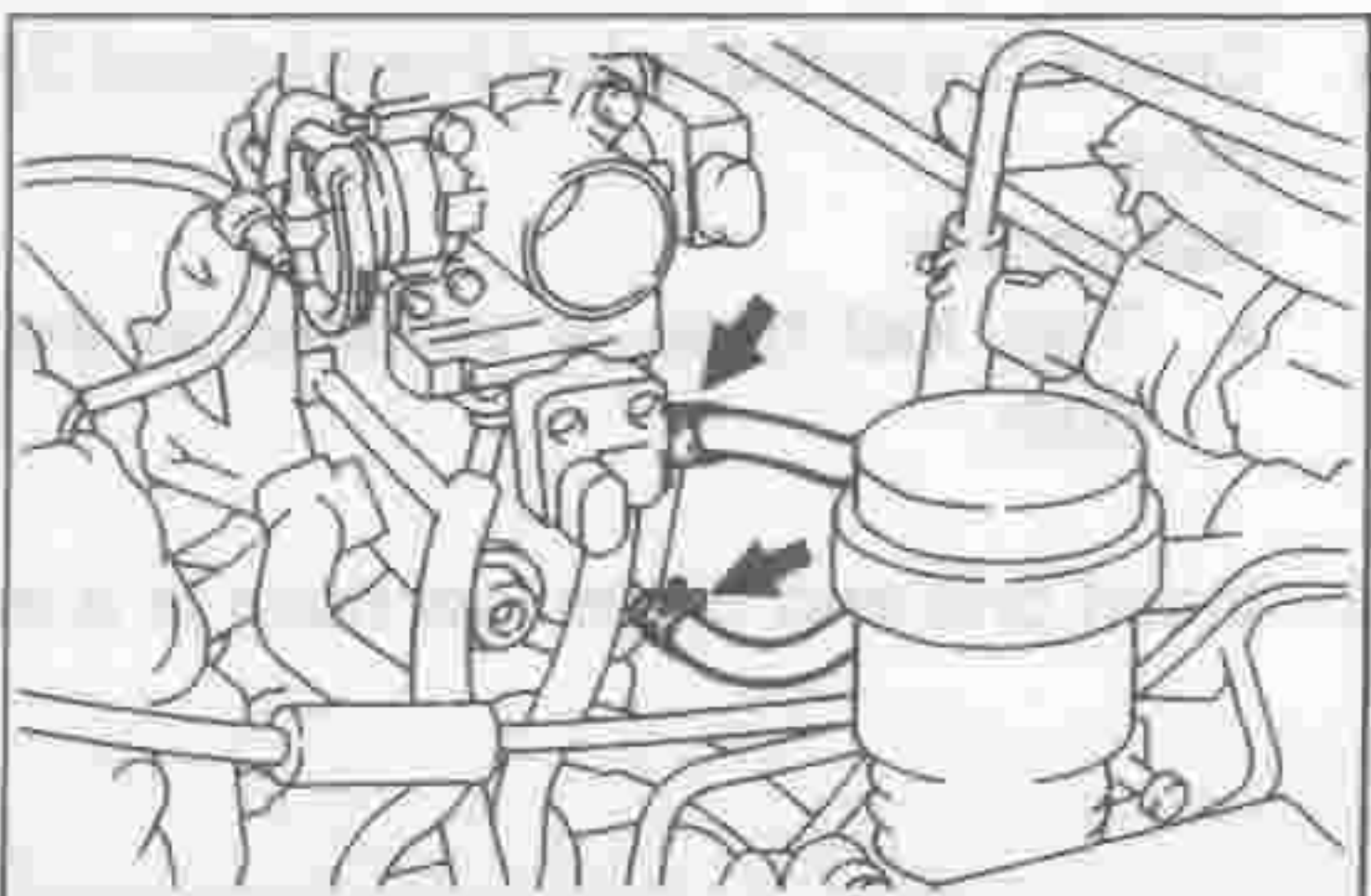
LEF00192-00156

18. Disconnect the ground cable from the negative (-) terminal of the battery.
19. Remove the SST (fuel presser gauge) from the fuel line.
20. Reconnect the fuel hose between the fuel pipe and the fuel filter.



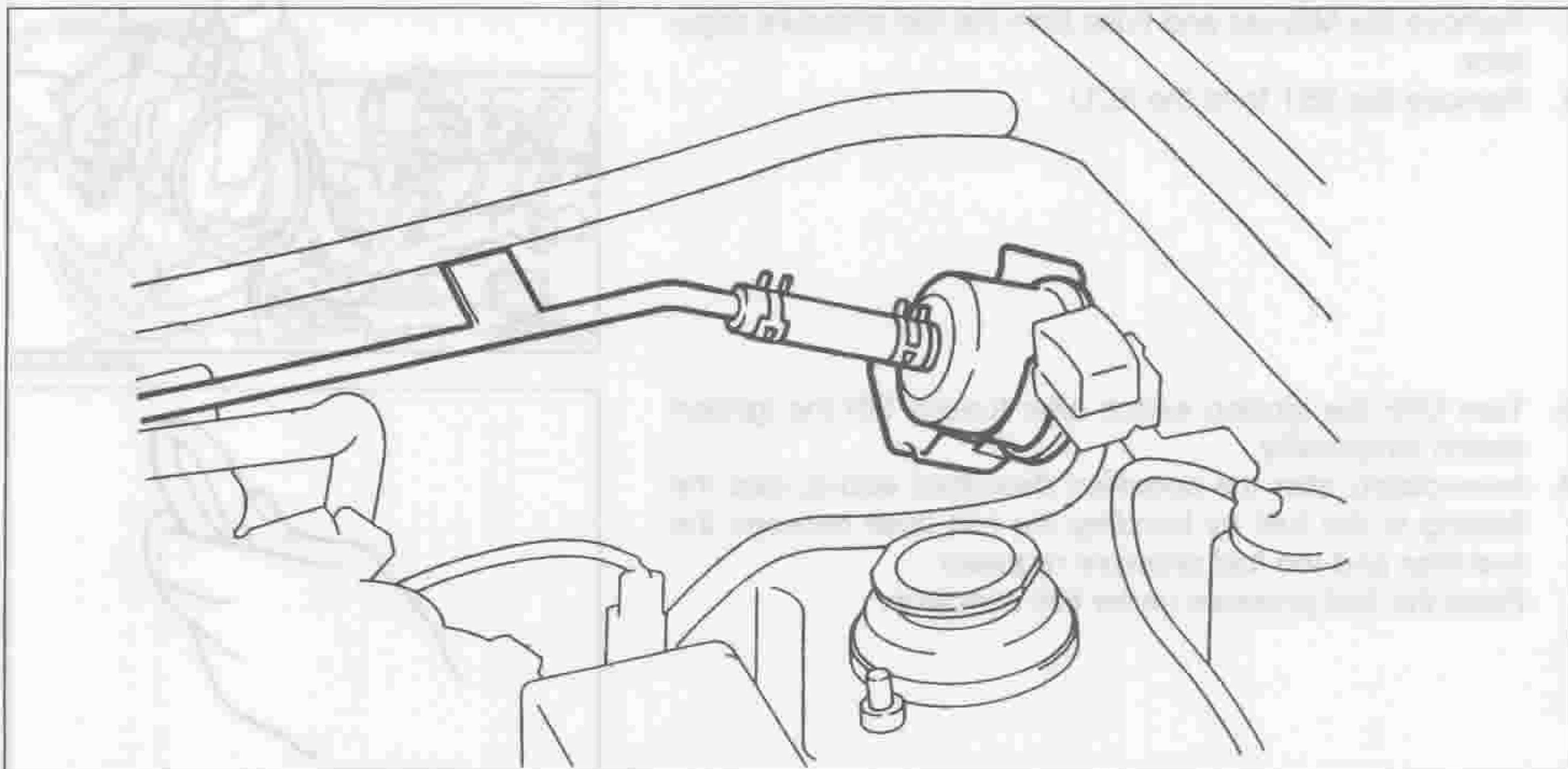
LEF00193-00157

21. Reconnect the ground cable to the negative (-) terminal of the battery.
22. Start the engine. Check to see if any leakage is present. Repair any defective part if fuel leakage exists.



LEF00194-00158

FUEL FILTER ELEMENT



LEF00195-00159

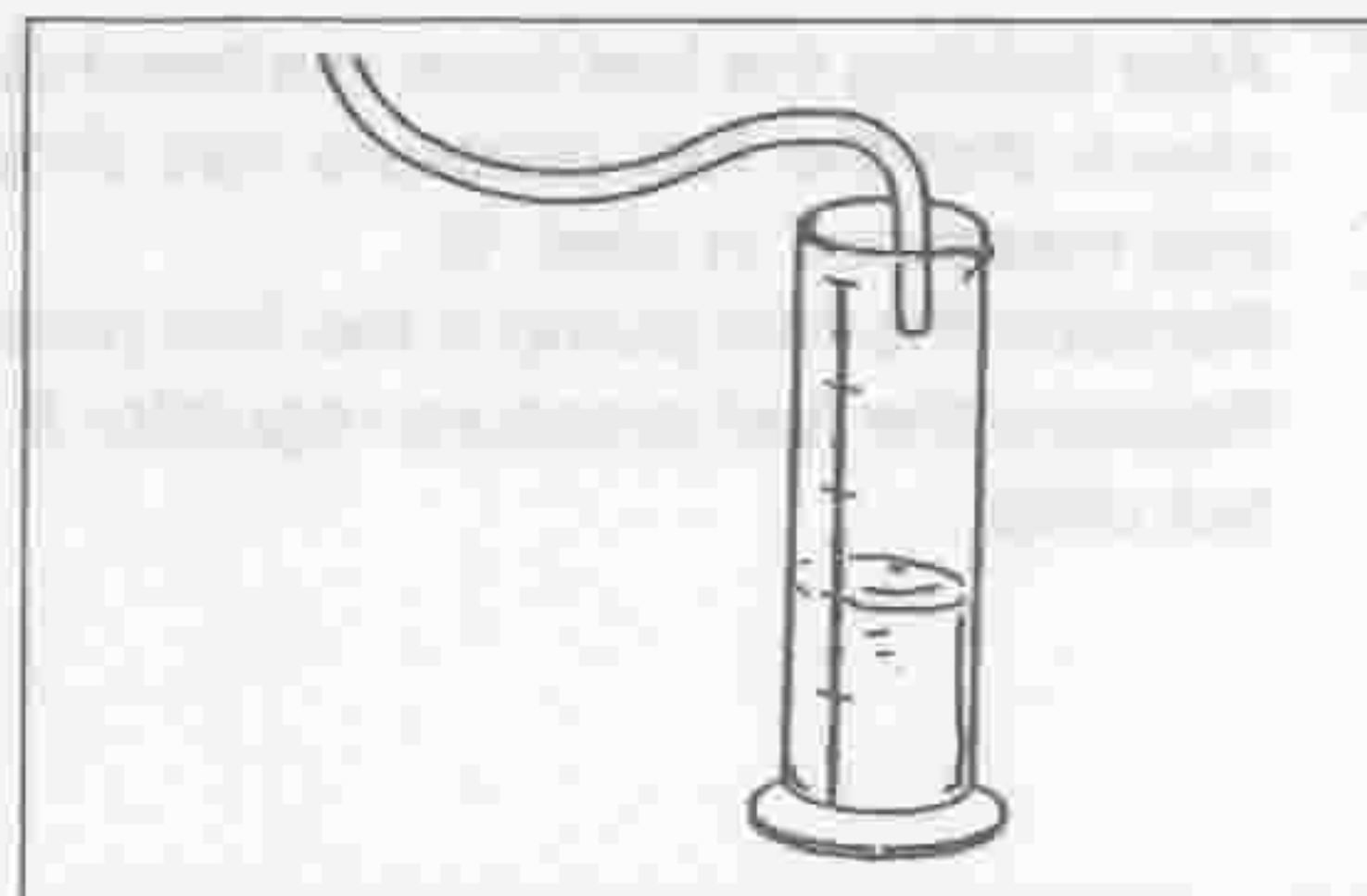
CHECK OF FUEL FILTER ELEMENT

1. Check the fuel flow rate.

Specified Amount of Fuel: 165 cm³ or more

If the fuel amount conforms to the specification, perform the operation, starting from the step 13 onward.

If the fuel amount is less than the specified amount, perform the operation, starting from the step 2 onward.



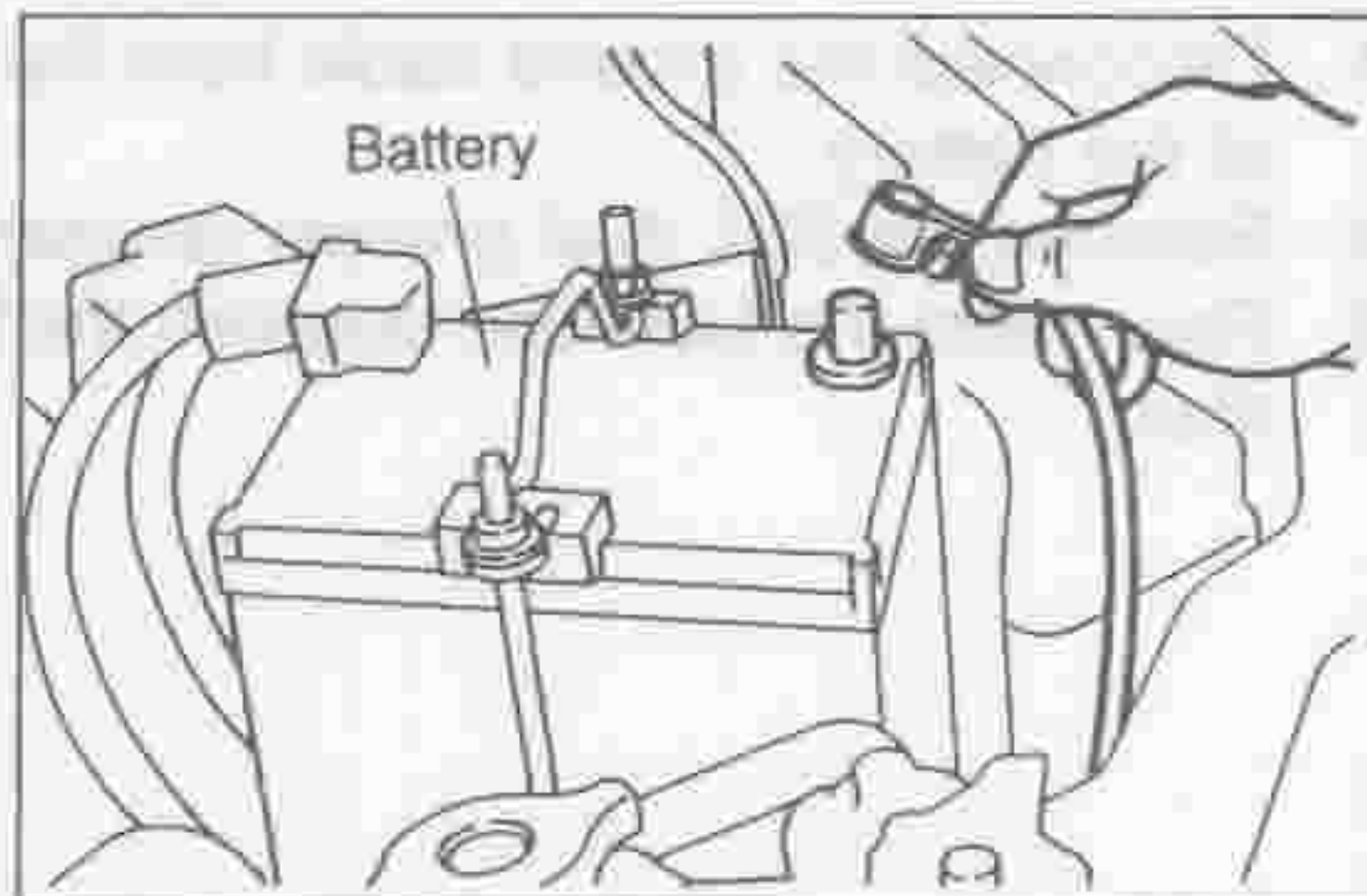
LEF00196-00160

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

3. Disconnect the fuel hose gradually.

CAUTION:

- Since the fuel will flow out, be certain to place a suitable container or cloth, etc. under the fuel filter so that no fuel may get to the resin or rubber parts or electrical parts of the vehicle.
- Release the inner pressure of the fuel tank by removing the fuel filler cap in advance.



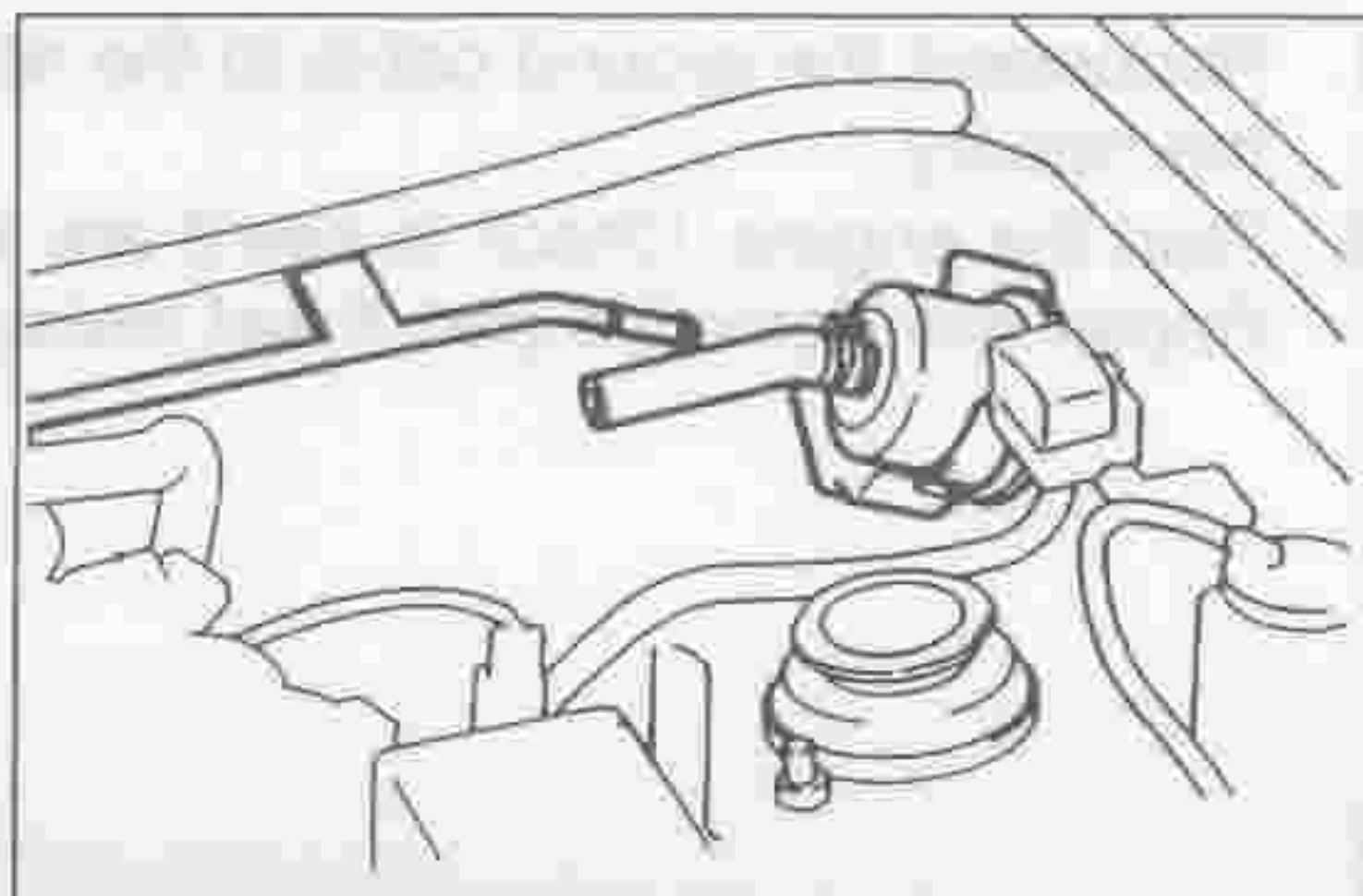
LEF00197-00161

4. Connect a suitable fuel hose (about 2 meter long) to the fuel pipe.

Reference:

- This fuel hose is included in the SST (09268-87702-000).

5. Insert one end of the fuel hose in a measuring cylinder.

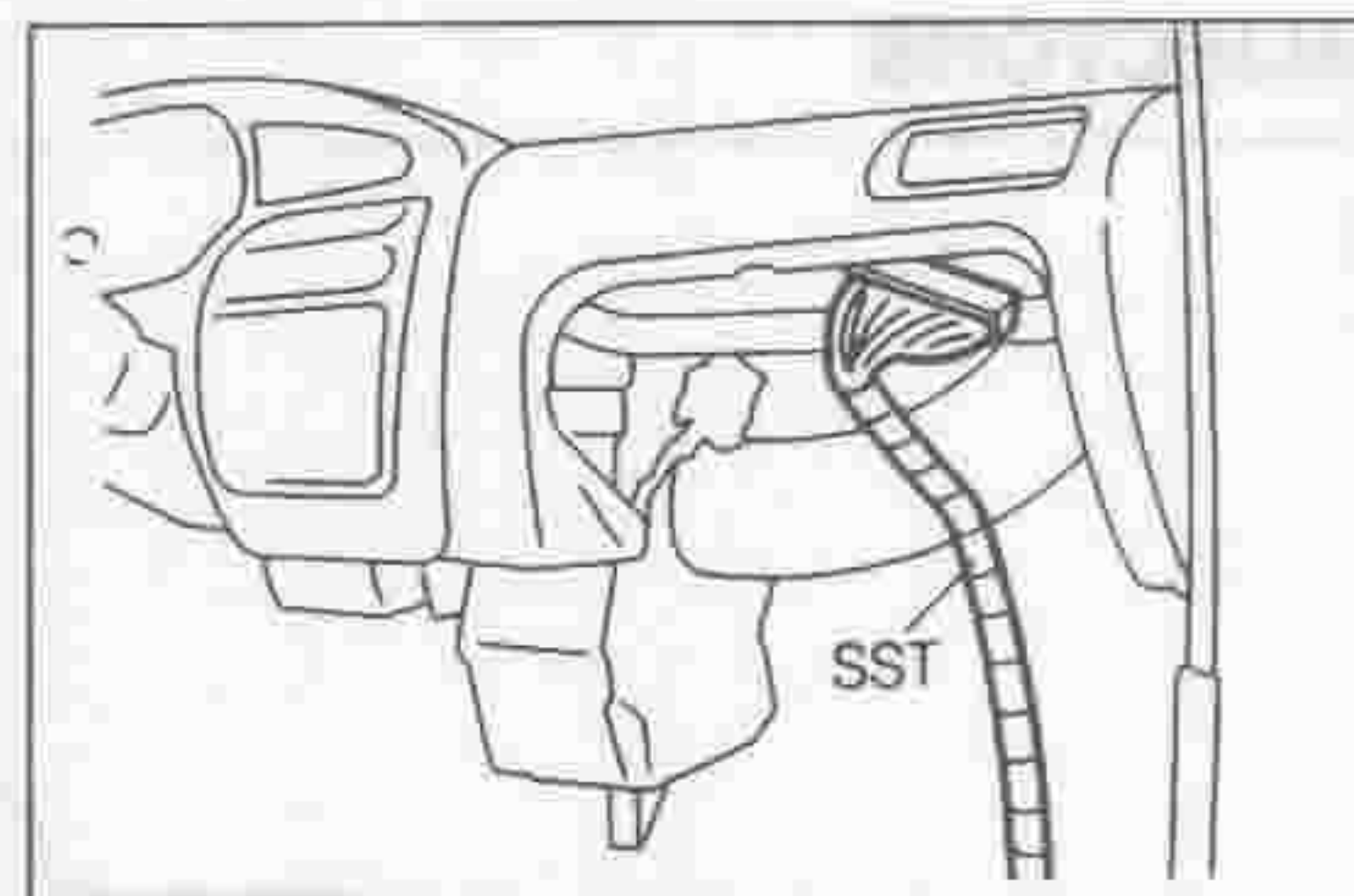


LEF00198-00162

6. Connect the following SST between the ECU and the engine wire.

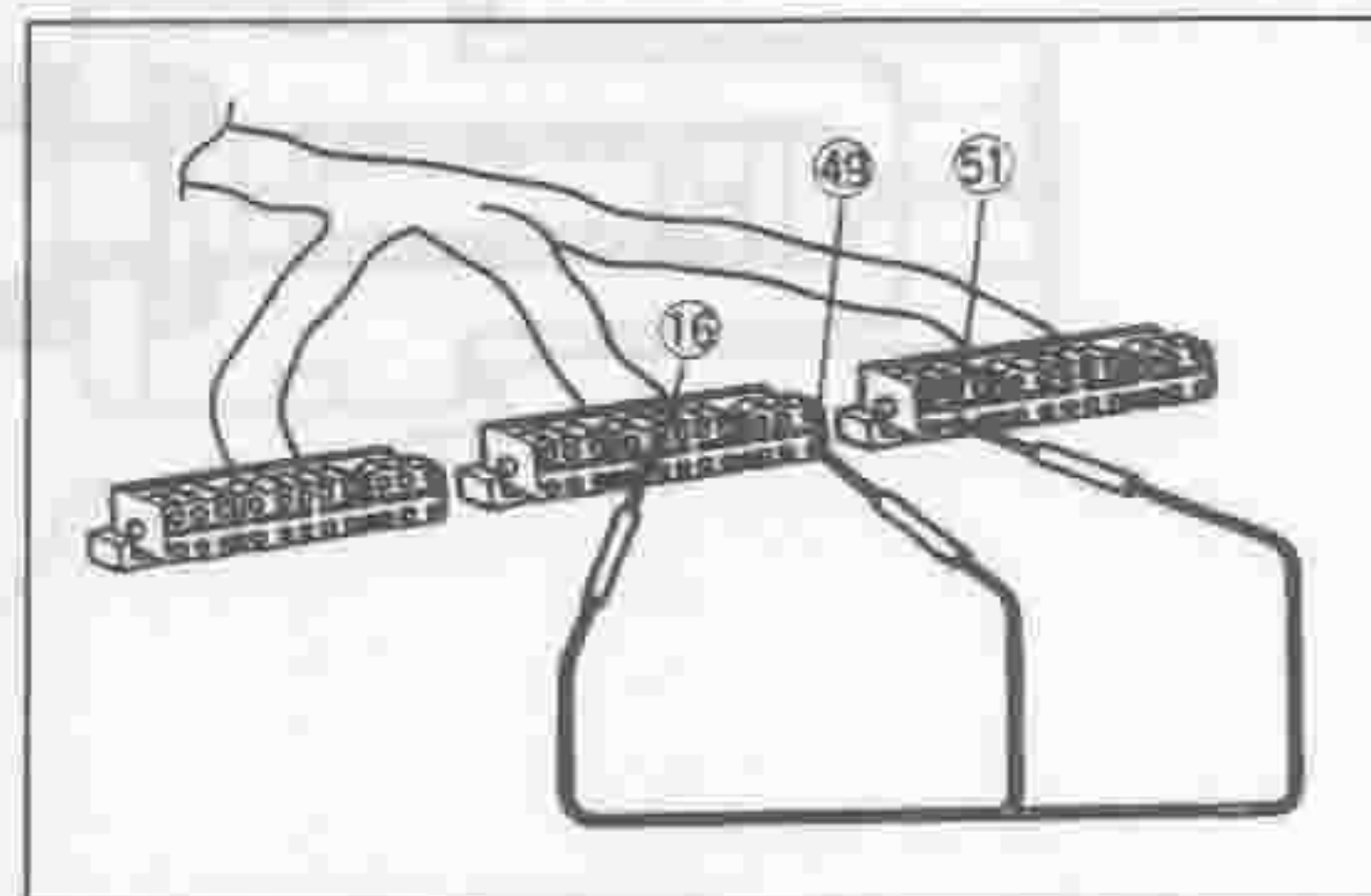
SST: 09842-87502-000

7. Reconnect the ground cable to the negative (-) terminal of the battery.



LEF00199-00163

8. Connect the SST terminals between ⑤① and ①⑥ (EF-EL) or ④⑨ - ①⑥ (ED-20).
9. Turn ON the ignition switch for 15 seconds. Then turn OFF the switch.



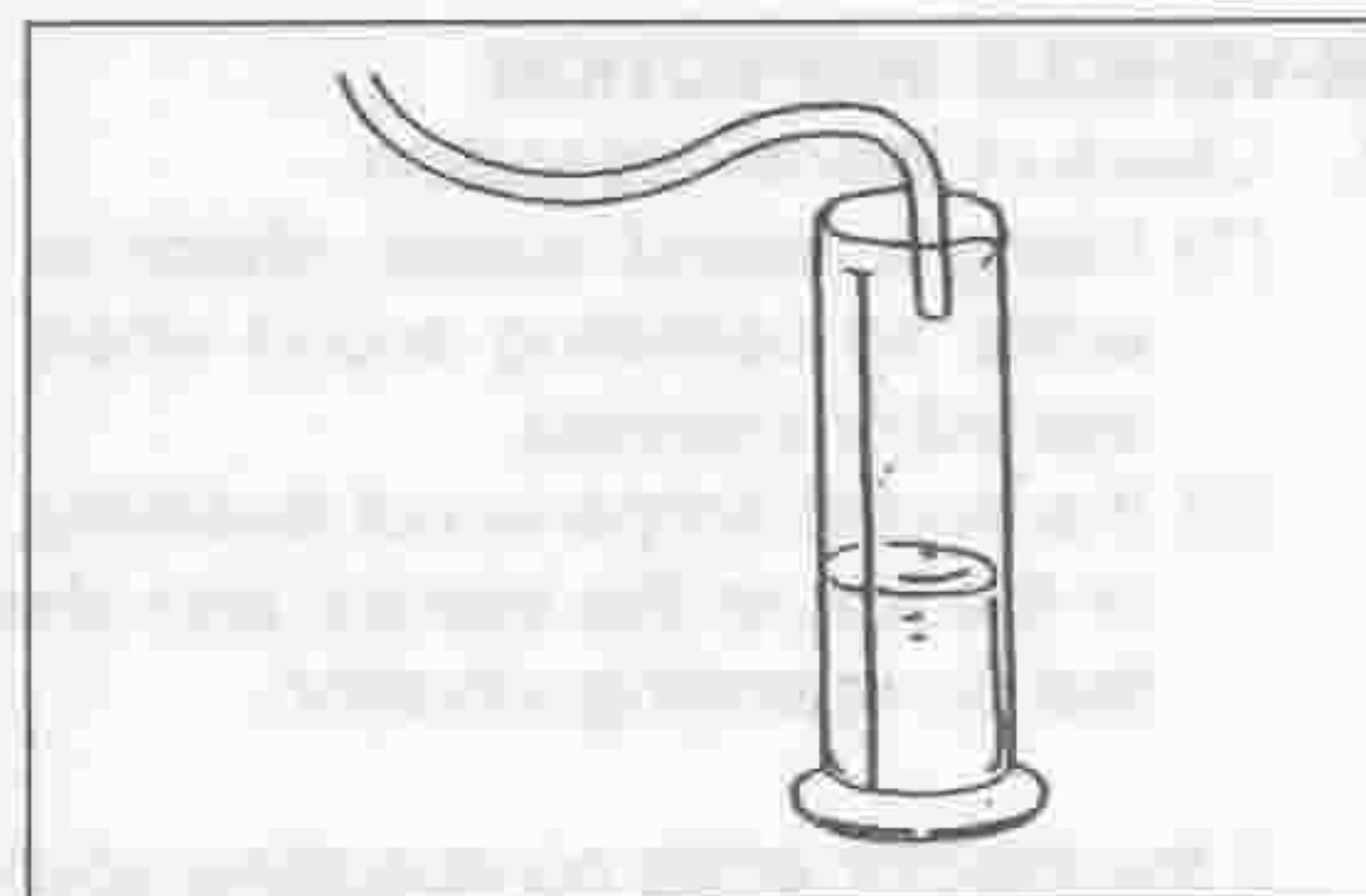
LEF00200-00164

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

Specified Amount of Fuel: 165 cm³ or more

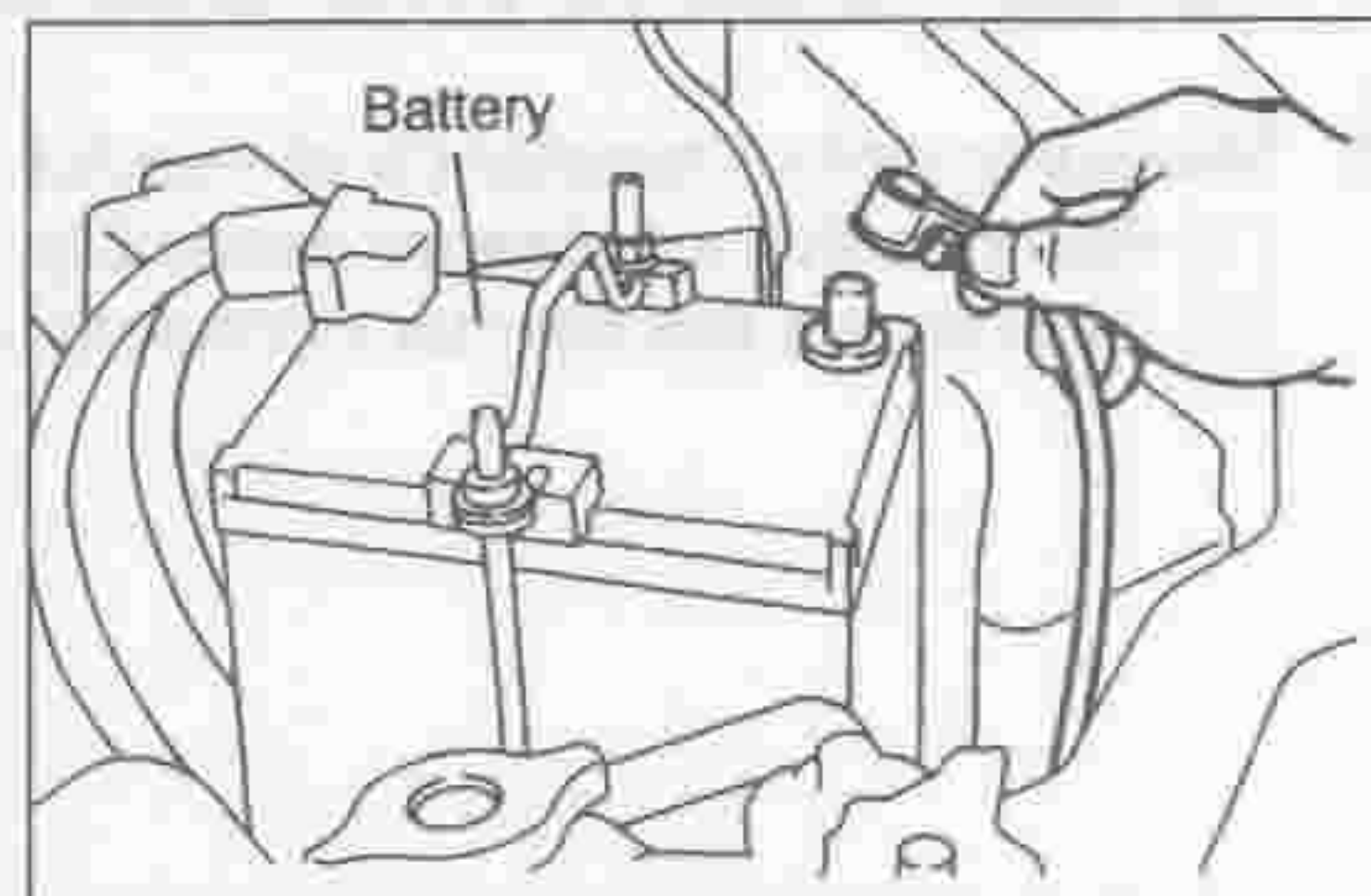
If the fuel amount conforms to the specification, replace the fuel filter.

If the fuel amount is less than the specified amount, check the fuel pump filter for restriction. Then, replace the fuel pump as required.



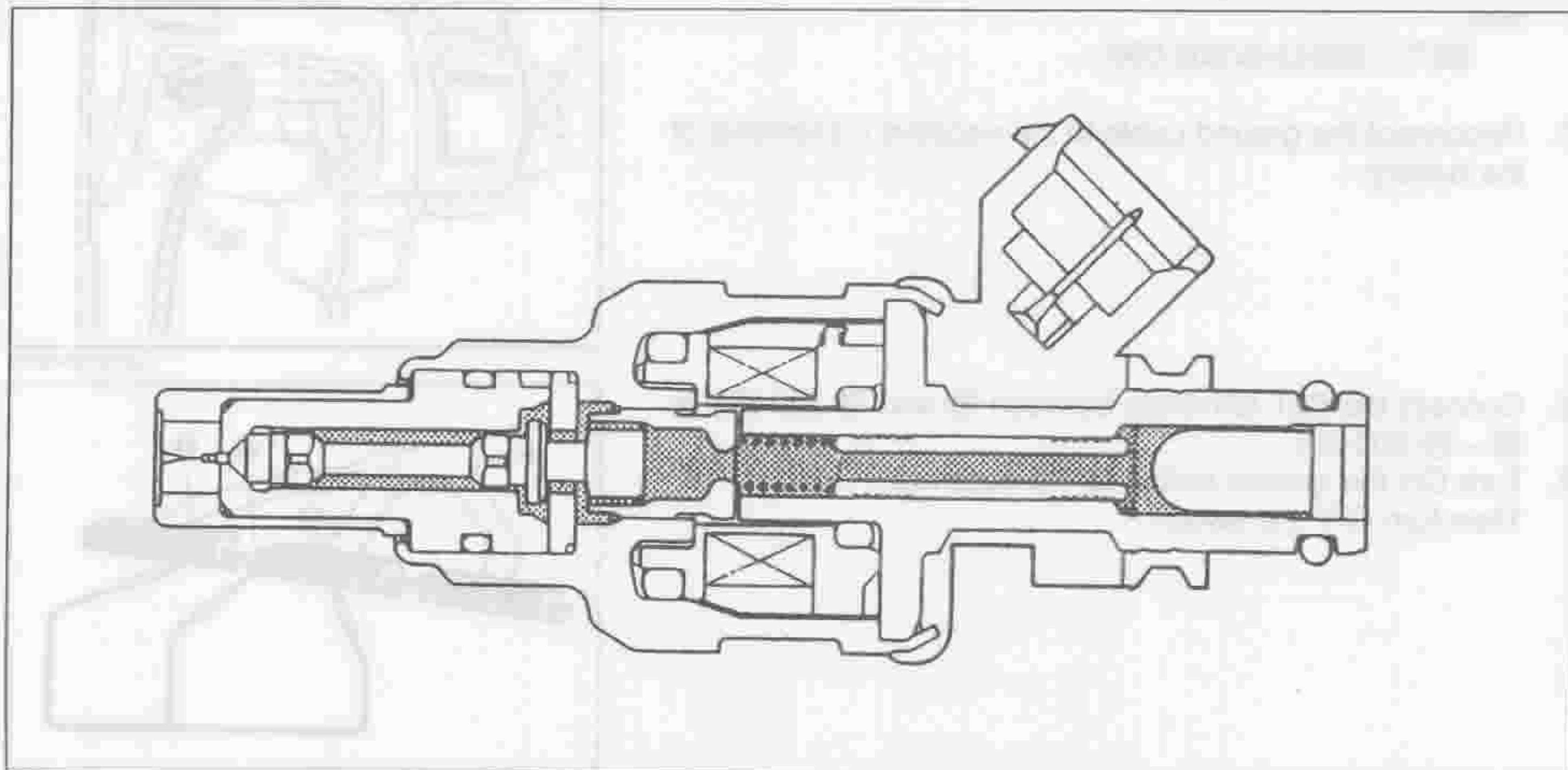
LEF00201-00165

11. Disconnect the ground cable from the negative (-) terminal of the battery.
12. Remove the SST (Check sub harness), connect the engine wire to the ECU.
13. Disconnect the fuel hose (2 meter long) from the fuel filter.
14. Securely connect the fuel hose to the fuel filter with new clip.
15. Reconnect the ground cable to the negative (-) terminal of the battery.
16. Start the engine. Check to see if any fuel leakage is present. Repair any defective part if fuel leakage exists.



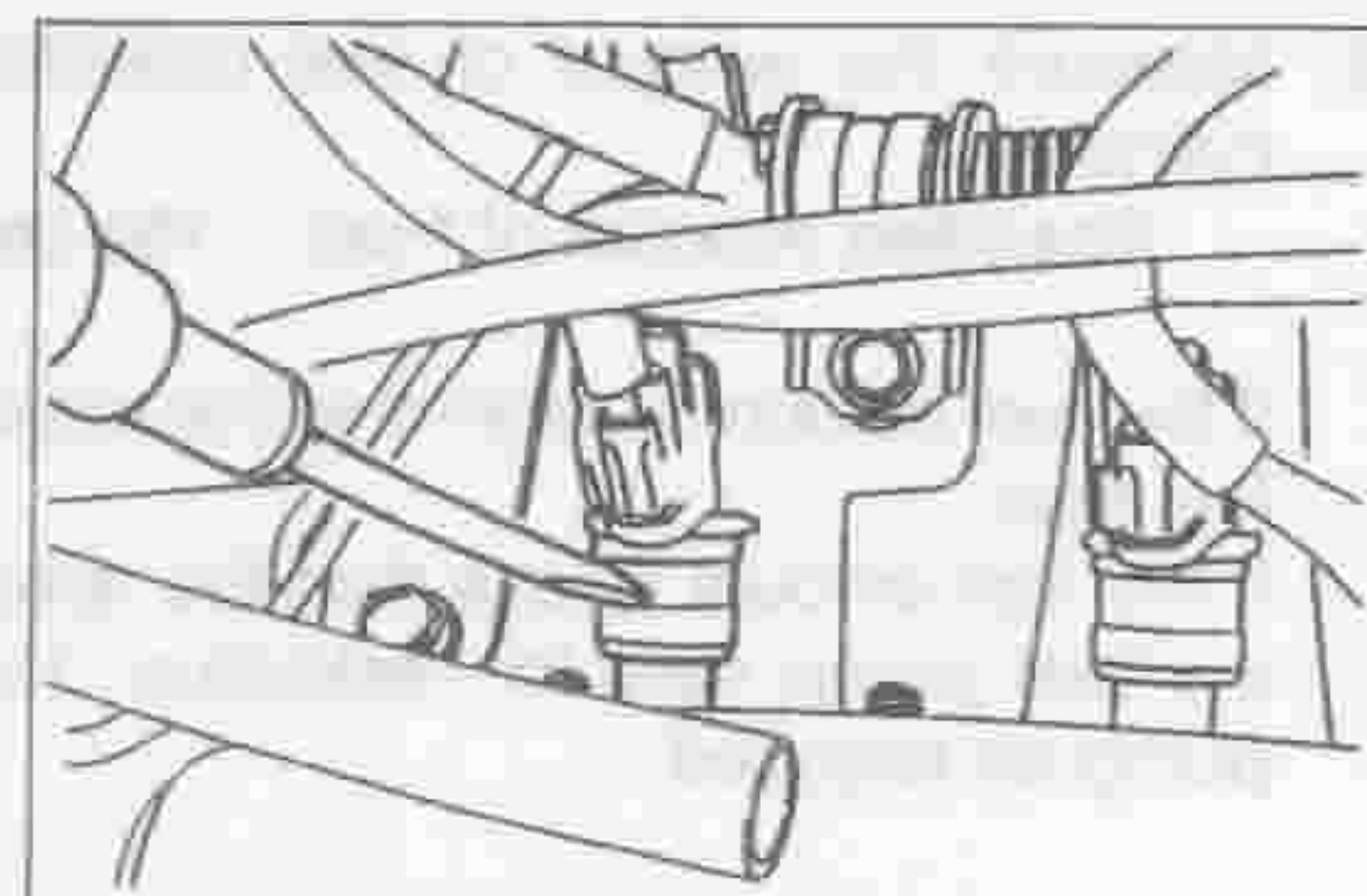
LEF00202-00166

INJECTORS



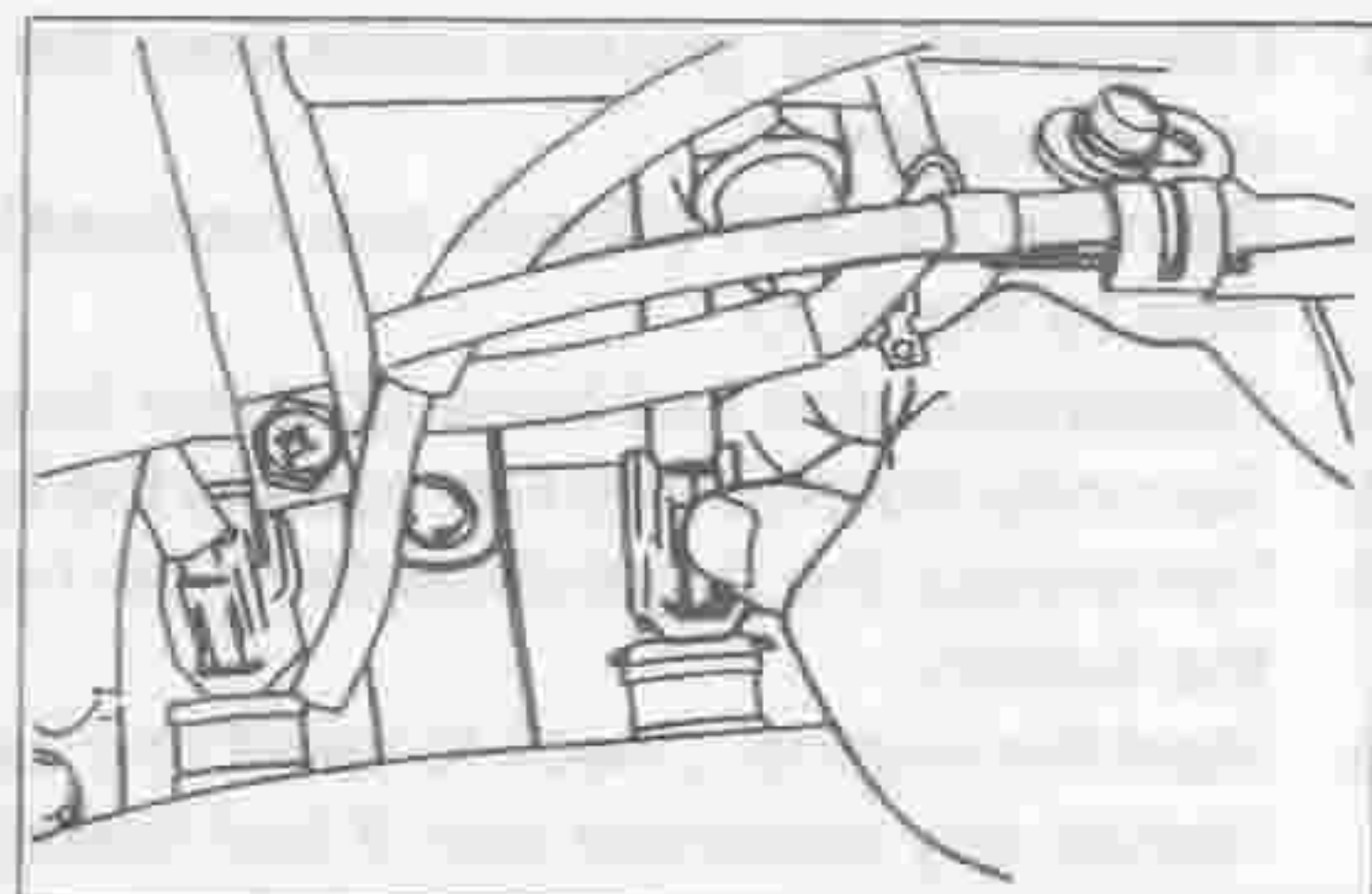
IN-VEHICLE INSPECTION

1. Check of injector operation
 - (1) Using a sound scope, check to see if each injector emits an operating sound when the engine is being started or cranked.
 - (2) If a sound scope is not available, apply a screwdriver or the like to the injector and check to see if you can feel an operating vibration.



If the injector emits no operating sound or emits an abnormal sound, check the wiring, wiring connector or injector.

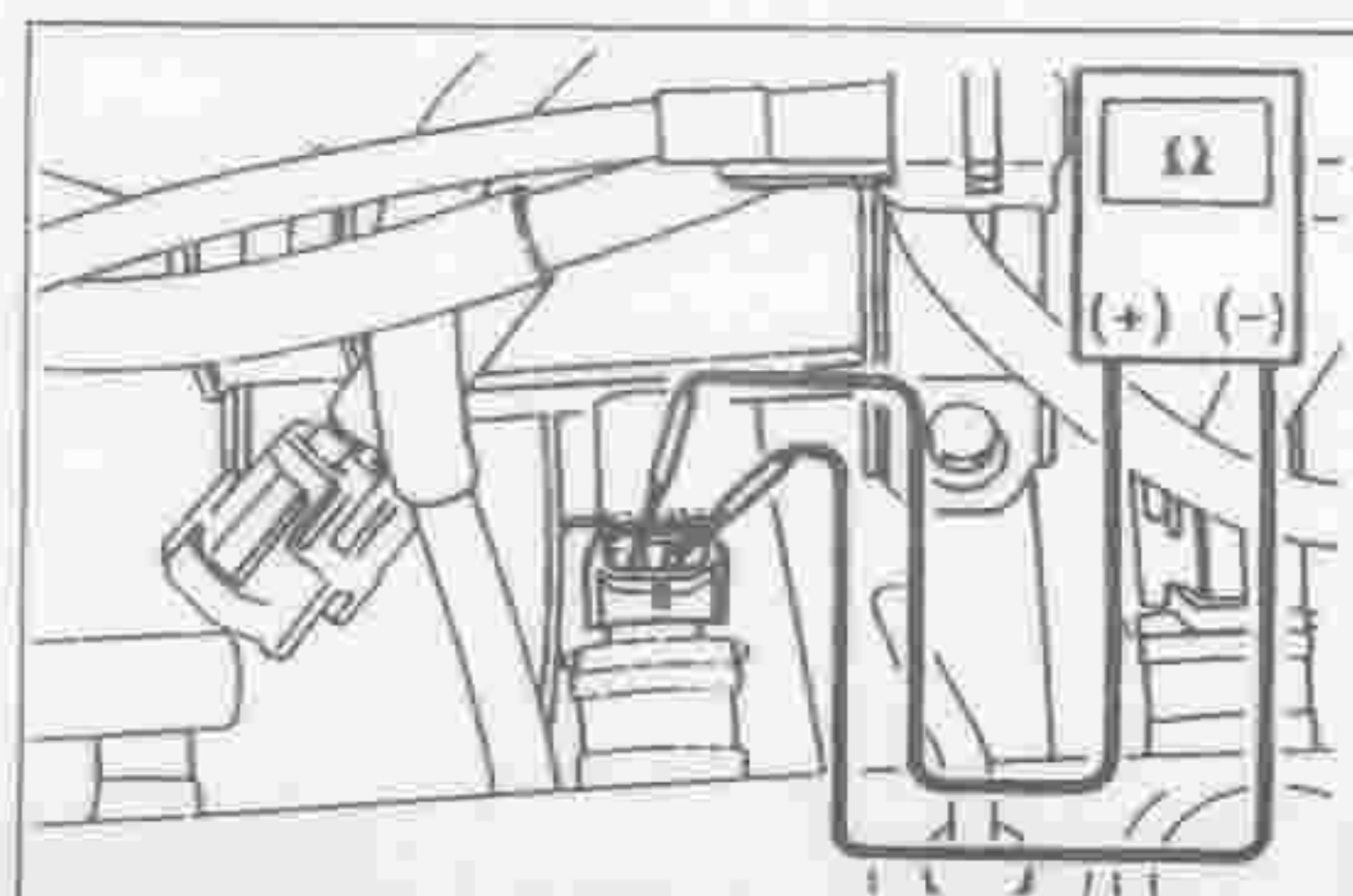
2. Measurement of resistance of injector
 - (1) Remove the air cleaner assembly.
 - (2) Disconnect the injector connector of the engine wire.



- (3) Measure the resistance between the terminals of each injector.
Specified Resistance: Approx. 14 Ω (at 20°C)

If the resistance between the terminals is not within the specification, replace the injector.

- (4) Connect the injector connector of the engine wire to the injector.



LEF00206-00170

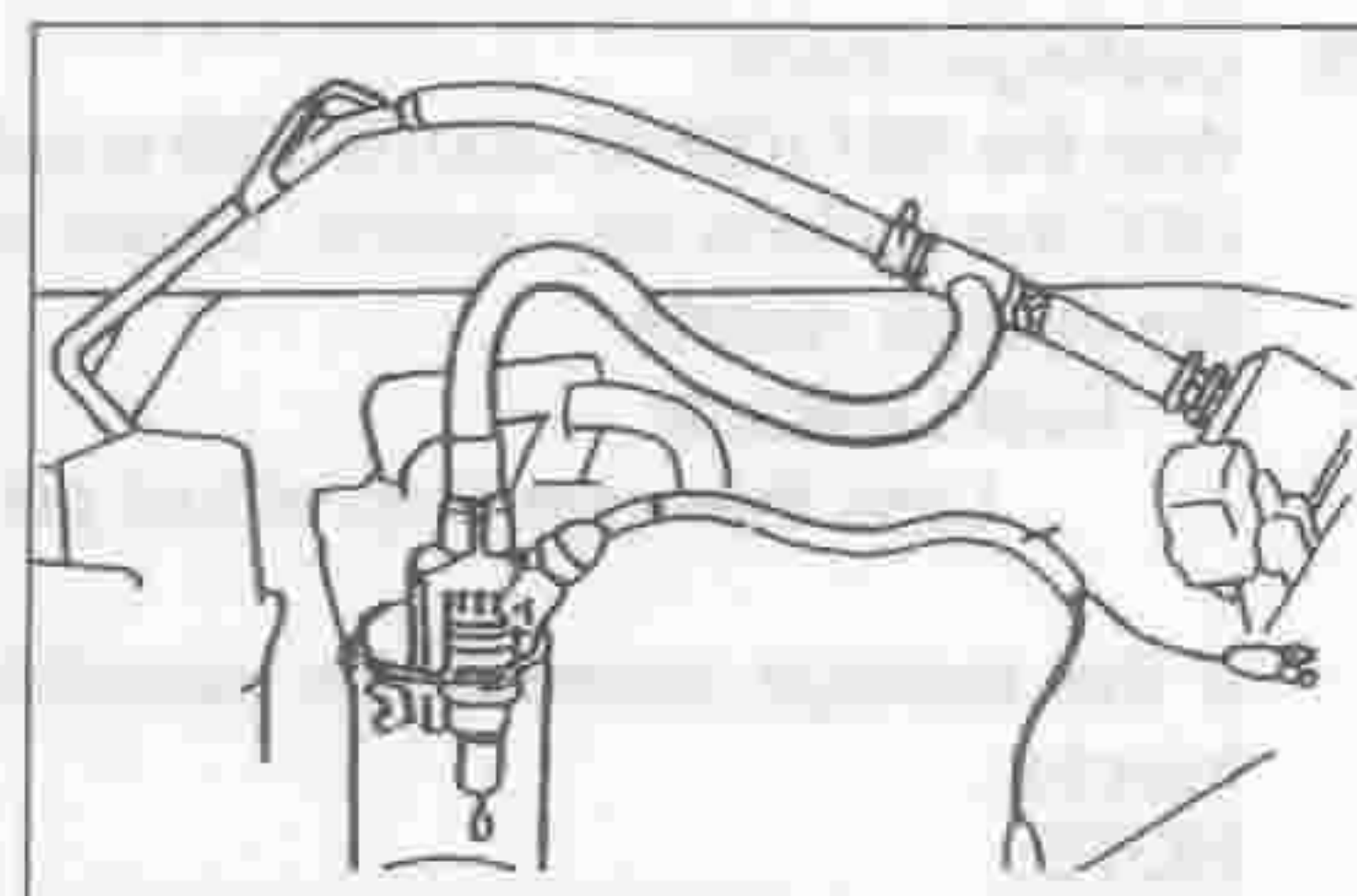
INSPECTION OF INJECTOR

1. Remove the injector.
2. Using the following SSTs, connect the injector.

SST: 09268-87702-000
09842-30070-000

NOTE:

- Install the other injector onto the injector removed position.
- Install a new O-ring to the O-ring seal section.
- Attach the hose bands to the rubber hose connections.
- Attach a suitable vinyl hose to the tip-end of the injector so as to prevent fuel from splashing.
- Remove the injector grommet. Check to see if the injector grommet exhibits any damage.

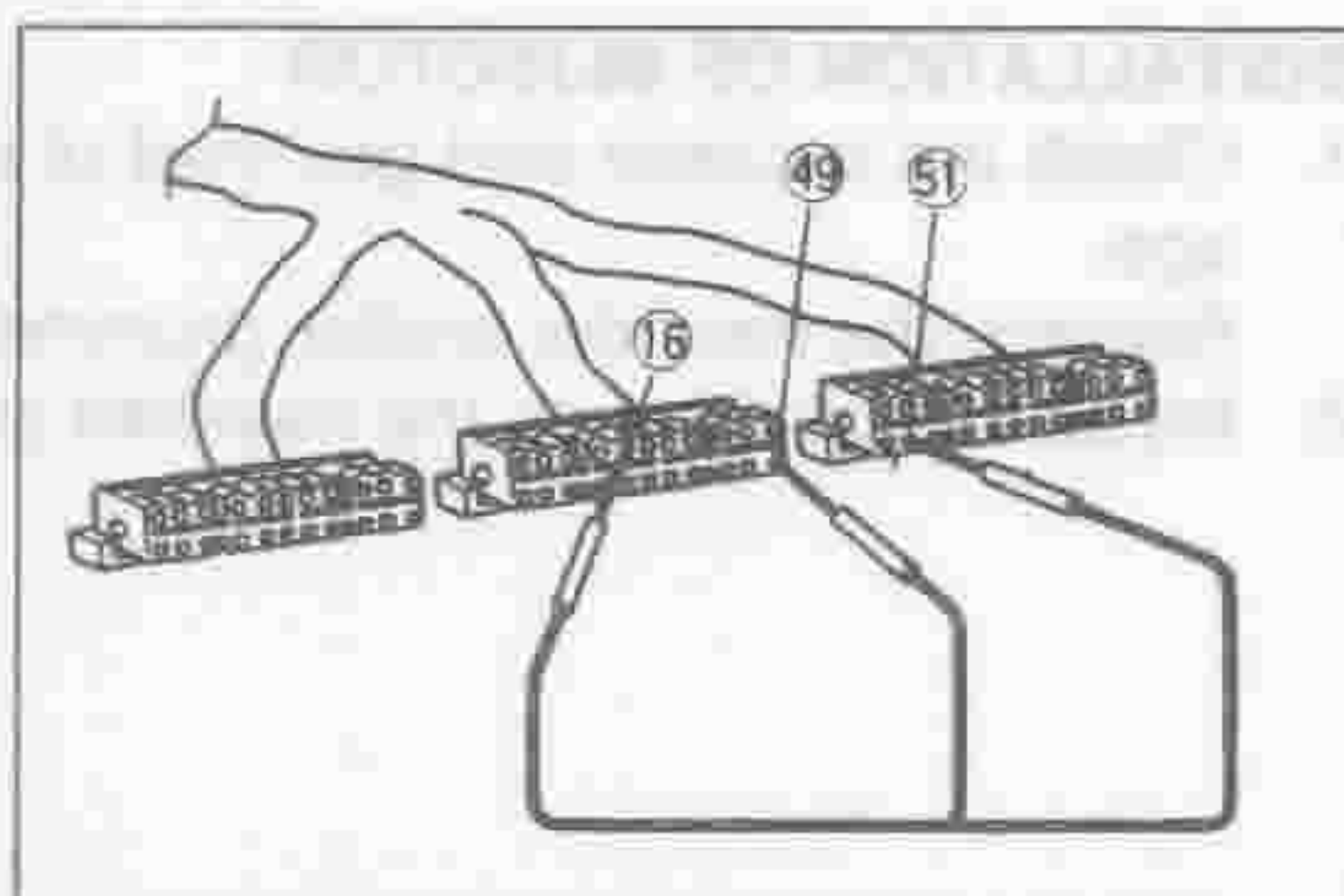


LEF00207-00171

3. Connect the following SST between the ECU and the engine wire.

SST: 09842-87502-000

4. Connect the SST terminals between ⑤① and ①⑥ (EF-EL) or ④⑨ - ①⑥ (ED-20).
5. Connect the ground cable terminal to the negative (-) terminal of the battery.
6. Turn ON the ignition switch.

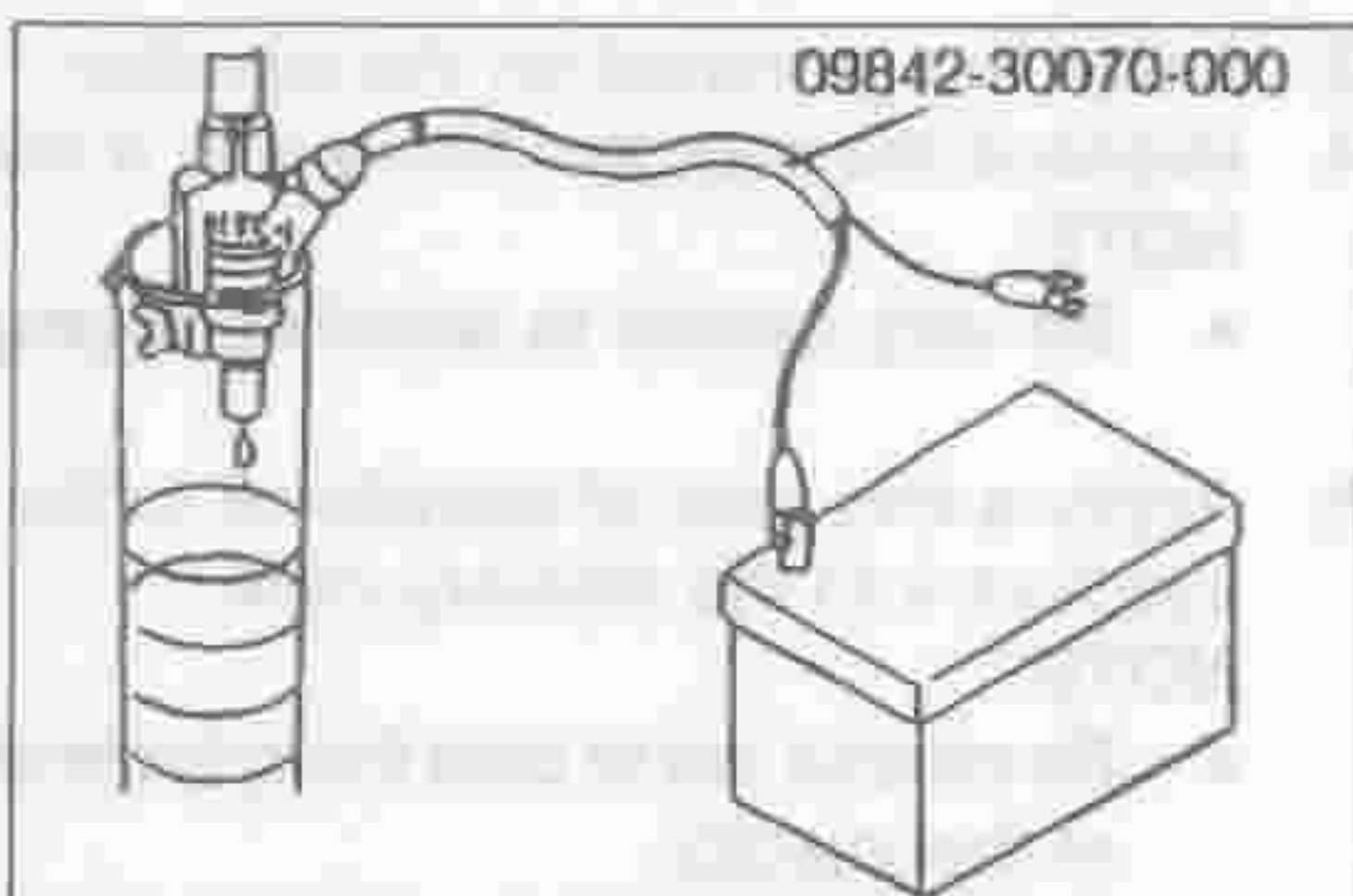


LEF00208-00172

7. Perform energizing for 15 seconds by means of the SST (09842-30070-000).
8. Measure the amount of fuel collected in the measuring cylinder.

Specified Pressure:

Specified Amount of Fuel: Approx. 35 - 38 cc
Variation Between Each Injector: 5 cc or less

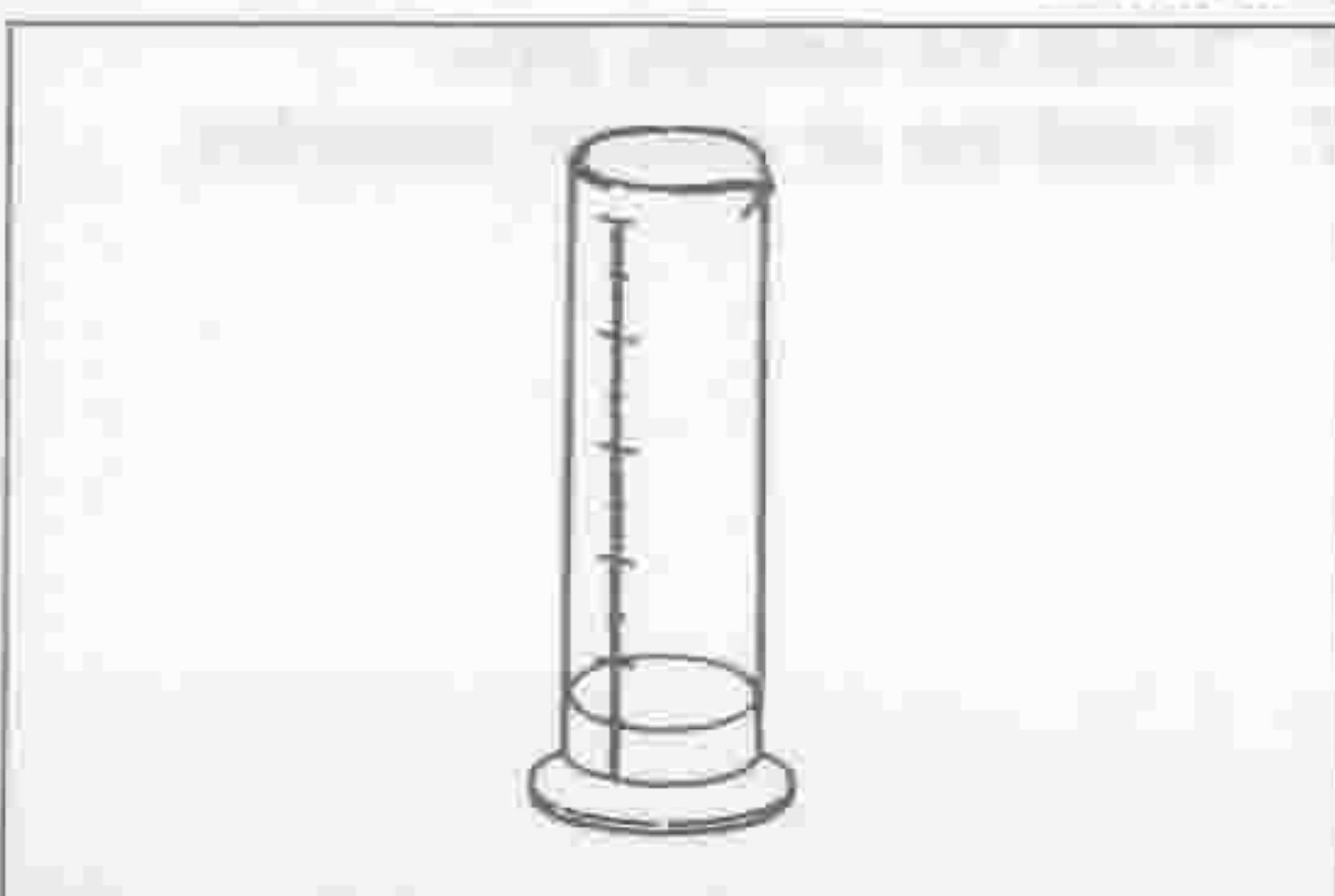


LEF00209-00173

NOTE:

- Conduct the measurement two or three times for each injector.
- Before the injector is pulled out, make certain to turn OFF the ignition key.
- 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.

If the amount of fuel fails to conform to the specification, replace the injector.



LEF00210-00174

9. Leakage check

With the SST (09842-30070-000) is not energized state, turn OFF the ignition key switch. Check any fuel leakage from the injector nozzle.

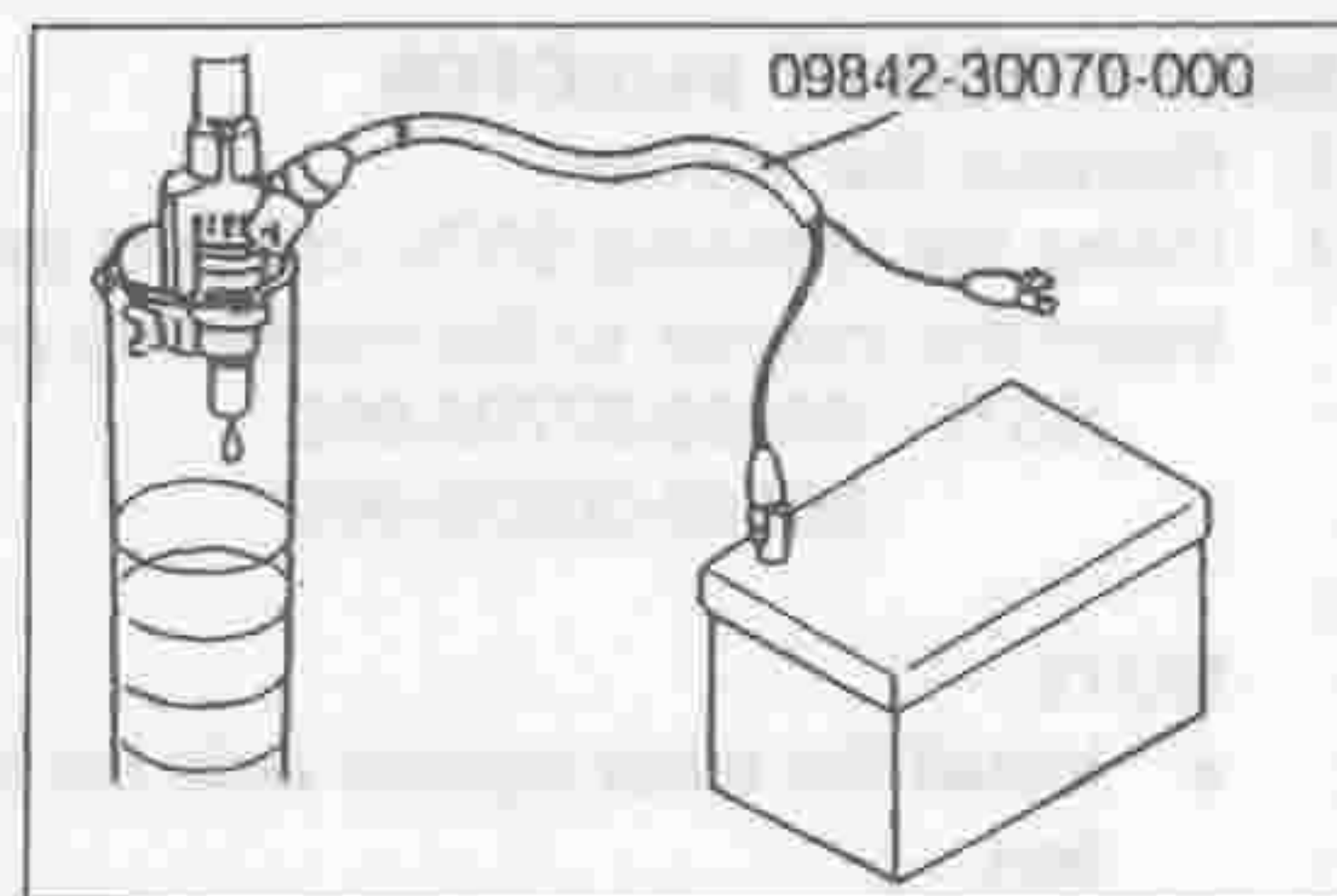
Fuel Leakage:

Less than one drop of fuel per minute

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

NOTE:

- Prior to the test, remove the vinyl hose that was attached on the injector.



LEF00211-00175

10. Turn OFF the ignition key.

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

12. Disconnect the SST.

NOTE:

- Care must be exercised as to fuel splashing and fuel flowing.

INSTALLATION OF INJECTOR

1. Check the insulator and grommet of each injector for damage.

Replace the insulator and/or grommet if damage exists.

2. Install the insulator on the manifold section.



LEF00212-00000

3. Install the grommet on the injection.

4. Replace the injector O-ring with a new part.

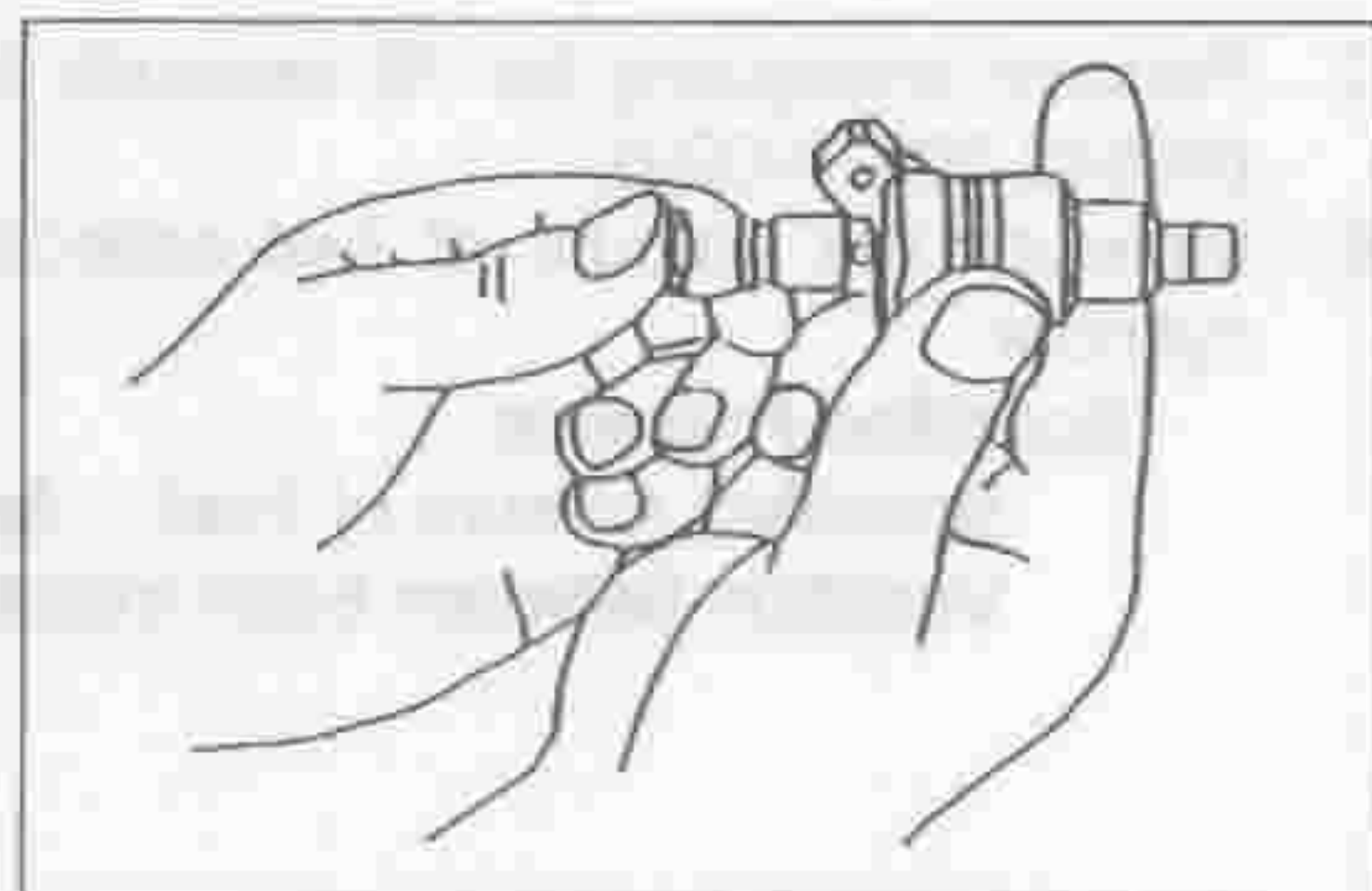
NOTE:

- Be very careful to avoid damaging the O-ring.

5. Apply a thin coat of spindle oil to the O-ring and install the injectors into the delivery pipe.

NOTE:

- Be careful not to coat the spindle oil to the inlet and outlet of the injector.



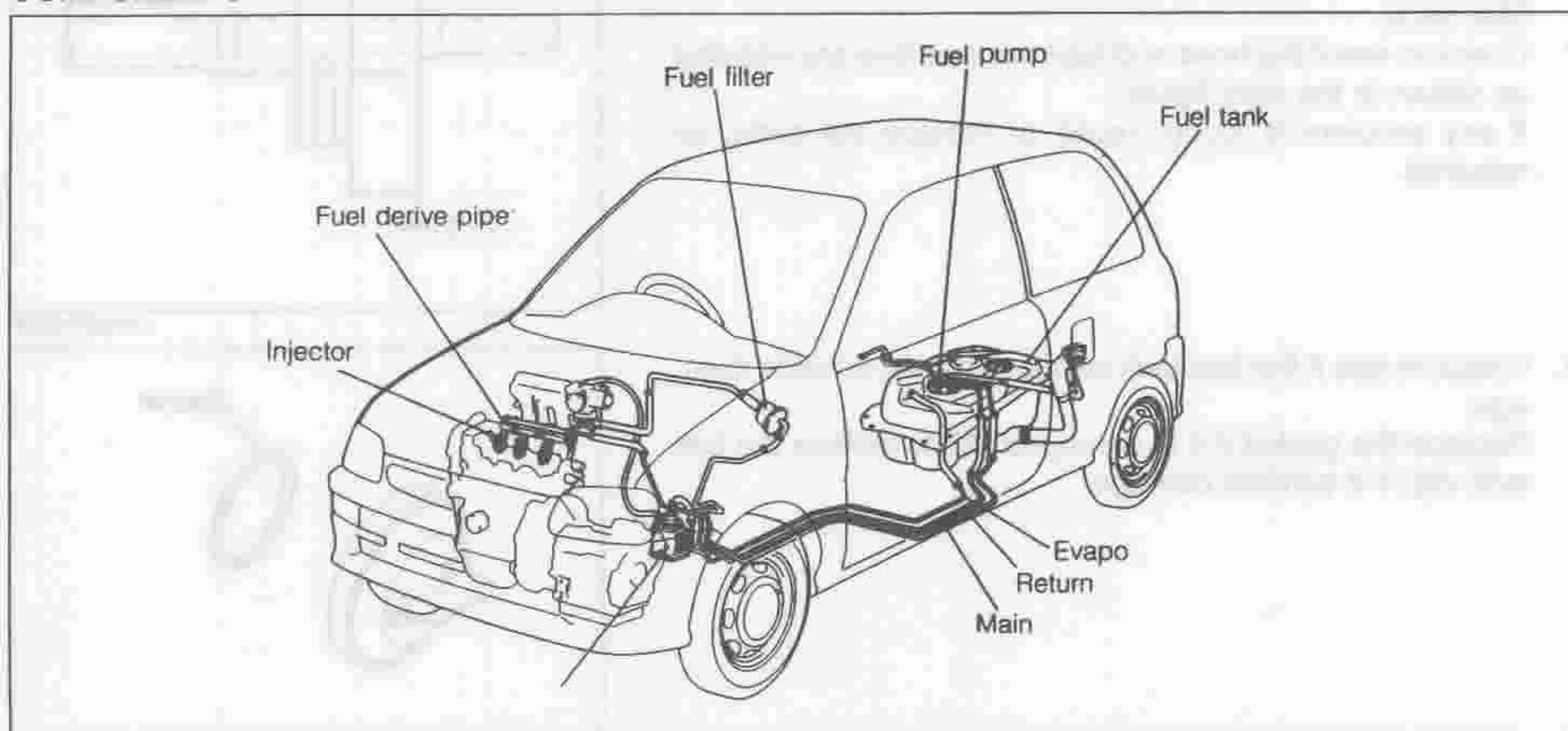
LEF00213-00176

6. Install the delivery pipe.

7. Install the air cleaner assembly.



FUEL LINE COMPONENTS



LEF00214-00177

PRECAUTIONS

1. Always use a new gasket and hose band (clip) when replacing the fuel tank or components.
2. Each part should be tightened securely to the specified torque.

WARNING:

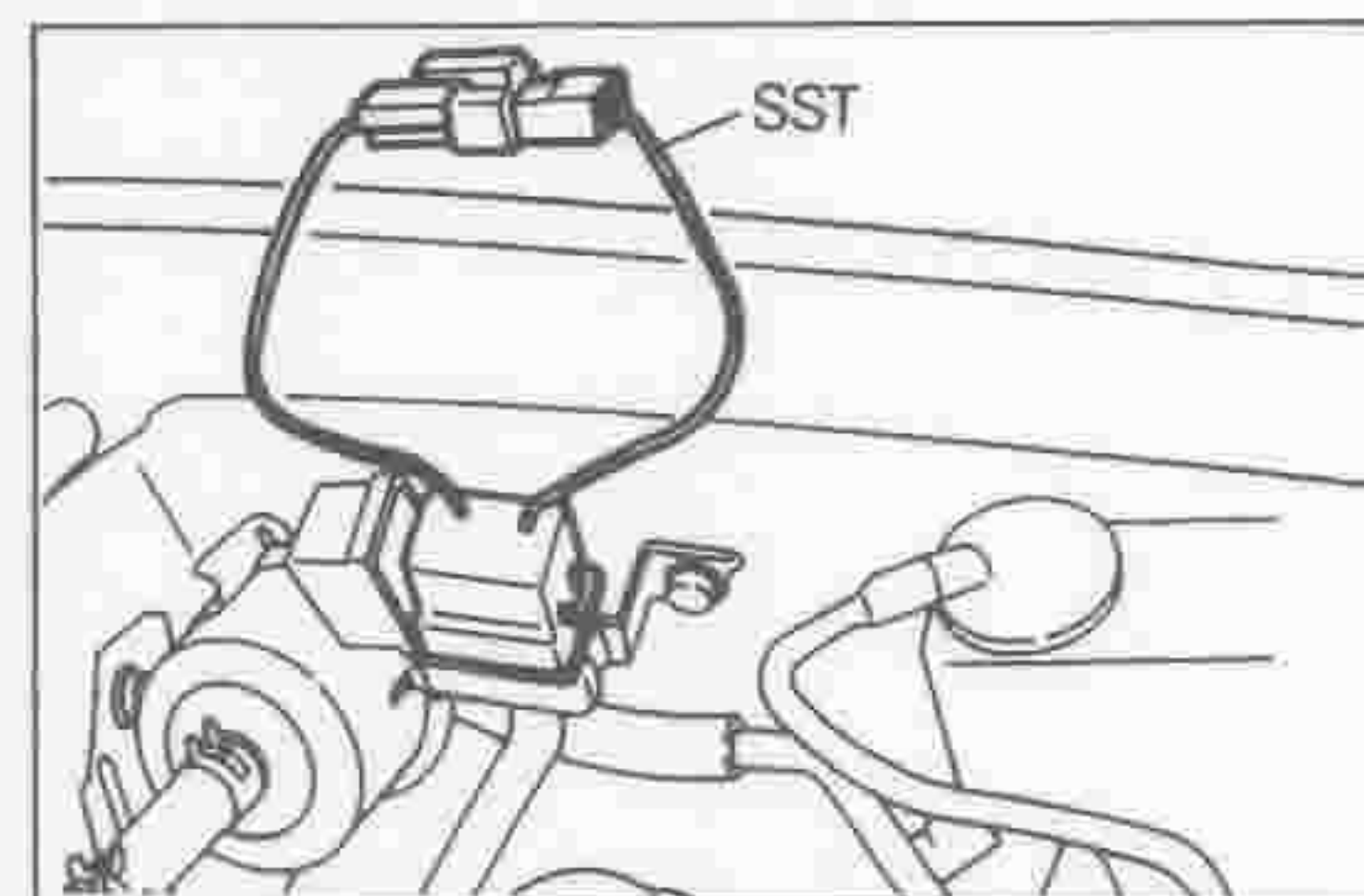
- Always keep fire away from the working site.

LEF00215-00000

INSPECTION OF FUEL LINES AND CONNECTIONS

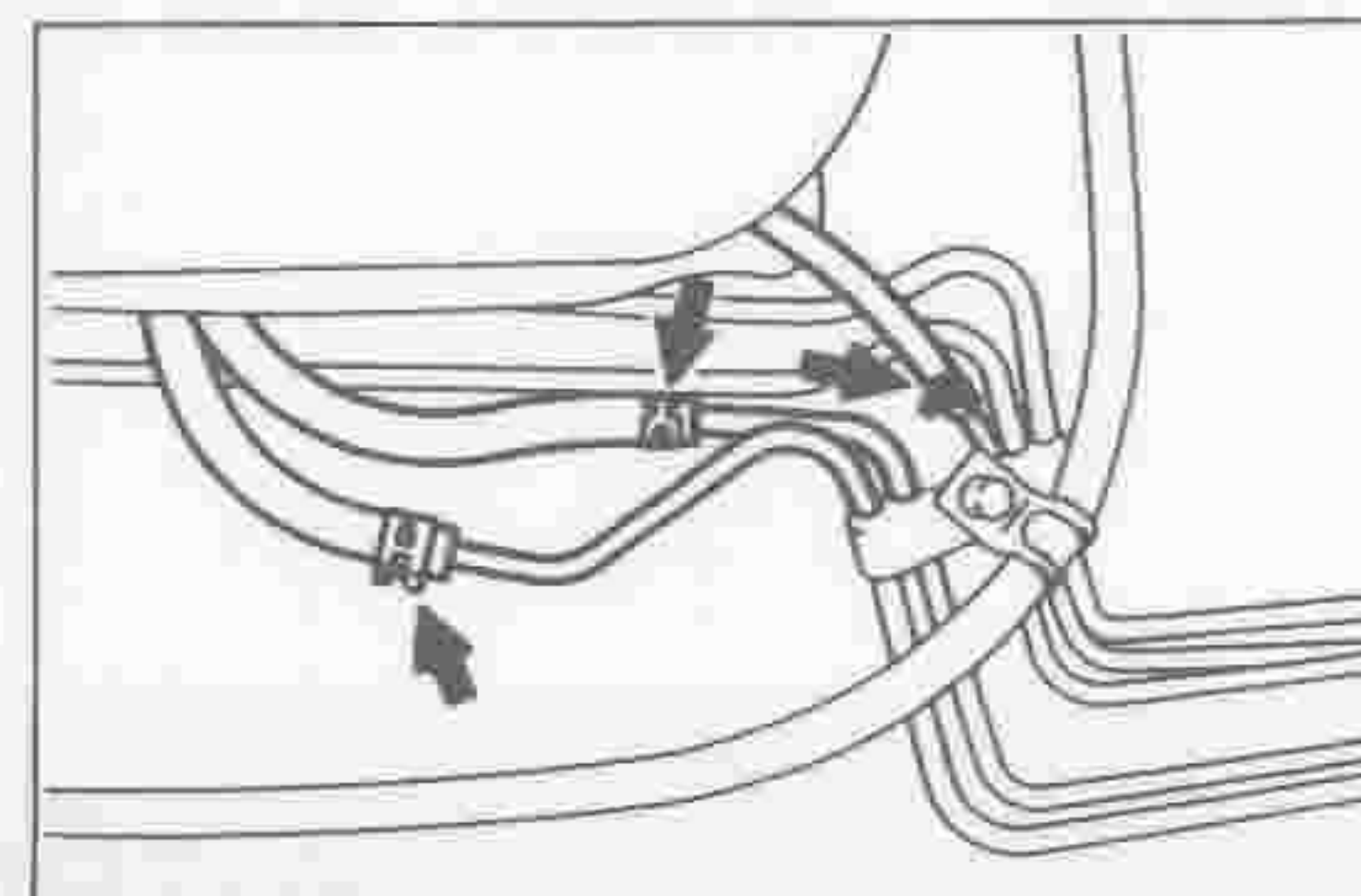
1. Connect the following SST to the check connector. Connect the terminal T to the ground terminal.

SST: 09991-87210-000



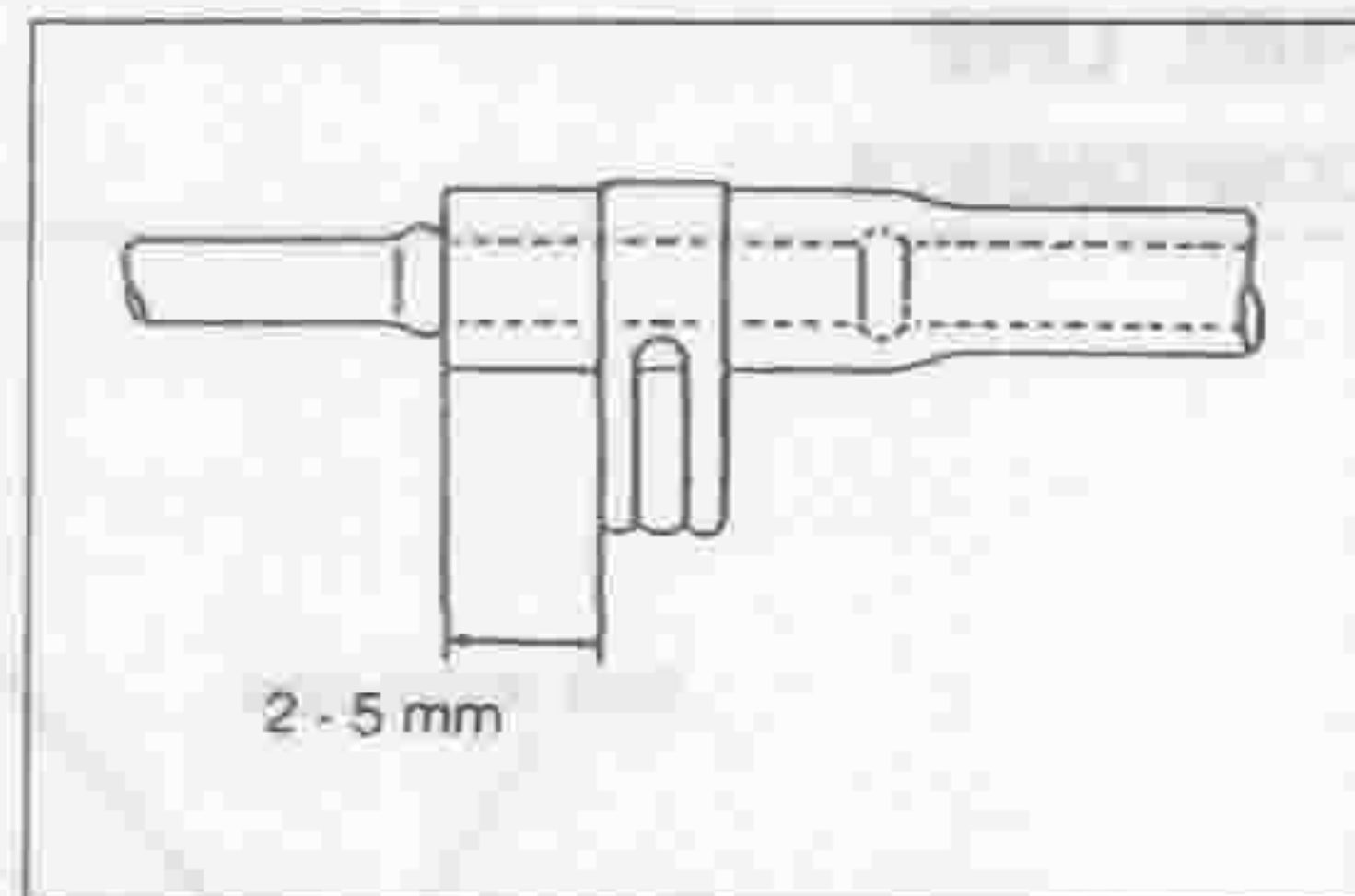
LEF00216-00178

2. Turn ON the ignition switch.
3. Check the fuel lines and connections for cracks, leakage or deformation.
If any crack, leakage or deformation is present, replace or repair the part concerned.
4. Turn OFF the ignition switch. Remove the SST from the check connector. Attach the cap to the check connector.
5. Check the fuel tank for deformation, cracks or fuel leakage. If the fuel tank exhibits any defect, repair or replace the fuel tank.



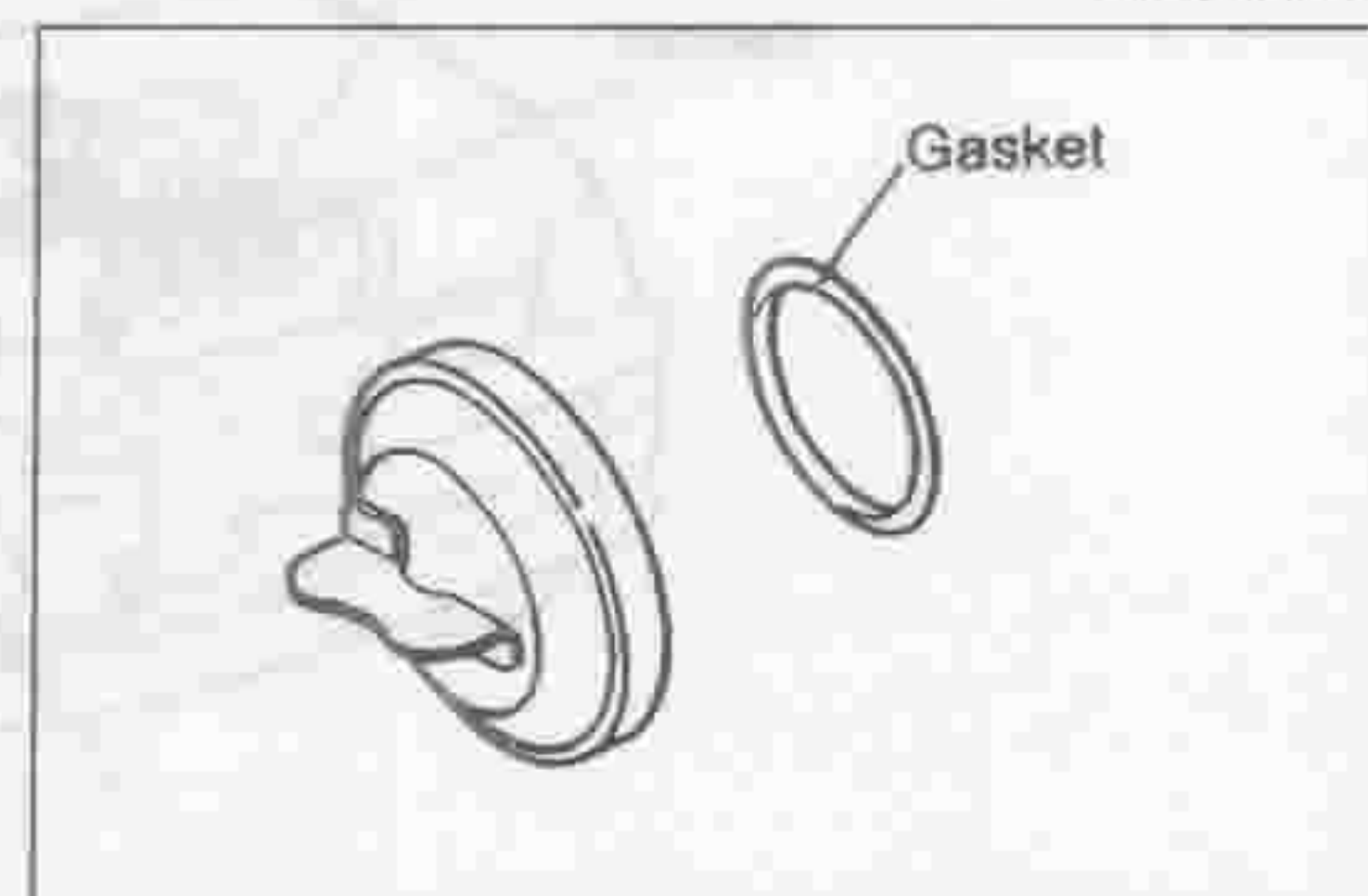
LEF00217-00179

6. Check the filler neck for damage or fuel leakage.
If the filler neck exhibits any defect, repair or replace the filler neck.
7. Check to see if the hose and tube connections are installed as shown in the right figure.
If any problem is found, repair or replace the parts, as required.



LEF00218-00180

8. Check to see if the fuel tank cap and gasket exhibits damage.
Replace the gasket if it is damaged. Also, replace the fuel tank cap if it exhibits damage.



LEF00219-00181



SST (Special Service Tools)

Shape	Part No. and name	Purpose	Remarks
	09268-87702-000 Injection measuring tool set	• Inspection of injectors • Inspection of pressure regulator • Inspection of fuel pressure	
	09268-87701-000 EFI fuel pressure gauge	Inspection of fuel pressure	
	09842-30070-000 EFI inspection wire	Inspection of fuel injectors	
	09842-87502-000 EFI computer check sub harness	Inspection of computer input/output voltage	
	09991-87210-000 Engine control system inspection sub harness	• Shorting terminal T	
	09991-87604-000 Tacho pulse pick-up wire	Measurement of engine speed	