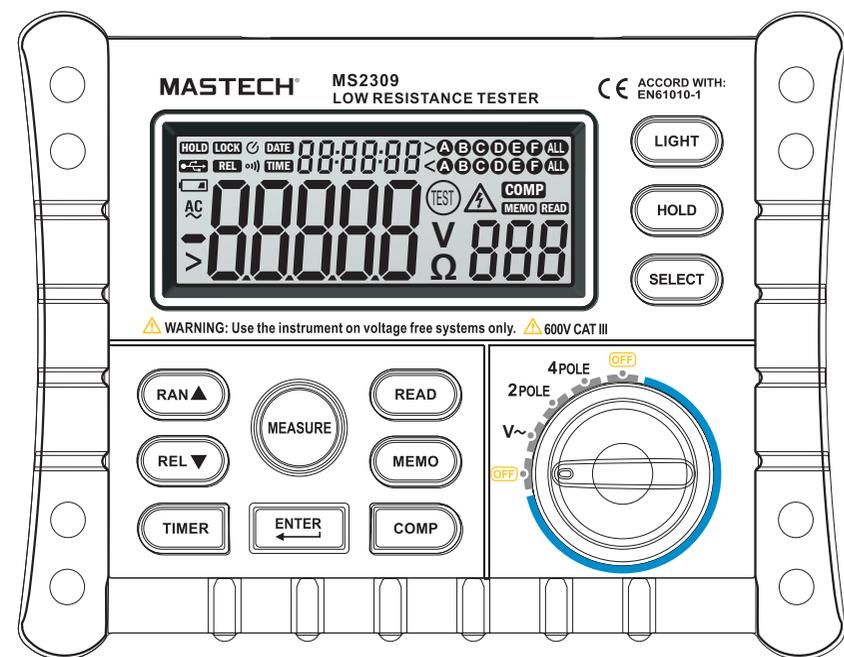


MASTECH[®]

MS2309

Low Resistance Tester



CAT III
600V

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1. Overview and Safety Information

Low resistance tester (hereafter known as the 'meter') is designed and manufactured according to the EN61010 safety standard, along with safety requirements for electronic measuring instruments with a over voltage rating of CAT III 600V and a pollution degree of 2. This manual covers general safety guidelines and warnings to help prevent personal injury and to ensure long life for the meter. Please read and follow all instructions and safety guidelines within this manual.

 CAUTION	Indicates actions could cause serious or fatal injury.
 WARNING	Indicates misuse or improper operation could cause serious or fatal injury.
 ATTENTION	Indicates actions could cause injury or damage to the meter.

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CAUTION

- Always move the rotary switch to the proper position before beginning measurement.
- Do not operate the meter around explosive gas, vapor, or dust.
- Never use the test leads or open the case while hands are wet.
- When measuring, always keep your fingers behind the probe guards.
- Do not operate the Meter with the case (or part of the case) removed.



WARNING

- Do not use the meter if any abnormalities or damage to the meter exist.
- Any adjustments or repair to the meter should be done by qualified personnel only. If the meter is damaged or needs repair, contact your local retailer.
- Do not allow any moisture inside the case or battery compartment.
- Remove the test leads and turn the rotary switch to the off position before replacing the batteries.



ATTENTION

- Always make sure the test leads are correctly inserted into input jacks before measurement.
- If the meter is not going to be used for an extended amount of time, remove the batteries to prevent damage to the meter.
- Do not expose the meter to direct sunlight, high temperature, humidity or moisture.
- Use a mild detergent or damp cloth to clean the meter. Do not use abrasives or solvents.
- Do not use the instrument with moisture on the input jacks.

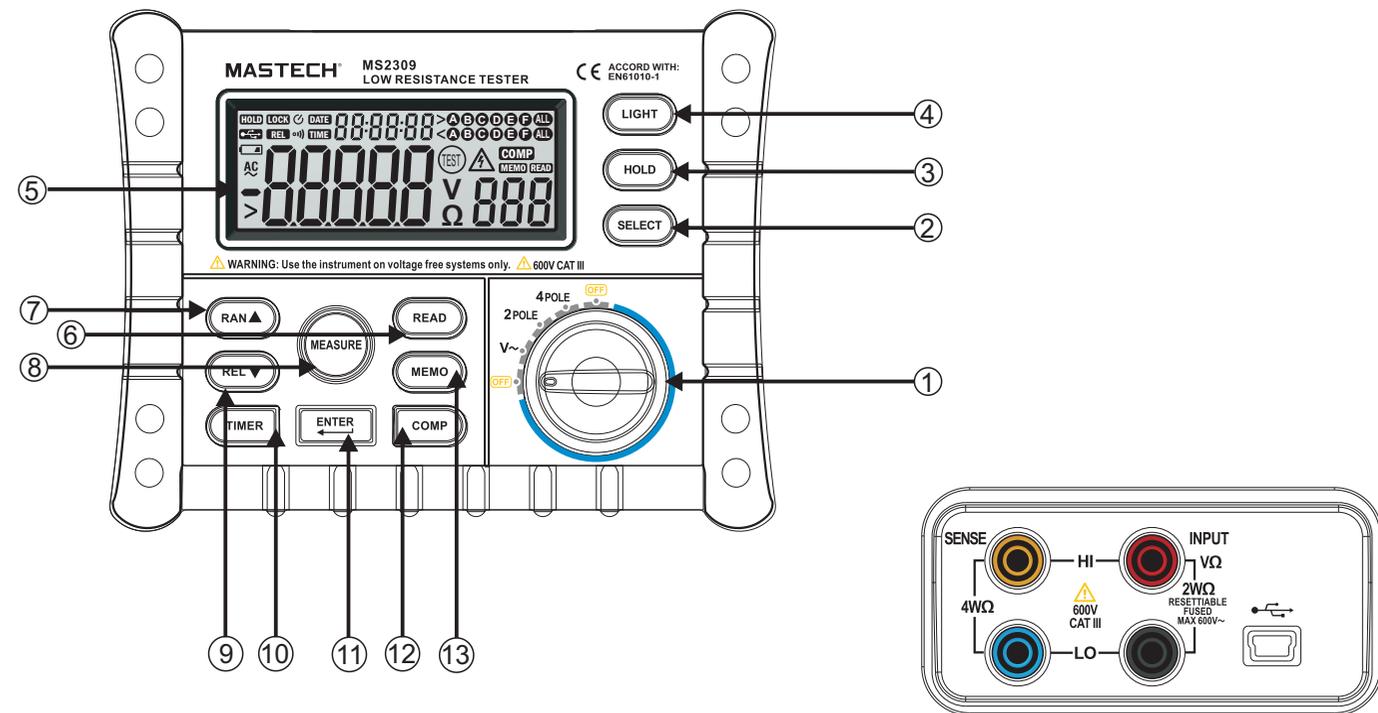
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2. Description

This meter is designed for many situations, such as power distribution lines, interior grounding wires, transformer resistance testing, with 2 or 4 wire resistance measurement modes and AC voltage measurement. The meter has a large, easy to read, backlit LCD screen with the ability to store up to 1000 sets of data. The meter's save data persists after turning off the meter, so data from previous uses can easily be recalled and used for comparison or relative measurement.

2.1 Buttons and Components

Item	Button	Function
1	Rotary Switch	To switch between measurement functions (ground voltage, 2 or 4 wire resistance measurement)
2	SELECT Button	Select comparison save slot
3	HOLD Button	To hold the current reading on the display
4	LIGHT Button	To turn on/off the backlight
5	Display	Shows measurement and stored data
6	READ Button	To view stored data
7	▲ Button	To select storage slot for stored data
8	MEASURE Button	To start/end resistance measurements
9	REL ▼ Button	To select a storage slot for stored data/switch to relative measurement
10	TIMER Button	To switch between date and time display
11	ENTER Button	To select active data storage slot
12	COMP Button	To compare measurements and stored data
13	MEMO Button	To store displayed data
14	4W Input Jacks	Use these input jacks for 4 wire systems
15	2W Input Jacks	Use these input jacks for 2 wire systems



2.2 Display



Display symbols:

Symbol	Function	Symbol	Function
TEST	Measurement in progress	DATE	Date display
>A	Measured value is greater than the compared values	<A	Measured value is less than the compared values
REL	Relative measurement	READ	View stored data
MEMO	Stored data slot selection		USB connection active
2POLE	2 wire resistance mode	4POLE	4 wire resistance mode
V	Volts (voltage)	Ω	Ohms (resistance)
	Auto power off		Low battery
~	Alternating current		Warning symbol

3. Specifications

3.1 Accuracy

Specified for temperatures of 23°C ±5°, relative humidity <75%

	Range	Accuracy
2 wire resistance	4Ω, 40Ω, 400Ω	±(0.5% + 5 digits)
4 wire resistance	4Ω, 40Ω, 400Ω	±(0.1% + 5 digits)
AC voltage	AC600V(50/60HZ)	±(2% + 5 digits)

3.2 Measurement Conditions

For low resistance measurements using a test current of a maximum of 250mA DC by average value rectification.

3.3 Operating Temperature and Humidity

0-40°C; relative humidity: <85%

3.4 Storage Temperature and Humidity

-10~50°C; relative humidity: <85%

3.5 Battery

8x1.5V AA batteries

3.6 Dimensions

330x125x365mm

3.7 Weight

3.45kg

3.8 Accessories

Test leads x4; Software CD x1; Manual x1

4. Operation Instructions

⚠ CAUTION

Do not attempt to measure more than 600V AC in voltage mode.
To avoid damage to the meter, do not apply voltage to the input terminals when measuring resistance.

To avoid false readings that could lead to damage to the meter or injury, replace the batteries as soon as the low battery symbol "  " appears. See Replacing the Batteries section for instructions.

4.1 2 Pole Resistance Measurement

Connect the test leads to the 2W input jacks and turn the rotary switch to the 2POLE position. Connect the leads to the ends of the resistance to be measured and press MEASURE. The test symbol will appear on the display and the button will light up. Once measurement is complete, the button's light will turn off and the measurement will be shown on the display.

NOTE:

Use the 4 pole method or switch to relative measurement after connecting leads for a more accurate measurement when measuring very small resistances. This is to eliminate the resistance of the leads themselves and provide a more accurate reading.

4.2 4 Pole Resistance Measurement

This method uses the 2W jacks to provide a constant current through the resistance and the 4W jacks to measure the voltage across the resistance. This will effectively eliminate the resistance of the circuit or the leads themselves.

Turn the rotary switch to the 4POLE position. Connect the red leads to one side of the resistance and the black leads to the other and press MEASURE. The test symbol will appear on the display and the button will light up. Once measurement is complete, the button's light will turn off and the measurement will be shown on the display.

NOTE:

The 4W jacks are the sampling voltage. For the most accurate results, connect the two 4W leads as close as possible to the resistance being measured.

4.3 Voltage Measurement

Turn the rotary switch to the V~ position. Insert the test leads into the 2W input jacks and connect the leads to the circuit under test. The measured AC voltage will be displayed.

NOTE:

Do not attempt to test voltages that may exceed 600V AC.

4.4 Storing Measurement Data

The tester can store up to 1000 readings in its internal memory. Memory is held even when powering off the tester.

1. After making a resistance measurement, press MEMO. The memory slot number is displayed on the right side of the display. Press MEASURE and the reading will flash, indicating that the value has been stored in the displayed memory slot.
2. The tester will automatically select the next highest memory slot when pressing MEMO.
3. To select a different memory slot, press the up or down button to change the selected memory slot.

4.5 Reading Stored Data

To read stored values:

1. Press READ. The memory slot appears in the bottom right of the display and the stored reading is shown on the main display.
2. Press up or down to move through the stored values.
3. Press ENTER to return to normal display.

4.6 Relative measurement

Relative measurement is only available in resistance mode.

1. After making a measurement, press REL to enter relative mode. The tester stores the value that was displayed and compares any subsequent measurement to the stored value. (REL = current reading - stored value)
2. Relative mode cannot be activated until the measurement process has completed.
3. The new measurement (current reading) cannot exceed the stored value's range, otherwise the display will only show 'OL'.

4.7 Date and Time

The date or time can be shown at the top of the display. Pressing TIMER will switch between time and date display.

To set the data and time:

1. Hold TIMER when turning on the tester. The flashing value can be adjusted by pressing the up or down buttons. Press TIMER to change the flashing value.
2. Once the time and date have been set, press ENTER to return the display to normal.

4.8 Compare Measured and Set Values

Pressing COMP after measurement will compare the current reading to a set of stored values and indicated whether or not the current reading is higher or lower than those stored values.

To set stored values:

1. Hold COMP when turning on the tester. The display will show a value and a save slot (A-F).
2. To adjust the value, press the up and down arrows. Press COMP to move the decimal point within the value.
3. Once the desired value is set, press MEASURE and the value will flash indicating it's been saved.
4. Press SELECT to change save slots. Repeat steps 2 and 3 for each slot needed.
5. Once all values are set, press ENTER to return the display to normal.

4.9 Backlight

Press LIGHT to turn the backlight on. Press LIGHT again to turn the backlight off.

4.10 Saving Data Using USB

The tester can send data to be stored on a PC using the included USB cable.

1. Install the included software on the PC to be used and connect the tester to the PC using the included USB cable.
2. Press READ to view the stored data on the tester.
3. Select the reading you wish to transfer to the PC and press MEASURE. The USB symbol will appear in the top left of the display, indicating communication with the PC is active.
4. Once the transfer is complete, the USB symbol will disappear. Press ENTER to return the display to normal.

5. Replacing the Batteries

 **CAUTION**

Do not attempt to replace the batteries if the tester is wet.
Do not open the battery cover during measurement.
Always turn the rotary switch to the off position before opening the battery cover.
Remove the test leads from the input jacks before opening the battery cover.

 **NOTE**

Do not mix old and new batteries.
Always note the polarity when inserting batteries.

1. Unscrew the battery cover and remove it from the back of the tester.
2. Remove the old batteries and replace them with new ones.
3. Return the battery cover and tighten the screws.

