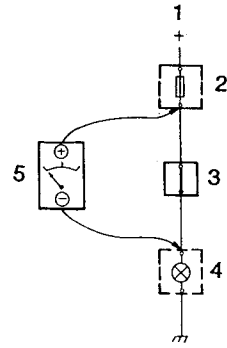


Checking the voltage drop

This measurement is carried out to ascertain whether the voltage drop along a cable or across a switch, for example, is too high.

- 1 Connect the instrument's positive lead to that part of the cable or component in closest electrical proximity to the battery.
- 2 Connect the negative lead to the other end of the cable or component.
- 3 When the circuit is energized, i.e. when current flows through it, the instrument will show the difference in voltage between the two measurement points. A circuit in good condition should not show a voltage drop of more than about 1 V. In simple circuits or connectors the voltage drop ought not to exceed about 0.5 V.

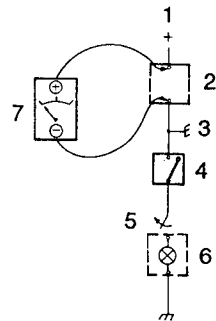


- 1 From the battery
- 2 Fuse box
- 3 Switch
- 4 Load
- 5 Voltmeter

Checking for short-circuit to earth

With a voltmeter or ISAT set for voltage measurement.

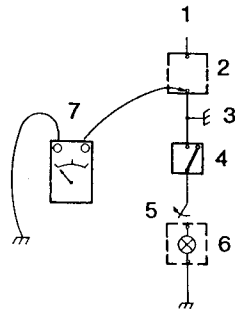
- 1 Remove the blown fuse and disconnect the load.
- 2 Connect the instrument across the fuse terminal pins.
- 3 Move the relevant cable harness while observing the instrument. Start at the electrical distribution box and continue along to the relevant load and/or components. If the instrument shows a reading, it indicates that the cable is short-circuited to earth.



- 1 From the battery
- 2 Fuse box
- 3 Short-circuit to earth
- 4 Switch
- 5 Load disconnected
- 6 Load
- 7 Voltmeter

With an ohmmeter or ISAT set for resistance measurement

- 1 Hold the instrument leads in contact with each other. If you are using an ohmmeter, adjust it until a reading of 0 ohms is obtained.
- 2 Remove the blown fuse and disconnect the load and the battery.
- 3 Connect one of the instrument leads to the fuse terminal pin on the load side.
- 4 Connect the other lead to a reliable earthing point on the car.
- 5 Move the relevant cable harness while observing the instrument. Start at the electrical distribution box and continue along to the relevant load and/or components. If the instrument shows infinite resistance, there is no short circuit. On the other hand, if it shows low resistance or none at all, this indicates that the cable is short-circuited to earth.

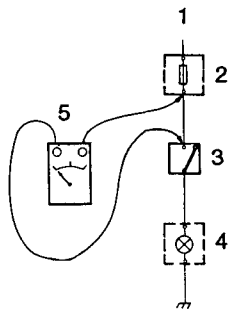


- 1 Battery disconnected
- 2 Fuse box
- 3 Short-circuit to earth
- 4 Switch
- 5 Load disconnected
- 6 Load
- 7 Ohmmeter

Checking for open-circuit

Use an ohmmeter or ISAT set for resistance measurement

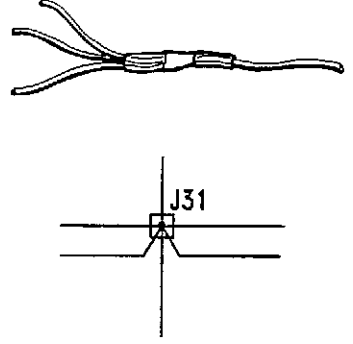
- 1 If you use an ohmmeter, adjust it until a reading of 0 ohms is obtained when its leads are held in contact with each other.
- 2 Disconnect the battery.
- 3 Connect the instrument leads to each end of the cable or component you want to check.
- 4 If the instrument shows a low resistance or none at all, there is no open circuit.



- 1 Battery disconnected
- 2 Fuse box
- 3 Switch
- 4 Load
- 5 Ohmmeter

Crimped connections

To reduce the number of connectors and improve their contact properties, many connections are crimped (branch points). What a crimped connection looks like and the symbol used for it in the wiring diagrams are shown on the right.



Fault-tracing in brief

Measuring equipment

Suitable instruments for fault-tracing in the car's electrical system are an ISAT, a voltmeter and an ohmmeter.

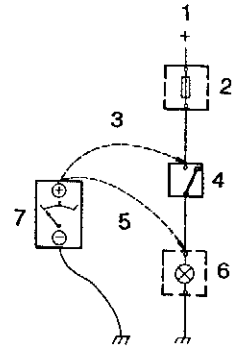
Use an ISAT or voltmeter for measuring the voltage at various points in a circuit. If the voltmeter is of analogue type, it should have an internal resistance of at least 20 megohm/V.

Use an ISAT or voltmeter for carrying out measurements in cable harnesses and on connectors, switches and contacts. An ohmmeter should not be used for carrying out measurements on components containing semiconductors, such as control units and time-delay relays, etc.

Since the instrument incorporates a battery which energizes the circuit to be measured, the car battery must be disconnected while measurement is in progress. This will ensure that no current is already flowing through the circuit and that a correct reading will be obtained.

Voltage measurement

- 1 Connect the instrument's negative lead (black) to a reliable earthing point on the car or to the negative terminal of the battery.
- 2 Connect the instrument's positive lead (red) to the point in the circuit that you want to check.
- 3 If a reading is obtained on the instrument, it means that a current is present at the point in question. If the voltage here should be the same as the battery voltage, it ought not to differ by more than about 1 volt. If the difference is greater than 1 volt, it indicates a fault in the circuit. One reason could be poor contact at a connection to some component or in a connector. Carry out further measurements in the circuit to locate the fault.



- 1 From the battery
- 2 Fuse box
- 3 Battery voltage
- 4 Switch
- 5 No voltage
- 6 Load
- 7 Voltmeter