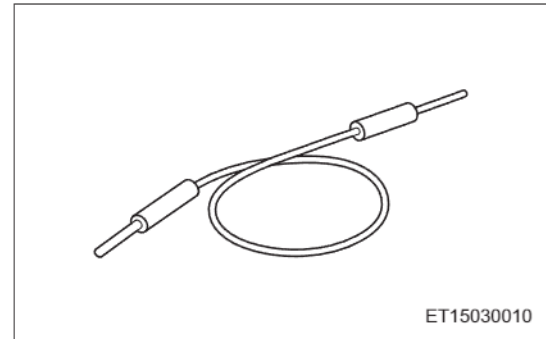


TROUBLESHOOTING

Electrical Troubleshooting Tools

1. Jumper Wire

The jumper wire is used to create a temporary circuit. Connect the jumper wire between the terminals of a circuit to bypass a switch.

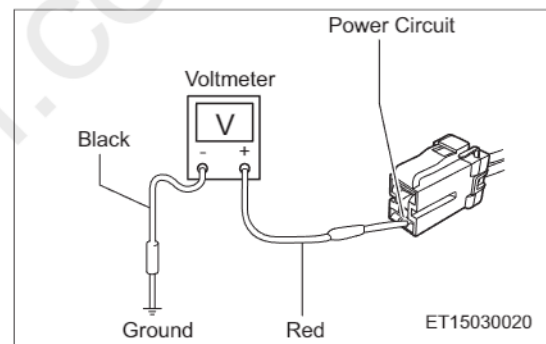


CAUTION

- DO NOT connect a jumper wire from power supply end to body ground, as this may damage the wire harnesses or electrical components.

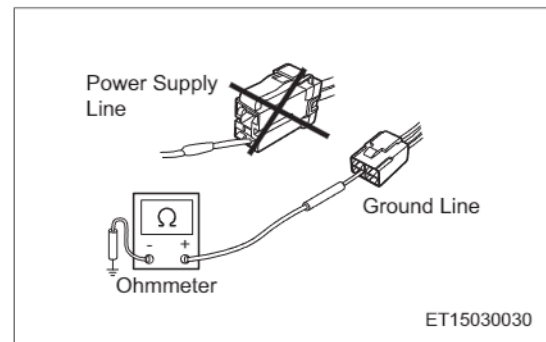
2. Voltmeter

The voltmeter is used to measure circuit voltage. The measurement range should be higher than 15 V. Measure voltage by connecting the positive probe (red) of the voltmeter to the positive lead of the component to be tested and the negative probe (black) to the negative lead or body ground.



3. Ohmmeter

The ohmmeter is used to measure resistance between two points in a circuit, or check the circuit for open or short.



CAUTION

- DO NOT connect ohmmeter to the circuit when applying voltage to the circuit, as this may result in inaccurate measured data or even damaging the ohmmeter.

Electrical Troubleshooting

Wire Harness Troubleshooting

The following 6 steps help to troubleshoot wire harnesses. Always check non-original components added to vehicle before performing any diagnosis. If the vehicle is equipped with these components, disconnect them to verify that these added components are not the cause of the problem.

Perform the following steps when troubleshooting wire harness:

1. Verify the problem.
2. Look for any related symptom (by inspecting the components in the same circuit).
3. Analyze the symptom (use the circuit diagram to determine the layout of the circuit, the area where the problems most likely occur and the area where the diagnosis will continue).
4. Isolate the problem area.
5. Repair the problem area.
6. Check for proper operation (in this step, check all the items in the repaired circuit for proper operation).

03

Voltage Test

1. Establish conditions in which voltage is present at the check point.

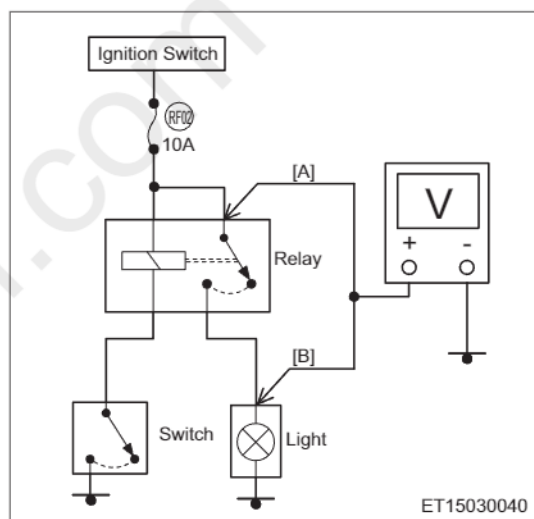
Example:

[A] - Ignition switch on

[B] - Ignition switch and switch on

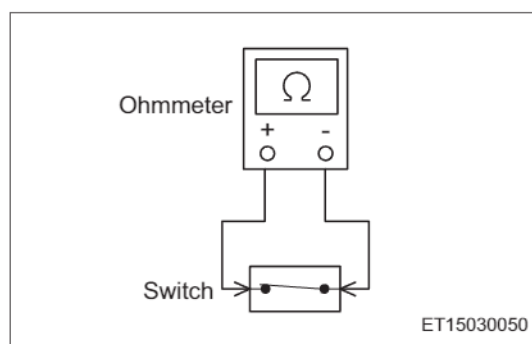
2. Using a voltmeter, connect the negative probe (black) to a good ground point or negative battery terminal, and the positive probe (red) to the connector or component terminal.

This check can be done with a test light instead of a voltmeter.



Circuit Continuity Test

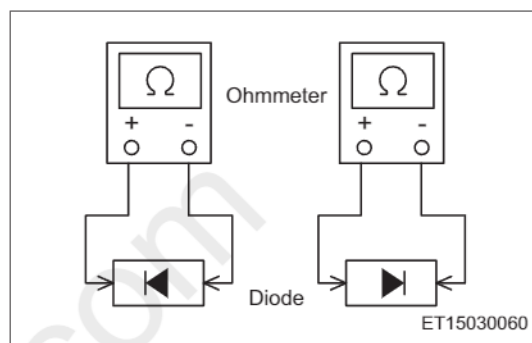
1. Turn off all the electrical equipment and ignition switch, and disconnect the negative battery cable.
2. Remove the circuit to be tested.
3. Connect the two probes of ohmmeter to the two ends of the circuit to be tested respectively, and check the circuit continuity (low resistance means there is good continuity in the circuit).



If the circuit has diodes, reverse the two probes and check again.

When contacting the negative probe (black) to the diode positive side and the positive probe (red) to the negative side, there should be continuity.

When contacting the two probes in reverse, there should be no continuity.



03

Short Circuit Test

1. Measure and record the battery voltage.
2. Pull out the fuse of the circuit to be tested or disconnect the power supply end of the test circuit.
3. Connect the positive probe (red) of the voltmeter to the positive battery terminal and the negative probe (black) to the power supply end of the circuit.
4. Check the voltage value displayed on the voltmeter. If the voltage value of battery is displayed, it indicates that the test circuit is short to ground.

This check can be done with a test light instead of a voltmeter.

Electrical Repair

Wire Harness Repair

CAUTION

- Measure the length of the lead to be repaired and select a proper substitute lead before servicing.
- If there are several leads to be repaired, please stagger the repaired parts.

1. Peel off 0.5 inch insulating layer from the lead to be repaired and the substitute lead.
2. Connect the original lead to the substitute lead with the heat shrink tube and compress the metal core of the heat shrink tube with a tool, so that the original lead and the substitute lead can be connected firmly.
3. Heat the heat shrink tube to shrink the outer rubber layer and ensure that the sealing of repaired area is in good condition.
4. Wrap the repaired lead with insulating tape.

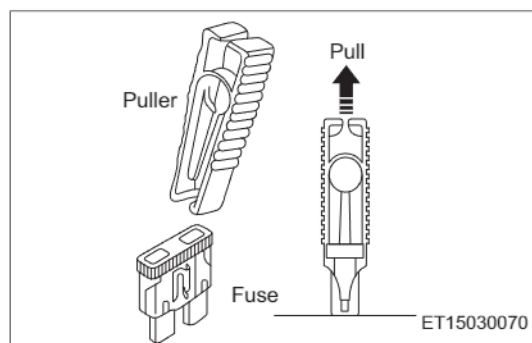
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Fuse Replacement

CAUTION

- The energizing test should be performed after replacing fuse. If the fuse is blown again, check the corresponding circuit for short. If any electrical equipment or additional device which exceeds the rated current is installed, replace it with a fuse with higher amperes.

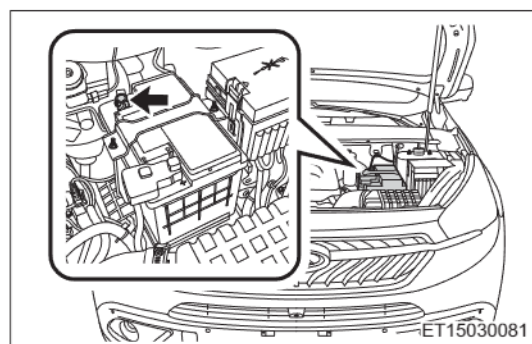
1. Turn off all the electrical equipment and ignition switch before servicing.
2. Remove the blown fuse with a fuse puller.
3. Replace the fuse with a new one which has the same specification.



Electrical Components

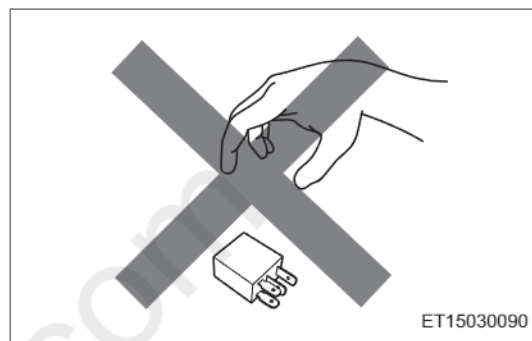
1. Battery Cable

Disconnect the negative battery cable (arrow) before servicing the electrical components.



2. Sensor, Switch and Relay

Do not drop or tap the sensor, switch or relay to avoid damaging the components during servicing.



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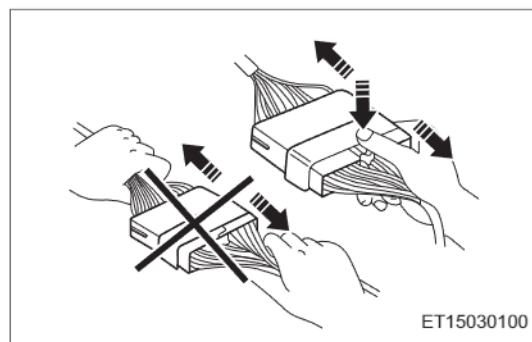
CAUTION

- Use the relay of the same specification with the original one during replacement.

3. Connector

a. Disconnect the connector.

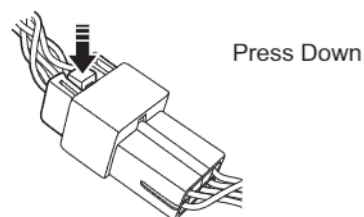
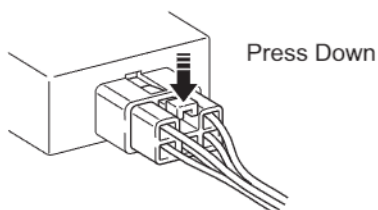
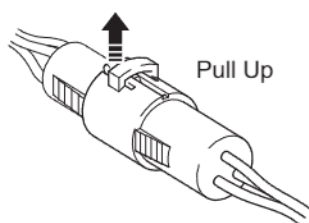
To pull apart connectors, pull on the connector itself and press the connector clip to disconnect it.



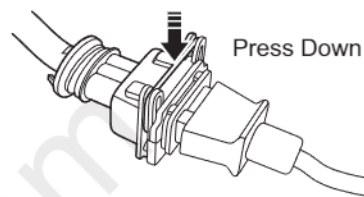
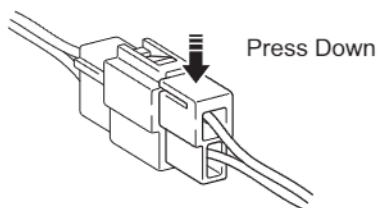
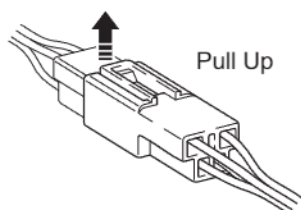
CAUTION

- DO NOT pull the wire harness forcibly to avoid damaging the components when disconnecting the connector.

There are a variety of ways to fix the connector clips, and the common disconnection methods are shown in the illustration.



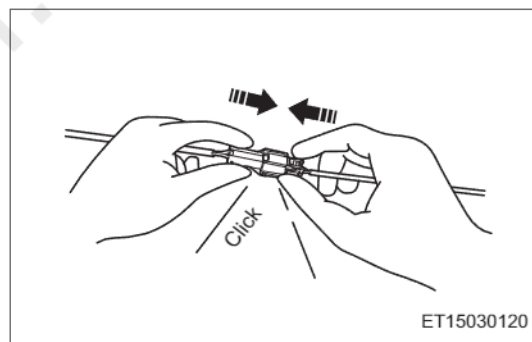
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b. Install the connector.

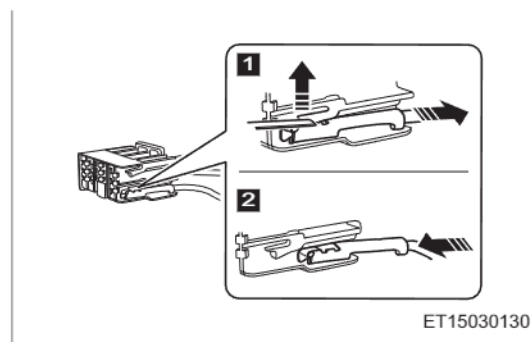
A "click" sound can be heard when the connector is installed in place.



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c. Replace the connector terminal.

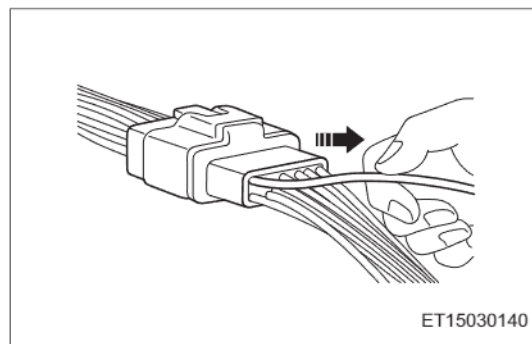
As shown in the illustration (1), insert a suitable tool into the terminal to lift up the fixing clip, and then pull out the terminal from behind. During installation, push the terminal from the back of the connector to ensure that the fixing clip is installed in place as shown in the illustration (2).



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d. Check the connector terminal.

Pull a single terminal wire gently to check if it is installed in place.



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