WIRING HARNESS

N08DAAB

TROUBLESHOOTING

The most important point in troubleshooting is to determine "Probable Causes". Once the probable causes are determined, parts to be checked can be limited to those associated with such probable causes. Therefore, unnecessary checks can be eliminated. The determination of the probable causes must be based on a theory and be supported by facts and must not be based on intuition only.

TROUBLESHOOTING STEPS

If an attempt is made to solve a problem without going through correct steps for troubleshooting, the problem symptoms could become more complicated, resulting in failure to determine the causes correctly and making incorrect repairs.The four steps below should be followed in troubleshooting.

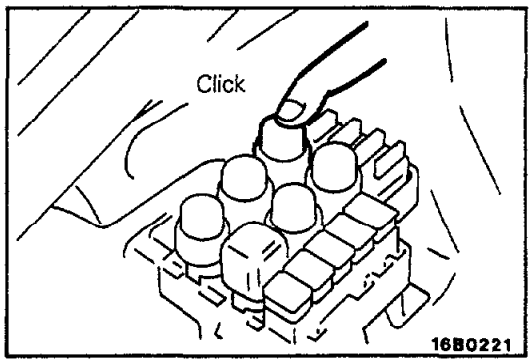
1 Observation of Problem Symptoms	Observe the symptom carefully. Check if there are also other problems.
2 Determination of Probable Causes	In determining the probable causes, it is necessary to check the wiring diagram to understand the circuit as a system. Knowledge of switches, relays and other parts is necessary for accurate determination. The causes of similar problems in the past must be taken into account.
3 Checking of Parts Associated with Probable Causes and Determination of Faulty Parts.	Troubleshooting is carried out by making step by step checks until the true cause is found. Always go through the procedures considering what check is to be made where for the best results.
4 Repair and Confirmation	After the problems are corrected, be sure to check that the system operates correctly. Also check that new problems have not been caused by the repair.

INFORMATION FOR DIAGNOSIS

This manual contains the cable diagrams as well as the individual circuit drawings, operational explanations, and troubleshooting hints for each component required to facilitate the task of troubleshooting. The information is compiled in the following manner:

(1) Cable diagrams show the connector positions, etc., on the actual vehicle as well as the harness path.
(2) Circuit drawings show the configuration of the circuit with all switches in their normal positions.
(3) Operational explanations include circuit drawings of voltage flow when the switch is operated and how the component operates in reaction.
(4) Troubleshooting hints include numerous examples of problems which might occur, traced backward in a common-sense manner to the origin of the trouble. Problems whose origins may not be found in this manner are pursued through the various system circuits.

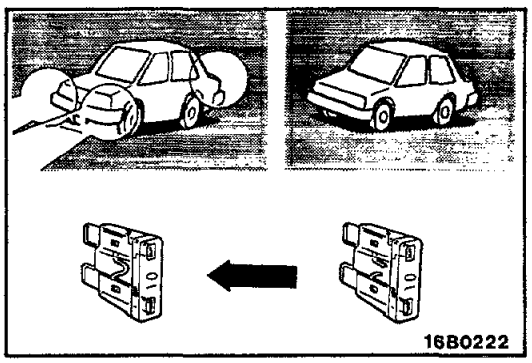
Remarks
Components of ECI, ETACS, ECS, etc. with ECU do not include 3 and 4 above. For this information, refer to a manual which includes details of these components.



INSPECTION

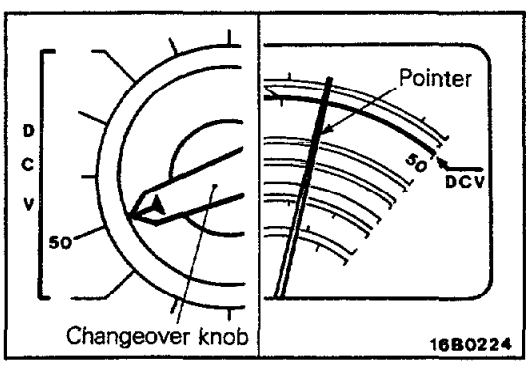
1. Visual and aural checks

Check relay operation, blower motor rotation, light illumination, etc. visually or aurally. The flow of current is invisible but can be checked by the operation of the parts.



2. Simple checks

For example, if a headlight does not come on and a faulty fuse or poor grounding is suspected, replace the fuse with a new one or ground the light to the body by a jumper wire to deter mine which part is responsible for the problem.

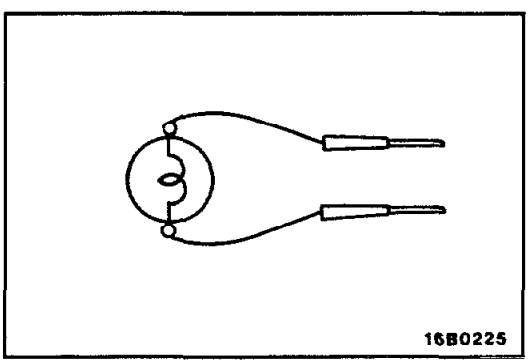


3. Checking with instruments

Use and appropriate instrument in an adequate range and read the indication correctly. You must have sufficient knowledge and experience to handle instruments correctly.

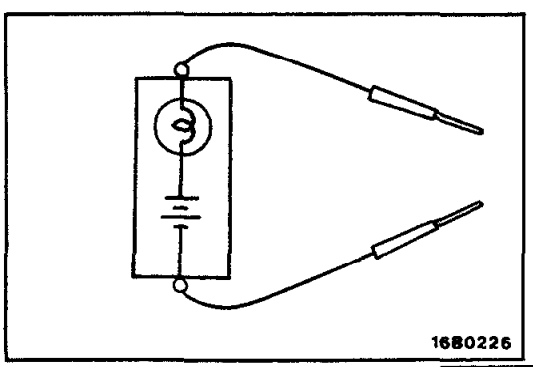
INSPECTION INSTRUMENTS

In inspection, make use of the following instruments.



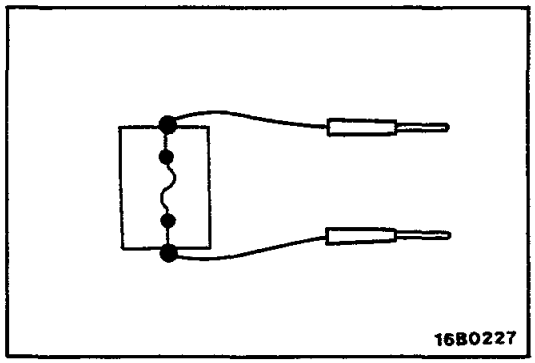
1. Test lamps

A test lamp consists of a 12 V bulb and lead wires. It is used to check voltages or shortcircuits.



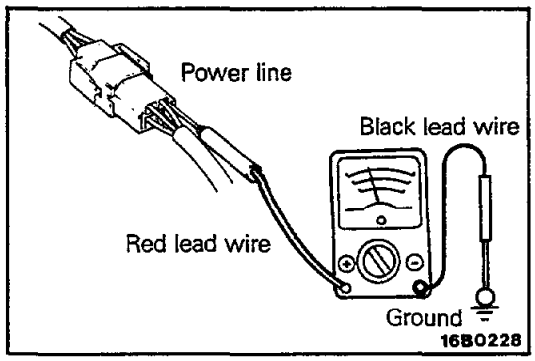
2. Self-power test light

A self-power test light consists of bulb, battery and lead wires connected in series. It is used to check continuity or grounding.



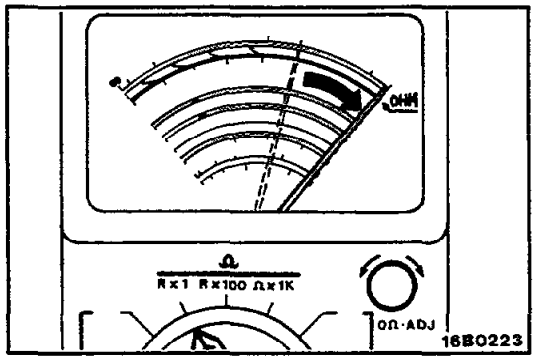
3. Jumper wire

A jumper wire is used to close an open circuit. Never use one to connect a power supply directly to a load.



4. *Voltmeter*

A voltmeter is used to measure the circuit voltage. Normally, the positive (red lead) probe is applied to the point of voltage measurement and the negative (black lead) probe to the body ground.



5. Ohmmeter

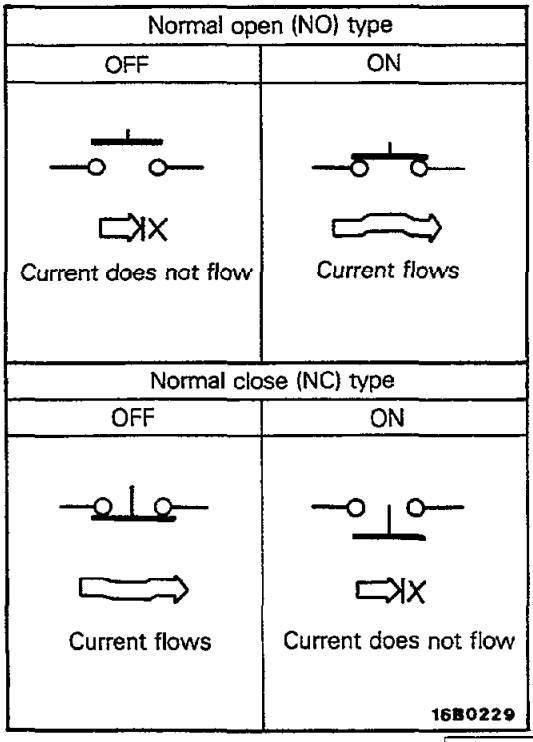
An ohmmeter is used to check continuity or measure resistance of a switch or coil. If the measuring range has been changed, the zero point must be adjusted before measurement.

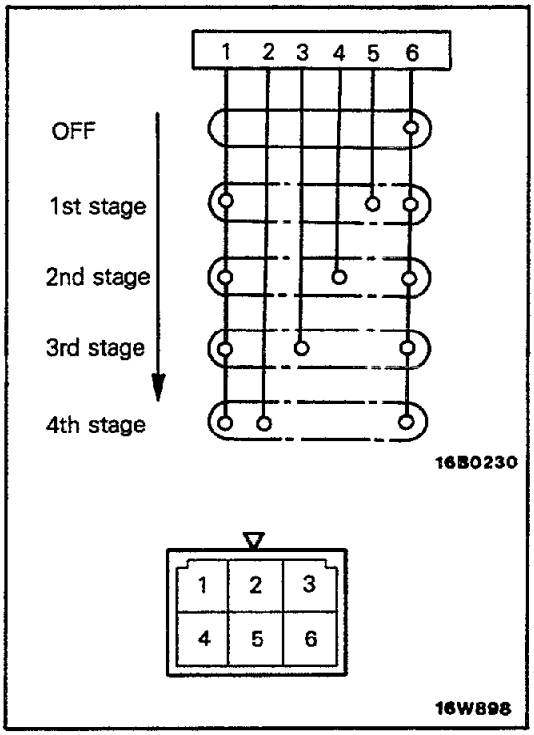
CHECKING SWITCHES

In a circuit diagram, a switch is represented by a symbol and in the idle state.

1. Normal open or normal close switch

Switches are classified into those which make the circuit open and those which make the circuit closed when off.



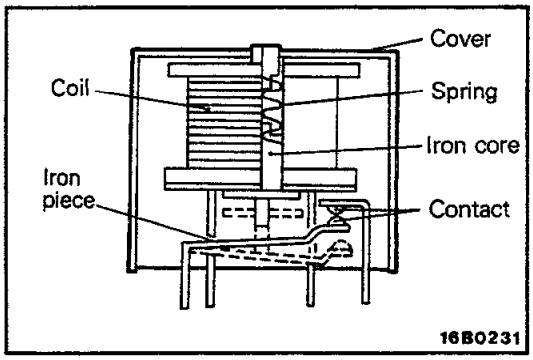


2. SWITCH CONNECTION

This figure illustrates a complex switch. The switch plates indicated by solid lines move in the direction of the arrow when operated. The continuity between terminals at each position is as indicated in the table below.

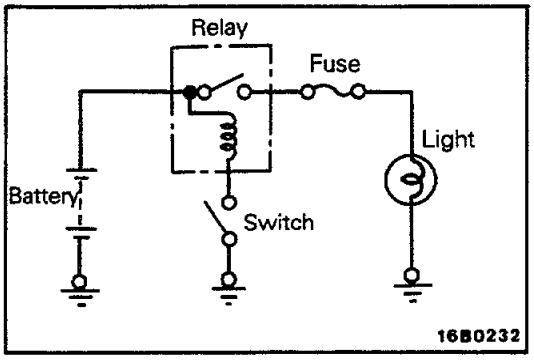
Position \ Terminal No.	1	2	3	4	5	6
OFF						
1st stage	○	—	—	—	○	○
2nd stage	○	—	—	○	—	○
3rd stage	○	—	○	—	—	○
4th stage	○	○	—	—	—	○

NOTE
○—○ denotes continuity between terminals.

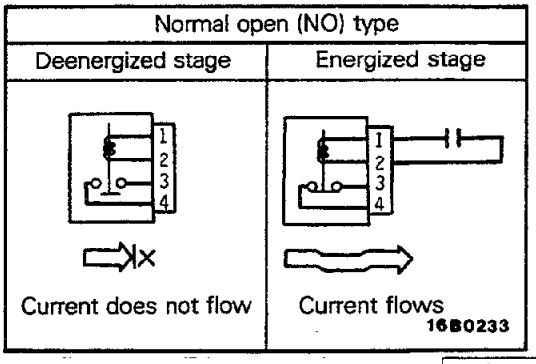


CHECKING RELAYS

1. When current flows through the coil of a relay, its core is magnetized to attract the iron piece, closing (ON) the contact at the tip of the iron piece. When the coil current is turned off, the iron piece is made to return to its original position by a spring, opening the contact (OFF).



2. By using a relay, a heavy current can by turned on and off by a switch of small capacity. For example, in the circuit shown here, when the switch is turned on (closed), current flows to the coil of the relay. Then, its contact is turned on (closed) and the light comes on. The current flowing at this time to the switch is the relay coil current only and is very small.



3. The relays may be classified into the normal open type and the normal close type by their contact construction.

NOTE
The deenergized state means that no current is flowing through the coil and the energized state means that current is flowing through the coil.

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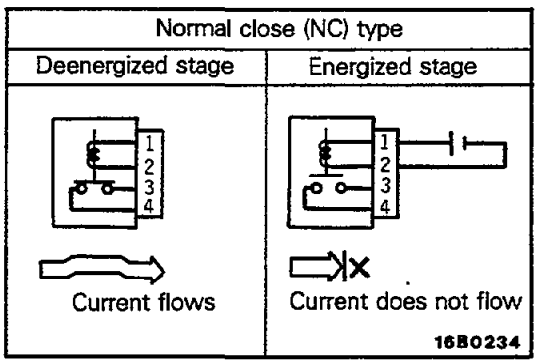
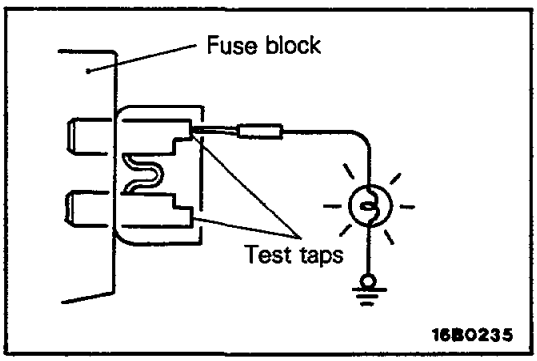
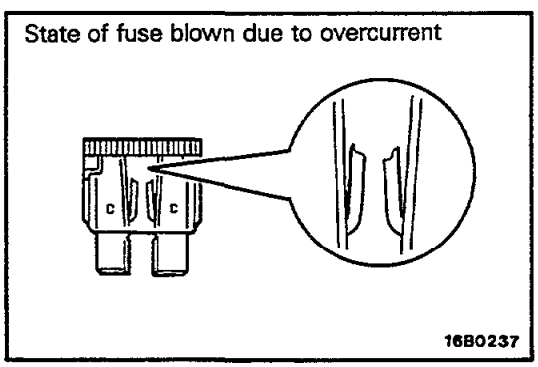


When a normal close type relay as illustrated here is checked, there should be continuity between terminals (1) and (2) and between terminals 3 and 4 when the relay is deenergized, and the continuity should be lost between terminals 3 and 4 when the battery voltage is applied to the terminals 1 and 2. A relay can be checked in this manner and it cannot be determined if a relay is okay or faulty by checking its state only when it is deenergized (or energized).



CHECKING FUSES

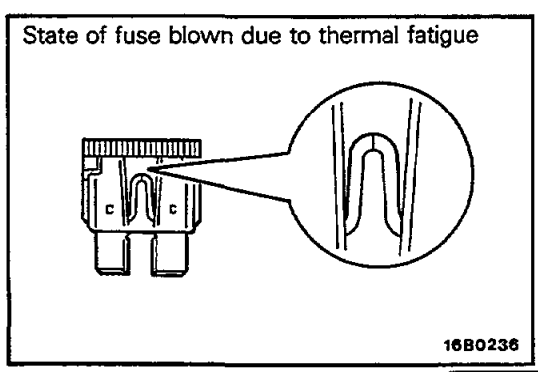
A blade type fuse has test taps provided to allow checking of the fuse itself without removing it from the fuse block. The fuse is okay if the test light comes on when its one lead is connected to the test taps (one at a time) and the other lead is grounded.
(Change the ignition switch position adequately so that the fuse circuit becomes live.)



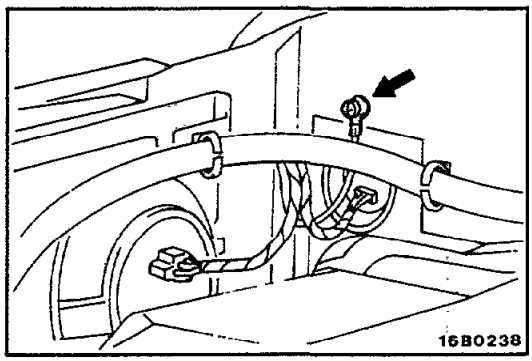
CAUTIONS IN EVENT OF BLOWN FUSE

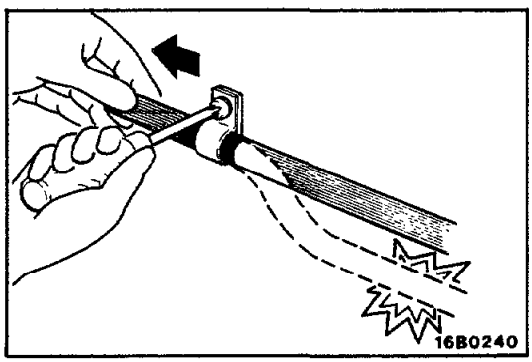
When a fuse is blown, there are two probable causes as follows: One is that it is blown due to flow of current exceeding its rating. The other is that it is blown due to repeated on/off current flowing through it. Which of the two causes is responsible can be easily determined by visual check as described below.

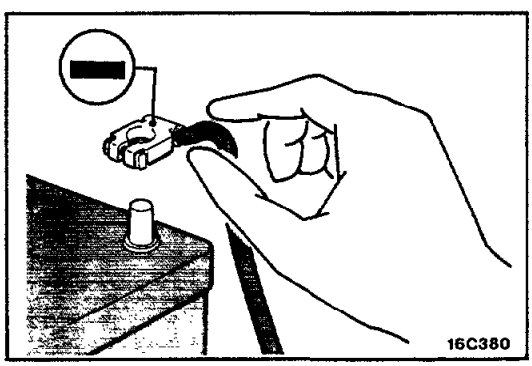
(1) Fuse blown due to current exceeding rating
The illustration shown the state of a fuse blown due to this cause. In this case, do not replace the fuse with a new one hastily since a current heavy enough to blow the fuse has flowed through it. First, check the circuit for shorting and check for abnormal electric parts. Only after the correction of such shorting or parts, fuse of the same capacity should be used as a replacement. Never use a fuse of lager capacity than the one that has blown. If such a fuse is used, electric parts or wirings could be damaged before the fuse blows in the event an overcurrent occurs again.



(2) Fuse blown due to repeated current on/off
The illustration shown the state of a fuse blown due to repeated current on/off. Normally, this type of problem occurs after fairly long period of use and hence is less frequent than the above type. In this case, you may simply replace with a new fuse of the same capacity.







CHECKING CABLES AND WIRES

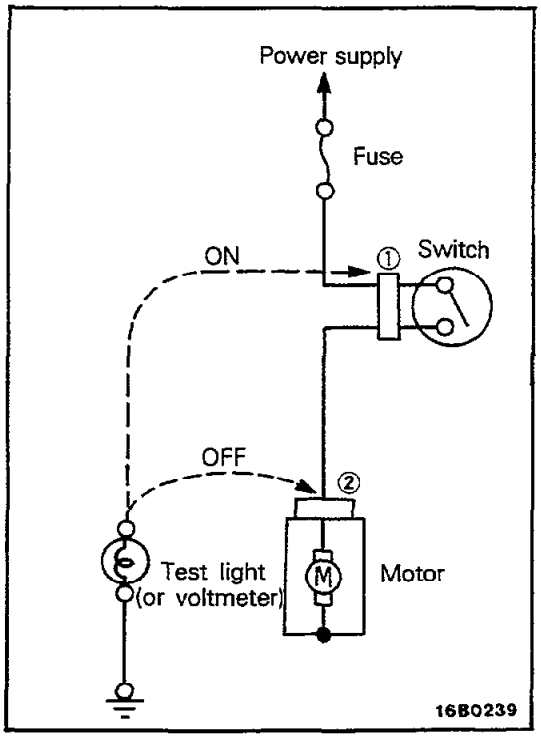
1. Check connections for looseness, rust and stains.
2. Check terminals and wires for corrosion by battery electrolyte, etc.
3. Check terminals and wires for open circuit or impending open circuit.
4. Check wire insulation and coating for damage, cracks and degrading.
5. Check conductive parts of terminals for contact with other metallic parts (vehicle body and other parts).
6. Check grounding parts to verify that there is complete continuity between attaching bolt(s) and vehicle body.
7. Check for incorrect wiring.
8. Check that wirings are so clamped as to prevent contact with sharp corners of the vehicle body, etc. or hot parts (exhaust manifold, pipe, etc.).
9. Check that wirings are clamped firmly to secure enough clearance from the fan pulley, fan belt and other rotating or moving parts.
10. Check that the wirings between the fixed parts such as the vehicle body and the vibrating parts such as the engine are made with adequate allowance for vibrations.

HANDLING ON-VEHICLE BATTERY

When checking or servicing does not require power from the on vehicle battery, be sure to disconnect the cable from the battery (–) terminal. This is to prevent problems that could be caused by shorting of the circuit. Disconnect the (–) terminal first and reconnect it last.

Caution

1. **Before connecting or disconnecting the negative cable, be sure to turn off the ignition switch and the lighting switch.**
   (If this is not done, there is the possibility of semiconductor parts being damaged.)
2. **After completion of the work steps [when the battery's negative (–) terminal is connected], warm up the engine and allow it to idle for approximately five minutes under the conditions described below, in order to stabilize engine control conditions, and then check to be sure that the idling is satisfactory.**
   For 3.0L Engine models: If the engine rpm is high, switch OFF the ignition switch, and then, after switching it ON again, let the engine idle for 2 or 3 minutes.
   This will cause the engine rpm to decrease about 100 rpm, so repeat this procedure until the prescribed idling speed is reached.
   Engine coolant temperature: 85–95°C (185–203°F)
   Lights, accessories: OFF
   Transmission: neutral position (Automatic transmission models: "N" or "P").
   Steering wheel: neutral (center) position

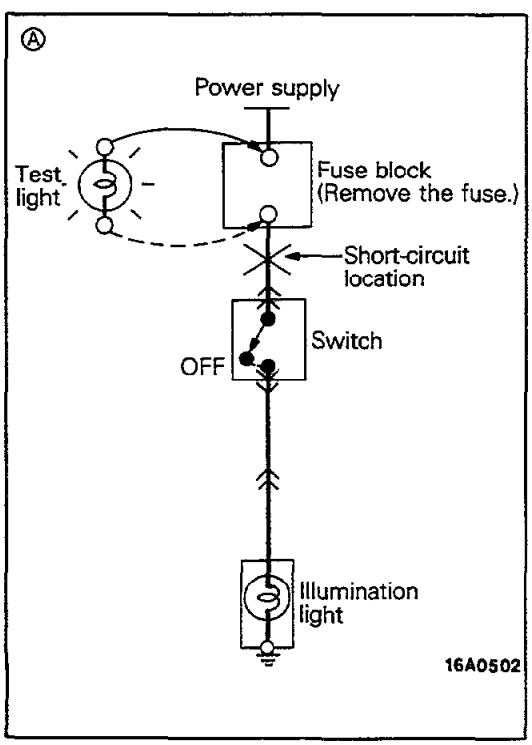


TROUBLESHOOTING

A circuit consists of the power supply, switch, relay, load, ground, etc. There are various methods to check a circuit including an overall check, voltage check, shortcircuit check and continuity check. Each of these methods is briefly described in the following.

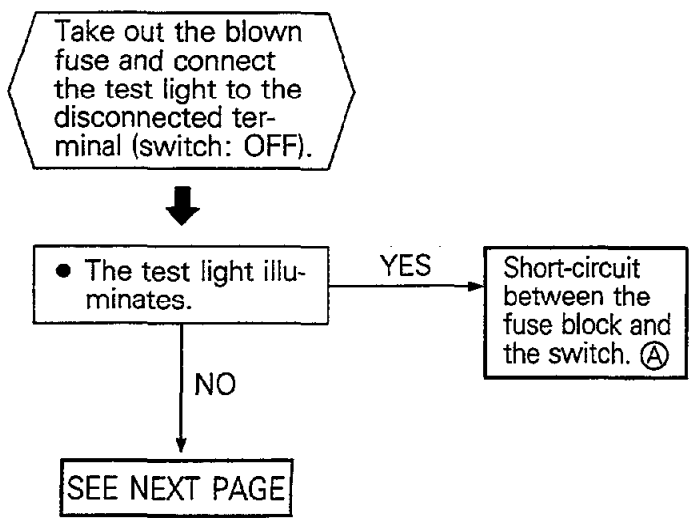
1. VOLTAGE CHECK

(1) Ground one lead wire of the test light. If a voltmeter is used instead of the test light, ground the grounding side lead wire.
(2) Connect the other lead wire of the test light to the power side terminal of the connector ①. The test light should come on or the voltmeter should indicate a voltage.
(3) Then, connect the test light or voltmeter to the connector ②. The test light should not come on, or the voltmeter should indicate no voltage. When the switch is turned on in this state, the test light should come on, or the voltmeter should indicate a voltage, with the motor starting to run.
(4) The circuit illustrated here is normal but if there is any problem such as the motor failing to run, check voltages beginning at the connector nearest to the motor unit the faulty part is identified.



2. CHECKING FOR A SHORT-CIRCUIT

Because the fuse has blown, it is probable that there is a short-circuited circuit. Follow the procedures below to narrow down the short-circuit location.



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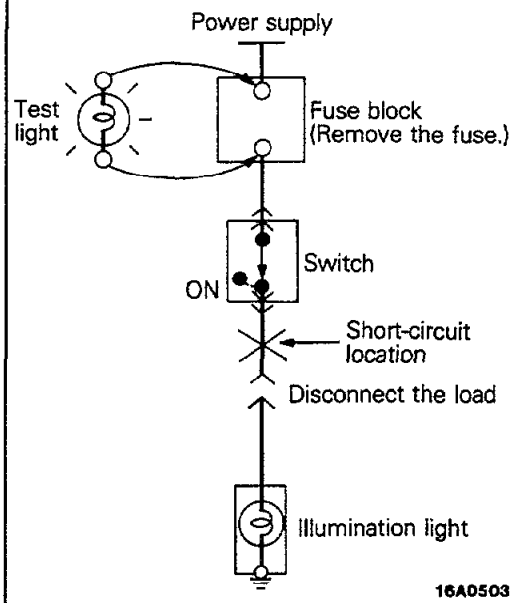

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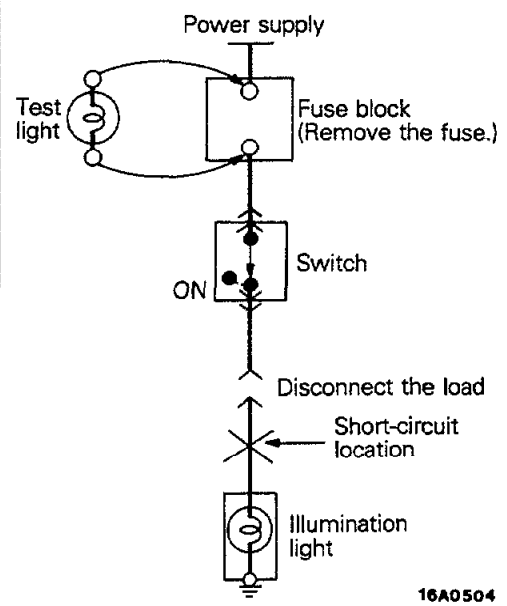

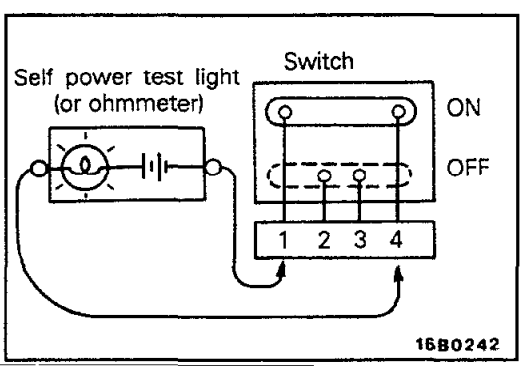

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Switch ON the switch.
(The test light illuminates but the illumination light does not.)

Disconnect the connector of the illumination light.

• The test light remains illuminated.

YES → Short-circuit between the switch and the illumination light. Ⓑ

NO → Short-circuit between the connector and the illumination light. Ⓒ

3. CHECKING CONTINUITY

(1) When the switch is in the OFF position, the self power test light should come on or the ohmmeter should read 0 Ω only when the terminals 2 and 3 are interconnected.
(2) When the switch is in the ON position, the self power test light should come on or the ohmmeter should read 0 Ω only when the terminals 1 and 4 are interconnected.

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HOW TO READ WIRING DIAGRAMS

N08DBAE

HOW TO READ CONFIGURATION DIAGRAMS

(1) Connector symbols

A wiring diagram shows the installed condition of each connector in a schematic style. The connectors are shown and classified as follows, depending on their locations and are marked by connector symbols.

In case connectors of the same shape (same number of wires) are centralized, their colors are indicated for identification.

Example: A–52 (Black)

- Connector color
- Connector's unique number (serial number)
- Connector symbol
  - A, B : Engine compartment
  - C : Instrument panel
  - D : Interior and frame