

SAFETY INFORMATION

The following safety information must be observed to insure maximum personal safety during the operation at this meter:

- Do not use the meter if the meter or test leads look damaged, or if you suspect that the meter is not operating properly.
- Never ground yourself when taking electrical measurements. Do not touch exposed metal pipes, outlets, fixtures, etc., which might be at ground potential. Keep your body isolated from ground by using dry clothing, rubber shoes, rubber mats, or any approved insulating material.
- Turn off power to the circuit under test before cutting, unsoldering, or breaking the circuit. Small amounts of current can be dangerous.
- Use caution when working above 60V dc or 30V ac rms. such voltages pose a shock hazard.
- When using the probes, keep your fingers behind the finger guards on the probes.
- Measuring voltage which exceeds the limits of the multimeter may damage the meter and expose the operator to a shock hazard. Always recognize the meter voltage limits as stated on the front of the meter.
- Never apply voltage or current to the meter that exceeds the specified maximum:

Input Limits	
Function	Maximum Input
Resistance, Capacitance, Diode test, Continuity	600V DC/AC
Inductance	600V DC/AC

SAFETY SYMBOLS



This symbol adjacent to another symbol, terminal or operating device indicates that the operator must refer to an explanation in the Operating Instructions to avoid personal injury or damage to the meter.



This **WARNING** symbol indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.



This **CAUTION** symbol indicates a potentially hazardous situation, which if not avoided, may result damage to the product.

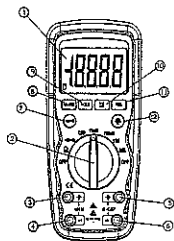



This symbol advises the user that the terminal(s) so marked must not be connected to a circuit point at which the voltage with respect to earth ground exceeds (in this case) 500 VAC or VDC.



This symbol adjacent to one or more terminals identifies them as being associated with ranges that may, in normal use, be subjected to particularly hazardous voltages. For maximum safety, the meter and its test leads should not be handled when these terminals are energized.




CONTROLS AND JACKS



1. 11000 count Liquid Crystal Display
2. Function switch
3. Positive input jack for inductance measurements
4. Negative input jack for inductance measurements
5. Positive input jack
6. COM (Negative) input jack.
7.  Diode pushbutton
8. Range pushbutton
9. HOLD pushbutton
10. Max/Min pushbutton
11. Relative Zero pushbutton
12. Backlight pushbutton

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SYMBOLS AND ANNUNCIATORS

	Continuity
	Low Battery
	Diode
HOLD	Data Hold
AUTO	AutoRanging
MANUAL	ManualRanging

SPECIFICATIONS


The instrument complies with: EN61010-1.

Insulation: Class2, Double insulation.

Overvoltage category: CATIII 600V, **Display:** 11000 counts LCD display with function indication.

Polarity: Automatic, (-) negative polarity indication.

Overrange: "OL" mark indication.

Low battery indication: The "" is displayed when the battery voltage drops below the operating level.

Measurement rate: 4 times per second, nominal.

Auto power off: Meter automatically shuts down after approx. 15 minutes of inactivity.

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Operating environment: 0 °C to 50 °C (32 °F to 122 °F) at < 70 % relative humidity.

Storage temperature: -20 °C to 60 °C (-4 °F to 140 °F) at < 80 % relative humidity.

For inside use, max height: 2000m

Pollution degree: 2

Power: One 9V battery, NEDA 1604, IEC 6F22.

Dimensions: 150 (H) x 70 (W) x 48 (D) mm

Weight: Approx.: 255g.

Accuracy is given at 18 °C to 28 °C (65 °F to 83 °F), less than 70 % RH

Resistance

Range	Resolution	Accuracy
110.0Ω	0.01Ω	±1.2% of rdg ± 0.5Ω
1.1000kΩ	0.1Ω	
11.00kΩ	1Ω	
1100.0kΩ	10Ω	±1.2% of rdg ± 10 dgts
1.1000MΩ	100Ω	
11.000MΩ	1kΩ	
40.00MΩ	10 kΩ	±2.5% of rdg ± 10 dgts

Maximum Input: 600V dc or 600V ac rms.

Capacitance (Auto-ranging)

Range	Resolution	Accuracy
11.000nF	1pF	±5.0% of rdg ± 0.7nF
110.00nF	10pF	
1.1000uF	100pF	±5.0% of rdg ± 15 dgts

11.000uF	1nF	±3.0% of rdg ± 10 dgts
110.00uF	10nF	
1.1000mF	0.1uF	±10.0% of rdg ± 10 dgts
11.000mF	1uF	
110.00mF	10uF	

Maximum Input: 600V dc or 600V ac rms.

Inductance (Manual-ranging)

Range	Resolution	Accuracy
11.000mH	1uH	±2.0% of rdg ± 0.05mH
110.00mH	10uH	
11.000H	1mH	±5.0% of rdg ± 0.05H
20.00H	10mH	

Maximum Input: 600V dc or 600V ac rms.

Diode Test

Test current	Resolution	Accuracy
0.3mA typical	1 mV	±10% of rdg ± 5 dgts

Open circuit voltage: 1.1V dc typical

Overload protection: 600V dc or ac rms.

Audible continuity

Audible threshold: Less than 30Ω; Test current: <0.3mA

Overload protection: 600V dc or ac rms.

OPERATION

1. ALWAYS turn the function switch to the OFF position when the meter is not in use. This meter has Auto OFF that automatically shuts the meter OFF if 15 minutes elapse between uses.
2. If "OL" appears in the display during a measurement, the value exceeds the range you have selected. Change to a higher range.

AUTORANGING/MANUAL RANGE SELECTION

When the meter is first turned on, it automatically goes into Autoranging. This automatically selects the best range for the measurements being made and is generally the best mode for most measurements. For measurement situations requiring that a range be manually selected, perform the following:

1. Press the **RANGE** key. The "AUTO" display indicator will turn off or select diode /beeper, AC/DC Clamp
2. Press the **RANGE** key to step through the available ranges until you select the range you want.
3. To exit the Manual Ranging mode and return to Autoranging, press and hold the **RANGE** key for 2 seconds.

MAX/MIN

Note: When using the MAX/MIN function in Autoranging mode, the meter will "lock" into the range that is displayed on the LCD when MAX/MIN is activated. If a MAX/Min reading exceeds that range, an "OL" will be displayed. Select the desired range BEFORE entering MAX/MIN mode.

1. Press the **MAX/MIN** key to activate the MAX/MIN recording mode. The display icon "MAX" will appear. The meter will display and hold the maximum reading and will update only when a new "max" occurs.
2. Press the **MAX/MIN** key again and the display icon "MIN" will appear. The meter will display and hold the minimum reading and will update only when a new "min" occurs.
3. To exit MAX/MIN mode press and hold the **MAX/MIN** key for 2 seconds

DISPLAY BACKLIGHT

The **BACK LIGHT BUTTON** is used to turn the back light on Only. Push the button again, the back light will close down.

HOLD

The hold function freezes the reading in the display. Press the **HOLD** key momentarily to activate or to exit the **HOLD** function.

RELATIVE ZERO BUTTON:

For convenient readings comparison & offset

RESISTANCE MEASUREMENTS

WARNING: To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any resistance measurements. Remove the batteries and unplug the line cords.

1. Set the function switch to the Ω position.
2. Insert the black test lead banana plug into the negative (COM) jack and the red test lead banana plug into the positive Ω jack.
3. Touch the test probe tips across the circuit or part under test. It is best to disconnect one side of the part under test so the rest of the circuit will not interfere with the resistance reading.
4. Read the resistance in the display. The display will indicate the proper decimal point, value and symbol.

CONTINUITY CHECK

WARNING: To avoid electric shock, never measure continuity on circuits or wires that have voltage on them.

1. Set the function switch to the $\rightarrow \bullet \rightarrow$ position.
2. Insert the black lead banana plug into the negative (-) jack (COM) and the red test lead banana plug into the positive (+) jack (Ω).
3. Press the $\rightarrow \bullet \rightarrow$ button until the $\rightarrow \bullet \rightarrow$ symbol appears in the display.
4. Touch the test probe tips to the circuit or wire you wish to check.
5. If the resistance is less than approximately 100 Ω , the audible signal will sound. The display will also show the actual resistance.

DIODE TEST

WARNING: To avoid electric shock, do not test any diode that has voltage on it.

1. Set the function switch to $\rightarrow \bullet \rightarrow$ position.
2. Press the $\rightarrow \bullet \rightarrow$ button until the $\rightarrow \bullet \rightarrow$ symbol appears in the display.
3. Insert the black test lead banana plug into the negative (-) jack (COM) and the red test lead banana plug into the positive (+) jack (Ω).
4. Touch the test probe tips to the diode or semiconductor junction you wish to test. Note the meter reading.
5. Reverse the probe polarity by switching probe position. Note this reading.
6. The diode or junction can be evaluated as follows:
 - A. If one reading shows a value and the other reading shows OL, the diode is good.
 - B. If both readings show OL, the device is open.
 - C. If both readings are very small or 0, the device is shorted.

NOTE: The value indicated in the display during the diode check is the forward voltage.

CAPACITANCE MEASUREMENTS

WARNING: To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any capacitance measurements. Remove the batteries and unplug the line cords.

1. Set the function switch to the CAP position. ("nF" and a small value will appear in the display).
2. Insert the black test lead banana plug into the negative (COM) jack and the red test lead banana plug into the positive Ω jack.

3. Touch the test leads to the capacitor to be tested. The display will indicate the proper decimal point, value and symbol.

INDUCTANCE MEASUREMENTS


WARNING: To avoid electric shock, disconnect both test probes from any source of voltage before making an inductance measurement.

1. If you wish to measure inductance, set the function switch to the 10mH.
2. Insert the black test lead banana plug into Negative input jack for inductance measurements and the red test lead banana plug into Negative input jack for inductance measurements.
3. Touch the inductance Probe head to the part whose inductance you wish to measure. Keep the probe touching the part under test until the reading stabilizes (about 10 seconds).
4. Read the temperature in the display. The digital reading will indicate the proper decimal point and value.

WARNING: To avoid electric shock, be sure the inductance has been removed before changing to another measurement function.

REPLACING THE BATTERY

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the battery door.

1. When the batteries become exhausted or drop below the operating voltage, "  " will appear in the right-hand side of the LCD display. The battery should be replaced.
2. Follow instructions for installing battery. See the Battery Installation

section of this manual.

3. Dispose of the old battery properly.

WARNING: To avoid electric shock, do not operate your meter until the battery door is in place and fastened securely.

BATTERY INSTALLATION

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the battery door.

1. Disconnect the test leads from the meter.
2. Open the battery door by loosening the screw using a Phillips head screwdriver.
3. Insert the battery into battery holder, observing the correct polarity.
4. Put the battery door back in place. Secure with the two screws.

WARNING: To avoid electric shock, do not operate the meter until the battery door is in place and fastened securely.

NOTE: If your meter does not work properly, check the fuses and battery to make sure that they are still good and that they are properly inserted.

REPLACING THE FUSES

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the fuse door.

1. Disconnect the test leads from the meter and any item under test.
2. Open the fuse door by loosening the screw on the door using a Phillips head screwdriver.
3. Remove the old fuse from its holder by gently pulling it out.
3. Install the new fuse into the holder.
4. Always use a fuse of the proper size and value (10A/250V fast blow for the 10A range).
5. Put the fuse door back in place. Insert the screw and tighten it securely.

WARNING: To avoid electric shock, do not operate your meter until the fuse door is in place and fastened securely.