



## INSTRUCTION MANUAL

### MT785

# 1500V DC H&W ANALYSIS CLAMP METER WITH DATA LOGGER & MOBILE APP





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## 1. INTRODUCTION

The instrument carries out the following measurements:

- AC TRMS voltage
- DC voltage and AC+DC TRMS voltage
- Phase sequence
- Active, reactive, apparent power and power factor on single-phase
- Active, reactive, apparent energy on single-phase systems
- AC voltage harmonics (1-25) and THD% up to 75Hz (1-8 above 75Hz)
- AC current harmonics (1-25) and THD% up to 75Hz (1-8 above 75Hz)
- DC power
- Frequency on voltage (leads) and current (clamp jaw)
- Resistance and continuity test with buzzer
- Diode and Capacitance
- Frequency and Duty Cycle
- Temperature with K-type Probe
- Electric motor starting currents (INRUSH)
- Memory Function
- Menu Function

## 2. SAFETY

### 2.1. Safety Information



This symbol, adjacent to another symbol or terminal, indicates the user must refer to the manual for further information.



This symbol, adjacent to a terminal, indicates that, under normal use, hazardous voltages may be present.



Double insulation.



Application around and removal from uninsulated hazardous live conductors is permitted.

### 2.2. Safety Notes

- Do not exceed the maximum allowable input range of any function.
- Do not apply voltage to meter when resistance function is selected.
- Set the function switch OFF when the meter is not in use.
- Remove the battery if meter is to be stored for longer than 60 days.

### 2.3. Warnings

- Set function switch to the appropriate position before measuring.
- When measuring volts do not switch to current/resistance modes.

- Do not measure current on a circuit whose voltage exceeds 1000V.
- When changing ranges always disconnect the test leads from the circuit under test.
- Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## 2.4. Cautions

- Read and understand this user manual before operating the meter.
- Improper use of this meter can cause damage, shock, injury or death.
- Always remove the test leads before replacing the battery .
- If the test leads need to be replaced, you must use a new one which should meet EN 61010-031 standard.
- Inspect the condition of the test leads and the meter itself for any damage before operating the meter, repair or replace any damage before use.
- Use great care when making measurements if the voltages are greater than 25VAC rms or 35VDC, these voltages are considered a shock hazard.
- Always discharge capacitors and remove power from the device under test before performing Diode, Resistance or Continuity tests.
- Voltage checks on electrical outlets can be difficult and misleading because of the uncertainty of connection to the recessed electrical contacts, other means should be used to ensure that the terminals are not "live".
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

## 2.5. Input Protection Limits

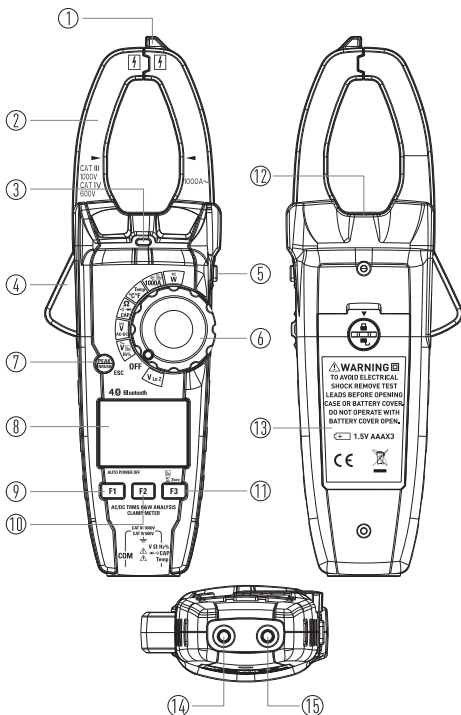
Function	Resolution
V DC or V AC	1500V DC/1000V AC
THD	1500V DC/1000V AC
1000A AC	1000A MAX
Power	550V DC/AC RMS
AC+DC Measurement	1000V DC/AC RMS

Surge Protection: 8kV peak per IEC 61010

### 3. DESCRIPTION

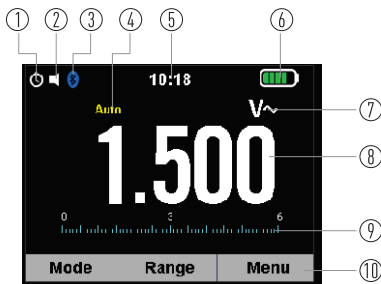
#### 3.1. Meter Description

- |  |                          |
|--|--------------------------|
| 1 - NCV Test                               | 8 - LCD Display          |
| 2 - Current Clamp                          | 9 - F1 Button            |
| 3 - Non-Contact AC Voltage Indicator Light | 10 - F2 Button           |
| 4 - Clamp Trigger                          | 11 - F3 Button           |
| 5 - Data Hold/Flashlight Button            | 12 - Flashlight          |
| 6 - Rotary Function Switch                 | 13 - Battery Cover       |
| 7 - Peak/Inrush/ESC Button                 | 14 - COM Input Jack      |
|  | 15 - Positive Input Jack |



## 3.2. Display Icons Description

- 1 - Auto Power Off
- 2 - Key Beeper
- 3 - Bluetooth
- 4 - Automatic/Manual Mode
- 5 - System's Time
- 6 - Battery Capacity
- 7 - Measuring Unit
- 8 - Measuring Result
- 9 - Analogue Bar Graph
- 10 - Indications Associated with Function Keys



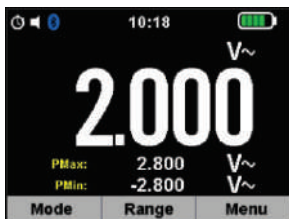
## 3.3. Description of Function Keys

### 3.3.1. Peak/Inrush/ESC Button

#### • PEAK Function

**Note:** Only ACV functions can do the peak value measurement.

1. PEAK Key is the peak value measurement key that acts with trigger.
2. In ACV functions, press the Peak/Inrush/ESC Button to activate the detection of Maximum and Minimum peak values of AC Voltage with a response time of 1ms, both values are constantly updated and are displayed cyclically every time the same key is pressed again.
3. The display shows the symbol associated with the selected function: "PMax" for maximum peak value, "PMin" for minimum peak value.

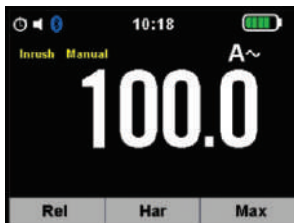




- Inrush Function

**Note:** Only ACA functions can do the INRUSH value measurement.

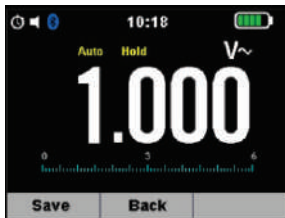
1. Switch motor off and put the clamp meter on the motor.
2. Press the Peak/Inrush/ESC Button, "----" will appear in the display.
3. Switch motor on and then read the value on the display.



- ESC it goes back to a normal measuring mode.

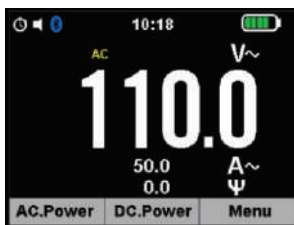
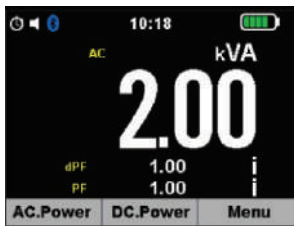
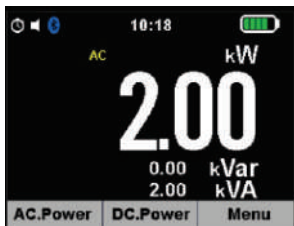
### 3.3.2. Data Hold/Flashlight Button

- To freeze the LCD reading, press the **Data Hold/Flashlight** Button.
- While data hold is active, the HOLD icon appears on the LCD, press the **Data Hold/Flashlight** Button again to return to normal operation.
- Press and hold the Data Hold/Flashlight Button for more than 1 second to turn the Flashlight on, press again to turn the Flashlight off.



### 3.3.3. F1,F2,F3 Software Key

- F1 Software Key: Default switch to MODE Function, AC POWER Function and SAVE Button.

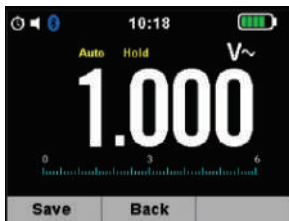


- F2 Software Key: Default into RANGE Button, the rotary switch function.
- F3 Software Key: Default into Menu Button.

## 3.4. Description of Internal Functions

### 3.4.1. Save Function

1. Press the Data Hold/Flashlight Button to freeze the result, the message "Hold" appears on the display.
2. Press the F1 (Save) Key to save the data in the instrument's memory.



### 3.4.2. Relative Values

1. To activate the relative mode, press and hold the F3 Key for more than 2 second to enter the selection interface.
2. Press and hold the F1 Key to enter relative measurement, the message REL and symbol "Rel" appear on the display.



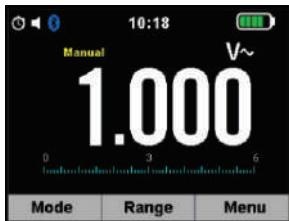
### 3.4.3. MIN/MAX Values

1. Press and hold the F3 Key for more than 2 second to enter the selection interface.
2. Press the F3 Key again to enter MAX MIN measurement, the message "Max" and symbol "MAX MIN" appear on the display.



### 3.4.4. Range Function

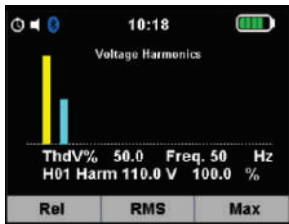
1. Into manual range and select range of the measure.
2. If pressing the Range Button for greater than 1 second will return to Auto Range.



## 3.5. Individual Harmonic Measurement Function

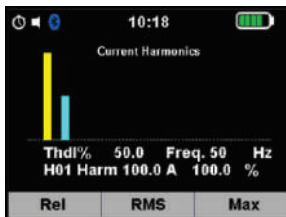
### 3.5.1. Voltage Measurement Mode

1. Press and hold the F3 Button for more than 2 second to enter the selection interface.
2. Press the F2 (Har) Button to enter Harmonic Measurement, press the F2 Button again to go back.
3. Press the F1 (<<) and F3 (>>) Button to select symbol "H01~H25".



### 3.5.2. Current Measurement Mode

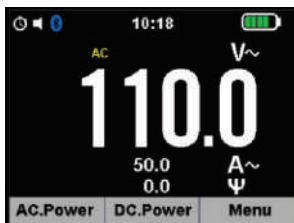
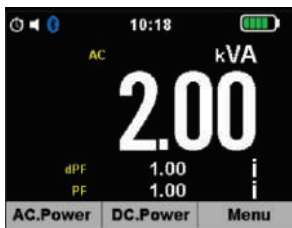
1. Press and hold the F3 Button for more than 2 second to enter the selection interface.
2. Press the F2 (Har) Button to enter Harmonic Measurement, press the F2 Button again to go back.
3. Press the F1 (<<) and F3 (>>) to select symbol "H01~H25"



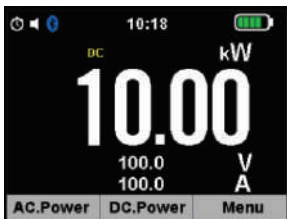
### 3.5.3. Power Measurement Mode

The AC power test interface is displayed by default, showing active power, reactive power, and visual power.

1. Press the F1 Button access to power factors and displacement power factor measurements, in the in-entry voltage, current and phase angle test interface.



2. Press the **F2** Button to enter the DC Power test interface, which measures DC Power, DC Current, DC Voltage.

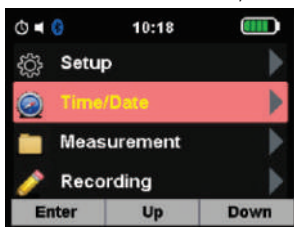


3. Press and hold the **F3** Button to enter the Harmonic Voltage Current Analysis interface of power, including Voltage Harmonic Analysis Maps, Harmonic Current Analysis Maps and Electrical Energy Testing.
4. Press the **F1** Button to enter the Current Harmonic Test.
5. Press the **F2** Button to enter the Voltage Harmonic Test.
6. Press the **F3** Button to enter the Power Test, press the **F1** Button to start the Clock, press the **F2** Button returns to the Previous Menu, press the **F3** Button stops the Power Test, press the **F1** Button saves the test results again, press the **F2** Button returns to the Previous Menu.



### 3.6. Main Menu

- Press the **F3** Button to enter the selection interface.
- Press the **F1** Button into selection menu, press the **F2** or **F3** Button to enter the Installation Settings interface, which can set the Key Sound, Automatic Shutdown Time, Time Display Format and Bluetooth On.



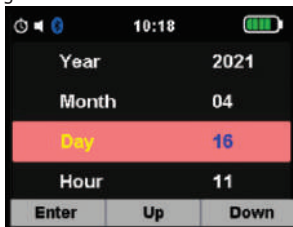
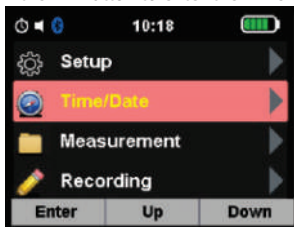
### 3.7. SETUP

Press the **F3** Button to enter the Installation Settings interface, you can set the Key Sound, Automatic Shutdown Time, Time Format, Bluetooth Switch.

- **Key Sound:** Allows activating/deactivating the tone of the function keys.
- **AP0 Time:** Allows defining the instrument's auto power off interval when idling in the five options: 15/30/45/60/OFF mins, Set value OFF to disable the function; Press F3 Button to switch on the instrument again after it has automatically switched off.
- **12 Hour:** Allows defining the format of the system time between the options: 12 Hours "On" and 24 Hours (Off).
- **Bluetooth:** Allows setting Bluetooth to turn on or off.

### 3.8. Time/Date

- Press the **F3** Button to enter the Settings Interface.
- Press the **F2** and **F3** Button to select the Time Setting Mode and press the **F1** Button to enter the Time Setting.

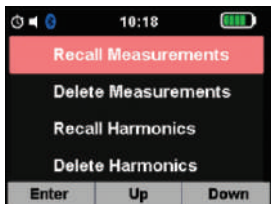


### 3.9. Measurement

Press the **F3** Button to enter the Settings Interface, press the **F2** and **F3** Button to Select Mode.

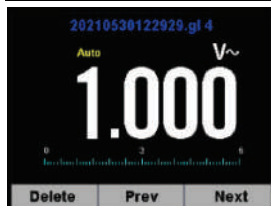
### 3.9.1. Recall Measurements

- Press the **F1** Button to enter the data view, F1 deletes the data, F2 turns up, F3 turns down.
- Press the **ESC** Button to exit the view.



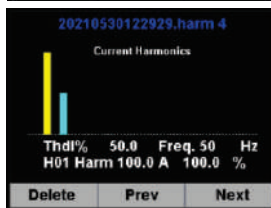
### 3.9.2. Delete Measurements

- Press the **F1** Button to enter the data view, F1 delete the data, F3 returns to the Previous Menu.
- Press the **ESC** Button to exit the view.



### 3.9.3. Recall Harmonics

- Press the **F1** Button to enter the data view, F1 to delete the data, F2 to turn the page up, F3 to enter the TREND Menu.
- Press the **ESC** Button to exit the view.



### 3.9.4. Delete Harmonics

- Press the F1 Button to enter the data view, F1 delete the data, F3 returns to the Previous Menu.
- Press the ESC Button to exit the view.

## 3.10. Recording

- Press the **F3** Button to enter the Settings Interface, press the **F2** and **F3** Button selection mode, press the **F1** Button to enter the Record Settings and Selection Interface, press the **F1** Button to enter the Data Record, press the **F3** Button to Stop, select the corresponding key to complete the corresponding operation.
- Press the **ESC** Button to return to exit.

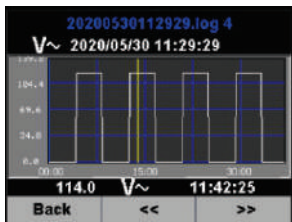
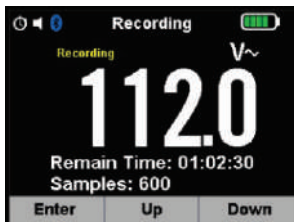


### 3.10.1. Start Recording

Start recording with **F1** and **F3** Button stop.

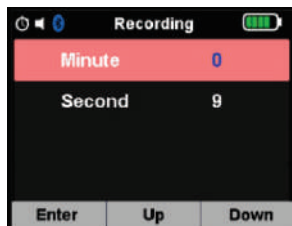
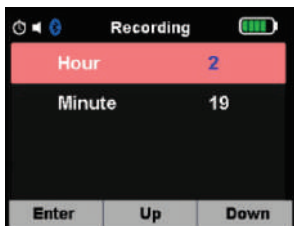
### 3.10.2. Recall Recordings

Press the **F1** Button to enter the Viewing Interface, **F1** to enter the record trend chart viewing interface, **F2** to turn up, **F3** to turn down the page.



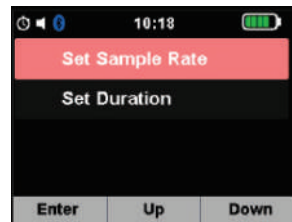
#### 1. Setup New Recording

Press the **F1** Button to enter the record installation interface, **F2** up, **F3** down.



#### 2.Delete Recordings

- Press the **F1** Button to enter the Data View, **F1** delete the data, **F3** returns to the Previous Menu.
- Press the **ESC** Button to exit the view.





### 3.11. Meter Info

- Press the **F3** Button to enter the Instrument Information Interface, **F1** returns to the Previous Menu.
- Press the **ESC** Button to exit.



### 3.12. Factory Set


- Press the **F3** Button to enter the Instrument Factory Settings Interface, **F1** OK, **F2** selection is, **F3** select NO.
- Press the **ESC** Button to exit.

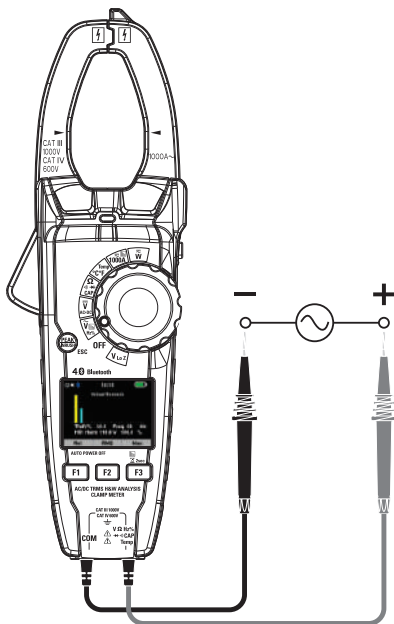


## 4. Operation

**Notes:** Read and understand all WARNING and CAUTION statements in this operation manual prior to using this meter.


### 4.1. Individual Harmonic Voltage Measurement

1. Set the function switch to the **VAC**  **Hz%** Position.
2. Insert the black test lead banana into the **COM** Input Jack; Insert the red test lead banana into the **Positive** Input Jack.
3. Press and hold the **F3** Button for more than 2 second to enter the selection interface and press the **F2 (Har)** Button to Enter Harmonic Measurement.
4. Select the "**Hn**" indicator then press the **F1** and **F3** Button to enter the individual harmonic mode.
5. Connect the test leads in parallel to the circuit under test.
6. Read the Harmonic Voltage Measurement on the LCD display.

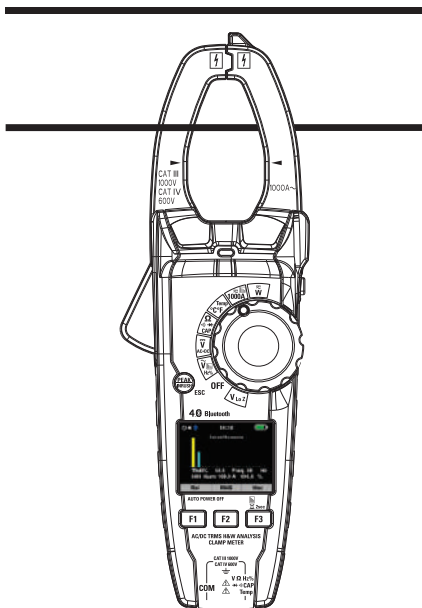


## 4.2. Individual Harmonic Current Measurement

**WARNING:** Ensure that the test leads are disconnected from the meter before making current clamp measurements.

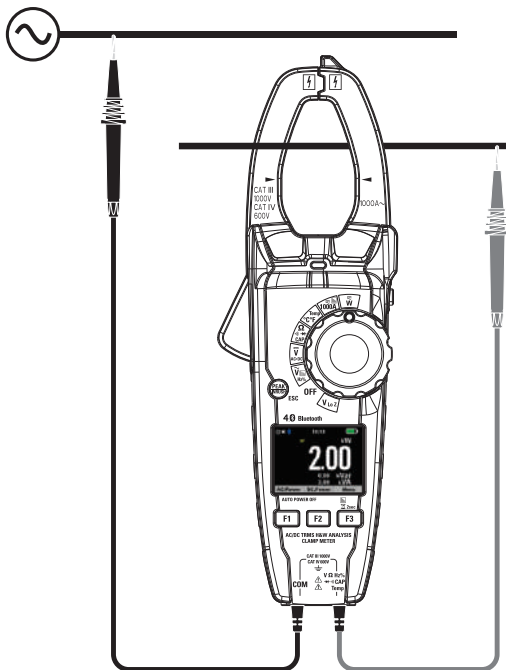
1. Set the function switch to the **1000A AC/DC**  Position.
2. Press and hold the **F3** Button for more than 2 second to enter the selection interface and press the **F2 (Har)** Button to enter Harmonic Measurement.
3. Select the **"Hn"** indicator then press the **F1** and **F3** Button to enter the individualharmonic mode.
4. Connect the clamp jaws to the circuit under test.
5. Read the Harmonic Current Measurement on the LCD display.

**Note:** The power measurement mode can also perform current harmonic measurement analysis.



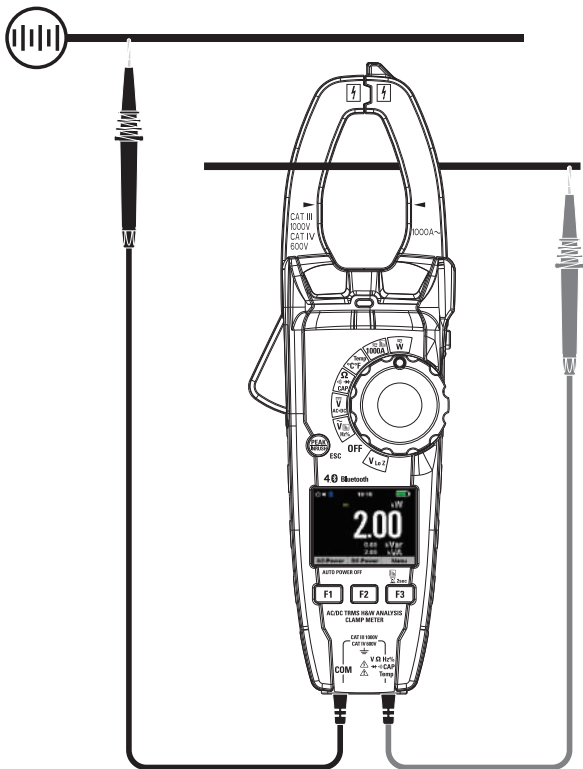
### 4.3. Measuring AC Power (Active, Apparent, Reactive)/Power Factor (PF)/Displace Power Factor

1. Set the rotary switch to the **W** Position.
2. Insert the black test lead banana into the **COM** Input Jack; Insert the red test lead banana into the **Positive** Input Jack.
3. Press the trigger to open the transformer jaws and clamp one conductor only, make sure that the jaw is firmly closed around the conductor.
4. Using the **F1** Button to choose the **AC Power** mode.



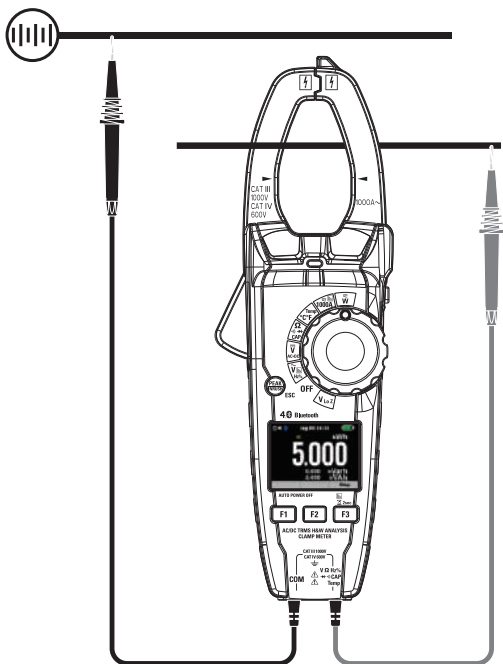
#### 4.4. Measuring DC Power

1. Set the rotary switch to the **W** Position.
2. Insert the black test lead banana into the **COM** Input Jack; Insert the red test lead banana into the **Positive** Input Jack.
3. Press the trigger to open the transformer jaws and clamp one conductor only, make sure that the jaw is firmly closed around the conductor.
4. Using the **F2** Button to choose the **DC Power** mode.



#### 4.5. Energy (Active, Apparent, Reactive)

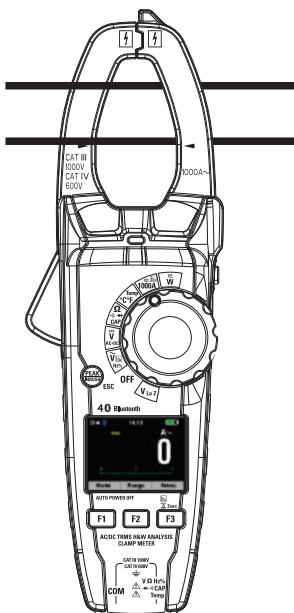
1. Set the rotary switch to the **W** Position.
2. Insert the black test lead banana into the **COM** Input Jack; Insert the red test lead banana into the **Positive** Input Jack.
3. Press the trigger to open the transformer jaws and clamp one conductor only, make sure that the jaw is firmly closed around the conductor.
4. Using the **F2** Button to choose the **DC Power** mode.
5. Press and hold the **F3** Button for more than 2 second to Enter the selection interface and press the **F3** Button to Enter Energy Measurement.
6. Use the F1 Button to select start, **F2** Button to select to return to the Previous Menu.



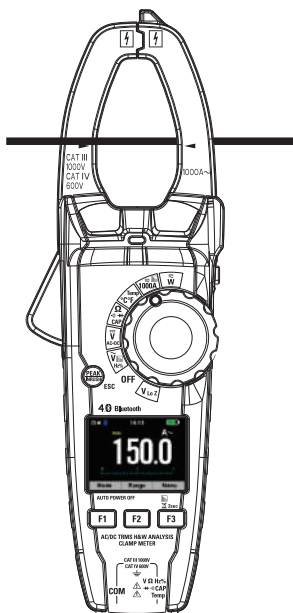
## 4.6. AC/DC Current Measurement

**WARNING:** Ensure that the test leads are disconnected from the meter before making current clamp measurements.

1. Set the Function Switch to the **1000A AC/DC** range.
2. In DC Current mode Press the F1 (REL) Button to zero the meter display.
3. Use the F1 (MODE) Button to select AC or DC Current.
4. Press the trigger to open jaw, fully enclose only one conductor for optimum results, center the conductor in the jaw.
5. The clamp meter LCD will display the reading.



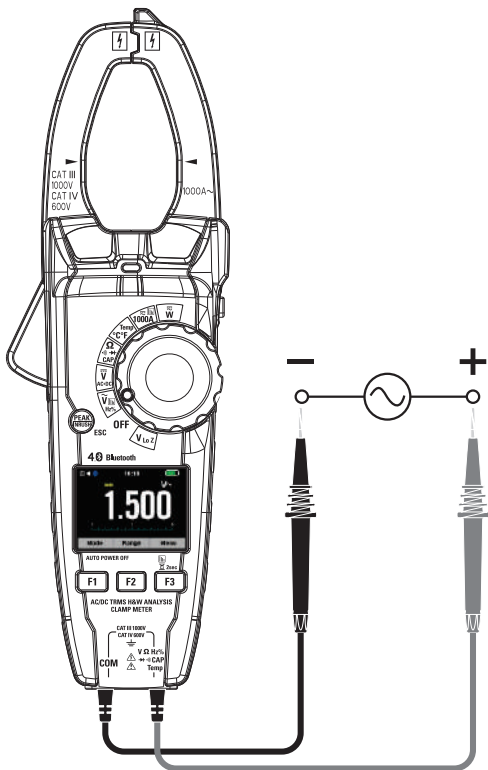
NO



YES

## 4.7. AC Voltage Measurement

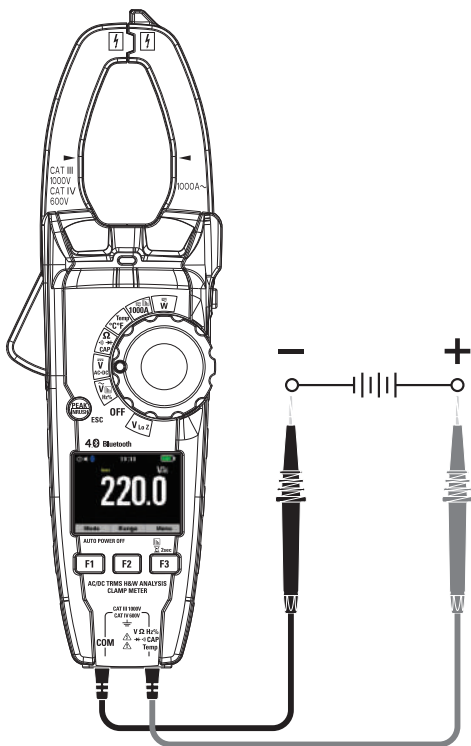
1. Set the rotary switch to the **VAC** Position.
2. Insert the black test lead banana into the **COM** Input Jack; Insert the red test lead banana into the **Positive** Input Jack.
3. Connect the test leads in parallel to the circuit under test.
4. Read the voltage measurement on the LCD display.





## 4.8. DC (AC+DC) Voltage Measurement

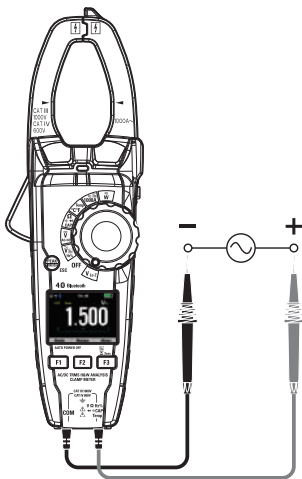
1. Set the rotary switch to the VDC AC+DC Position.
2. Insert the black test lead banana into the COM Input Jack; Insert the red test lead banana into the Positive Input Jack.
3. Connect the test leads in parallel to the circuit under test.
4. Read the voltage measurement on the LCD display.



## 4.9. Low Z Voltage Measurement

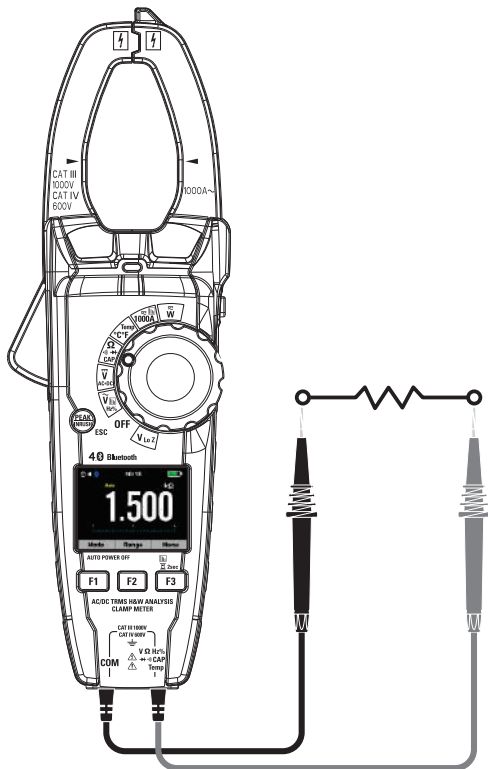
**WARNING:** Observe all safety precautions when working on live live voltages. Do not connect to circuits that exceed 600V AC/DC when the meter is set to Low Z.

- Low Z is used to check for “ghost” voltage.
  - Ghost voltages are present when non-powered wires are in close proximity to wires powered wires.
  - Capacitive coupling between wires make it appear that non-powered wires are connected to a real source of voltage.
  - The Low Z setting places a load on the circuit, which greatly reduces the voltage reading when connected to ghost voltage.
1. Set the rotary switch to the **V Lo Z** Position.
  2. Momentarily press the **MODE** Button to select AC or DC voltage, the AC “~” or DC “= ” symbol will appear on the LCD display.
  3. Insert the black test lead banana into the **COM** Input Jack; Insert the red test lead banana into the **Positive** Input Jack.
  4. If measuring DC voltage, touch the red test lead to the positive side of the circuit and the black test lead to the negative side of the circuit.
  5. Touch the test leads to the circuit under test.
  6. Read the voltage on the LCD display.



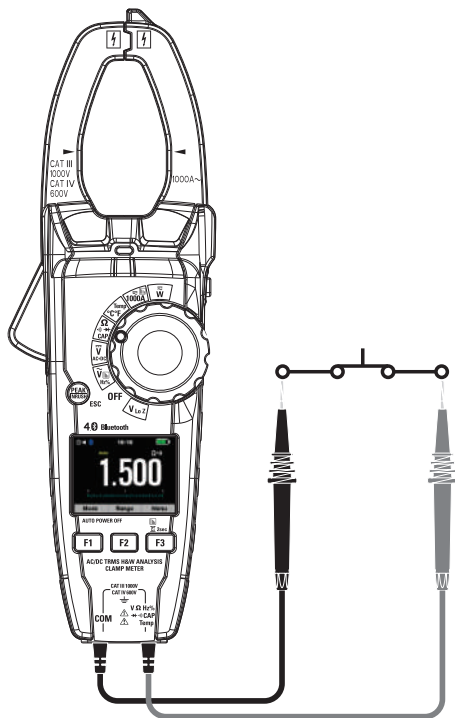
#### 4.10. Resistance Measurement

1. Set the rotary switch to the  $\Omega$   $\rightarrow$  CAP Position.
2. Insert the black test lead banana into the **COM** Input Jack; Insert the red test lead banana into the **Positive** Input Jack.
3. Touch the test probe tips across the circuit or component under test.
4. Read the resistance on the LCD display.



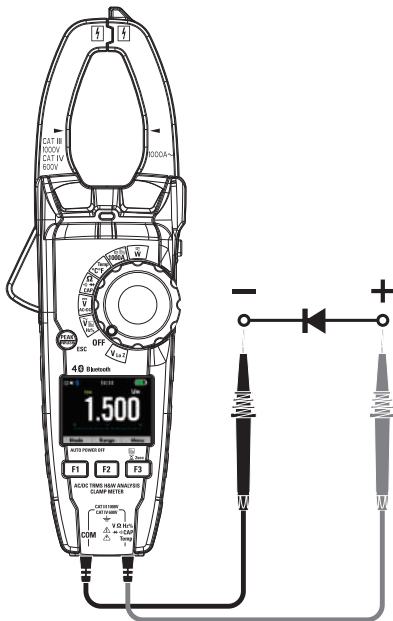
#### 4.11. Continuity Check

1. Set the rotary switch to the  $\Omega$   $\rightarrow$  CAP Position.
2. Insert the black test lead banana into the **COM** Input Jack; Insert the red test lead banana into the **Positive** Input Jack.
3. Use the **MODE** Button to select continuity "🔊", the display icons will change when the **MODE** Button is pressed.
4. Touch the test probe tips across the circuit or component under test.
5. If the resistance is  $< 50\Omega$ , a tone will sound.



## 4.12. Diode Test

1. Set the rotary switch to the  $\Omega$   $\rightarrow$  CAP Position.
2. Insert the black test lead banana into the **COM** Input Jack; Insert the red test lead banana into the **Positive** Input Jack.
3. Use the **MODE** Button to select the diode function if necessary (Diode symbol will appear on the LCD when in Diode test mode).
4. Touch the test probe tips to the diode or semiconductor junction under test, note the meter reading.
5. Reverse the test lead polarity by reversing the red and black leads, note this reading.
6. The diode or junction can be evaluated as follows:
  - If one reading displays a value (typically 0.400V to 0.900V) and the other reading displays "OL", the diode is good.
  - If both readings display "OL" the device is open.
  - If both readings are very small or "0", the device is shorted.

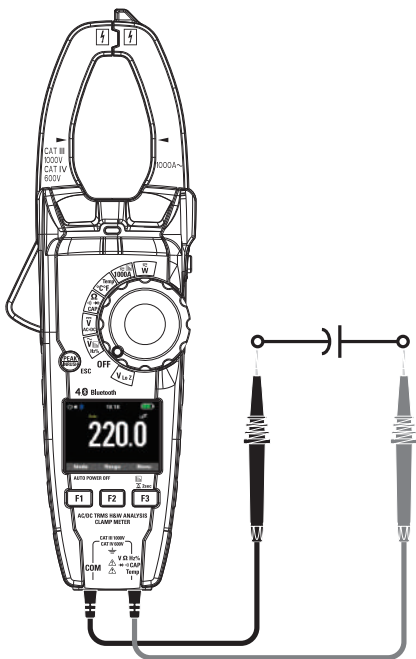


### 4.13. Capacitance Measurement

**WARNING:** To avoid electric shock, discharge the capacitor under test before measuring.

1. Set the rotary switch to the  $\Omega$   $\rightarrow$  CAP Position.
2. Insert the black test lead banana into the **COM** Input Jack; Insert the red test lead banana into the **Positive** Input Jack.
3. Touch the test probe tips across the part under test, if "**OL**" appears in the display, remove and discharge the component.
4. Read the capacitance value in the display, the display will indicate the proper decimal point and value.

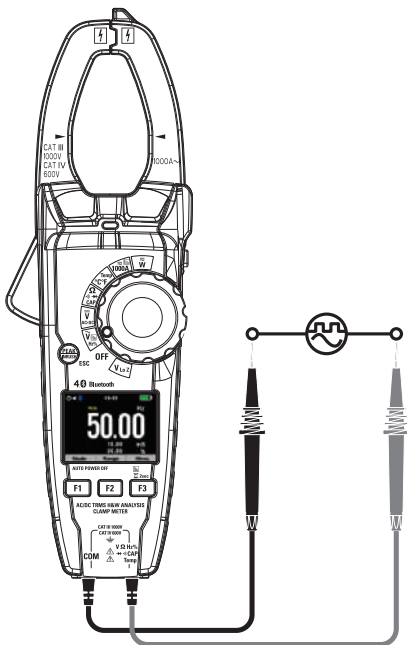
**Note:** For very large values of capacitance measurement it can take several minutes before the final reading stabilizes.



## 4.14. Frequency Measurement

**WARNING:** To avoid electric shock, discharge the capacitor under test before measuring.

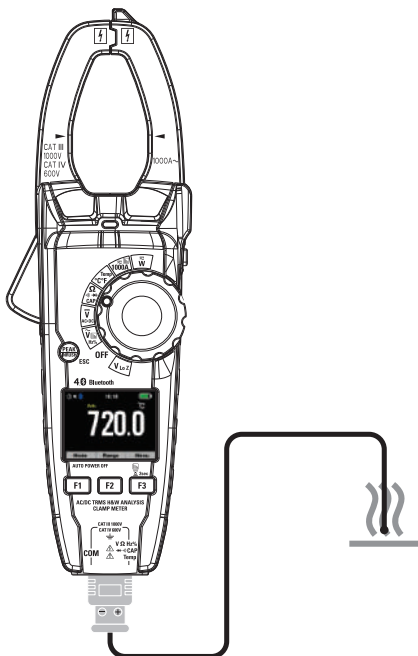
1. Set the rotary switch to the **VAC Hz%** Position.
2. Insert the black test lead banana into the **COM** Input Jack; Insert the red test lead banana into the **Positive** Input Jack.
3. Press Hz/% Button to select the Frequency (Hz) or Duty cycle (%).
4. Touch the test probe tips across the part under test.
5. Read the value on the display, the display will indicate the proper decimal point and value.
6. In Voltage and Current mode press **Hz/%** Button to select Frequency (**Hz**) or Duty cycle (**%**).



## 4.15. Temperature Measurement

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

1. Set the function switch to the **TEMP** Position.
2. Use the **MODE** Button to select °C or °F.
3. Insert the Temperature Probe into the negative **COM** and the **Positive** Input Jack, observing polarity.
4. Touch the Temperature Probe head to the device under test, continue to touch the part under test with the probe until the reading stabilizes.
5. Read the temperature on the display, the digital reading will indicate the proper decimal point and value.





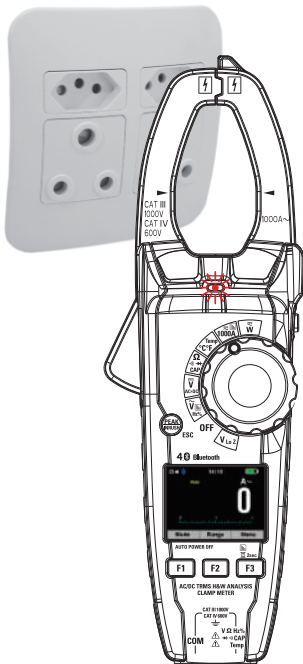
## 4.16. Non-Contact AC Voltage Measurement

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

1. Touch the probe tip to the hot conductor or insert into the hot side of the electrical outlet.
2. If AC voltage is present, the detector light will illuminate.

**Note:** The conductors in electrical cord sets are often twisted, for best results, rub the probe tip along a length of the cord to assure placing the tip in close proximity to the live conductor.

**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. Automatic Power OFF

- In order to conserve battery life, the meter will automatically turn off after approximately 15 minutes.
- To turn the meter on again, turn the function switch to the OFF Position and then to the desired function position.

## 6. Maintenance

**WARNING:** To avoid electrical shock, disconnect the meter from any circuit, remove the test leads from the input terminals, and turn OFF the meter before opening the case. Do not operate the meter with an open case.

### 6.1. Cleaning and Storage

- Periodically wipe the case with a damp cloth and mild detergent.
- Do not use abrasives or solvents.
- If the meter is not to be used for 60 days or more, remove the battery and store it separately.

### 6.2. Battery Replacement

1. Remove the Phillips head screw that secures the rear battery door.
2. Open the battery compartment.
3. Replace the 3x1.5V AAA Alkaline batteries.
4. Secure the battery compartment.

### 6.3. Temperature Probe Replacement

**Note:** To use a Type K thermocouple probe that is terminated by a subminiature (Flat blade) connector, a subminiature-to-banana plug adaptor is required.

## 7. Specifications

### 7.1. Technical Specifications

Accuracy calculated as  $[\% \text{reading} + (\text{num. digits} \times \text{resolution})]$  at 18 to 28°C; <75%HR.

#### 7.1.1. DC Voltage

Range	Resolution	Accuracy
600.0mV	0.1mV	$\pm(0.5\% + 8 \text{ digits})$
6.000V	0.001V	$\pm(1.5\% + 5 \text{ digits})$
60.00V	0.01V	
600.0V	0.1V	
1500V	1V	

Input impedance: >10MΩ. Protection against overcharge: 1000V DC/AC rms

### 7.1.2. AC TRMS Voltage (50Hz-400Hz)

Range	Resolution	Accuracy
6.000V	0.001V	±(1.5% + 5 digits)
60.00V	0.01V	
600.0V	0.1V	
1000V	1V	

Input impedance: > 9MΩ;

Protection against overcharge: 1000V DC/AC rms.

Accuracy specified from 5% to 100% of the measuring range, sine wave;

Accuracy PEAK function: ±10%rdg, PEAK response time: 1ms.

### 7.1.3. LowZ AC TRMS Voltage

Range	Resolution	Accuracy
6.000V	0.001V	±(3.0% + 40 digits)
60.00V	0.01V	
600.0V	0.1V	
1000V	1V	

Input impedance: 1KΩ; Protection against overcharge: 1000V DC/AC rms.

Accuracy specified from 5% to 100% of the measuring range, sine wave.

### 7.1.4. AC+DC TRMS Voltage (50Hz-1kHz)

Range	Resolution	Accuracy
6.000V	0.001V	±(2.5% + 20 digits)
60.00V	0.01V	
600.0V	0.1V	
1000V	1V	

Input impedance>10MΩ; Protection against overcharge: 1000V DC/AC rms.

### 7.1.5. DC Current

Range	Resolution	Accuracy
600.0A	0.1A	±(2.5% + 5 digits)
1000A	1A	±(2.8% + 5 digits)

Protection against overcharge: 1000A DC/AC rms.

### 7.1.6. AC TRMS Current

Range	Resolution	Accuracy
600.0A	0.1A	$\pm(2.5\% + 8 \text{ digits})$
1000A	1A	$\pm(2.8\% + 8 \text{ digits})$

Protection against overcharge: 1000A DC/AC rms.

Accuracy specified from 5% to 100% of the measuring range, sine wave.

Accuracy Inrush function integral time 100ms, and reading for reference only.

### 7.1.7. Resistance and Continuity Test

Range	Resolution	Accuracy
600.0 $\Omega$	0.1 $\Omega$	$\pm(1.0\% + 10 \text{ digits})$
6.000k $\Omega$	0.001k $\Omega$	$\pm(1.5\% + 5 \text{ digits})$
60.00k $\Omega$	0.01k $\Omega$	
600.0k $\Omega$	0.1k $\Omega$	
6.000M $\Omega$	0.001M $\Omega$	$\pm(2.5\% + 5 \text{ digits})$
60.00M $\Omega$	0.01M $\Omega$	$\pm(3.5\% + 10 \text{ digits})$

Buzzer<50 $\Omega$ ; Protection against overcharge: 1000V DC/AC rms.

### 7.1.8. Frequency (Electronic Circuits)

Range	Resolution	Accuracy
9.999-9.99kHz	0.01-10Hz	$\pm(1.2\% + 5 \text{ digits})$

Protection against overcharge: 1000V DC/AC rms.

Sensitivity: >5Vrms (at 20%-80% duty cycle)

### 7.1.9. Capacitance

Range	Resolution	Accuracy
60.00nF	0.01nF	$\pm(4.0\% + 20 \text{ digits})$
600.0nF	0.1nF	$\pm(3.0\% + 8 \text{ digits})$
6.000 $\mu$ F	0.001 $\mu$ F	
60.00 $\mu$ F	0.01 $\mu$ F	
600.0 $\mu$ F	0.1 $\mu$ F	
6000 $\mu$ F	1 $\mu$ F	$\pm(5.0\% + 8 \text{ digits})$

Protection against overcharge: 1000V DC/AC rms.

### 7.1.10. Duty Cycle

Range	Resolution	Accuracy
10.0%-90.0%	0.1%	$\pm(1.2\% + 8 \text{ digits})$

Pulse frequency range: 40Hz-10kHz; Pulse amplitude:  $\pm 5V$  (100s-100ms)

### 7.1.11. Temperature with K-Type Probe

Range	Resolution	Accuracy
-40.0 to 600.0°C	0.1°C	$\pm(1.5\% + 3^\circ\text{C})$
600 to 1000°C	1°C	
-40.0 to 600.0°F	0.1°F	$\pm(1.5\% + 5.4^\circ\text{F})$
600 to 1800°F	1°F	

Protection against overcharge: 1000V DC/AC rms

Instrument accuracy without probe; Specified accuracy with stable environmental temperature at  $\pm 1^\circ\text{C}$ .

For long-lasting measurements, reading increases by  $2^\circ\text{C}$ .

### 7.1.12. Diode Test

Test Current	Max Voltage with Open Circuit
<1.5mA	3.3V DC

### 7.1.13. Voltage Harmonics

Harmonic Order	Base Wave Frequency	Resolution	Accuracy
1-25	20-75Hz	0.1% THD	$\pm(5.0\% + 8 \text{ digits})$
1-8	75-400Hz	0.1% THD	$\pm(6.0\% + 8 \text{ digits})$

Protection against overcharge: 1000V DC/AC rms.

Uncertainty defined for: Voltage >10V; Below 2% of voltage range, add 20 counts.

### 7.1.14. Current Harmonics

Harmonic Order	Base Wave Frequency	Resolution	Accuracy
1-25	20-75Hz	0.1% THD	$\pm(5.0\% + 20 \text{ digits})$

Protection against overcharge: 1000V DC/AC rms.

Uncertainty defined for: Voltage  $\geq 10A$ ; Below 2% of voltage range, add 20 counts.

### 7.1.15. DC Power

Range	Resolution	Accuracy
0.00-99.99kW	0.01kW	$\pm(3.0\% + 10 \text{ digits})$
100.0-999.9kW	0.1kW	$\pm(3.0\% + 5 \text{ digits})$

Protection against overcharge: 1000V DC/AC rms  
Voltage >10V; Current  $\geq 10\text{A}$ ; Pf  $\geq 0.5$ ; Below 2% of range, add 20 counts.

### 7.1.16. AC Power (Active, Apparent, Reactive)

Range	Resolution	Accuracy
0.00-99.99 kW/kVA/kVAR	0.01 kW/kVA/kVAR	$\pm(3.0\% + 10 \text{ digits})$
100.0-999.9 kW/kVA/kVAR	0.1 kW/kVA/kVAR	$\pm(3.0\% + 5 \text{ digits})$

Protection against overcharge: 1000V DC/AC rms  
Uncertainty defined for: Sine waveform 20-75Hz; Voltage >10V;  
Current  $\geq 10\text{A}$ ; Pf  $\geq 0.5$ ; Below 2% of range, add 20 counts.

### 7.1.17. Power Factor/ Displace Power Factor

Range	Resolution	Accuracy
0.20-1.00	0.01	$\pm 3^\circ$


Uncertainty defined for: Sine waveform 20-75Hz; Voltage >10V;  
Current  $\geq 10\text{A}$ ;  
Below 2% of voltage and current range, add 2°.

### 7.1.18. Energy (Active, Apparent, Reactive)

Range	Resolution	Accuracy
0.000-9.999 kW/kVA/kVAR	0.001 kW/kVA/kVAR	$\pm(3.0\% + 10 \text{ digits})$
10.00-99.99 kW/kVA/kVAR	0.01 kW/kVA/kVAR	$\pm(3.0\% + 5 \text{ digits})$

Protection against overcharge: 1000V DC/AC rms 1000A DC/AC rms  
Uncertainty defined for: Sine waveform 20-75Hz; Voltage >10V;  
Current  $\geq 10\text{A}$ ; Pf  $\geq 0.5$ ; Below 2% of range, add 20 counts.

## 7.2. General Specifications

Basic Functions	Range
Clamp Jaw Opening	33mm (1.26") approx.
Bluetooth	4.0
Display	6000 counts RGB LCD
Low Battery Indication	"  " is displayed
Over-Range Indication	Over-range indication "OL" display
Measurement Rate	3 readings per second, nominal
PEAK	Captures peaks >1ms
INRUSH	100ms
Temperature Sensor	Type K thermocouple
Input Impedance	10M $\Omega$ (VDC and VAC)
AC Response	True RMS (AAC and VAC)
Operating Temperature	5 to 40°C (41 to 104°F)
Storage Temperature	-20 to 60°C (-4 to 140°F)
Operating Humidity	Max 80% up to 31°C (87°F) decreasing linearly to 50% at 40°C (104°F)
Storage Humidity	<80%
Operating Altitude	2000 meters (7000ft.) maximum.
Battery	Three 1.5 AAA Batteries
Auto Power Off	After approx. 15 minutes
Dimensions	239 x 80 x 49mm
Weight	350g
Safety	CAT IV 600V, CAT III 1000V Conforms to UL STD. 61010-1, 61010-2-030, 61010-2-033 and 61010-031; Certified to CSA STD. C22.2, NO.61010-1, 61010-2-30, 61010-2-033 and 61010-031.



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