

TRUE RMS MULTIMETER

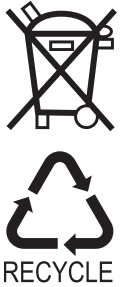


IMPORTANT SAFETY INFORMATION

Please read this manual thoroughly before use and store in a safe place for future reference

WARNING

- 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.
- Use caution on live circuits. Voltages above 30V AC rms, 42V AC peak or 60V DC pose a shock hazard.
- Verify operation before using meter by measuring a known live voltage.
- Measurements in the 10A range should be limited to 30 seconds maximum every 15 minutes.
- Never test resistance, diodes, or continuity on a live circuit.
- 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.
- Risk of Electrocution. Before use, always test the Voltage Detector on a known live circuit to verify proper operation.
- Do not touch the temperature probe to live circuits.
- Do not use the meter if the meter or test leads appear damaged.
- Do not use the meter in wet or damp environments or during electrical storms.
- Do not use the meter or near explosive vapours, dust, or gasses.
- Do not use the meter if it operates incorrectly, protection may be compromised.
- Do not use the 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.
- Do not measure voltages if a motor or the circuit is being switched ON or OFF. Large voltages surges may occur that can damage the meter.



FUNCTIONS

TRUE RMS

Provides a more accurate measure of AC signals that are imperfect waveforms

MULTI-TEST

Test everything from voltage and frequency, resistance, and continuity along with the ability to test diodes and temperature

NON-CONTACT VOLTAGE DETECTION

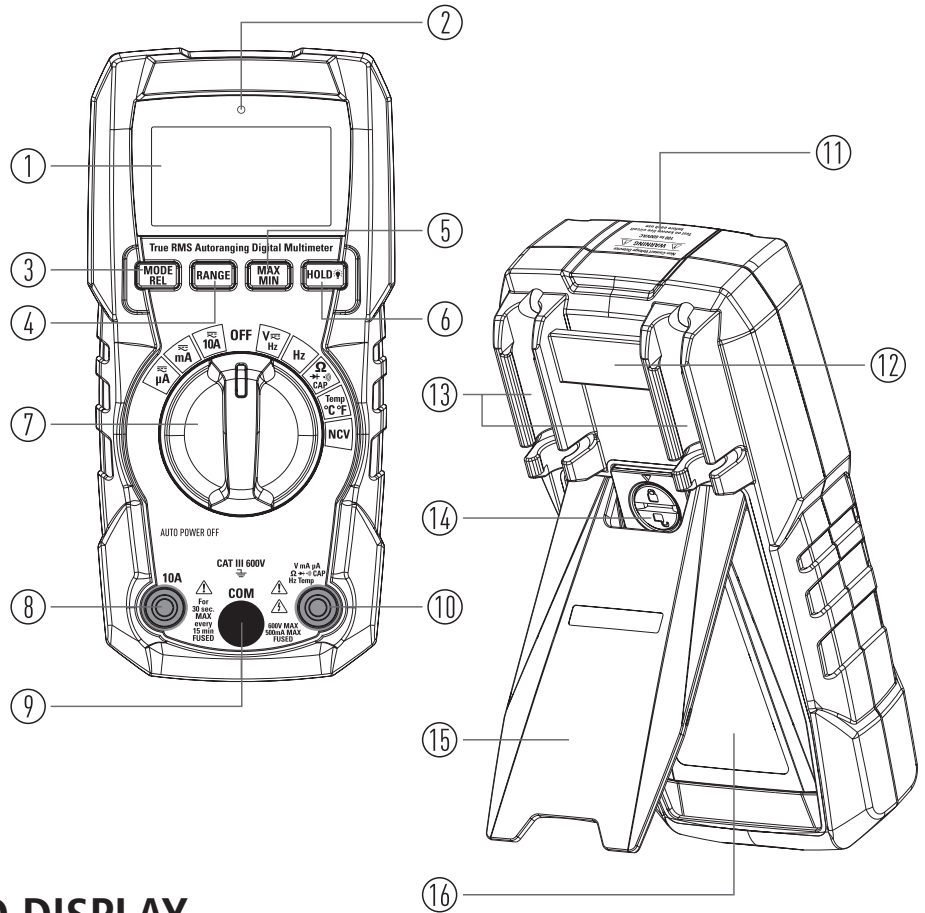
Safely measure AC live voltage without even touching the circuit

LCD DISPLAY

An illuminated digital LCD display will ensure clear and precise data

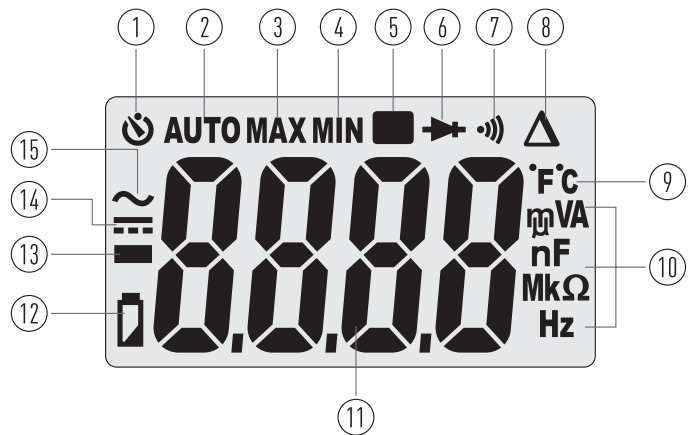
PRODUCT OVERVIEW

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



SYMBOLS USED ON LCD DISPLAY

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



BUTTON FUNCTIONS

MODE AND REL (RELATIVE) BUTTON

- Press the MODE button to select AC/DC Voltage, AC/DC Current, Frequency, Ohms, Diode Test, Continuity or Capacitance, Temperature.
- Press the REL button for >2 seconds to turn on or off the Relative function.
- The Relative function zeros out the reading difference between the actual measurement and the store reference value.

NOTE: REL does not work on Frequency, Diode Test, Continuity

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.
- For measurement situations requiring that a range be manually selected, perform the following:
 1. Press the RANGE button, the "AUTO" display indicator will turn off.
 2. Press the RANGE button to cycle through the ranges until you select the range you want.
 3. Press and hold the RANGE button for 2 seconds to exit the Manual Ranging mode and return Auto Ranging.

MAX/MIN BUTTON

1. Momentarily 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. Momentarily press the MAX/MIN button again to view the lower reading, "MIN" indicator will appear on the LCD display, the meter will display and hold the maximum reading and will update when a lower "min" occurs.
3. Press and hold 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 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.


HOLD/BACKLIGHT BUTTON

- Press the HOLD/Backlight button to turn on or off the HOLD function.
- Press the HOLD/Backlight button for >2 seconds to turn on or off the Backlight function.



AUTO POWER OFF

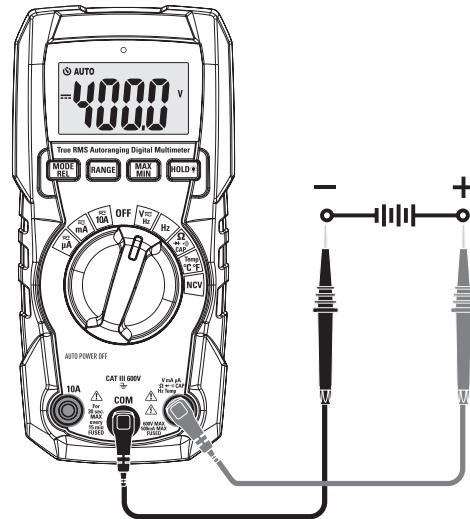
- The auto off feature will turn the meter off after 15 minutes.
- To disable the auto power off feature, hold down the MODE button and turn the meter on.

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.

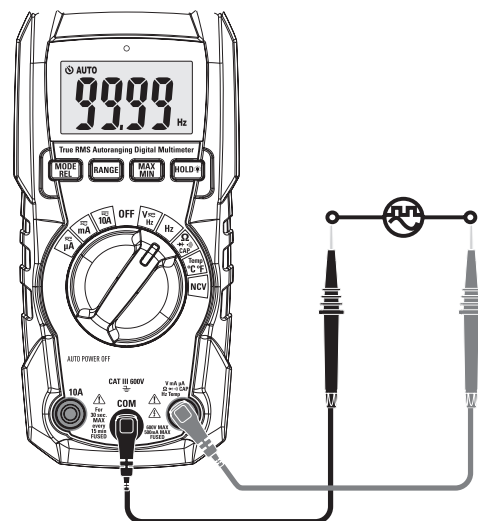
AC/DC VOLTAGE (FREQUENCY) MEASUREMENT

1. Set the rotary function switch to the V AC/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.
6. Press the MODE Button to indicate Hz.
7. Read the frequency in the display.





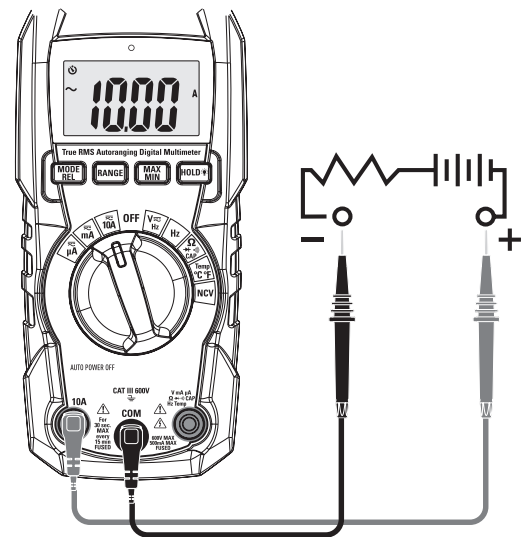
FREQUENCY (ELECTRONIC) MEASUREMENT

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 in the display.



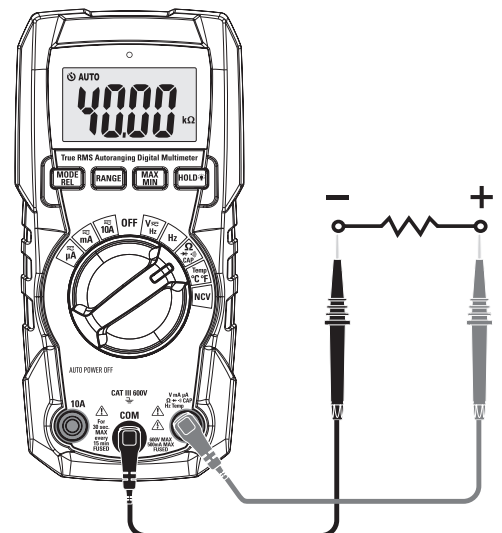
AC/DC CURRENT MEASUREMENT

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 μ A AC/DC, set the rotary function switch to the μ A position and insert the red test lead into the Positive Input Jack.
5. To select AC or DC current, press the MODE button until the AC  or DC  symbol appears 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.
9. Read the current in the display.



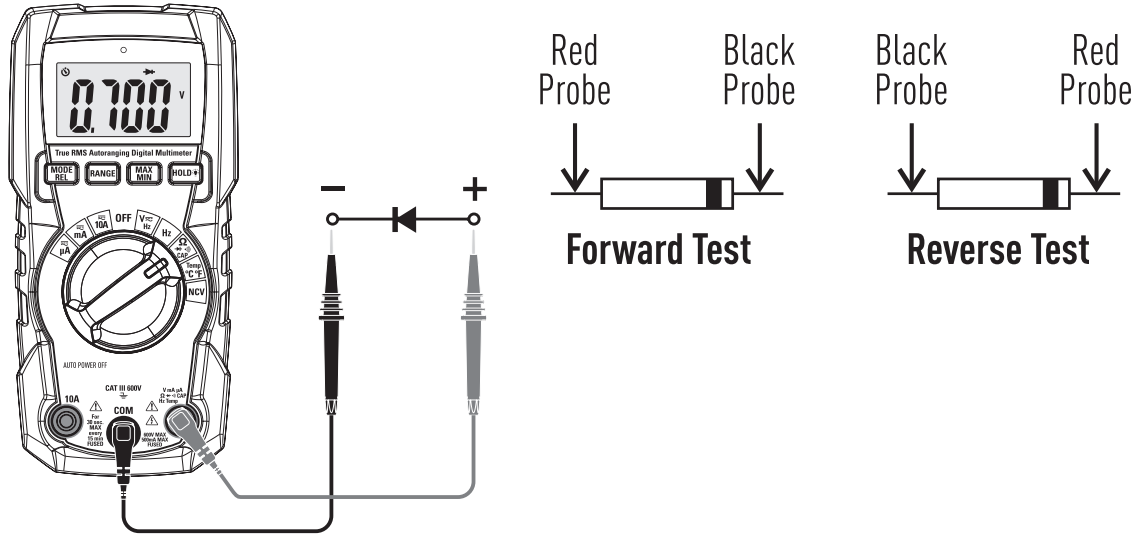
RESISTANCE MEASUREMENT

1. Set the rotary function switch to the Ω position.
2. Press the MODE button until the Ω 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 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 in on the display.



DIODE TEST

1. Set the rotary function switch to the Ω \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 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.



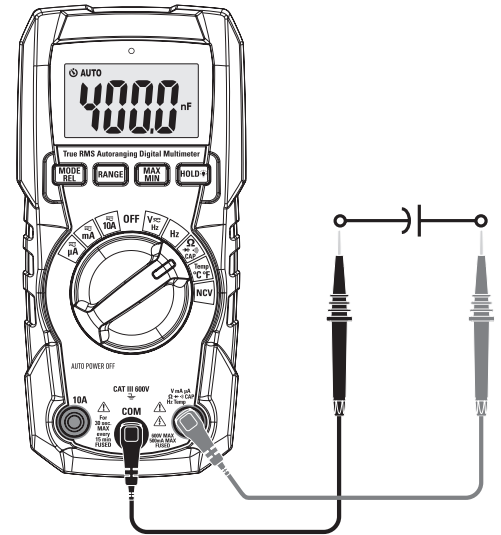
CONTINUITY CHECK

1. Set the rotary function switch to the Ω \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 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 approximately 50ohms or less and the resistance reading will be shown on the display.



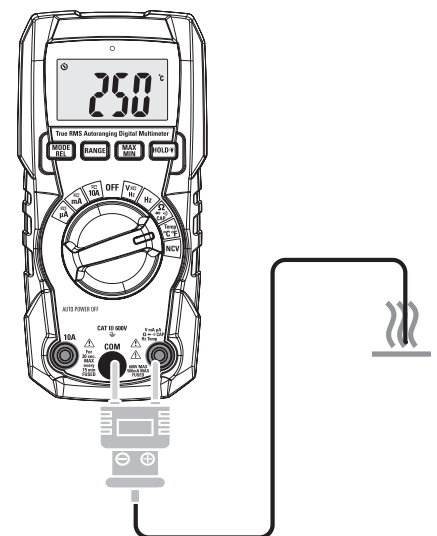
CAPACITANCE MEASUREMENT

1. Set the rotatory function switch to the $\Omega \cdot \text{CAP}$ 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 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 in the display.



TEMPERATURE MEASUREMENT

1. Set the function switch to the Temp position.
2. Press the MODE button until the oC or oF.
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 in the display.



NON-CONTACT AC VOLTAGE DETECTION

1. Set the rotary function switch to the NCV position.
2. Hold the detector close to the AC voltage being tested.
3. If no signal is detected, the LCD will show "EF", NCV indicator light will not flash and the buzzer will not sound.
4. According to the detected signal strength, LCD displays different horizontal lines.
 - When the signal is strongest, four horizontal lines will appear on the LCD display.
 - When the signal is weakest, only one horizontal line will appear.
 - Meanwhile, NCV indicator light flashes and the buzzer make 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.



REPLACING THE BATTERY

1. Make sure to disconnect the test leads from any source of voltage before removing battery cover.
2. Counterrotate 180 degrees to open the back cover of battery.
3. Replace old batteries with two AAA 1.5V batteries.
4. Reassemble the meter.

REPLACING THE FUSES

1. Disconnect the test leads from the meter.
2. Counterrotate 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 μ A/mA range or 10A/600V fast blow for the 10A range).
5. Replace and secure the rear cover.

GENERAL SPECIFICATIONS

Insulation	Class 2, Double Insulation
Diode Test	Test current approx.1 mA , open circuit voltage of 2V typical
Continuity Test	Audible signal if the resistance is <50Ω
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	> 10MΩ 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	154x7 4x43mm / Approx. 21 Og [No batteries]
Safety	Complies with UL 61010-1 v.3 for measurement Category III600V, Pollution Degree 2.

ELECTRICAL SPECIFICATIONS

FUNCTION	RANGE	RESOLUTION	ACCURACY
AC True RMS Voltage	4.000V	0.001V	± (1.2% + 3 digits)
	40.00V	0.01V	
	400.0V	0.1V	± (1.2% +5 digits)
	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	400.00mV	0.1mV	± (0.5% + 8 digits)
	4.000V	0.001V	
	40.00V	0.01V	
	400.0V	0.1V	
	600V	1V	

AC True RMS Current	400.0μA	0.1μA	± (1.0% +5 digits)
	4000μA	1μA	
	40.00mA	0.01mA	
	400.0mA	0.1mA	± (1.2% + 8 digits)
	4.000A	0.001A	± (2.0% + 3 digits)
	10.00A	0.01A	± (2.0% + 5 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).

FUNCTION	RANGE	RESOLUTION	ACCURACY
DC Current	400.0μA	0.1μA	± (1.0% + 5 digits)
	4000μA	1μA	
	40.00mA	0.01mA	
	400.0mA	0.1mA	± (1.0% + 8 digits)
	4.000A	0.001A	± (2.0% + 3 digits)
	10.00A	0.01A	± (2.0% + 5 digits)

Temperature	-18 to 1000oC	1oC	± (1.5% +5oC)
	0 to 1832oF	1oF	± (1.5% + 9oF)

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	4.000nF	0.001nF	± (3.5% + 60 digits)
	40.00nF	0.01nF	± (3.5% + 10 digits)
	400.0nF	0.1nF	
	4.000μF	0.001μF	± (4.0% + 5 digits)
	40.00μF	0.01μF	
	400.0μF	0.1μF	± (3.5% + 5 digits)
	4.000mF	0.001mF	

FUNCTION	RANGE	RESOLUTION	ACCURACY
Frequency (Electrical)	4.000Hz	0.001Hz	± (1.2% + 5 digits)
	40.00Hz	0.01Hz	
	400.0Hz	0.1Hz	
	4.000kHz	0.001kHz	
	10.00kHz	0.01kHz	

Sensitivity: >15V RMS			
Frequency (Electronic)	2.000Hz~4.000Hz	0.001Hz	± (1.2% + 5 digits)
	40.00Hz	0.01Hz	
	400.0Hz	0.1Hz	
	4.000kHz	0.001kHz	
	40.00kHz	0.01kHz	
	400.0kHz	0.1kHz	
	4.000MHz	0.001MHz	
	10.00MHz	0.01MHz	

>0.8V RMS while 100kHz; 3V RMS while > 100kHz

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.

WARRANTY STATEMENT

Brown & Watson International Pty Ltd ("BWI") of 1500 Ferntree Gully Road, Knoxfield, Vic., telephone (03) 9730 6000, fax (03) 9730 6050, warrants that all products described in its current catalogue will under normal use and service be free of failures in material and workmanship for a period of three (3) years from the date of the original purchase by the customer as marked on the invoice. This warranty does not cover ordinary wear and tear, abuse, alteration of products or damage caused by the purchaser.

To make a warranty claim the consumer must deliver the product at their cost to the original place of purchase or to any other place which may be nominated by either BWI or the retailer from where the product was bought in order that the warranty assessment may be performed. The consumer must also deliver the original invoice evidencing the date and place of purchase together with an explanation in writing as to the nature of the claim. In the event that the claim is determined to be for a minor failure of the product then BWI reserves the right to repair or replace it at its discretion. In the event that a major failure is determined the consumer will be entitled to a replacement or a refund as well as compensation for any other reasonably foreseeable loss or damage.

This warranty is in addition to any other rights or remedies that the consumer may have under State or Federal legislation.

IMPORTANT NOTE

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

Distributed by AUSTRALIA

Brown & Watson International Pty. Ltd.
Knoxfield Victoria 3180
Phone: (03) 9730 6000
Fax: (03) 9730 6050
National Toll Free: 1800 113 443

NEW ZEALAND OFFICE Griffiths Equipment Ltd.

19 Bell Avenue,
Mount Wellington,
Auckland 1060, New Zealand
Phone: (09) 525 4575
Fax: (09) 579 1192