

## Voltage Measurements

1. Connect the red test lead to the "VΩ" jack and the black test lead to the "COM" jack.
2. Set the Function switch to the desired voltage type (DCV) or (ACV) position.
3. Touch the probes to the test points, the range will change automatically to the level that will display the input voltage with best resolution.
4. The value indicated in the display window is the measured value of voltage with proper decimal point and annunciator indication.
5. For dc, a (-) sign is displayed for negative polarity; positive polarity is implied.

## Current Measurements

1. Set the Function switch to the desired current range ( $\mu A$ , mA, or 10A) position.
2. To toggle between "DC" and "AC" mode, press Mode switch. The "DC" or "AC" annunciators is displayed in the upper left corner.
3. For current measurements less than 320mA, connect the red test lead to the  $\mu A$ /mA jack and the black test lead to the COM jack.
4. For current measurements of 320mA or greater, connect the red test lead to the 10A jack and the black test lead to the COM jack.

5. Remove power from the circuit under test and open the normal circuit path where the measurement is to be taken. Connect the meter in series with the circuit.
6. Apply power and read the value from the display.

## Resistance Measurements

1. Set the Function switch to the "Ω" position.
2. Turn off power to the circuit under test. External voltage across the components causes invalid readings.
3. Connect the red test lead to the "VΩ" jack and the black test lead to the "COM" jack.
4. Connect the test leads to the point of measurements and read the value from the display.

## Testing Diodes

1. Set the Function switch to  $\rightarrow/\leftarrow$  position.
2. Turn off power to the circuit under test. External voltage across the components causes invalid readings.
3. To toggle between the continuity/diode modes, press Mode Switch.
4. Touch probes to the diode. A forward-voltage drop is about 0.6V (typical for a silicon diode).
5. Reverse probes. If the diode is good, "OL" is displayed. If the diode is shorted, a value near 0mV will be displayed.
6. If the diode is open, "OL" is displayed in both directions.

## Continuity Measurements

1. Set the Function switch to  $\rightarrow/\leftarrow$  position.
2. Turn off power to the circuit under test. External voltage across the components causes invalid readings.
3. To toggle between the continuity/diode modes, press Mode Switch.
4. Connect the test leads to the two points at which continuity is to be tested. The buzzer will sound if the resistance is less than approximately 20Ω.

## MAINTENANCE

### WARNING

Remove test leads before changing battery or fuse or performing any servicing.

## Battery Replacement

Power is supplied by a 9 volt "transistor" battery, (NEDA 1604, IEC 6F22). The "☐" appears on the LCD display when replacement is needed.

To replace the battery, remove the three screws from the back of the meter and lift off the front case. Remove the battery from case bottom.

## Fuse Replacement

If no current measurements are possible, check for a blown overload protection fuse. There are two fuses, F1 for the  $\mu A$ /mA jack and F2 for the 10A jack. For access to fuses, remove the three screws from the back of the meter and lift off the front case. Replace F1 only with the original type 0.5A/400V, fast acting fuse. Replace F2 only with the original type 10A/600V, fast acting ceramic fuse.

## Cleaning

Wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents. Dirt or moisture in the terminals can affect readings.



**Safety:** Conforms to IEC61010-1 (EN61010-1), CAT III 600V, Class II, Pollution degree 2 Indoor use, CAT III: Is for measurements performed in the building installation.

EMC: Conforms to EN61326-1.

**The symbols used on this instrument are:**

- Caution, risk of electric shock
- Caution, refer to accompanying documents
- Equipment protected throughout by Double insulation (Class II)
- Alternating current
- Direct current
- Ground

## 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.

## SPECIFICATIONS

**Display:** 3½ digit liquid crystal display (LCD) with a maximum reading of 3200.

**Analog bar graph:** 32 segments with measurements 12 times per second.

**Polarity:** Automatic, (-) negative polarity indication.

**Overrange:** "OL" mark indication.

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

**Measurement rate:** 2 times per second, nominal.

**Auto power off:** Meter automatically shuts down after approx. 10 minutes of inactivity.

**Operating environment:** 0°C to 50°C at < 70% relative humidity.

**Storage temperature:** -20°C to 60°C at < 80% relative humidity.

**Temperature coefficient:** 0.1% (specified accuracy)/1°C (0°C to 18°C, 28°C to 50°C).

**Altitude:** 6561.7 feet (2000m)

**Power:** Single standard 9-volt battery, NEDA 1604, JIS 006P, IEC 6F22.

**Battery life:** 200 hours typical with carbon-zinc.

**Dimensions:** 147mm (H) × 70mm (W) × 39mm (D).

**Weight:** Approx. 11.8 oz. (335g) including holster.

**Accessories:** One pair test leads, One spare fuse, 9V battery (installed) and Operating Instructions.

	Maximum input		Input impedance	
	Range	DC Accuracy	AC Accuracy	Input impedance
Voltage (50/60Hz)	320mV	± 1.2% rdg + 1 d	N / A	> 1000MΩ
	3.2V	± 0.8% rdg + 1 d		11MΩ
	32V		± 2% rdg + 4 d	10MΩ
	320V	± 1.2% rdg + 1 d		
	600V			
Current (50/60Hz)	Range	DC Accuracy	AC Accuracy	Voltage burden
	320μA			0.2V
	3200μA	± 2.0% rdg + 1 d	± 2.5% rdg + 4 d	2V
	32mA			0.2V
	320mA			2V
OHM	10A	± 3.0% rdg + 3 d	± 3.5% rdg + 4 d	2V
	Range	Resolution	Accuracy	Test current
	320Ω	100mΩ	± 2.0% rdg + 5 d	< 0.7mA
	3.2kΩ	1Ω		< 0.13mA
	32kΩ	10Ω	± 1.5% rdg + 3 d	< 13μA
	320kΩ	100Ω		< 1.3μA
	3.2MΩ	1kΩ	± 2.5% rdg + 3 d	
DiodeTest	30MΩ	10kΩ	± 5.0% rdg + 5 d	< 0.13μA
	0 - 2000	1mV	± 10% rdg + 2 d	0.5mA (Vf = 0.6V)
Continuity Check	Range	Resolution	Audible indication	Test current
	320Ω	100mΩ	< approx. 20Ω	< 0.7mA

## OPERATION

Before taking any measurements, read the Safety Information Section. Always examine the instrument for damage, contamination (excessive dirt, grease, etc.) and defects. Examine the test leads for cracked or frayed insulation. If any abnormal conditions exist do not attempt to make any measurements.

## Input Warning Beeper

The meter have a beeper that warns the user when the test lead is in the current jack while the meter is switched to make a voltage measurement. Another safety feature to protect the meter and you.

## Manually Selecting Range

The meter also has a manual range mode. In manual range, you select and lock the meter in a range. To manually select a range:

Press [RANGE] button to hold the selected range. Subsequently pressing the [RANGE] button will select each range in sequence from the lowest to highest range. Hold the button for 2 seconds to return to the Autorange Mode.

## Mode Switch (DC/AC), (⌚/⚡)

Press this switch to toggle between DC and AC in the current measurements. Press this switch to toggle between the continuity/diode modes, if the function switch is set to ⌚/⚡ position.