



## INSTRUCTION MANUAL

**MT876**

**600V AC/DC MULTIMETER**





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## 1. Introduction

- The meter measures AC/DC Voltage and Current, Resistance, Diode Test, Continuity, Capacitance, Frequency, Duty Cycle and Temperature.
- The meter also tests 1.5V and 9V batteries and offers a Non-Contact AC Voltage detector.
- In addition, the meter detect Live/Neutral wire through a single test lead by contact.
- Proper use and care of this meter will provide many years of reliable service.

## 2. Safety

### 2.1. WARNINGS

- Read, understand and follow Safety Rules and Operating Instructions in this manual before using this meter.
- The meter's safety features may not protect the user if not used in accordance with the manufacturer's instructions.
- Keep fingers away from the metal probe tips when taking measurements.
- Before changing functions using the selector switch, always disconnect the test leads from the circuit under test.
- Comply with all applicable safety codes, Use approved personal protective equipment when working near live electrical circuits - particularly with regard to arc-flash potential.
- Use caution on live circuits, Voltages above 30V AC RMS, 42V AC peak or 60V DC pose a shock hazard.
- Do not use if the meter or test leads appear damaged.
- Verify operation before using meter by measuring a known live voltage.
- Do not use the meter in wet or damp environments or during electrical storms.
- Do not use the meter near explosive vapors, dust or gasses.
- Do not use the meter if it operates incorrectly, protection may be compromised.
- Do not operate meter while Low Battery warning is on, replace batteries immediately.
- Do not apply voltage or current that exceeds the meter's maximum rated input limits.

## 2.1. Input Limits

Function	Maximum Input
Voltage AC or DC	600V AC/DC
Frequency, Resistance, Capacitance, Continuity, Diode Test, Temperature	250V AC/DC
10A Current AC or DC	10A/600V (6.3x32mm) fast acting Fuse
uA/mA Current AC or DC	500mA/600V (6.3x32mm) fast acting Fuse
Battery Test	20V AC/DC

**CAUTION:** When the voltage is more than 600V, the current of uA is more than 4000uA, the current of mA is more than 400mA, and the current of 10A is more than 10A, the Buzzer will sound an alarm.

## 2.3. International 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 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.



Double insulation



This symbol advises the user that the terminal(s) so marked must not be connected to a circuit point at which the voltage exceeds 600 VAC or VDC



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 in damage to the product.

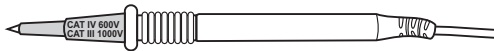
## 2.4. Safety Category Ratings

Category Rating	Brief Description	Typical Applications
CAT II	Single phase receptacles and connected loads	<ul style="list-style-type: none"><li>Household appliances, power tools</li><li>Outlets more than 30ft (10m) from a Cat III source</li><li>Outlets more than 60ft (20m) from a Cat IV source</li></ul>
CAT III	Three phase circuits and single phase lighting circuits in commercial buildings	<ul style="list-style-type: none"><li>Equipment in fixed installations such as 3-phase motors, switch gear and distribution panels</li><li>Lighting circuits in commercial buildings</li><li>Feeder lines in industrial plants</li><li>Any device or branch circuit that is close to a Cat III source</li></ul>

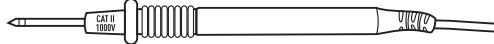
- The measurement category (CAT) rating and voltage rating is determined by a combination of the meter, test probes and any accessories connected to the meter and test probes.
- The combination rating is the LOWEST of any individual component.

## 2.5. Test Leads

Insulated Tip On ➡



Insulated Tip Removed ➡

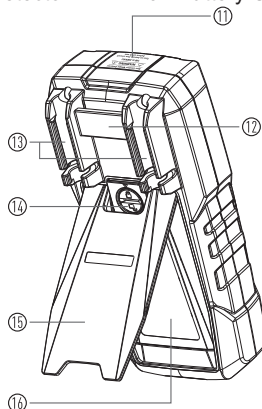
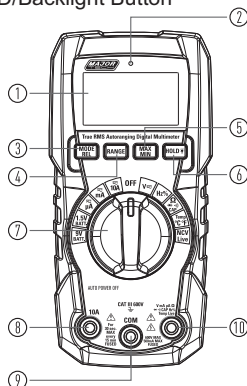


**WARNING:** Operation is limited to CAT II applications when the insulated tips are removed from one or both test probes. Refer to Input Limits section in this manual for maximum voltage ratings.

## 3. Description

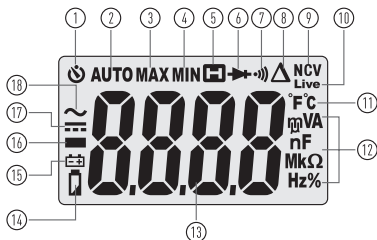
### 3.1. Meter Description

- |                           |                          |                         |
|---------------------------|--------------------------|-------------------------|
| 1 - LCD Display           | 7 - Function Switch      | 12 - Lanyard Hole       |
| 2 - NCV Indicator         | 8 - 10A Input Jack       | 13 - Test Lead Holders  |
| 3 - MODE/RELATIVE Button  | 9 - COM Input Jack       | 14 - Battery Cover Lock |
| 4 - RANGE Button          | 10 - Positive Input Jack | 15 - Tilt Stand         |
| 5 - MAX/MIN Button        | 11 - NCV Detector        | 16 - Battery Cover      |
| 6 - HOLD/Backlight Button |                          |                         |



### 3.2. Symbols Used on LCD Display

- 1 - Auto Power Off
- 2 - Auto Ranging
- 3 - Maximum
- 4 - Minimum
- 5 - Display Hold
- 6 - Diode Test
- 7 - Continuity
- 8 - Relative Mode
- 9 - NCV Detection
- 10 - Live/Neutral Wire Measurement Function
- 11 - Degree Celsius/Degree Fahrenheit
- 12 - Units of Measure List
- 13 - Measurement Reading
- 14 - Low Battery
- 15 - Battery Test
- 16 - Minus Sign
- 17 - Direct Current
- 18 - Alternating Current



## 4. Button Function

### 4.1. MODE and REL Button

- Press the **MODE** Button to select AC/DC Voltage, AC/DC Current, Frequency, Duty Cycle, Ohms, Diode Test, Continuity or Capacitance, Temperature, NCV and Live.
- Hold down the **REL** Button to turn the Relative Function ON/OFF.
- The Relative function zeros out the reading on the display and stores it as a reference, subsequent readings will be displayed as the relative difference between the actual measurement and the stored reference value.

**Note:** REL does not work on Frequency, Diode Test, Continuity, NCV, Live.

### 4.2. RANGE Button

- When the meter is first turned on, it automatically goes into Auto Ranging.
- This automatically selects the best range for the measurements being made and is generally the best mode for most measurements.
- To manually select a range, perform the following:
  1. Press the **RANGE** Button, the “**AUTO**” display indicator will turn off.
  2. Press the **RANGE** Button to step through the available ranges until you select the range you want.
  3. Hold down the **RANGE** Button to exit the Manual Ranging mode and return to Auto Ranging.

### 4.3. MAX/MIN Button

1. Press the **MAX/MIN** Button to activate the MAX/MIN mode, the “**MAX**” indicator will appear on the LCD display, the meter will display and hold the maximum reading and will update when a higher “max” occurs.
2. Press the **MAX/MIN** Button again to view the lowest reading, the “**MIN**” indicator meter will appear on the LCD display, the meter will display and hold the minimum reading and will update when a lower “min” occurs.
3. Hold down the **MAX/MIN** Button to end MAX/MIN and return to normal operation.

**Note:** The meter does not auto range when the MAX/MIN mode is active, the display will read OL if the range is exceeded. When this occurs, exit MAX/MIN and use the RANGE button to select a high range. MAX/MIN does not work on Frequency, Duty Cycle, Diode Test, Continuity and Capacitance.


### 4.4. HOLD/Backlight Button

- Press the **HOLD/Backlight** Button to turn on/off the HOLD function.
- Hold down the **HOLD/Backlight** Button to turn the backlight on/off.

### 4.5. Auto Power Off

- The auto off feature will turn the meter off after 15 minutes.
- To disable the auto power off feature, hold down the **MODE** Button and turn the meter on.

## 4.6. Low Battery Indication

- The “” icon will appear in the lower left corner of the display when the battery voltage becomes low.
- Replace the battery when this appears.

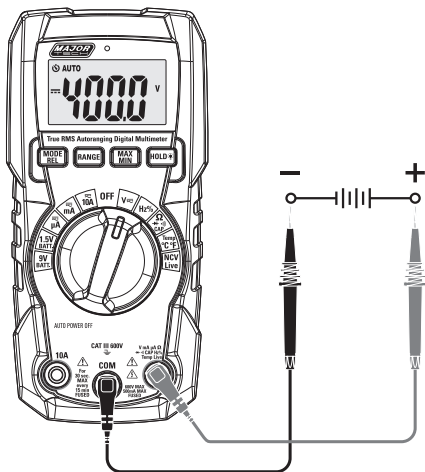
## 5. Operating Instructions

### 5.1. AC/DC Voltage Measurement

**WARNING:** Observe all safety precautions when working on live voltages.

**CAUTION:** Do not measure voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.

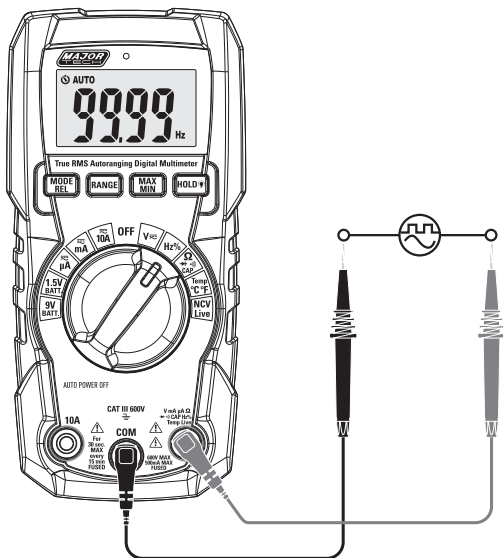
1. Set the rotatory function switch to the **VAC/DC** Position.
2. To select AC or DC voltage, press the **MODE** Button until the **AC** “~” or **DC** “—” symbol appears on the LCD display.
3. Insert the black test lead banana plug into the negative **COM** Input Jack; Insert the red test lead banana plug into the **Positive** Input Jack.
4. Touch the black test probe tip to the negative side of the circuit; Touch the red test probe tip to the positive side of the circuit.
5. Read the voltage on the LCD display.



## 5.2. Frequency/Duty Cycle Measurement (Electronic)

**WARNING:** Observe all safety precautions when working on live voltages.

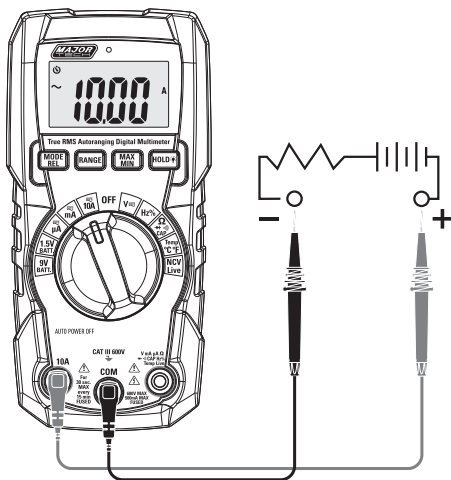
1. Set the rotatory function switch to the **Hz/%** Position.
2. Insert the black test lead banana plug into the negative **COM** Input Jack; Insert the red test lead banana plug into the **Positive** Input Jack.
3. Touch the test probe tips to the circuit under test.
4. Read the frequency on the display.
5. Press the **MODE** Button again to indicate “%” on the display.
6. Read the % of duty cycle on the display.



### 5.3. AC/DC Current Measurement

**WARNING:** Observe all safety precautions when working on live circuits. Measurements in the 10A range should be limited to 30 seconds maximum every 15 minutes.

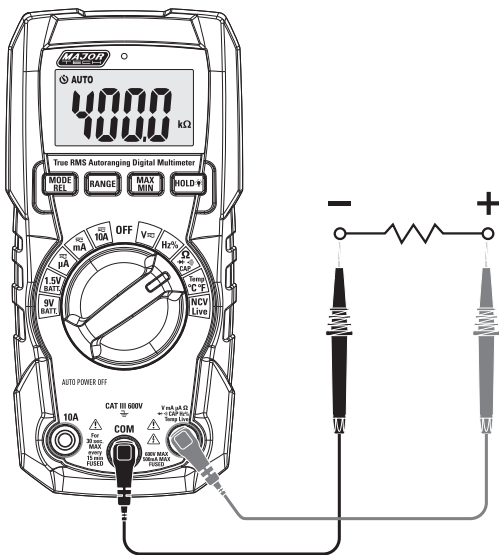
1. Insert the black test lead banana plug into the **COM** Input Jack.
2. For current measurements up to **10A** AC/DC, set the rotary function switch to the **10A** Position and Insert the red test lead into the **10A** Input Jack.
3. For current measurements up to **400mA** AC/DC, set the rotary function switch to the **mA** Position and Insert the red test lead into the **Positive** Input Jack.
4. For current measurements up to **4000 $\mu$ A** AC/DC, set the rotary function switch to the  **$\mu$ A** Position and Insert the red test lead into the **Positive** Input Jack.
5. Press the **MODE** Button to select AC or DC current, the **AC** “~” or **DC** “—” symbol will be shown on the LCD display.
6. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
7. Touch the black test probe tip to the neutral side of the circuit; Touch the red test probe tip to the “hot” side of the circuit.
8. Apply power to the circuit, Read the current on the LCD display.



## 5.4. Resistance Measurement

**WARNING:** Never test resistance on a live circuit.

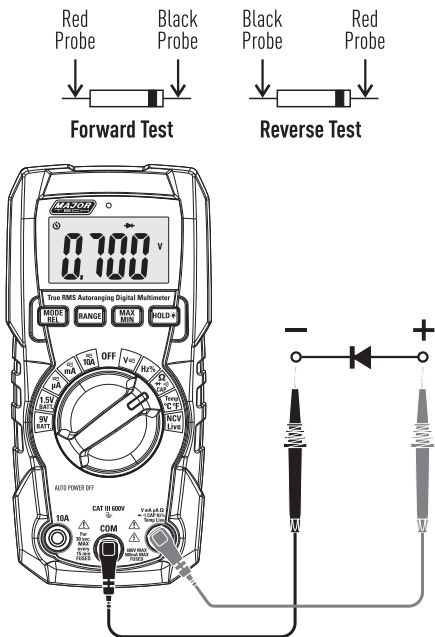
1. Set the rotary function switch to the  $\Omega$   $\rightarrow$  CAP Position.
2. Press the **MODE** Button until the “ $\Omega$ ” symbol appears on the LCD display.
3. Insert the black test lead banana plug into the negative **COM** Input Jack; Insert the red test lead banana plug into the **Positive** Input Jack.
4. Touch the test lead probes to the component under test, if the component is installed in a circuit, it is best to disconnect one side before testing to eliminate interference with other devices.
5. Read the resistance on the LCD display.



## 5.5. Diode Test



**WARNING:** Never test diodes on a live circuit.

1. Set the rotary function switch to the  $\Omega \rightarrow \rightarrow$  CAP Position.
2. Press the **MODE** Button until the “ $\rightarrow$ ” symbol appears on the LCD display.
3. Insert the black test lead banana plug into the negative **COM** Input Jack; Insert the red test lead banana plug into the **Positive** Input Jack.
4. Touch the test lead probes to the diode under test.
5. Forward voltage will indicate 0.4 to 0.7V on the LCD display; Reverse voltage will indicate “OL”; Shorted devices will indicate near 0 and an open device will indicate “OL” in both polarities.



## 5.6. Continuity Check

**WARNING:** Never test continuity on a live circuit.

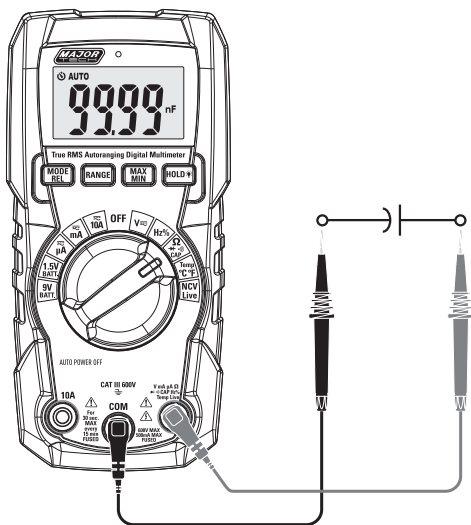
1. Set the rotary function switch to the  $\Omega$   CAP Position.
2. Press the **MODE** Button until the “” symbol appears on the LCD display.
3. Insert the black test lead banana plug into the negative **COM** Input Jack; Insert the red test lead banana plug into the **Positive** Input Jack.
4. Touch the test lead probes to the device or wire under test.
5. A beeper will sound if the resistance is approx. 50 ohms or less and the resistance reading will be shown on the LCD display.



## 5.7. Capacitance Measurement

**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.

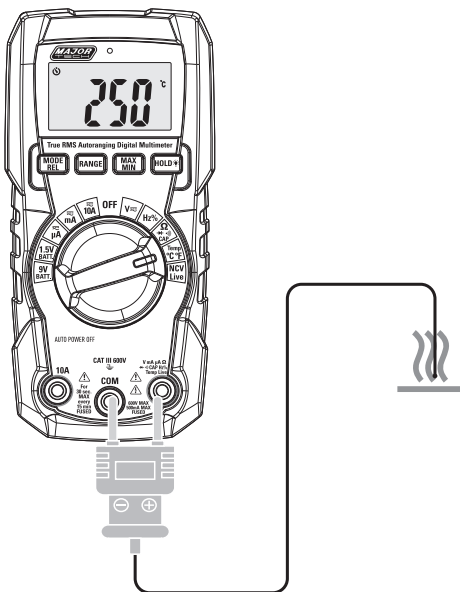
1. Set the rotary function switch to the  $\Omega$   $\rightarrow$  CAP Position.
2. Press the **MODE** Button until the “nF” symbol appears on the LCD display.
3. Insert the black test lead banana plug into the negative **COM** Input Jack; Insert the red test lead banana plug into the **Positive** Input Jack.
4. Touch the test leads to the capacitor to be tested, wait until the readings settle before ending the test.
5. Read the capacitance value on the display.



## 5.8. Temperature Measurement

**WARNING:** Do not touch the temperature probe to live circuits.

1. Set the function switch to the **Temp** Position.
2. Press the **MODE** Button to indicate **°C** or **°F**.
3. Connect the temperature probe to the banana plug adapter, note the - and + markings on the adapter.
4. Connect the adapter to the meter, making sure the - side goes into the **COM** Input Jack and the + side goes into the **Positive** Input Jack.
5. Touch the tip of the temperature probe to the object being measured.
6. Read the temperature on the LCD display.



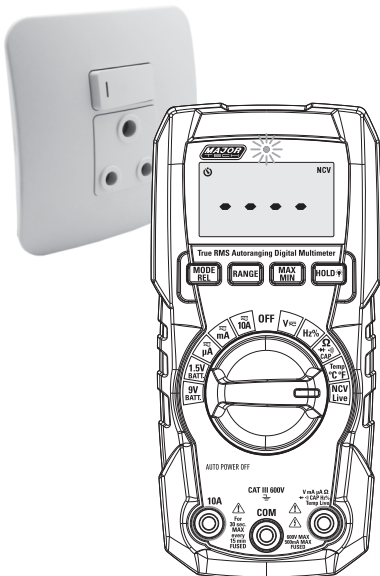
## 5.9. Non-Contact AC Voltage Detection

**WARNING:** Risk of Electrocution. Before use, always test the Voltage Detector on a known live circuit to verify proper operation.

1. Set the rotary function switch to the **NCV/Live** Position.
2. Press the **MODE** Button to select readings in “**NCV**”.
3. Hold the detector close to the AC voltage being tested.
4. If no signal is detected, the LCD will show “**EF**”, the NCV indicator light will not flash and the buzzer sound will not trigger.
5. According to the detected signal strength, LCD displays different horizontal lines.
  - When the signal is strongest, the LCD displays four horizontal lines, when the signal is weakest, only one line.
  - Meanwhile, the NCV indicator light flashes and the buzzer triggers a different sound.

**Note:** The sensing level varies with the distance between the sensing part and the measured AC power cord.

**Note:** The detector is designed with high sensitivity. Static electricity or other sources of energy may randomly trip the sensor. This is normal operation.



## 5.10. Contact Type Live/Neutral Wire Measurement

**WARNING:** Risk of Electrocution. Before use, always test the Voltage Detector on a known live circuit to verify proper operation.

1. Set the rotary function switch to the **NCV/Live** Position.
2. Press the **MODE** Button to select readings in “**Live**”.
3. Insert the red test lead into the **Positive** Input Jack.
4. Do not connect any test leads or conductors to the other two terminals.
5. Touch the red test lead probes to the AC power socket.
  - If no signal is detected, the LCD will show “----”, the NCV indicator light will not flash and the buzzer sound will not trigger.
  - When the signal is detected, the LCD displays “**Live**”, the NCV indicator light flashes and the buzzer sound is triggered.



## 5.11. Battery Test

**WARNING:** Do not connect to circuits that exceed 20V AC RMS or 20V DC when the meter is set to 1.5V or 9V BATT Position.

1. Set the rotary function switch to the **1.5V** or **9V** BATT. Position.
2. Insert the black test lead banana plug into the negative **COM** Input Jack; Insert the red test lead banana plug into the **Positive** Input Jack.
3. Connect the red test lead to the positive side of the battery and the black test lead to the negative side of the battery.
4. Read the voltage in the display.

	Good	Weak	Bad
9V battery	>8.2V	7.2 to 8.2V	<7.2V
1.5V battery	>1.35V	1.22 to 1.35V	<1.22V



## 6. Maintenance and Cleaning

This Multimeter is designed to provide years of dependable service, if the following care instructions are performed:

1. Keep the meter dry, if it gets wet, wipe it off.
2. Use and store the meter in normal temperatures, temperature extremes can shorten the life of the electronic parts and distort or melt plastic parts.
3. Handle the meter gently and carefully, dropping it can damage the electronic parts or the case.
4. Keep the meter clean, wipe the case occasionally with a damp cloth, do not use chemicals, cleaning solvents, or detergents.
5. Use only fresh batteries of the recommended size and type, remove old or weak batteries so they do not leak and damage the unit.
6. If the meter is to be stored for a long period of time, the batteries should be removed to prevent damage to the unit.

## 7. Replacing The Battery

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

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

1. Contrarotate 180 degrees to open the back cover of battery.
2. Replace old batteries with two "AAA" 1.5V batteries.
3. Re-assemble the meter.

## 8. Replacing The Fuses

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

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

1. Disconnect the test leads from the meter.
2. Contrarotate 180 degrees to open the back cover of battery for the 500mA/600V fast and remove the rear cover for the 10A/600V fast.
3. Gently remove the old fuse and install the new fuse into the holder.
4. Always use a fuse of the proper size and value (500mA/600V fast blow for the  $\mu$ A/mA range or 10A/600V fast blow for the 10A range).
5. Replace and secure the rear cover.

## 9. Specifications

### 9.1. Specifications

Function	Range	Resolution	Accuracy
AC True RMS Voltage	4.000V	0.001V	$\pm(1.2\% + 3 \text{ digits})$
	40.00V	0.01V	$\pm(1.2\% + 5 \text{ digits})$
	400.0V	0.1V	
	600V	1V	

All AC voltage ranges are specified from 5% of range to 100% of range.

AC Voltage Bandwidth: 50Hz to 60Hz (All wave); 50Hz to 1kHz (Sine wave).

DC Voltage	400.0mV	0.1mV	$\pm(0.5\% + 8 \text{ digits})$
	4.000V	0.001V	
	40.00V	0.01V	
	400.0V	0.1V	
	600V	1V	

AC True RMS Current	400.0 $\mu$ A	0.1 $\mu$ A	$\pm(1.0\% + 5 \text{ digits})$
	4000 $\mu$ A	1 $\mu$ A	
	40.00mA	0.01mA	
	400.0mA	0.1mA	$\pm(1.2\% + 8 \text{ digits})$
	4.000A	0.001A	$\pm(2.0\% + 3 \text{ digits})$
	10.00A	0.01A	$\pm(2.0\% + 5 \text{ digits})$

All AC Current ranges are specified from 5% of range to 100% of range.

AC Current Bandwidth: 50Hz to 60Hz (All wave); 50Hz to 400Hz (Sine wave).

DC Current	400.0 $\mu$ A	0.1 $\mu$ A	$\pm(1.0\% + 5 \text{ digits})$
	4000 $\mu$ A	1 $\mu$ A	
	40.00mA	0.01mA	
	400.0mA	0.1mA	$\pm(1.0\% + 8 \text{ digits})$
	4.000A	0.001A	$\pm(2.0\% + 3 \text{ digits})$
	10.00A	0.01A	$\pm(2.0\% + 5 \text{ digits})$

Function	Range	Resolution	Accuracy
Resistance	400.0Ω	0.1Ω	±(1.2% + 5 digits)
	4.000kΩ	0.001kΩ	
	40.00kΩ	0.01kΩ	
	400.0kΩ	0.1kΩ	
	4.000MΩ	0.001MΩ	±(2.5% + 8 digits)
	40.00MΩ	0.01MΩ	±(3.0% + 8 digits)

Capacitance	99.99nF	0.01nF	±(3.5% + 40 digits)
	999.9nF	0.1nF	±(3.0% + 5 digits)
	9.999μF	0.001μF	
	99.99μF	0.01μF	±(3.5% + 5 digits)
	999.9μF	0.1μF	
	9.999mF	0.001mF	±(4.0% + 10 digits)
	99.9mF	0.01mF	±(5.0% + 20 digits)

Frequency (Electronic)	9.999Hz	0.001Hz	±(1.2% + 5 digits)
	99.99Hz	0.01Hz	
	999.9Hz	0.1Hz	
	9.999kHz	0.001kHz	
	99.99kHz	0.01kHz	
	999.9kHz	0.1kHz	
	9.999MHz	0.001MHz	

Sensitivity: >0.8V RMS while <100kHz; >3V RMS while >100kHz.

Duty Cycle	0.5% to 99.9%	0.1%	±(1.2% + 5 digits)
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Pulse width: 100μs-100ms; Frequency: 40Hz to 10kHz.


Temperature	-18 to 1000°C	1°C	±(1.5% + 5°C)
	0 to 1832°F	1°F	±(1.5% + 9°F)

**NOTE:** Accuracy is stated at 18 to 28°C (65 to 83°F) and less than 75%RH.

**NOTE:** Accuracy specifications consist of two elements:

- (% reading) - This is the accuracy of the measurement circuit.
- (+ digits) - This is the accuracy of the analog to digital converter.

## 9-2.General Specifications

Insulation	Class 2, Double Insulation
Diode Test	Test current approx.1mA , open circuit voltage of 3V typical
Continuity Test	Audible signal if the resistance is $<50\Omega$
Battery Test current	9V (approx.6mA); 1.5V (approx.30mA)
Low Battery Indication	"  is displayed
Display	4000 count LCD
Over Range Indication	"OL" is displayed
Polarity	Minus symbol "-" is displayed for negative polarity
Measurement Rate	3 readings per second, nominal
Auto Power Off	approx. 15 minutes
Input Impedance	$>10M\Omega$ AC and DC Voltage
AC Response	True RMS
AC Voltage Bandwidth	50Hz to 1kHz
AC Current Bandwidth	50Hz to 400Hz
Batteries	Two AAA 1.5V batteries
Fuse	10A/600V fast acting Fuse; 500mA/600V fast acting Fuse
Operating Environment	5 to 40°C (41 to 104°F)
Storage Environment	-10 to 50°C (14 to 122°F)
Operating Humidity	Max 80% up to 31°C (87°F) decreasing linearly to 50% at 40°C (104°F)
Storage Humidity	$<80\%$
Dimensions/Weight	154 x 74 x 43mm / Approx. 221g (No batteries)
Safety	Complies with UL 61010-1 v.3 for measurement Category III 600V, Pollution Degree 2 Probe assemblies to be used for Mains measurements shall be RATED as appropriate for Measurement Category III according to IEC 61010-31 and shall have a voltage RATING of at least the voltage of the circuit to be measured. Measurement Category III (CAT III) is applicable to test and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.



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