Resistance measurements

There are two measurement methods for resistance:

- 2-wire ohms
- 4-wire ohms

As shown in the figure in Connections for resistance measurements (on page 3-10), one pair of test leads are used for 2-wire ohms measurement. A test current is applied and the voltage across the resistance under test is measured on the same leads.

As shown in the figure in Connections for resistance measurements (on page 3-10), two pairs of test leads are used for 4-wire ohms measurements. One pair of test leads applies the test current, and the other set measures the voltage. As a result, 4-wire ohms is more accurate for low-resistance measurements.The disadvantages of 4-wire ohms are a longer settling time and the need to use an extra set of test leads.

The table below lists the measurement ranges (2-wire and 4-wire) and test currents for the instrument.

Resistance ranges and test currents

Resistance range	Test current
100 Ω	1 mA
1 kΩ	1 mA
10 kΩ	100 µA
100 kΩ	10 µA
1 MΩ	1 µA
10 MΩ	0.1 µA
100 MΩ	0.1 µA

NOTE

Use the following procedure and commands to perform basic measurements. Refer to Enhancing measurement performance (on page 3-37) for details about setting measurement speed and resolution. It also provides information on using other features and settings to optimize measurement performance.

Front-panel operation

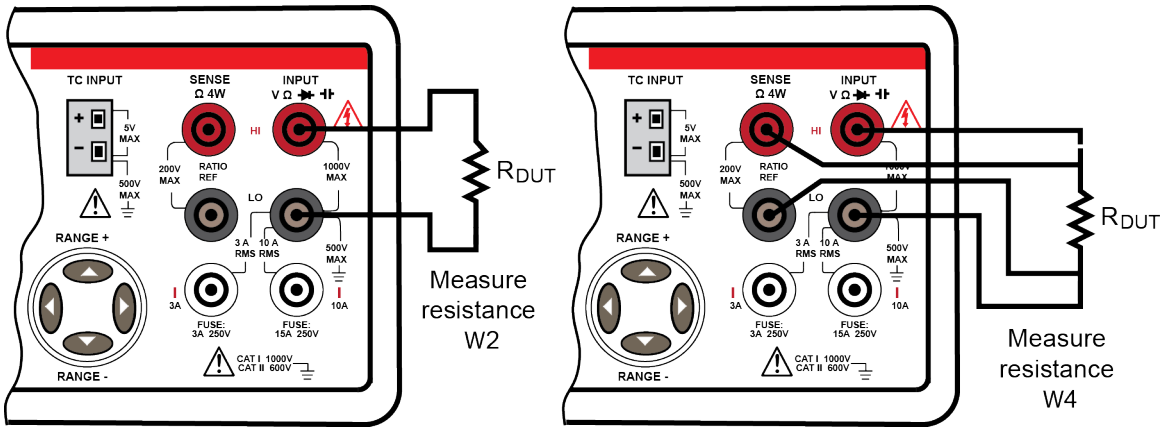
Perform the following steps to measure resistance:

1. Connect the device under test to the instrument, as shown below.
2. Select a resistance measurement function:
   - Press **Ω2** to select 2-wire ohms.
   - Press **SHIFT** and then **Ω2** (**Ω4**) to select 4-wire ohms.
3. Select a measurement range (auto or manual):
   - Autorange is the power-on default. If manual ranging is selected (MAN indicator on), press **SHIFT** and then **ESC** (**AUTO**) to select autorange.
   - For manual ranging, press the **RANGE** ▲ and ▼ keys to select a measurement range.
4. Observe the reading shown on the display.

Connections for resistance measurements

Source current flows from INPUT HI to INPUT LO as shown in the following figure.

Figure 19: Connections for resistance measurements



Range selection

For best accuracy and resolution, always use an appropriate range to perform the measurement. With autorange enabled, the instrument will automatically select the optimum measurement range. Autorange is the power-on default setting.

You can select a measurement range (or autorange) in a couple of ways:

- Use the front-panel keys to select a range or control autorange.
- Use a configuration menu to select a range or control autorange.

The difference between autoranging and manual ranging is the settling time. Autorange is convenient, but a manually selected range can usually speed up the process.

If the input signal exceeds the allowable range, the `OVLD` message is displayed. The threshold for readings is 120 percent of the range for maximum and 10 percent of the range for minimum.

NOTE

The measurement range for temperature, continuity, and diode testing is fixed and cannot be changed.

Front-panel operation

Perform the following steps to set measurement range using the front panel keys:

1. Select a measurement function.
2. Select a measurement range or use autorange:
   - Use the **RANGE** ▲ and ▼ keys to select a range. The MAN indicator turns on to indicate that manual ranging is being used.
   - Pressing **SHIFT** and then **ESC** (**AUTO**) toggles the instrument between manual ranging and autorange. When autorange is selected, the MAN indicator is off.