

Megger[®]



DCM1500S

Digital Clamp Meter

User Guide

This manual supersedes all previous issues of this manual. Please ensure that you are using the most recent issue of this document. Destroy any copies that are of an older issue.

Declaration of Conformity

Hereby, Megger Instruments Limited declares that radio equipment manufactured by Megger Instruments Limited described in this user guide is in compliance with Directive 2014/53/EU. Other equipment manufactured by Megger Instruments Limited described in this user guide is in compliance with Directives 2014/30/EU and 2014/35/EU where they apply.

The full text of Megger Instruments EU declarations of conformity are available at the following internet address

Safety Information

Understand and follow the operating instructions carefully.

WARNING

Identify hazardous conditions and actions that could cause **BODILY HARM** or **DEATH**

- When using test leads or probes, keep your fingers behind the finger guards.
- Personal protective equipment should be used if there are ACCESSIBLE HAZARDOUS LIVE PARTS in the installation where measurement is to be carried out.
- Remove test leads from meter before opening the battery door or meter case.
- Use the meter only as specified in this manual; otherwise, the protection provided by the meter may be impaired.
- Always use the proper input terminals, switch position, and range for measurements.
- Verify the meters operation by measuring a known voltage. If in doubt, have the meter calibrated.
- Do not apply more than the rated voltage, as marked on the meter, between terminals or between any terminal and earth.
- Use caution with voltages above 30 V AC rms, 42 V AC peak, or 60 V DC. These voltages pose a shock hazard.
- To avoid false readings that can lead to electric shock and injury, replace the battery as soon as the low battery indicator blinks.
- Disconnect circuit power and discharge all high-voltage capacitors before testing resistance, continuity, diodes, or capacitance.
- Do not use the meter around explosive gas or vapour.
- To reduce the risk of fire or electric shock do not expose this product to rain or moisture.
- PVHV test leads are only for use on circuits NOT directly connected to a MAINS supply.
- Probe assemblies to be used for MAINS measurements shall be RATED as appropriate for MEASUREMENT CATEGORY III or IV according to EN 61010-031 and shall have a voltage RATING of at least the voltage of the circuit to be measured.

Safety Information

- DO NOT USE the test leads if the internal white insulation layer is exposed.
- DO NOT USE the test leads above maximum ratings of CAT Environment or voltage and current that are indicated on the probe and probe tip guard.
- Do not apply a current with a frequency that is higher than the frequency response range specified in the Electrical Specifications section.
- Do not apply or remove the clamp or test leads on or around uninsulated hazardous live conductors where a potential to cause electric shock, electrical burns or arc flash exists.

CAUTION

- Disconnect the test leads from the test points before changing the position of the function rotary switch.
 - Never connect a source of voltage with the function rotary switch in Ω , $\overline{H}$ and  position.
 - Do not expose the meter to extremes of temperature or high humidity.
-

Symbols as marked on the Meter and Instruction manual

	Risk of electric shock
	See instruction manual
	DC measurement
	AC measurement
	Both direct and alternating current
	AC Measurement using FCC3450 flexible CT accessory
	Equipment protected by double or reinforced insulation
	Battery
	Earth
	Conforms to EU directives
	Conforms to UKCA directives
	Application around and removal from hazardous live conductors
	Do not discard this product or throw away
	Bluetooth®

CATIV

Measurement category IV: Equipment connected between the origin of the low-voltage mains supply outside the building and the consumer unit.

CATIII

Measurement category III: Equipment connected between the consumer unit and the electrical outlets.

CATII

Measurement category II: Equipment connected between the electrical outlets and the user's equipment.

Unsafe Voltage

- To alert you to the presence of a potentially hazardous voltage, when the tester detects a voltage ≥ 30 V or a voltage overload (OL) in V, mV, PV. The ⚡ symbol is displayed.

Features

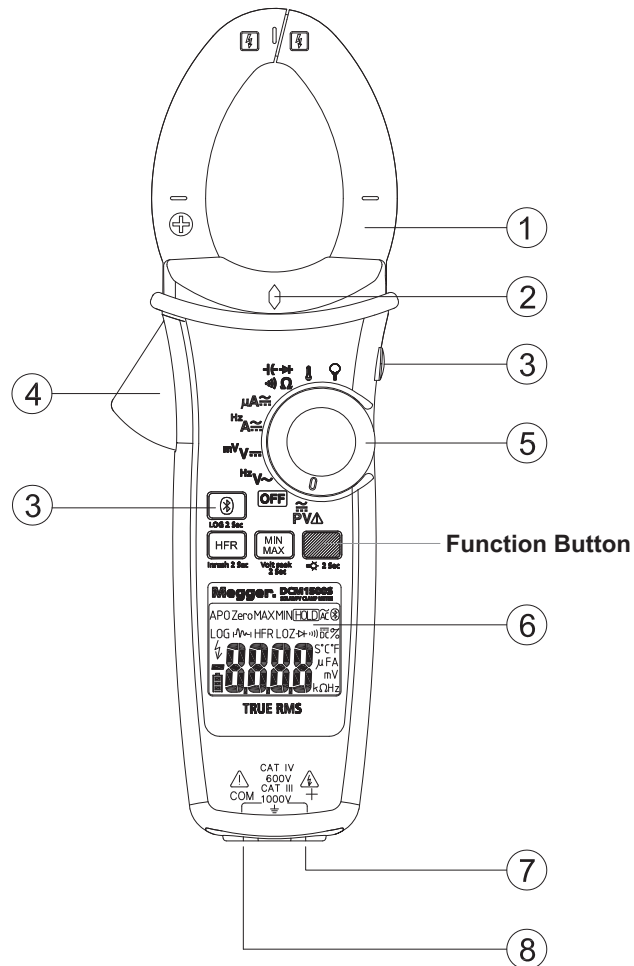
- 6000 Count LCD display
- Backlight
- VoltSeek (Non-Contact Voltage Detection)
- True RMS reading on AC
- Data logger (up to 4000 sample values)
- Manual save mode
- Bluetooth® communication
- Torch turns on when clamp jaws open
- 1500 A AC/DC current measurement
- DC voltage measurement up to 2000 V using the PVHV lead set
- AV voltage measurement up to 1500 V using the PVHV lead set
- 600 k Ω Resistance measurement / continuity beeper
- AC current measurement up to 3000 A using FCT3450 flexible CT accessory
- Frequency counter
- Capacitance/Diode test
- °C/°F Temperature function
- Inrush current
- DCA auto-zeroing button
- Max/Min hold
- Smart hold
- High frequency noise rejection filter
- Auto power off (APO)
- CAT IV 600 V/CAT III 1000 V safety standard

Unpacking and Inspection

Upon removing your new Solar/PV Clamp Meter from its packing, you should have the following items:

- Megger DCM1500S Solar/PV Clamp Meter
- Test lead set (one black, one red)
- Test probes (one black, one red)
- Crocodile clips (one black, one red)
- TP100 Temperature probe
- Megger PVHV1 Lead set (4mm plugs)
- Megger PVHV2 Lead set (MC4 PV plugs)
- User Manual
- Carry case
- Batteries

The Meter Description



- 1 JAW
- 2 VoltSeek LED
- 3 Push button
- 4 Trigger
- 5 Rotary switch to turn the instrument On / Off and select a function
- 6 6,000 count LCD display
- 7 Positive input terminal
- 8 Common (earth reference) input terminal

Making Basic Measurements

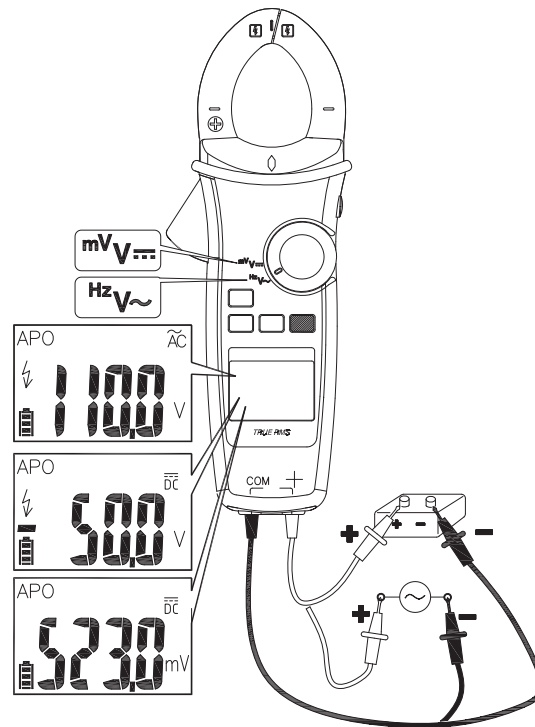
Preparation and Caution Before Measurement

⚠ Observe the rules of ⚠ Warnings and ⚠ Cautions.

⚠ CAUTION

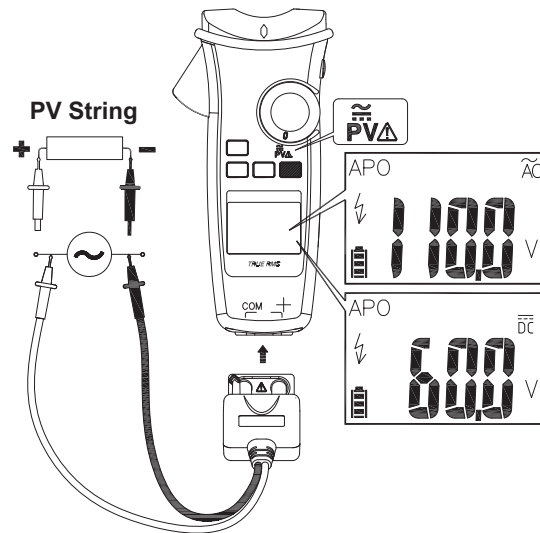
When connecting the test leads to the DUT (Device Under Test) connect the common test lead before connecting the live test lead. When removing the test leads remove the live test lead before removing the common test lead.

Measuring Voltage



Turn the switch to select the measuring function.

Measuring PV Voltage



Turn the switch and press the Function button to select AC/DC mode

CAUTION

This function is only available with the dedicated PVHV test lead sets.

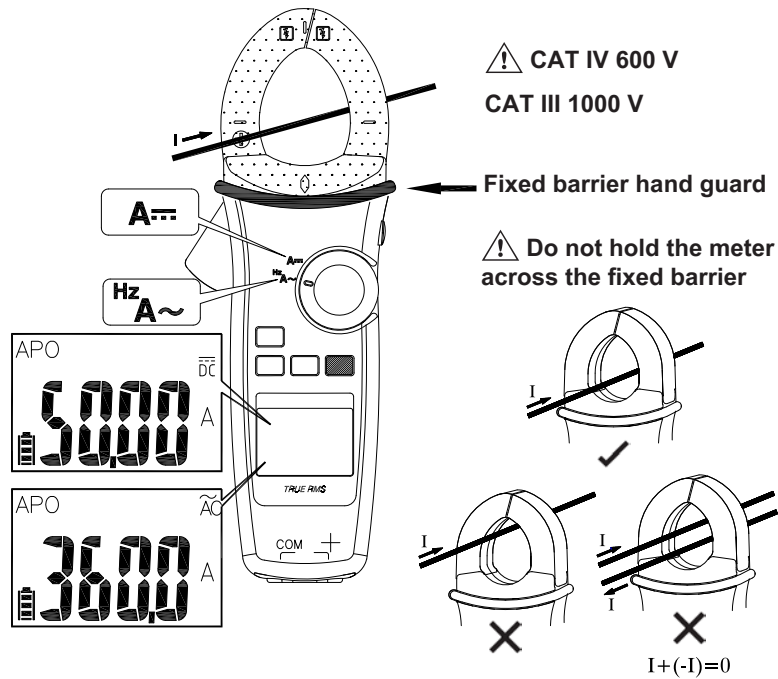
For CAT III or CAT IV environments: use the test leads with the probe tip guard cap fixed firmly. Without the probe tip guard cap, the test leads can be used in CAT II environments ONLY.

For 1500 V AC and 2000 V DC measurement (CAT 0): these test leads can only be used in environments that are not directly connected to the MAINS supply.

Always select correct AC/DC mode to perform any high voltage measurement.

The meter will flash this symbol  and the correct mode symbol (AC/DC) if the input voltage is different and/or dangerous.

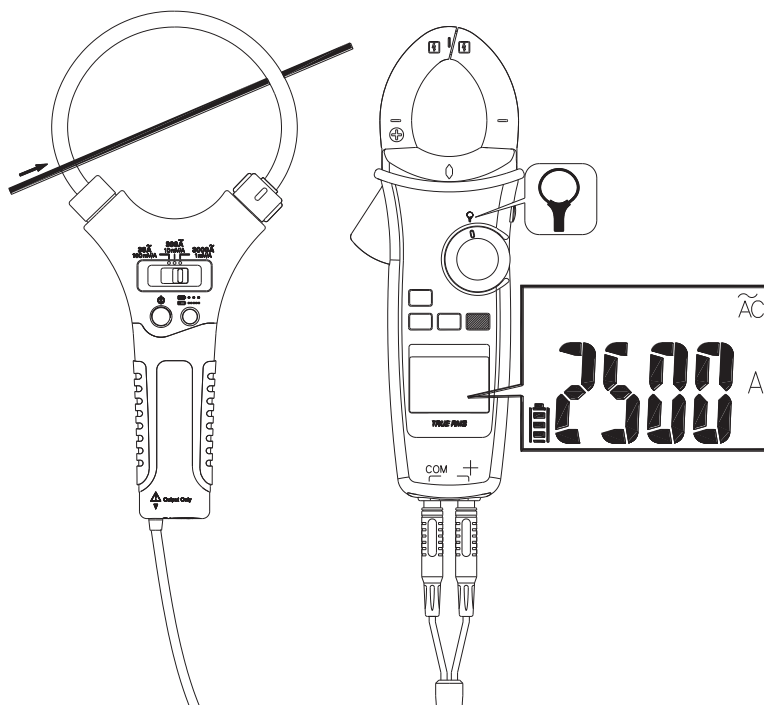
Measuring Current



Turn the switch and press the Function button to select AC/DC/Hz mode.

Note: The torch will turn on when the jaw is opened.

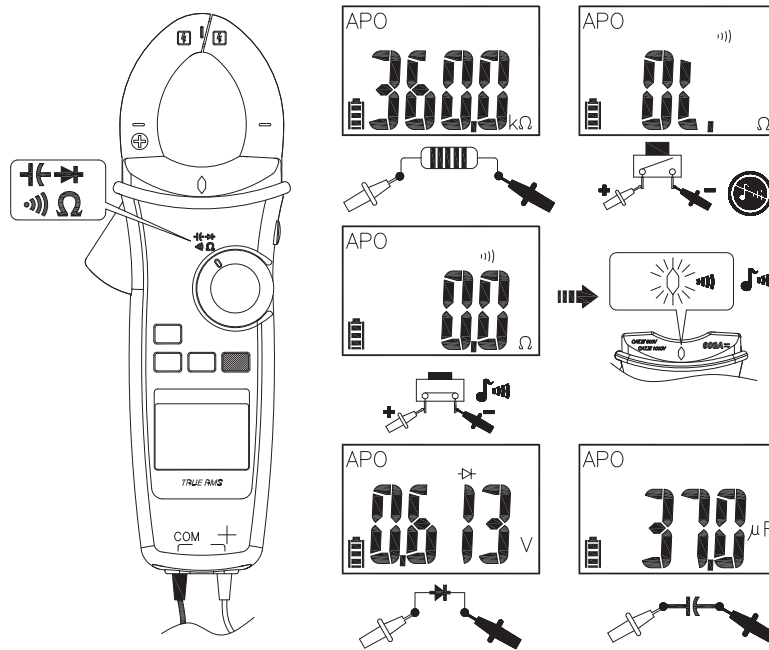
Measuring AC Currents with the FCT3450 Flexible CT



Set the flexible CT input on the rotary switch on the clamp. Set the FCT3450 range selector to 3000 A/1 mV/A

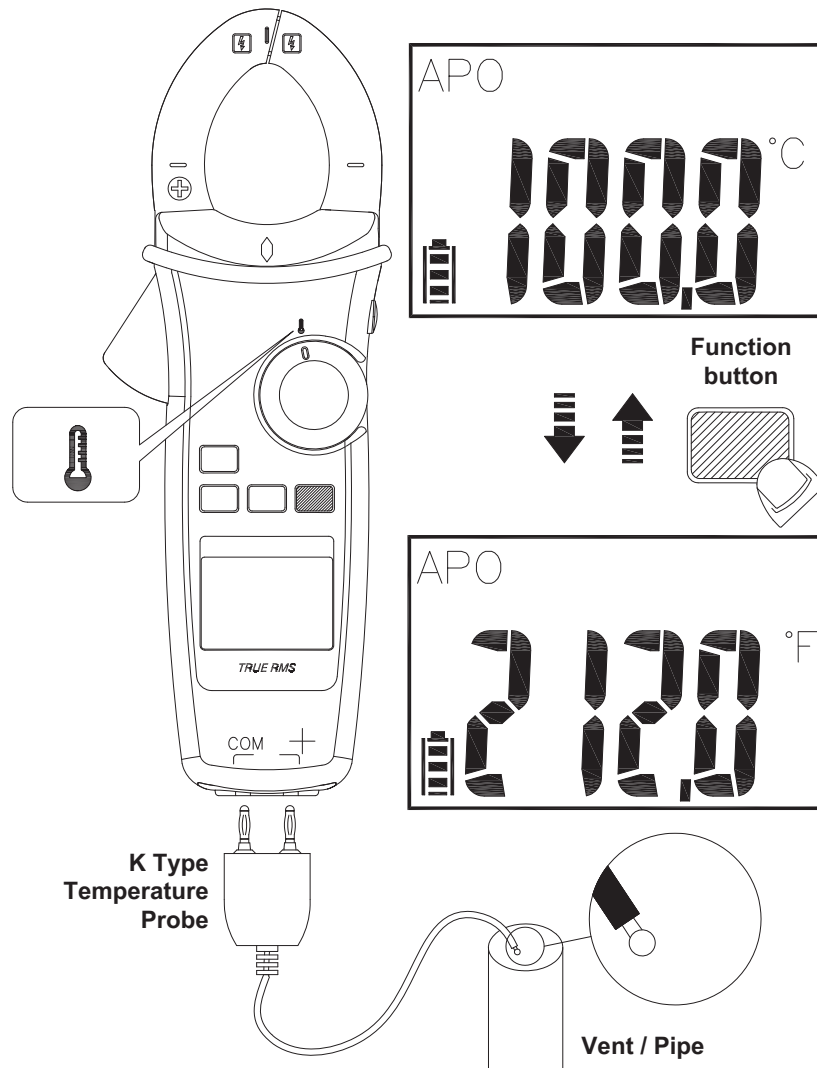
Note: Please follow the above illustrated instructions and measure a known current to ensure that the connection between the two meters is correct.

Measuring Resistance/Continuity/Capacitance/Diode



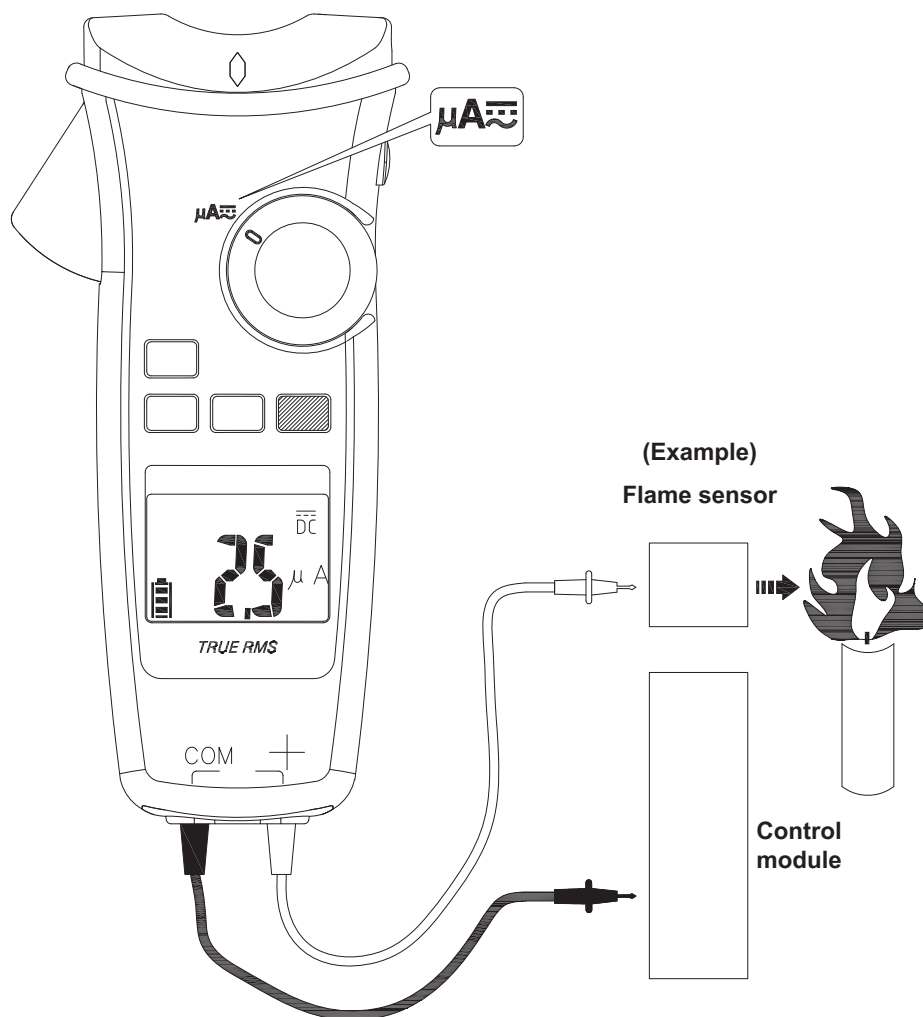
Turn the switch and press the Function button to select the measuring function

Measuring Temperature °C / °F



Turn the switch and press the Function button to select °C / °F mode.

Measuring μA



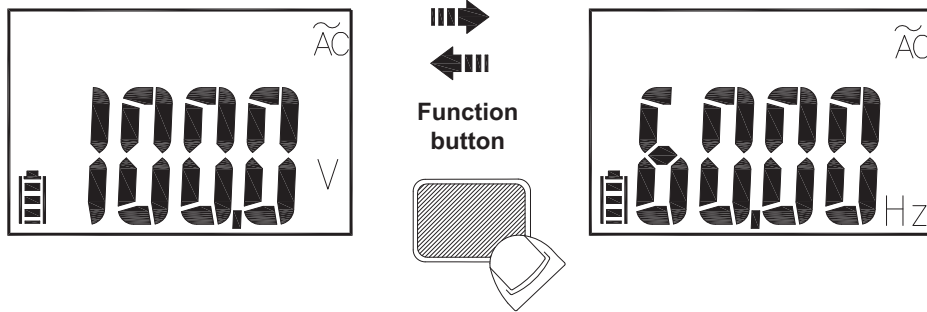
Turn the switch and press the Function button to select AC/DC mode.

Using the Function Button

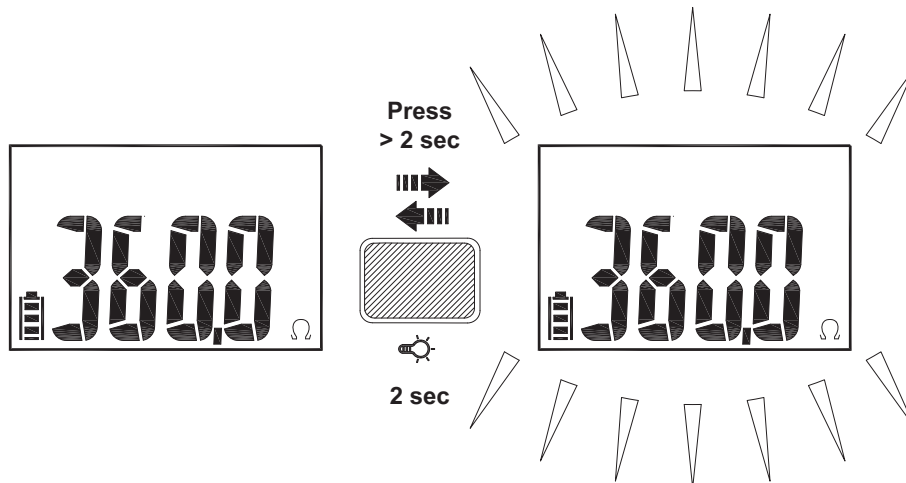
Switch Position	Function
PV	$\overline{\overline{\text{DC}}} \rightarrow \tilde{\text{AC}}$
V$\sim$	$\text{V}\sim \rightarrow \text{Hz}$
V$\equiv$	$\text{V}\equiv \rightarrow \text{mV}\equiv$
A$\approx$	$\text{A}\equiv \rightarrow \text{A}\sim \rightarrow \text{Hz}$
μA	$\overline{\overline{\text{DC}}} \rightarrow \tilde{\text{AC}}$
Ω	$\Omega \rightarrow \text{diode symbol} \rightarrow \text{transistor symbol} \rightarrow \text{transistor symbol}$
	$^{\circ}\text{C} \rightarrow ^{\circ}\text{F}$
	$\tilde{\text{AC}}$

Press the Function button to change the function for each rotary switch position.

Measuring Frequency

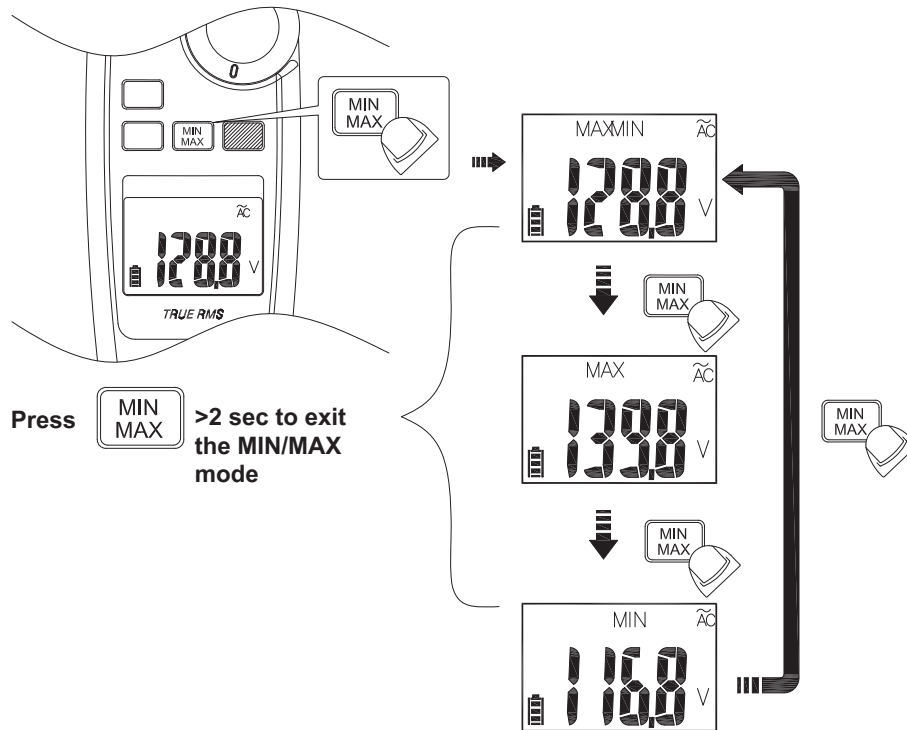


Backlight



Press Function button for over 2 seconds to turn Backlight on or off.

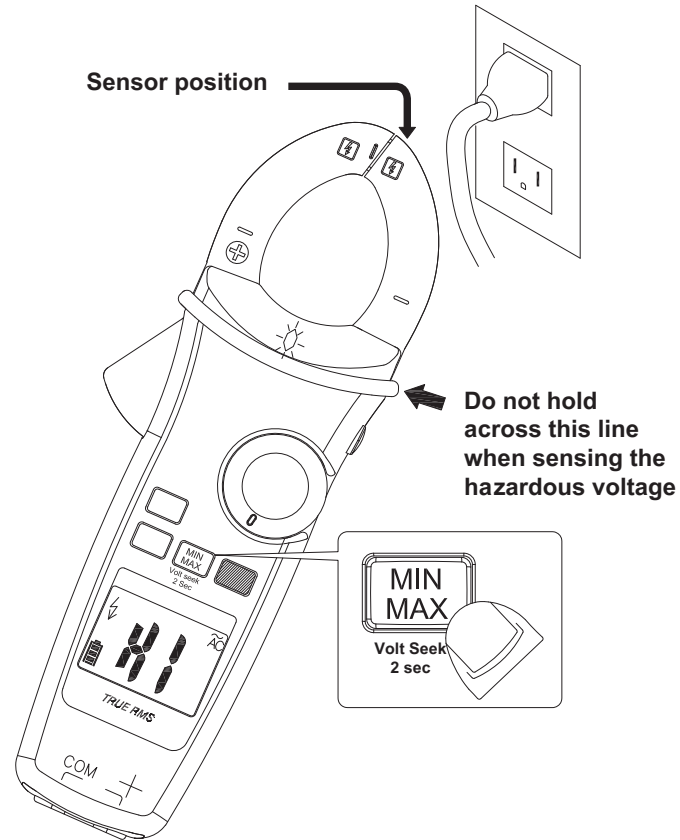
MIN/MAX



The MIN/MAX mode records the min and max input values.

When the input goes below the recorded min value or above the recorded max value, the meter beeps and records the new value. Press Hold button to pause the recording.

Volt Seek

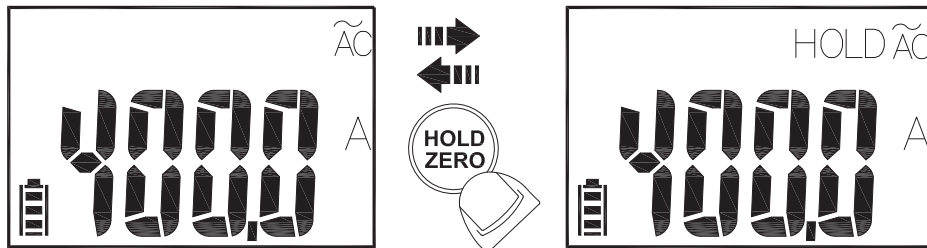


Press MIN/MAX button for over 2 seconds to enter/exit Volt Seek mode. Press MIN/MAX button to switch from high to low sensitivity.

WARNING

The Volt Seek LED indicates the electric field. If the Volt Seek LED is not on, voltage could still be present.

Smart Hold

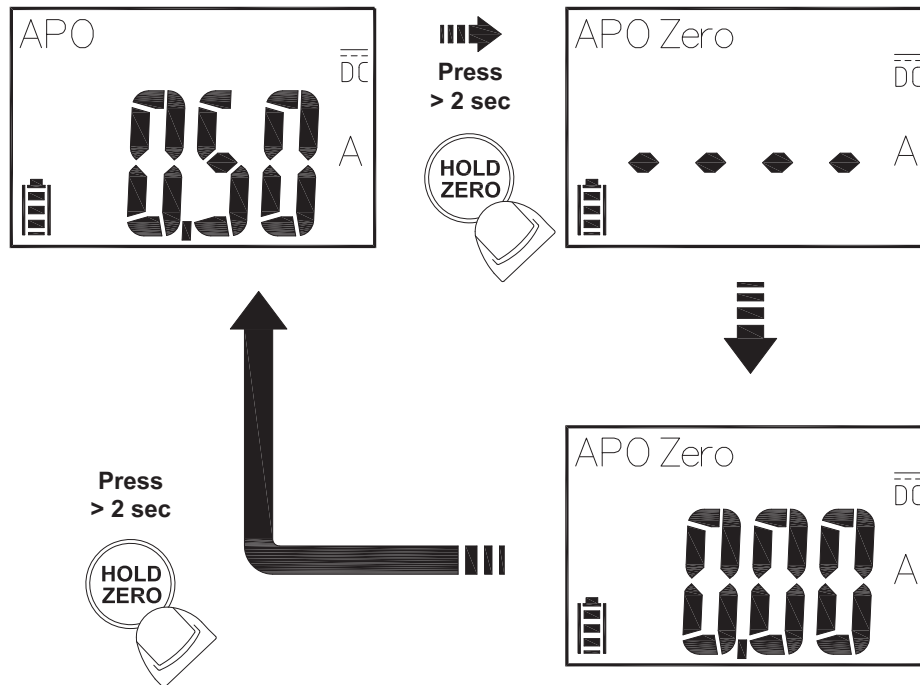


The meter will beep continuously, and the display will flash if the measured signal is larger than the display reading by 50 counts.

DCA ZERO

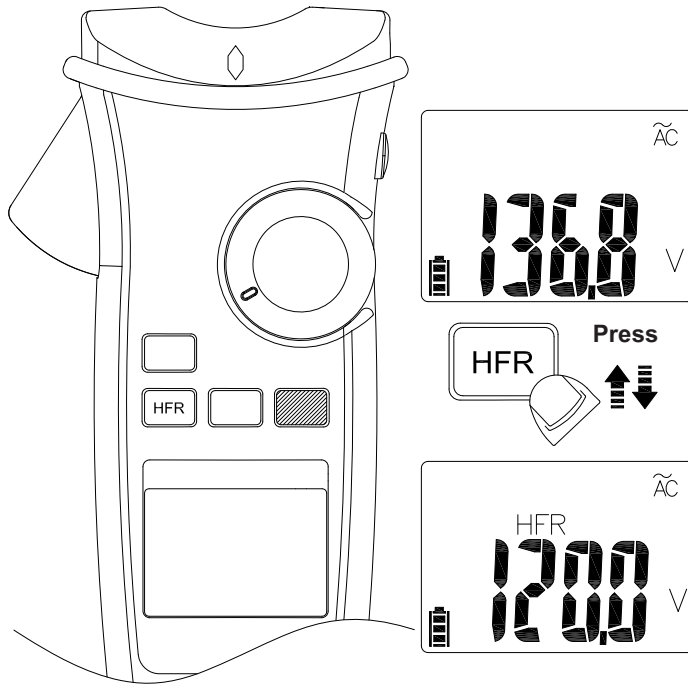
Remove the clamp from the conductor before performing DCA ZERO.

Press the HOLD button for over 2 seconds to compensate for any residual magnetism.



High Frequency Rejection Filter (HFR)

The High Frequency Rejection (HFR) mode uses a low pass filter when taking AC measurements. The cut-off frequency (-3 dB point) of the low pass filter is 800 Hz.

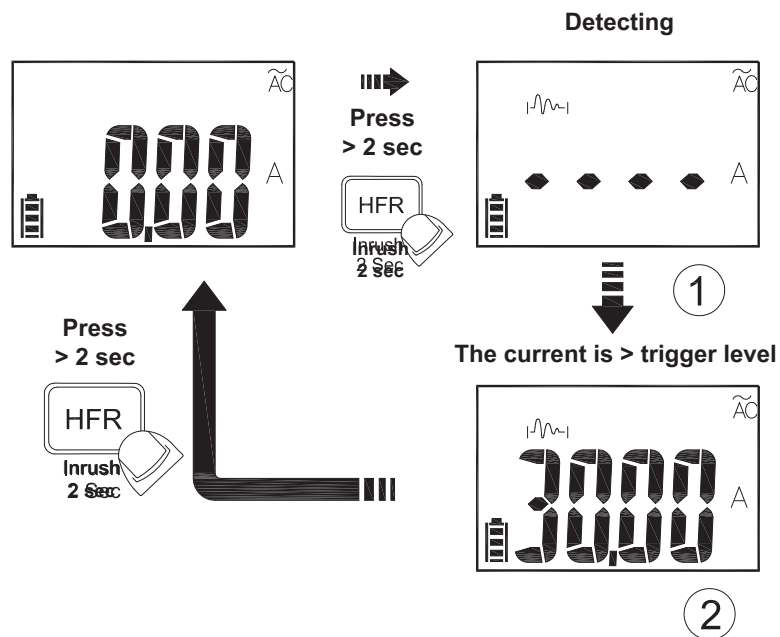
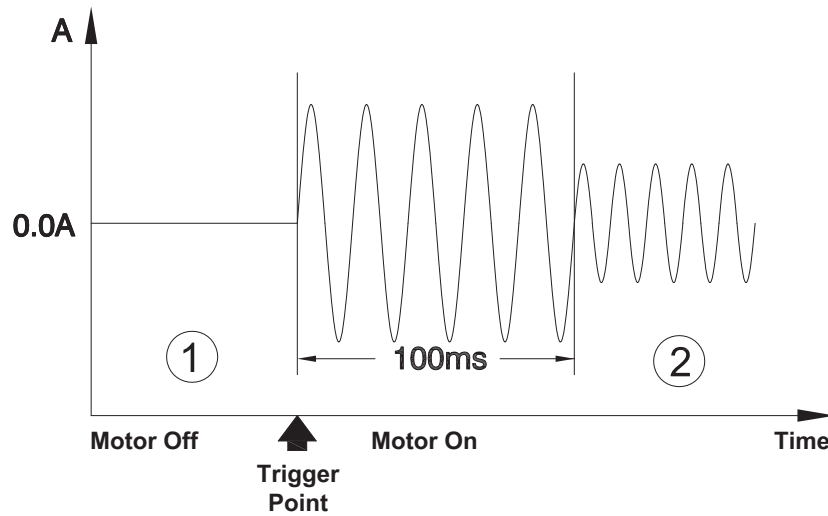


WARNING

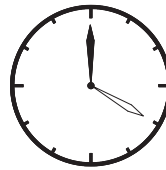
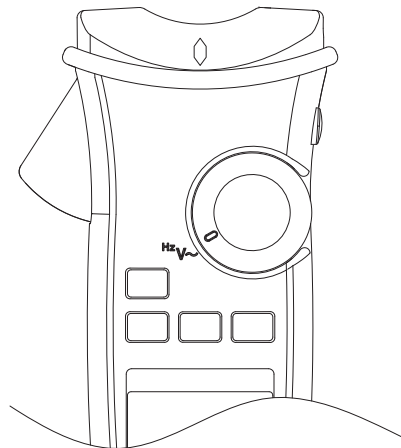
Hazardous voltages may still be present when the LCD reading is very low in HFR mode. Verify the voltage again without HFR mode activated.

INRUSH

When using the inrush current mode, select a suitable measurement range before pressing the HFR/INRUSH button and triggering the inrush current measurement feature.



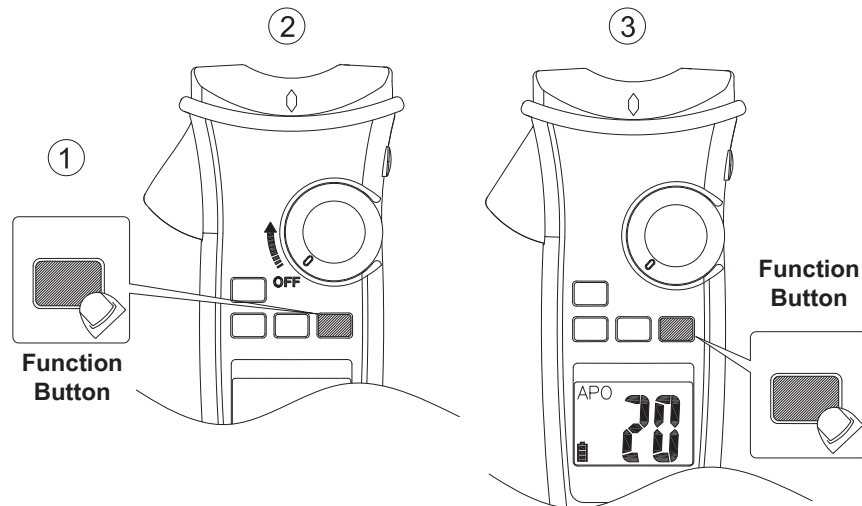
Auto Power Off



After user specified time
with no operation (Note Time
Setting of Auto Power Off)

Wake up the meter by turning the switch or pressing any button.

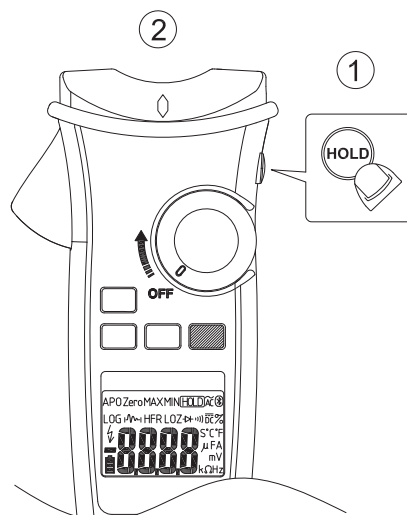
Time Setting of Auto Power Off



Press and hold the function button whilst turning the meter on, the meter beeps 3 times prior to APO (Auto Power Off) activating.

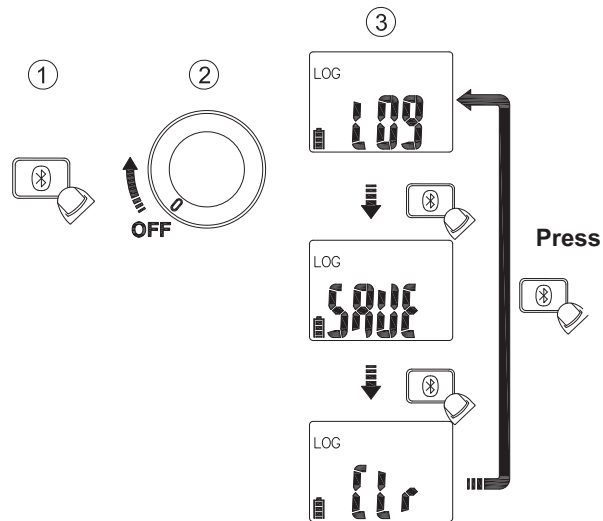
Release the function button and press it again to select the desired time. The auto power off time can be set to 5 mins, 10 mins, 20 mins, or disabled (OFF).

Testing LCD Display



Turn on the meter while keeping HOLD button pressed.

Function of LOG Button



Press the Bluetooth® button while powering-up to select the Logger mode, Manual Saving mode or Clear the memory.

The meter can store up to 4000 data entries in internal memory.

Time interval setting mode

LOG 2 Sec

Press > 2 sec

LOG S

Press

LOG 60 S

Press

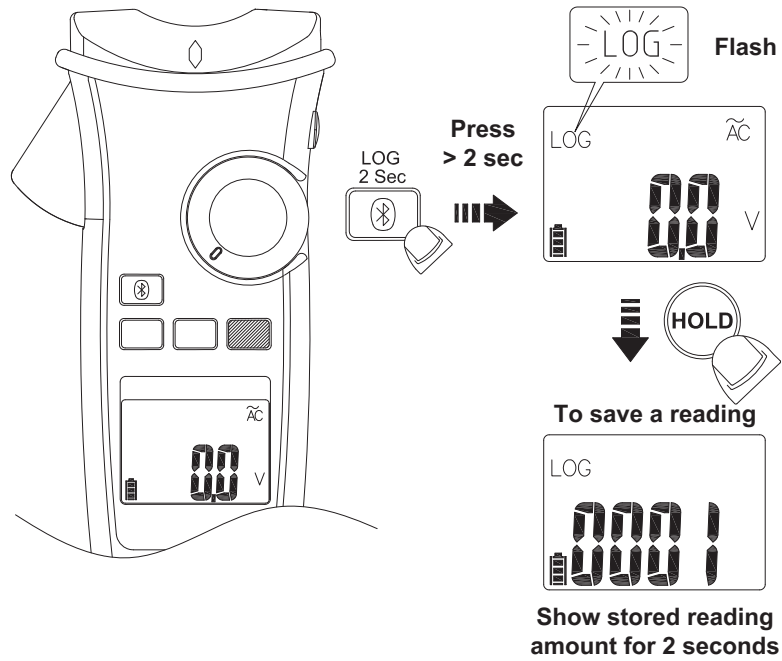
LOG 00 V

Start to record automatically after 2 seconds without operation

LOG icon flashes while logging

All stored data is cleared at the start of each data log or when Clr (Clear) or Save (Manual Saving) is selected. Data can be downloaded and saved for analysis by the Megger Link App.

Manual Saving Mode



If Manual Saving is selected, readings can be stored by pressing the Hold/Zero button when in Log mode. The sample location is displayed on each button press.

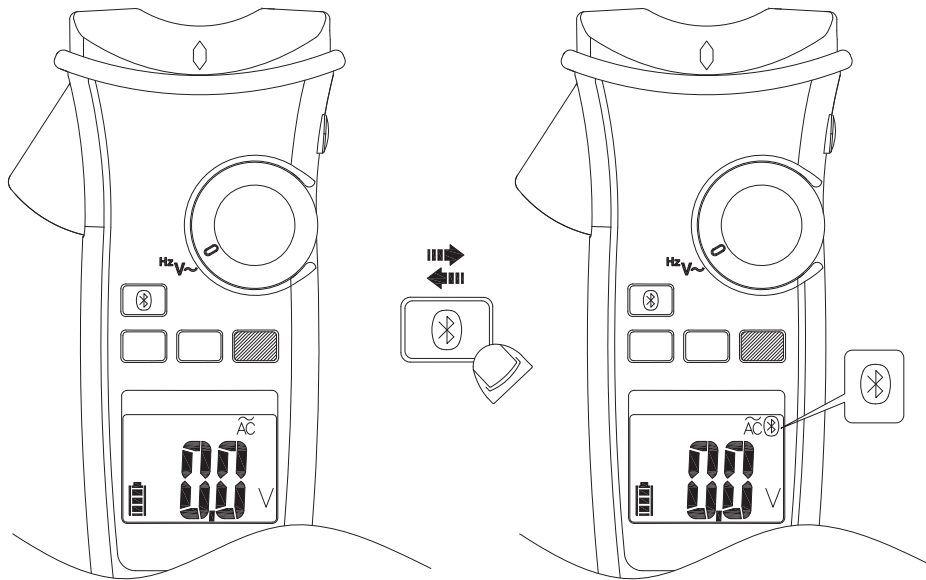
CAUTION

All stored data is saved until switching to data logger mode or executing the clear function.

Bluetooth®

The meter uses Bluetooth® low energy (BLE) V4.0 wireless technology to transfer the real-time reading and the stored data. The open-air communication range is up to 10 meters.

Download the “Megger Link” App. Turn on the Bluetooth function of the meter by pressing the Bluetooth button and open the Megger Link App to connect the DCM. The Bluetooth icon of the meter will flash whilst connecting and remain on the LCD once the connection is established.



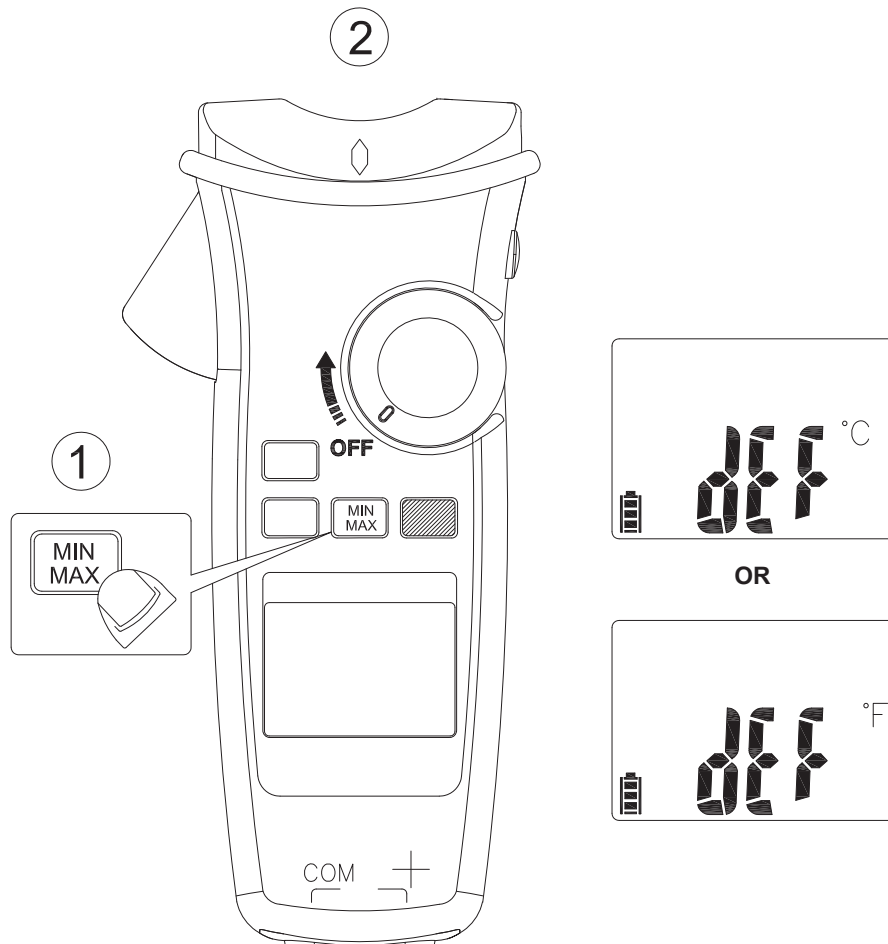
QR Code for the Megger Link App
on the Google Play Store



QR Code for the Megger Link App
on the Apple App Store



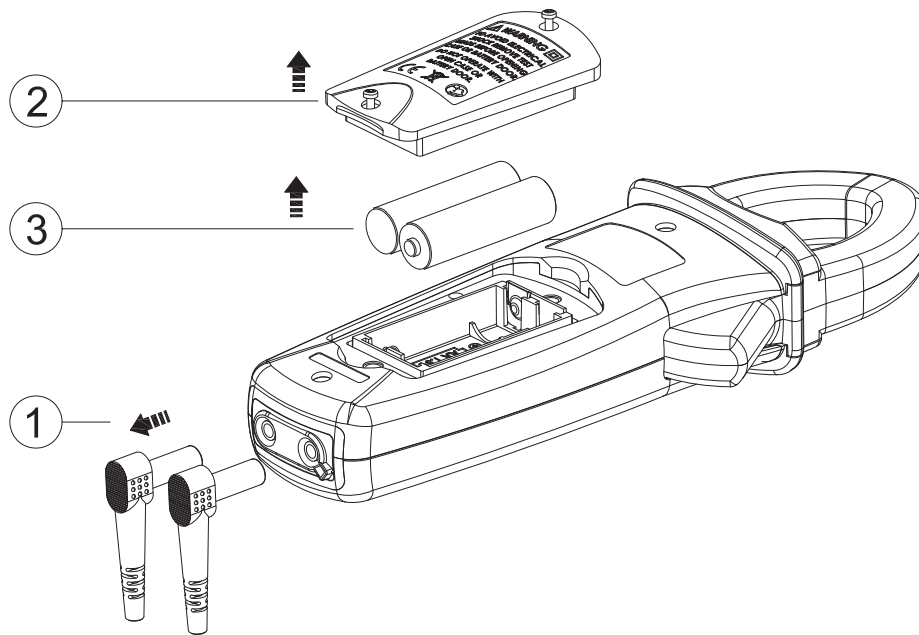
Default Temperature Units Setting



Press and hold the MIN/MAX button whilst turning the meter on to select °C or °F.

Low Battery and Battery Replacement

Replace the battery as soon as the low battery indicator appears to avoid false readings. Refer to the following figure to replace the batteries



CAUTION

Remove test leads from meter before opening the battery cover or meter case.

Specifications

General Specifications

Display count :	6,000 counts.
Overrange display :	« OL » or « -OL »
Measurement frequency :	3 times per second
Maximum Conductor Size of JAW:	42 mm diameter
Dimensions (W x H x D) :	62 x 254 x 41 mm
Weight (approx.) :	480 g (including battery)
Low Batteries Indication	If battery voltage drops below the operating voltage,  will flash.
Power requirements :	AA size battery x 2 (R6, LR6, 15D, 15A)
Battery life :	Approximately 200 hours (based on Alkaline batteries without using the backlight).

Environmental Conditions

Indoor Use Only	
Pollution degree :	2
Maximum Operating Altitude :	2,000 m (6562 ft)
Operating Temperature & Relative Humidity :	-10 °C ~ 10 °C, -10 °C ~ 30 °C, ≤80 % RH. 30 °C ~ 40 °C, ≤75 % RH. 40 °C ~ 50 °C, ≤45 % RH.
Storage temperature :	-20 to +60 °C, 0 to 80 % RH. (batteries not fitted)
Vibration :	Random Vibration per MIL-PRF-28800F Class 2
Drop Protection :	1.2 m (4 ft) drop to hardwood on concrete floor
Safety :	EN 61010-1, EN 61010-2-032, EN 61010-2-033 for CAT III 1000 V, CAT IV 600 V, EN 61326-1

Electrical Specifications

Accuracy is given as $\pm$ (% of reading + counts of least significant digit) at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, with relative humidity less than 80% and is specified for 1 year after calibration.

Temperature coefficient : $0.1 \times (\text{Specified accuracy}) / ^{\circ}\text{C}$,
< 18°C , > 28°C

AC Function :

- ACV and ACA specifications are AC coupled, true RMS.
- Accuracy is unspecified for a Square Wave.
- For non-sinusoidal waveforms, Additional Accuracy by Crest Factor (C.F.):
Add 3.0% for C.F. 1.0 ~ 2.0
Add 5.0% for C.F. 2.0 ~ 2.5
Add 7.0% for C.F. 2.5 ~ 3.0
- Max. Crest Factor of Input Signal:
3.0 @ 3000 counts
2.0 @ 4500 counts
1.5 @ 6000 counts
- Frequency Response is specified for sine waveform. LCD displays 0 counts when the reading < 20 counts.

DC mV

Range	OL Reading	Resolution	Accuracy
600.0 mV	660.0 mV	0.1 mV	$\pm (0.7\% + 5\text{D})$

Input Impedance : $10\text{ M}\Omega$

Overload Protection : AC/DC 1,000 V

DC Voltage

Range	OL Reading	Resolution	Accuracy
600.0 V	660.0 V	0.1 V	$\pm (0.7\% + 2\text{D})$
1000 V	1100 V	1 V	

Input Impedance : $10\text{ M}\Omega$

Overload Protection : AC/DC 1,000 V

AC Voltage

Range	OL Reading	Resolution	Accuracy
600.0 V	660.0 V	0.1 V	± (1.0% + 5D)
1000 V	1100 V	1 V	

Input Impedance : 10MΩ // less than 100 pF

Frequency Response : 45 ~ 400 Hz (Sine Wave)

Overload Protection : AC/DC 1,000 V

PV DC Voltage (using PVHV1 or PVHV2 lead set)

Range	OL Reading	Resolution	Accuracy
600.0 V	660.0 V	0.1 V	± (2.0% + 5D)
2000 V	2200 V	1 V	

Input Impedance : 10 MΩ

Overload Protection : AC/DC 1,000 V

PV AC Voltage (using PVHV1 or PVHV2 lead set)

Range	OL Reading	Resolution	Accuracy
600.0 V	660.0 V	0.1 V	± (2.0% + 5D)
1500 V	1600 V	1 V	

Input Impedance : 10MΩ

Frequency Response : 45 ~ 400 Hz (Sine Wave)

Overload Protection : AC/DC 1,000 V

Caution: PVHV test leads are only for use in environments not directly connected to MAINS supply

AC/DC μA

Range	OL Reading	Resolution	Accuracy
400.0 μA	440.0 μA	0.1 μA	± (1.0% + 3D)
4000 μA	4400 μA	1 μA	

Input Impedance : Approx. 2.2 kΩ

Frequency Response : 45 ~ 400 Hz (Sine Wave)

Overload Protection : AC/DC 1,000 V

AC/DC Current

Range	OL Reading	Resolution	Accuracy
60.00 A	66.00 A	0.01 A	± (2.0% + 5D)
600.0 A	660.0 A	0.1 A	
1500 A	1550 A	1 A	

Add 10 digits to the accuracy when <5.0 A. Add 0.5% to the accuracy when >1000 A.
Add 1% to the accuracy when >100 Hz.

Frequency Response : (Sine Wave) 45 ~ 400 Hz for ≤1000 A
45 ~ 65 Hz for >1000 A

Overload Protection : AC/DC 1500 A

Flexible Current Probe

Range	OL Reading	Resolution	Accuracy
300.0 A	330.0 A	0.1 A	± (1.5% + 5D)
3000 A	3300 A	1 A	

Frequency Response : 45 Hz to 400 Hz

Accuracy does not include accuracy of the Flexible Current Probe

Overload Protection : AC/DC 1000 V

Frequency

Range	OL Reading	Resolution	Accuracy
100.00 Hz	100.00 Hz	0.01 Hz	± (0.3% + 3D)
1000.0 Hz	1000.0 Hz	0.1 Hz	
10.000 kHz	10.000 kHz	0.001 kHz	

Minimum Sensitivity : > 5 V (for ACV 1 Hz ~ 10 kHz)
> 8 A (for ACA 1 Hz ~ 1 kHz)

Minimum Frequency : 1 Hz

Overload Protection : AC/DC 1000 V and 1500 A

HFR (High Frequency Rejection)

Available for ACV and ACA. Add ± 4% to specified accuracy of each function and each range for 45 Hz to 200 Hz. Accuracy is unspecified for > 200 Hz.

Cut-off Frequency (-3 dB): 800 Hz

Inrush Current

Available for ACA and Flexible Current Probe. Trigger level: $\geq 50\Omega$.
Add $\pm 3\%$ to specified accuracy of each function and each range.

Resistance

Range	OL Reading	Resolution	Accuracy
600.0 Ω	660.0 Ω	0.1 Ω	$\pm (0.9\% + 5D)$
6.000 k Ω	6.600 k Ω	0.001 k Ω	$\pm (0.9\% + 2D)$
60.00 k Ω	66.00 k Ω	0.01 k Ω	
600.0 k Ω	660.0 k Ω	0.1 k Ω	

To obtain a more accurate reading, the lead resistance should be measured by connecting the probes/clips together and the result deducted from any resistance measurement taken.

Overload Protection : AC/DC 1000 V

Continuity

Built-in buzzer sounds when measured resistance is less than 20 Ω and the sound is off when measured resistance is more than 200 Ω , between 20 Ω to 200 Ω the buzzer may be either on or off.

Continuity Indicator : 2.7 kHz Tone Buzzer

Response Time of Buzzer : < 100 ms

Overload Protection : AC/DC 1000 V

Diode

Range	OL Reading	Resolution	Accuracy
1.500 V	1.550 V	0.001 V	$\pm (0.9\% + 2D)$

Open Circuit Voltage : Approx. 1.8 V

Overload Protection : AC/DC 1000 V

Capacitance

Range	OL Reading	Resolution	Accuracy
100.0 μF	110.0 μF	0.1 μF	$\pm (1.9\% + 2D)$
1000 μF	1100 μF	1 μF	

Overload Protection : AC/DC 1000 V

VoltSeek

Voltage Range of High Sensitivity : 80 V ~ 1000 V (At the top edge of the jaw)

Voltage Range of Low Sensitivity : 160 V ~ 1000 V (At the top edge of the jaw)

Temperature

Range	OL Reading	Resolution	Accuracy
-40.0 °C – 400.0 °C	440.0 °C	0.1 °C	± (1% + 20D)
-40.0 °F – 752.0 °F	824.0 °F	0.1 °F	± (1% + 36D)

The accuracy does not include the accuracy of the thermocouple probe.
Accuracy specification assumes surrounding temperature stable to ± 1 °C.
For surrounding temperature changes of ± 2 °C rated accuracy applies after 2 hours.

Overload Protection : AC/DC 1000 V

Specification PVHV1 (4mm plugs) and PVHV2 (MC4) test leads

Input Impedance : 10 M Ω

Overvoltage Category : CAT II 1000 V AC , 1500 V DC CAT III 1000 V,
CAT IV 600 V.

Pollution Degree : 2

Exposed probe tip length : Test probe: 18 mm to 3.5 mm
(0.70 inch to 0.14 inch)

Environmental ratings : -10 °C to 45 °C (-4 °F to 113 °F), 80% R.H.

Altitude : 2000 m (6,562 ft)

Safety Standard : EN61010-031

Product manufactured in Taiwan

Maintenance

Do not attempt to repair this meter. It contains no user-serviceable parts. Repair or servicing should only be performed by qualified personnel.

Cleaning

Periodically wipe the case with a dry cloth and detergent, do not use abrasives or solvents

WEEE Directive

The crossed out wheeled bin symbol on the instrument and on the batteries is a reminder not to dispose of them with general waste at the end of their life. Megger is registered in the UK as a Producer of Electrical and Electronic equipment. The registration No is; WEE/DJ2235XR.

Users of Megger products in the UK may dispose of them at the end of their useful life by contacting B2B Compliance at or by telephone on

Users of Megger products in other regions should contact their local Megger office or distributor.

Battery Disposal

The batteries in this product are classified as Portable Batteries under the Batteries Directive. Please contact either Megger Ltd, your local Megger office or distributor for instructions on the safe disposal of these batteries. Megger is registered in the UK as a producer of batteries. The registration number is BPRN01235.

For further information see

Warranty (3 years)

This meter is warranted to the original purchaser against defects in material and workmanship for 3 year from the date of purchase.

During this warranty period, the manufacturer will, at its option, replace or repair the defective unit, subject to verification of the defect or malfunction.

This warranty does not cover fuses, disposable batteries, or damage from abuse, neglect, accident, unauthorised repair, alteration, contamination, or abnormal conditions of operation or handling.

Any implied warranties arising out of the sale of this product, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the above. The manufacturer shall not be liable for loss of use of the instrument or other incidental or consequential damages, expenses, or economic loss, or for any claim or claims for such damage, expense or economic loss. Some states or countries laws vary, so the above limitations or exclusions may not apply to you.