



Model 72-7750: OPERATING MANUAL

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Overview

This Operating Manual covers information on safety and cautions. Please read the relevant information carefully and observe all the **Warnings** and **Notes** strictly.

Warning

To avoid electric shock or personal injury, read the "Safety Information" and "Rules for Safe Operation" carefully before using the Meter.

Digital Multimeter Model **72-7750** (hereafter referred to as "the Meter" is 3 3/4 digits with steady operations, fashionable structure and highly reliable measuring instrument. The Meter uses large scale of integrated circuit with double integrated A/D converter as its core and has full range overload protection.

The Meter can measure AC/DC Voltage, AC/DC Current, Resistance, Capacitance, Temperature, Frequency, Diodes, Continuity and etc. The Meter adopted advanced "co-injection" technique in order to provide sufficient insulation. In addition, the Display Backlight feature enables user to work in a dim condition.



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Unpacking Inspection

Open the package case and take out the Meter. Check the following items carefully to see any missing or damaged part:

Item	Description	Qty
1	English Operating Manual	1 piece
2	Test Lead	1 pair
3	Test Clip	1 pair
4	Point Contact Temperature Probe	1 piece
5	RS-232C Interface Cable	1 piece
6	CD-ROM (Installation Guide & Computer Interface Software)	1 piece

In the event you find items missing or damaged, please contact your dealer immediately.



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Safety Information

This Meter complies with the standards IEC61010: in pollution degree 2, overvoltage category (CAT. III 1000V, CAT. IV 600V) and double insulation.

CAT. III: Distribution level, fixed installation, with smaller transient overvoltages than CAT. IV

CAT IV: Primary supply level, overhead lines, cable systems etc.

Use the Meter only as specified in this operating manual, otherwise the protection provided by the Meter may be impaired.

In this manual, a Warning identifies conditions and actions that pose hazards to the user, or may damage the Meter or the equipment under test.

A Note identifies the information that user should pay attention on.

International electrical symbols used on the Meter and in this Operating Manual are explained on page 8.



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Rules For Safe Operation (1)

Warning


To avoid possible electric shock or personal injury, and to avoid possible damage to the Meter or to the equipment under test, adhere to the following rules:

- Before using the Meter inspect the case. Do not use the Meter if it is damaged or the case (or part of the case) is removed. Look for cracks or missing plastic. Pay attention to the insulation around the connectors.
- Inspect the test leads for damaged insulation or exposed metal. Check the test leads for continuity. Replace damaged test leads with identical model number or electrical specifications before using the Meter.
- Do not apply more than the rated voltage, as marked on the Meter, between the terminals or between any terminal and ground.
- The rotary switch should be placed in the correct position and no changeover of range shall be made during measurement, to prevent damage of the Meter.
- When working at an effective voltage over 60V DC or 30V rms AC, special care should be taken for there is danger of electric shock.
- Use the proper terminals, function, and range for your measurements.
- Do not use or store the Meter in an environment of high temperature, humidity, explosive, flammable and strong magnetic field. The performance of the Meter may deteriorate after dampened.
- When using the test leads, keep your fingers behind the finger guards.
- Disconnect circuit power and discharge all high-voltage capacitors before testing resistance, continuity, diodes, current or capacitance.



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




Rules For Safe Operation (2)

- Before measuring current, check the Meter's fuses and turn off power to the circuit before connecting the Meter to the circuit.
- Replace the battery as soon as the battery indicator  appears. With a low battery, the Meter might produce false readings that can lead to electric shock and personal injury.
- Remove test leads, point contact temperature probe and RS232C interface cable from the Meter and turn the Meter power off before opening the Meter case.
- When servicing the Meter, use only the same model number or identical electrical specifications replacement parts.
- The internal circuit of the Meter shall not be altered at will to avoid damage of the Meter and any accident.
- Soft cloth and mild detergent should be used to clean the surface of the Meter when servicing. No abrasive and solvent should be used to prevent the surface of the Meter from corrosion, damage and accident.
- The Meter is suitable only for indoor use.
- Turn the Meter off when it is not in use and take out the battery when not using for a long time.
- Periodically check the battery as it may leak after some time. If leakage is apparent, the battery should be immediately replaced to prevent damage.

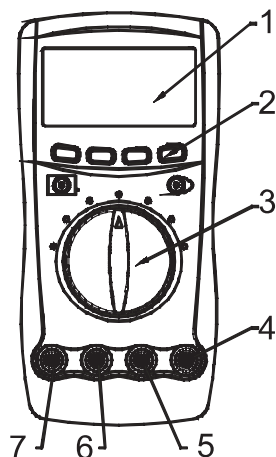


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International Electrical Symbols

	AC (Alternating Current).
	DC (Direct Current).
	AC or DC.
	Ground.
	Double Insulated.
	Low Battery.
	Continuity Test.
	Diode.
	Fuse.
	Warning. Refer to the Operating Manual.
	Conforms to Standards of European Union.

The Multimeter Structure (see figure 1)



(figure 1)









- ① LCD Display
- ② Functional Buttons
- ③ Rotary Switch
- ④ **H_zV Ω** Input Terminal:
Input for voltage, frequency, resistance, diode, capacitance and continuity measurements.
- ⑤ **COM** Input Terminal:
Return terminal for all measurements.
- ⑥ **mA $^{\circ}$ C** Input Terminal
Input for mA \sim and temperature measurement.
- ⑦ **10A** Input Terminal
Input for A \sim measurement.



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Rotary Switch

The table below provides information about the rotary switch positions.

Rotary Switch Position	Function
V 	AC or DC voltage measurement
Ω  	Ω : Resistance measurement  : Diode test  : Continuity test
	Capacitance measurement
Hz	Frequency measurement
$^{\circ}\text{C}$	Temperature measurement
mA 	AC or DC current measurement range from 0.01mA to 600.0mA.
A 	AC or DC current measurement range from 10mA to 10.00A

Functional Button(1)





The table below provides information about functional button operation.

Button	Measuring Function	Operation Performed
	Display Backlight	Press  once to turn the Display Backlight on. It will turn off automatically in about 60 seconds.
(BLUE)		Switches between AC and DC Voltage; the Meter beeps. DC is default.
		Switches between continuity and diode and resistance measurement; The Meter beeps. Resistance is default.
	mA	Switches between AC and DC current measurement range from 0.01mA to 600.0mA ; the Meter beeps. DC is default.
RANGE	Any rotary Switch Position	<ol style="list-style-type: none"> 1.Press RANGE to enter the manual ranging mode; the Meter beeps. Manually selecting a range causes the Meter to exit the Hold mode. 2.Press RANGE to step through the ranges available for the selected function; the Meter beeps. 3.Press and hold RANGE for over 1 second to return to autoranging; the Meter beeps.

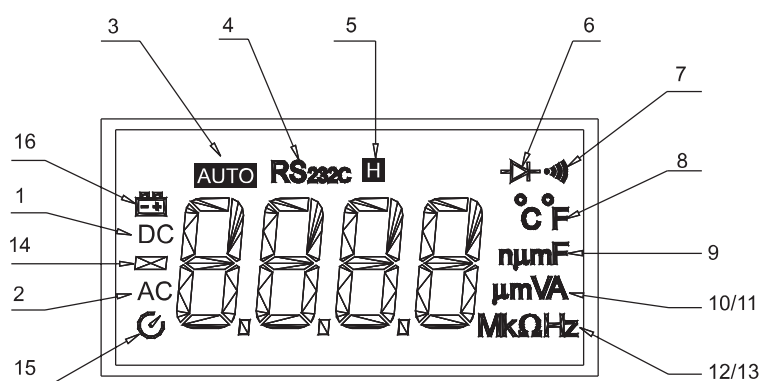


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Functional Button(2)

HOLD 	Any rotary Switch Position	Press HOLD  to enter and exit the Hold mode in any mode, the Meter beeps.
	At OFF position	<ul style="list-style-type: none">● Press and hold HOLD  button while turning on the Meter to display full icons.● Press HOLD  again to return to normal display mode.
POWER	Any rotary Switch Position	Turn the Meter's power on and off.
RS232C	Any rotary switch position	Turn on or off the serial port interface without changing the original setting. Although HOLD H is on, outputted data displayed on the computer is the current measurement value.




Display Symbols(1) (see figure 2)



(figure 2)

Number	Symbol	Meaning
1	DC	Indicator for DC voltage or current
2	AC	Indicator for AC voltage or current
3	AUTO	The Meter is in the auto range mode in which the Meter automatically selects the range with the best resolution.
4	RS232C	Data output is in progress
5	H	Data hold is active
6	→ ←	Diode Test.
7	•••)	The continuity buzzer is on
8	°C °F	The unit of temperature: Centigrade temperature Fahrenheit temperature
9	nF, μF, mF	Farad. The unit of capacitance nF: Nanofarad. 1×10^{-9} or 0.000000001 farads. μF: Microfarad. 1×10^{-6} or 0.000001 farads. mF: Millifarad. 1×10^{-3} or 0.001 farads.

Display Symbols(2) (see figure 2)

10	$\mu\text{A}, \text{mA}$ A	Amperes (amps). The unit of current. mA: Milliamp, 1×10^{-3} or 0.001 amperes. μA : Microamp. 1×10^{-6} or 0.000001 amperes.
11	mV, V	Volts. The unit of voltage. mV: Millivolt. 1×10^{-3} or 0.001 volts
12	$\Omega, \text{k}\Omega,$ MΩ	Ω : Ohm. The unit of resistance. $\text{k}\Omega$: Kilohm. 1×10^3 or 1000 ohms $\text{M}\Omega$: Megaohm. 1×10^6 or 1,000,000 ohms
13	Hz, kHz, MHz	Hertz. The unit of frequency in cycles/second. kHz: Kilohertz. 1×10^3 or 1000 hertz MHz: Megahertz. 1×10^6 or 1,000,000 hertz
14		Indicates negative reading
15		Sleep Mode feature is enabled.
16		The battery is low. ⚠ Warning: To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator appears.
	OL	The input value is too large for the selected range



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Measurement Ranges(1)

A measurement range determines the highest value the Meter can measure. Most Meter functions have more than one range. See "Accuracy Specifications. "

A. Selecting a Measurement Range

Being in the right measurement range is important:

- If the range is too low for the input, the Meter displays **OL** to indicate an overload.
- If the range is too high, the Meter will not display the most accurate measurement.

B. Manual Ranging and Autoranging

The Meter has both manual range and autorange options:

- In the autorange mode, the Meter selects the best range for input signals.
This allows you to switch test points without having to reset the range.
- In the manual range mode, you may select the range.
This allows you to override autorange and lock the Meter in a specific range.

The Meter defaults to the autorange mode in measurement functions that have more than one range. When the Meter is in the autorange mode, **AUTO** is displayed.

To enter and exit the manual range mode:

1. Press **RANGE**.

The Meter enters the manual range mode and **AUTO** turns off.

Pressing the range button increments the meter to the next range. When the highest range is reached, The Meter wraps to the lowest range.

2. To exit the manual range model, press and hold **RANGE** for over 1 second.



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Measurement Ranges(2)

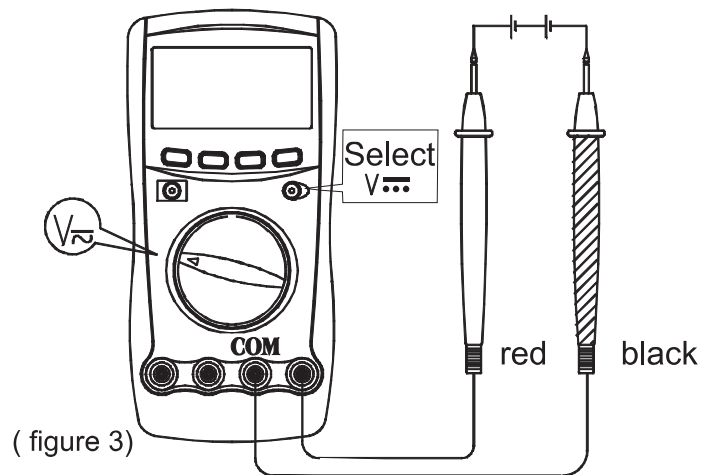
The Meter returns to the autorange mode and **AUTO** is displayed.

Note

- If you manually change the measurement range after entering the Hold recording modes, the Meter exits these modes.

Measurement Operation(1)

A. DC Voltage Measurement (see figure 3)



⚠ Warning

To avoid harm to you or damage to the Meter from electric shock, please do not attempt to measure voltages higher than 1000V, although readings may be obtained.

The DC Voltage ranges are:
600mV, 6V, 60V, 600V and 1000V.

To measure DC voltage, connect the Meter as follows:

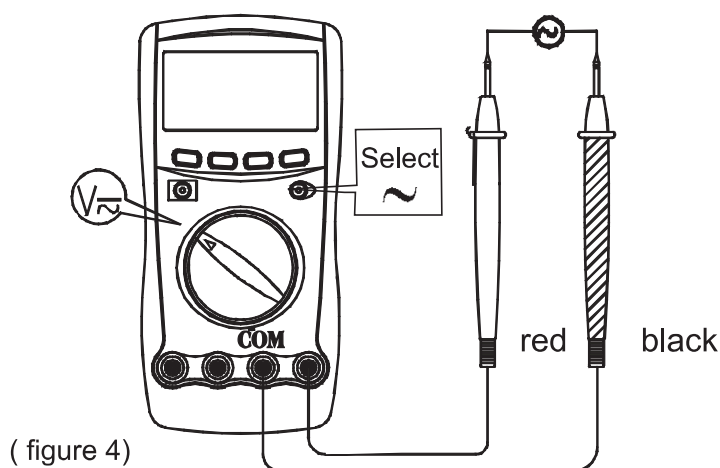
1. Insert the red test lead into the **HzVΩ** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to **V~**; DC measurement is default or press **BLUE** button to select DC measurement mode.
3. Connect the test leads across with the object being measured.
The measured value shows on the display.

Measurement Operation(2)

Note

- In each range, the Meter has an input impedance of $10\text{M}\Omega$. This loading effect can cause measurement errors in high impedance circuits. If the circuit impedance is less than or equal to $10\text{k}\Omega$, the error is negligible (0.1 or less).
- When DC voltage measurement has been completed, disconnect the connection between the test leads and the circuit under test and remove test leads from the input terminals.

B. AC Voltage Measurement (see figure 4)



⚠ Warning

To avoid harm to you or damage to the Meter from electric shock, please do not attempt to measure voltages higher than 1000V rms, although readings may be obtained.

The AC Voltage ranges are:
600mV, 6V, 60V, 600V and 1000V.

To measure AC voltage, connect the Meter as follows:

1. Insert the red test lead into the **HzVΩ** terminal and the black test lead into the **COM** terminal.

Measurement Operation(3)

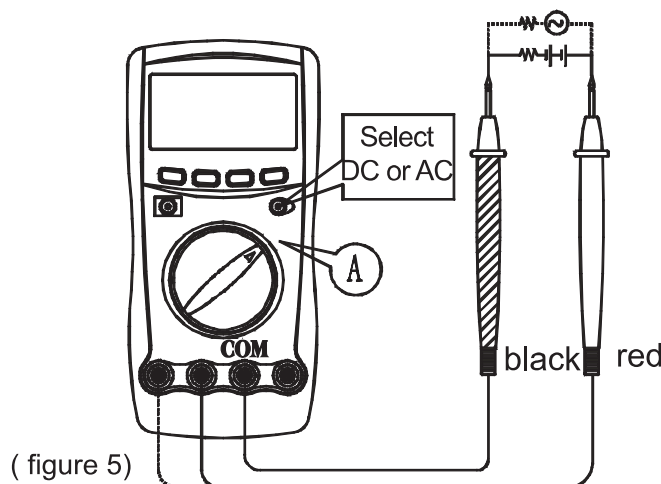
2. Set the rotary switch to $V\sim$; and press **BLUE** button to select AC measurement mode.
3. Connect the test leads across with the object being measured.

The measured value shows on the display.

Note

- In each range, the Meter has an input impedance of $10M\Omega$. This loading effect can cause measurement errors in high impedance circuits. If the circuit impedance is less than or equal to $10k\Omega$, the error is negligible (0.1 or less).
- When AC voltage measurement has been completed, disconnect the connection between the test leads and the circuit under test and remove test leads from the input terminals.

C. DC or AC Current Measurement (see figure 5)



Warning


If the fuse burns out during measurement, the Meter may be damaged or the operator may be injured. Use proper terminals, function and range for the measurement. When leads are connected to the current terminals, do not place them in parallel across any circuit.



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Measurement Operation(4)

Use the 10A terminal and A range if the current value to be tested is an unknown.

The meter has 2 measurement positions on the rotary switch: mA  and A .

To measure current, do the following:

1. Insert the red test lead into the **mA** or **10A** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to **μA**, **mA**, or **A**. The Meter defaults to DC current measurement mode. To toggle between DC and AC current measurement function, press the **BLUE** button.
3. Connect the test leads with the object being measured.

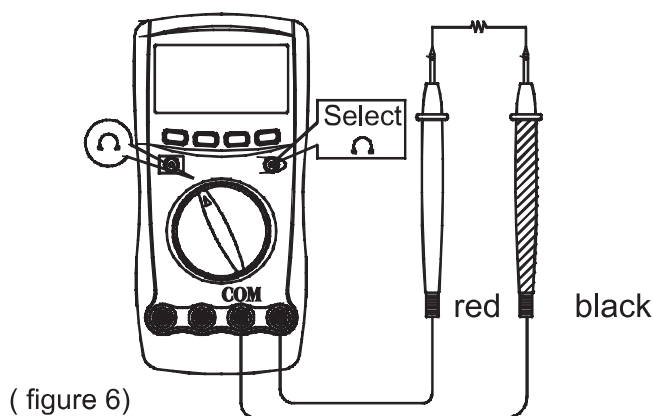
The measured value shows on the display

Note:

- For safety sake, the measuring time for high current should be less than 10 seconds for each measurement and the interval time between 2 measurements should be greater than 15 minutes.
- When current measurement has been completed, disconnect the connection between the testing leads and the circuit under test and remove testing leads from the input terminals.

Measurement Operation(5)

D. Measuring Resistance (see figure 6)



⚠ Warning

To avoid injury, please do not attempt to measure voltage higher than 60V DC or 30V rms AC.

To avoid damage to the Meter or devices under test, disconnect circuit power and discharge all the high-voltage capacitors before measuring resistance.

The resistance ranges are:
600Ω, 6kΩ, 60kΩ, 600kΩ, 6MΩ and 60MΩ .

To measure resistance, connect the Meter as follows:

1. Insert the red test lead into the **HZVΩ** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to Ω resistance measurement (Ω) is default or press **BLUE** button to select Ω measurement mode.
3. Connect the test leads across with the object being measured.

The measured value shows on the display.



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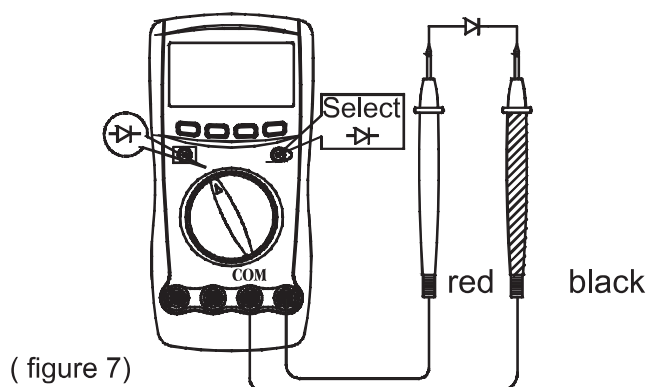
Measurement Operation(6)

Note:

- The test leads can add 0.1Ω to 0.2Ω of error to resistance measurement. To obtain precision readings in low-resistance measurement (600Ω), short-circuit the input terminals beforehand and record the reading obtained.
- For high-resistance measurement ($>1M\Omega$), it is normal to take several seconds to obtain a stable reading.
- If Ω reading with shorted test leads is not $\leq 0.5\Omega$, check for loose test leads, wrong function selected, or enabled data hold function.
- The LCD displays **OL** indicating open-circuit or the tested resistor value is higher than the maximum range of the Meter.
- Resistance measurement is default to auto range mode. At Ω range, open circuit voltage approximate 1.20V. At all other range, open circuit voltage approximate 0.45V.
- When resistance measurement has been completed, disconnect the connection between the testing leads and the circuit under test and remove testing leads from the input terminals.

Measurement Operation(7)

E.Testing Diodes (see figure 7)



Warning

To avoid injury, please do not attempt to measure voltages higher than 60V DC or 30V rms AC. To avoid damage to the Meter or to devices under test, disconnect circuit power and discharge all the high-voltage capacitors before testing diodes.

Use the diode test to check diodes, transistors, and other semiconductor devices. The diode test sends a current through the semiconductor junction, then measure the voltage drop across the junction. A good silicon junction drops between 0.5V and 0.8V

To test the diode out of a circuit, connect the Meter as follows:

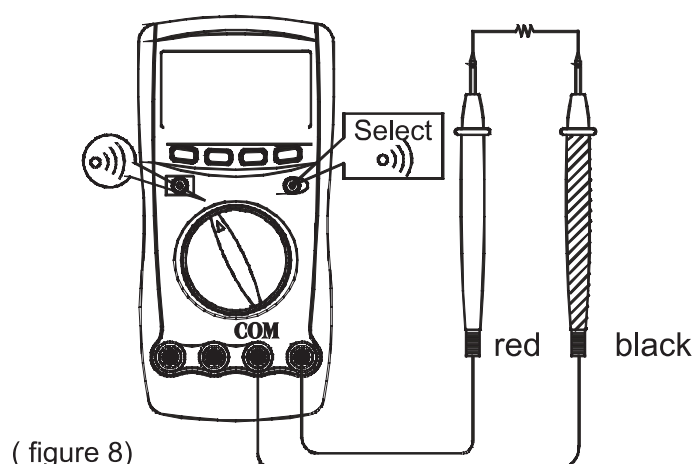
1. Insert the red test lead into the **H_zV Ω** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to $\Omega \rightarrow \rightarrow \rightarrow$ and press **BLUE** button to select $\rightarrow \rightarrow$ measurement mode.
3. For forward voltage drop readings on any semiconductor component, place the red test lead on the component's anode and place the black test lead on the component's cathode. The red test lead polarity is "+" while the black test lead polarity is "-".

Measurement Operation(8)

Note

- In a circuit, a good diode should still produce a forward voltage drop reading of 0.5V to 0.8V; however, the reverse voltage drop reading can vary depending on the resistance of other pathways between the probe tips.
- Connect the test leads to the proper terminals as said above to avoid error display.
- The LCD will display **OL** indicating either open circuit or wrong polarity connection.
- The unit of diode is volt (V), displaying the positive-connection voltage-drop value.
- Diode test has only auto range mode, open circuit voltage approximate 3V.
- When diode testing has been completed, disconnect the connection between the testing leads and the circuit under test and remove testing leads from the input terminals.

F. Testing for Continuity (see figure 8)



Measurement Operation(9)

Warning

To avoid injury, please do not attempt to measure voltages higher than 60V DC or 30V rms AC.

To avoid damage to the Meter or to devices under test, disconnect circuit power and discharge all the high-voltage capacitors before measuring continuity.

To test for continuity, connect the Meter as follows:

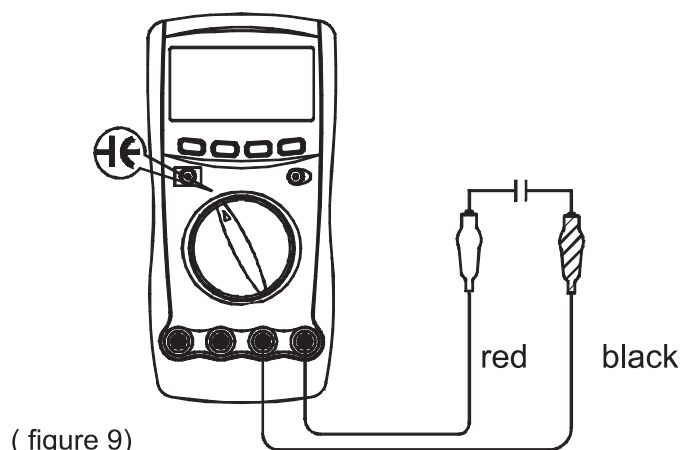
1. Insert the red test lead into the **H_zV Ω** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to $\Omega \rightarrow \text{diode symbol} \rightarrow \text{continuity symbol}$ and press **BLUE** button to select continuity symbol measurement mode.
3. The buzzer sounds if the resistance of a circuit under test is less than 70 Ω , and the LCD displays the tested circuit resistance value.

Note

- The LCD displays **OL** indicating the circuit being tested is open.
- The testing range of continuity is fixed as: 600.0 Ω
The open circuit voltage approximate 1.2V.
- When continuity testing has been completed, disconnect the connection between the testing leads and the circuit under test and remove testing leads from the input terminals.

Measurement Operation(10)

G. Capacitance Measurement (see figure 9)



⚠ Warning

To avoid injury, please do not attempt to measure voltage higher than 60V DC or 30V rms AC.

To avoid damage to the Meter or to the equipment under test, disconnect circuit power and discharge all high-voltage capacitors before measuring capacitance.

Use the DC voltage function to confirm that the capacitor is discharged.

The Meter capacitance ranges are:
6nF, 60nF, 600nF, 6μF, 60μF, 600μF and 6mF.

Connect the Meter as follows:

1. Insert the red test lead or red clip into the **HzVΩ** terminal and the black test lead or black clip into the **COM** terminal.
2. Set the rotary switch to **⎓**.
3. Connect the test lead or test clip across with the object being measured.

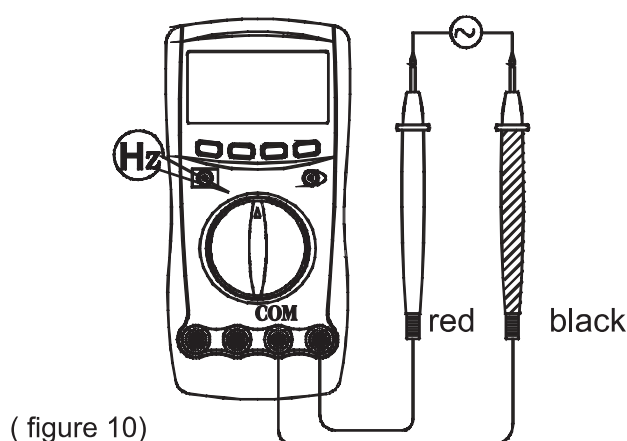
The measured value shows on the display.

Measurement Operation(11)

Note

- For testing polarized capacitors, connect the red test lead or red clip to anode & black test lead or black clip to cathode.
- To minimize the effect of capacitance stored in the test leads, the test lead should be as short as possible. In addition, the remaining voltage, insulated impedance & dielectric absorption from the capacitor may cause slight measurement error.
- Larger capacitor values in the mF range may require up to 15 seconds to measure.
- The LCD displays **OL** indicating the tested capacitor is shorted or it exceeds the maximum range of the Meter.
- When capacitance measurement has been completed, disconnect the connection between the testing leads or testing clips and the circuit under test and remove the testing leads or testing clips away from the input terminals of the Meter.

H. Frequency Measurement (see figure 10)



⚠ Warning

To avoid injury, please do not attempt to measure voltages higher than 60V DC or 30V rms AC.



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Measurement Operation(12)

The measurement ranges are:

6kHz, 60kHz, 600kHz, 6MHz and 60MHz.

To measure frequency, connect the Meter as follows:

1. Insert the red test lead into the **HzVΩ** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to **Hz**;
3. Connect the test leads across with the object being measured.

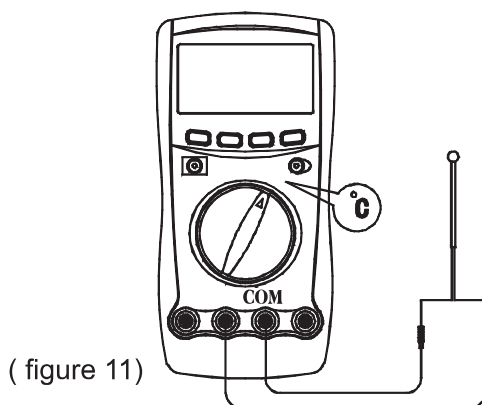
The measured value shows on the display.

Note

- When measuring input scope < 30V rms frequency signal, follow the above procedure. When measuring input scope >30V rms, reading may not be obtained due to the fluctuation of overload protection circuit.
- Normal test lead capacitance tends to attenuate high frequency signals. When testing higher than 1MHz signal, use as short as possible the leads.
- When Hz measurement has been completed, disconnect the connection between the testing leads and the circuit under test and remove the testing leads away from the input terminals.

Measurement Operation(13)

I. Temperature Measurement (see figure 11)



⚠ Warning

To avoid injury, please do not attempt to measure voltages higher than 60V DC or 30V rms AC.

The temperature measurement range is -40°C~1000°C.

To measure temperature, connect the Meter as follows:

1. Insert the red temperature probe into the **mA°C** terminal and the black temperature probe into the **COM** terminal.
2. Set the rotary switch to °C;
3. Place the temperature probe to the object being measured.

The measured value shows on the display.

Note

- The Meter automatically displays the temperature value inside the Meter when there is no temperature probe connection.
- The included point contact temperature probe can only be used up to 250 °C. For any measurement higher than that, the other type temperature probe must be used instead.
- When temperature measurement has been completed, disconnect the connection between the temperature probe and the circuit under test, and remove the temperature probe away from the input terminals of the Meter.



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Sleep Mode

To preserve battery life, the Meter automatically turns off after 10 minutes of inactivity







The Meter can be activated by turning the rotary switch or pressing any button except the **YELLOW** button.

The Meter will be under Hold mode and display the last measurement value before it entered sleep mode if it is activated by pressing any button except the **YELLOW** button. It is possible to exit Hold mode by pressing the **HOLD**.

If the Meter is activated by turning the rotary switch, all the reading will be erased. It will start from the switch selected function.

In RS232C serial port data output mode, Sleep Mode function will be disabled.

General Specifications

- Maximum Voltage between any Terminals and Ground : 1000V rms.
-  Fused Protection for mA°C Input Terminal : 1A, 250V, fast type fuse, $\phi 5 \times 20 \text{mm}$
-  Fused Protection for 10A Input Terminal : 10A, 250V, fast type fuse, $\phi 5 \times 20 \text{mm}$
- Maximum Display : 5999
- Auto and manual range selectable.
- Temperature : Operating: 0°C~40°C (32°F~104°F)
Storage: -10°C~50°C (14°F~122°F)
- Measurement Speed : Updates 3 times/second.
- Negative Reading : Display 
- Overloading : Display **OL**
- Data Holding : Display 
- Battery Type : One piece of 9V NEDA 1604 or 6F22 or 006P
- Battery Deficiency : Display 
- Dimensions (H x W x L): 177mm x 85mm x 40mm.
- Weight : Approximate 312g (battery included)
- Safety/ Compliances : IEC61010 CAT III 1000V, CAT IV 600V overvoltage and double insulation standard
- Certification: 

Accuracy Specifications(1)

Accuracy: \pm (a% reading + b digits), guarantee for 1 year.

Operating temperature: 18°C~28°C


Relative humidity: \leq 75%

Temperature coefficient: $0.1 \times (\text{specified accuracy}) / 1^\circ\text{C}$

A. DC Voltage

Range	Resolution	Accuracy
600.0mV	0.1mV	$\pm(0.5\%+5)$
6.000V	1mV	$\pm(0.5\%+3)$
60.00V	10mV	
600.0V	100mV	
1000V	1V	$\pm(0.5\%+5)$


Remarks:

- Overload protection: 1000V 
- Input impedance: $\geq 10\text{M}\Omega$

B. AC Voltage

Range	Resolution	Accuracy
600.0mV	0.1mV	40~100Hz: $\pm (1.2\%+3)$
6.000V	1mV	40~100Hz: $\pm (1\%+2)$
60.00V	10mV	100Hz~1kHz: $\pm (2\%+2)$
600.0V	100mV	1k~10kHz: $\pm (4\%+3)$
		10k~20kHz: $\pm (4\%+5)$
1000V	1V	40~100Hz: $\pm (1\%+3)$
		100~1kHz: $\pm (2\%+3)$

Remarks:

- Overload protection: 1000V 
- Input impedance: $\geq 10\text{M}\Omega$
- Displays effective value of sine wave (mean value response)
- Frequency response:
 - <40V: 40Hz~20kHz, -3dB can reach 100kHz
 - $\geq 40\text{V}$: 40Hz~1kHz, -3dB can reach 30kHz.

Accuracy Specifications(2)

C. DC Current

Range	Resolution	Accuracy
60.00mA	10 μ A	$\pm(1.2\%+3)$
600.0mA	100 μ A	
10.00A	10mA	$\pm(1.5\%+5)$

Remarks

- **Overload protection:**
60.00mA to 600.0mA range:
1A, 250V, fast type fuse, $\phi 5 \times 20$ mm
10.00A range:
10A, 250V, fast type fuse, $\phi 5 \times 20$ mm
- **At 10.00A range:**
For continuous measurement ≤ 10 seconds and
interval time between 2 measurements greater
than 15 minutes.

D. AC Current

Range	Resolution	Accuracy
60.00mA	10 μ A	$\pm(2\%+5)$
600.0mA	100 μ A	
10.00A	10mA	$\pm(2.5\%+5)$

Remarks

- **Overload protection:**

Accuracy Specifications(3)

60.00mA to 600.0mA range:

1A, 250V, fast type fuse, $\phi 5 \times 20 \text{mm}$

10.00A range:

10A, 250V, fast type fuse, $\phi 5 \times 20 \text{mm}$

- **At 10.00A range:**


For continuous measurement ≤ 10 seconds and interval time between 2 measurements greater than 15 minutes.

- Frequency response: 40Hz~1kHz.

E. Resistance

Range	Resolution	Accuracy	Remarks
600.0 Ω	0.1 Ω	$\pm(1.2\%+2)$	Open circuit voltage approximate 1.20V
6.000k Ω	1 Ω	$\pm(1\%+2)$	Open circuit voltage approximate 0.45V
60.00k Ω	10 Ω		
600.0k Ω	100 Ω		
6.000M Ω	1k Ω	$\pm(1.2\%+2)$	
60.00M Ω	10k Ω	$\pm(1.5\%+2)$	


F. Diode Test

Range	Resolution	Overload Protection
	10mV	600Vp

Remarks:

- Open circuit voltage approximate 3V.
- Display forward voltage drop approximate 0.5~0.8V.

G. Continuity Test

Range	Resolution	Overload Protection
	1 Ω	600Vp

Remark:

- Open circuit voltage approximate 1.2V.

Accuracy Specifications(4)

H. Capacitance

Range	Resolution	Accuracy	Overload Protection
6.000nF	1pF	$\pm(4\%+10)$	600Vp
60.00nF	10pF	$\pm(4\%+3)$	
600.0nF	100pF		
6.000μF	1nF		
60.00μF	10nF		
600.0μF	100nF		
6.000mF	1μF	$\pm(5\%+10)$	

I. Frequency

Range	Resolution	Accuracy
6.000kHz	1Hz	$\pm(0.05\%+1)$
60.00kHz	10Hz	
600.0kHz	100Hz	
6.000MHz	1kHz	
60.00MHz	10kHz	

Remarks:

- Overload protection: 600Vp
- Input sensitivity as follows;
At <1MHz: $\leq 300\text{mVrms}$;
At $\geq 1\text{MHz}$: $\leq 600\text{mVrms}$.
- Maximum input: 30V rms.

J. Temperature

Range	Resolution	Accuracy	Overload Protection
-40~1000 $^{\circ}$ C	1 $^{\circ}$ C	-40~0 $^{\circ}$ C: $\pm(3\%+4)$	1A, 250V, fast type fuse, 5 \times 20mm
		0~400 $^{\circ}$ C: $\pm(1\%+3)$	
		400~1000 $^{\circ}$ C: $\pm(2\%+10)$	

Maintenance(1)

This section provides basic maintenance information including battery and fuse replacement instruction.

Warning

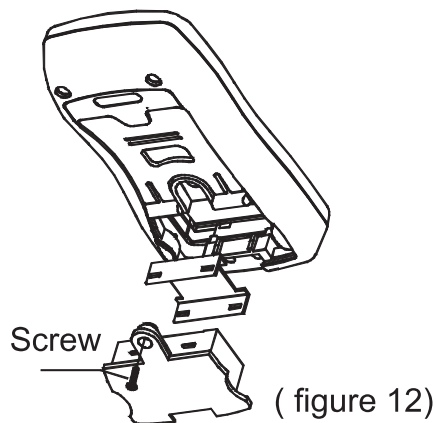
Do not attempt to repair or service your Meter unless you are qualified to do so and have the relevant calibration, performance test, and service information.

To avoid electrical shock or damage to the Meter, do not get water inside the case.

A. General Service


- Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents.
- To clean the terminals with cotton bar with detergent, as dirt or moisture in the terminals can affect readings.
- Turn the Meter power off when it is not in use.
- Take out the battery when it is not to be used for a long time.
- Do not use or store the Meter in a place of humidity, high temperature, explosive, flammable and strong magnetic field.

B. Replacing the Battery (see figure 12)



Maintenance(2)

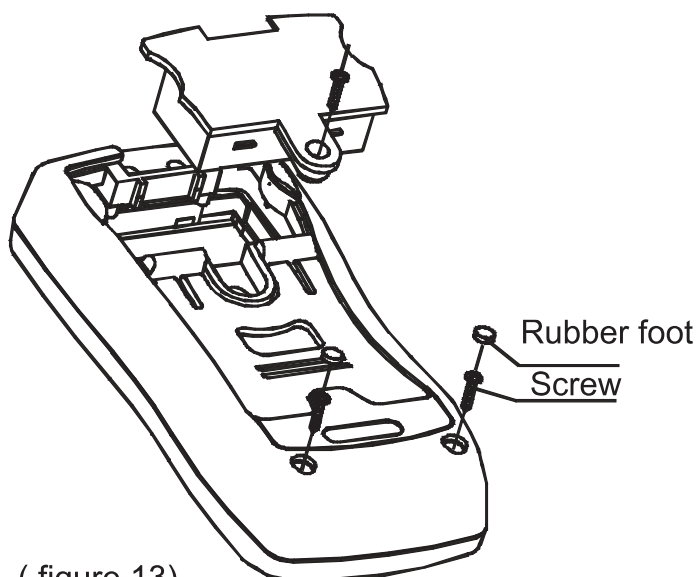
Warning

To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator "  " appears. Make sure the test leads are disconnected from the circuit being tested before opening the case bottom.

To replace the battery:

- Press the **POWER** to turn the Meter off and remove all connections from the terminals.
- Remove the screw from the battery compartment, and separate the battery compartment from the case bottom.
- Remove the battery from the battery compartment.
- Replace with a new 9V battery (NEDA 1604 or 6F22 or 006P) .
- Rejoin the case bottom and battery compartment, and reinstall the screw.

C. Replacing the Fuses (see figure 13)



(figure 13)



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Maintenance(3)

Warning

To avoid electrical shock, arc blast, personal injury or damage to the Meter, use specified fuses ONLY in accordance with the following procedure.

To replace the Meter's fuse:

- Press the **POWER** to turn the Meter off and remove all connections from the terminals.
- Remove the screw from the battery compartment, and separate the battery compartment from the case bottom.
- Remove the 2 rubber feet and 2 screws from the case bottom, and separate the case top from the case bottom.
- Remove the fuse by gently prying one end loose, then take out the fuse from its bracket.
- Install **ONLY** replacement fuses with the identical type and specification as follows and make sure the fuse is fixed firmly in the bracket.
 - Fuse 1: 1A, 250V, fast type fuse, $\phi 5 \times 20 \text{mm}$
 - Fuse 2: 10A, 250V, fast type fuse, $\phi 5 \times 20 \text{mm}$
- Rejoin the battery compartment and the case top, and reinstall the screw.
- Rejoin the case bottom and case top, and install the 2 screws and 2 rubber feet.

Replacement of the fuses is seldom required. Burning of a fuse always results from improper operation.

RS232C Serial Port(1)

A. RS232C Port Cable

The Meter		Computer		
D-sub 9 Pin Male		D-sub 9 Pin Female	D-sub 25 Pin Female	Pin Name
2	-----	2	3	RX
3	-----	3	2	TX
4	-----	4	20	DTR
5	-----	5	7	GND
6	-----	6	6	DSR
7	-----	7	4	RTS
8	-----	8	5	CTS

B. Setting of RS232C Serial Ports

Default of RS232C Serial Port for communication is set as:

Baud Rate 19230

Start bit 1 (always 0)

Stop bit 1 (always 1)

Data bits 7

Parity 1 (odd)

C. System Requirements for Installing the Interface program

To use the **Interface Program**, you need the following hardware and software:

- An IBM PC or equivalent computer with 80486 or higher processor and 640X 480 pixel or better monitor.
- Microsoft Windows 98 or above
- At least 8MB of RAM
- At least 8MB free hard drive space.



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RS232C Serial Port(2)

- Access to a CD-ROM drive.
- A vailable serial port.
- A mouse or other pointing device supported by Windows.

Please refer to the included CD-ROM "**Installation Guide & Computer Interface Software**" for installing and operating instructions of the **Interface Program**.

**** END ****

This operating manual is subject to change without notice.



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