true rms

FLEXIBLE AC CLAMP METER

Model : CMF-3200

Your purchase of this Flexible CLAMP Meter It is a smart meter . marks a step forward for you into the field of precision measurement. Although this CLAMP METER is a complex and delicate instrument, its durable structure will allow many years of use if proper operating techniques are developed. Please read the following instructions carefully and always keep this manual within easy reach.

OPERATION MANUAL

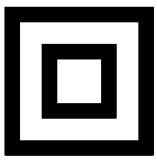
Caution Symbol

Caution :

* Risk of electric shock !

Caution :

* Do not apply the overload voltage, current to the input terminal !
* Remove test leads before open the battery cover !
* Cleaning - Only use the dry cloth to clean the plastic case !



* Double insulation

Environment Conditions

* *Installation Categories III-1000V.*
* *Pollution Degree 2.*
* *Altitude up to 2000 meters.*
* *Indoor use.*
* *Relative humidity 80% max.*

TABLE OF CONTENTS

1. FEATURES

* Meet IEC 1010 CAT III 1000 V safety requirement.
* 6000 counts A/D, high resolution.
* True RMS
* Double insulation coil.
* ACA, DCV, ACV, ohms, continuity.
  Capacitance, Diode.
* Smart function, Auto range.
* Smart operation, Build in 3 intelligent function :
  " V ", " Ω "," A ".
* " V " function can select DCV, ACV automatically with
  auto range.
* " Ω " function can select the Resistance , Diode,
  Continuity beeper, Capacitance automatically with
  auto range.
* ACA " 600A " & " 3000A " automatically.
* Data hold .
* Auto shut off is available to save battery life.
* 10 M ohm impedance for voltage circuit.
* Built-in overload protection for most ranges.
* LSI circuit provides high reliability and durability.
* Uses durable, long-lasting components, enclosed in
  strong, light weight ABS-plastic housing.

2. SPECIFICATIONS

2-1 General Specifications

Display	33.5 mm x18.7 mm LCD display
Measurement	DCV, ACV, ACA, Resistance,Capacitance, Diode, Continuity beeper.
A/D counts no.	6000 counts.
Smart function	" V " function can select ACV, DCV automatically with auto range.
	" Ω " function can select the Resistance,Diode, Continuity beeper,Capacitance automatically with auto range.
	ACA " 600A ", " 3000A " automatically with auto range.
Data hold	To freeze the display reading on the LCD display
Power On/Off management	Auto power off or manual power off.
Selection	Smart function or auto function .
Polarity	Automatic Switching, " - " indicates negative polarity.
Sampling time	Approx. 0.5 to 1 second.
Operating Temp. & humidity	0 ℃ to 50 ℃ (32 ℉ to 122 ℉) Max. 80% RH.
Power supply	DC 1.5 V battery (UM-4, AAA) x 2
Power consumption	Approx. DC 16.1 mA.
Flexible Cable length	300 mm
Flexible Cable Diameter	8 mm
Dimension	290 x135 x 27.8 mm (11.4x 5.3 x 1.09 inch).
Weight	208 g/0.46 LB (w.o battery).
Accessories Included	Red and Black Test Leads..... 1 Set Instruction Manual..... 1 PC

2-2 Electrical Specifications (23±5 ℃)

DC Voltage	
Range	6 V/60 V/600 V /1000 V
Resolution	0.001V /0.01V /0.1V/1 V
Accuracy	± (0.8% + 5d)
Input impedance	10 M ohm.
Over load protection	±1000 DCV, 1000 ACV

AC Voltage	True RMS
Range	6 V/60 V/600 V/1000 V
Resolution	0.001V /0.01V /0.1V/1 V
Accuracy	± (1% + 8d) ** Spec. are tested under 50/60 Hz.*
Input impedance	10 M ohm.
Over load protection	±1000 DCV, 1000 ACV
Smart Function Test	**must be ＞ 350mV AC**

AC Current	True RMS	
Range	600A/3000A	
Resolution	0.1A /1A	
Accuracy	600 A Range	± (1% +8d)
	3000 A Range	± (1% +10d)
Linearity	± 0.2% of reading value from 10% to 100% of range value.	
Conductor position sensitivity	± (2% +15d) of reading value * The measured conductor distance from center＞ 25mm (1")	
External field influence	increase ± 1.5% of range value max. * Recommend the distance between different " Flexible current probe " should ＞ 200mm	
Remark	* Accuracy is specified that the measured conductor's position is on the center of "Flexible current probe". * ACA specification be tested on sine wave 50/60 Hz. * Measurement range：0.1A to 3000A	

Diode
Short/non conductance, good/defect test

Capacitance	
Range	6 nF/60 nF/600 nF/6 uF/60 uF/600 uF
Resolution	0.001nF/0.01nF/0.1 nF/0.001uF/0.01uF/0.1uF
Accuracy	± (3 % + 10d)
Over load protection	±30 DCV, 30 ACV.
Remark	Discharge capacitor before testing.
Smart Function Test	**must be ＞ 0.400nF**

OHMS	
Range	600Ω/6 KΩ/60 KΩ/600 KΩ/6 MΩ/60MΩ
Resolution	0.1Ω/0.001KΩ/0.01KΩ/0.1KΩ/0.001MΩ/0.01MΩ
Accuracy	600 ohm : ±(1 % + 5d) 6K/60K/600K/6M : ±(1.5 % + 5d) 60M : ±(3 % + 5d)
Over load protection	±350 DCV, 350 ACV.
Remark	※60MΩ measurements must be operated in the automatic shift mode

Continuity Beeper
Beeper will sound if measured resistance less than 20 ohm.

Remark :

* *Spec. tested under the environment RF Field Strength less than 3 V/M & frequency less than the 30 MHz only.*

3. FRONT PANEL DESCRIPTION

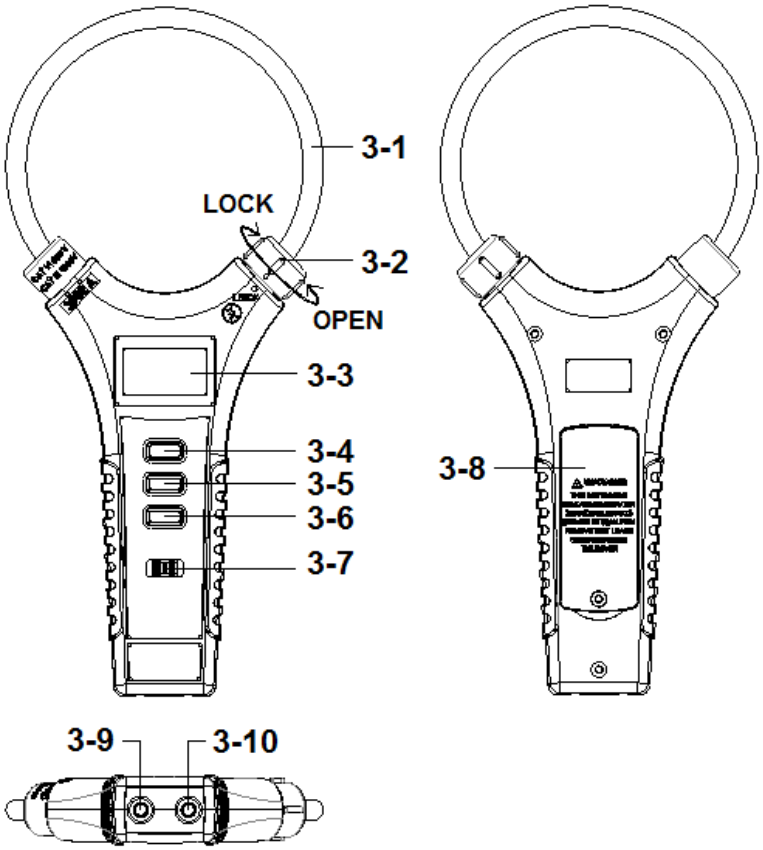


Fig. 1

3-1 Flexible current probe
3-2 **Probe lock/open**
3-3 Display
3-4 POWER button
3-5 HOLD button
3-6 SELECT button
3-7 Function Switch
3-8 Battery compartment/Cover
3-9 COM input terminal
3-10 V/ohm/Diode/Continuity/Cap. input terminal

4. PRECAUTIONS & PREPARATIONS FOR MEASUREMENT

1) Ensure that the DC 1.5V X2 batteries are connected with the right polarity and placed in the battery compartment correctly.
2) Place the Red & Black Test Leads into the proper input terminal before making measurement.
3) Remove either of the test leads from the circuit when changing the measurement range.
4) Except operate the " Data Hold " function, it should cancel the " Data Hold " function, otherwise the display reading will freeze permanently.
5) Do not exceed the maximum rated voltage and current to the input terminal.
6) Remove the battery if the instrument is not to be used in a long period of time.
7) For safety consideration, when change the new test leads, it should use the replace test leads that already approval of " CATIII-1000 V " at least.
8) Power On/Off management :
   a. When not use the meter,press the " POWER button " switch " (3-4, Fig. 1), turn off the power complete.
   b. During the measurement, after 10 minutes of the meter It will automatically shut down.

   c. Disable Auto Power Off (no automatic shutdown) Press the "select button" (3-6, Fig. 1) and at the same time Press the power switch (3-4, Fig. 1), turn on the power.

5. MEASURING PROCEDURE

5-1 Symbols & units of display

Symbols Units	Descriptions
SMART	Appears when selecting " Smart " mode. The meter default mode is " Smart "
AUTO	Appears when selecting " Automatic range " mode.
DC	Appears when selecting DC mode. (DC voltage)
AC	Appears when selecting AC mode. (AC voltage or AC current)
H	Appears when the " Data hold " function is operated.
	Power voltage is already under the low condition.
	Appears when the " Continuity beeper " is operated.
V	Units for voltage measurements.
A	Units for " Current " measurement.
Ω,KΩ,MΩ	Units for resistance measurements.
nF,uF	Units for " Capacitance " measurement.
	Appears when the " Diode " function is operated.
—	Appears when measuring a DCV value is negative.
OL	Over range indicator for voltage and current, ohm function.

5-2 DC Voltage, AC voltage true rms Measurement

1) Connect BLACK test lead into " COM " terminal (3-9,Fig. 1)
2) Connect RED test lead into " V " terminal (3-10, Fig. 1).
3) Select the " Function switch " (3-7, Fig. 1) to the " V " position, Display will show " SMART "marker.meter is under " Smart " mode for voltage AC/DC auto scanning.
4) The meter can measure the ACV, DCV value automatically and with auto range selection.
5) Push the " SELECT button " (3-6, Fig. 1) to select the " ACV " or " DCV " measurement.
6) When LCD show the " AUTO " marker, the meter is under the " auto range " mode. Meter will select the suitable measurement range automatically.
7) Press " SELECT button ", will return to the SMART mode.

5-3 Resistance Measurement

1) Connect BLACK test lead into " COM " terminal (3-9,Fig.1).
2) Connect RED test lead into " Ω " terminal (3-10, Fig. 1).
3) Select the " Function Switch " (3-7, Fig. 1) to the " Ω " position.
4) When LCD show the " SMART " marker, the meter is under the " SMART " mode. Meter will select the suitable measurement range automatically.
5) Operation "smart" mode at the push SELECT button (3-6 Figure 1) meter will perform "Auto Range" Displays "AUTO" symbol on the LCD.
6) Press " SELECT button ", will return to the SMART mode.

5-4 AC Current true rms Measurement

1) Select the " Function switch " (3-7, Fig. 1) to the "A " position, Display will show " AUTO "marker. meter is under the auto range operation.
2) Unscrew according to the illustrated "Probe Locker" (3-2, Fig. 1) Remove the flexible probe, the measuring probe on the hook The current conductor.
3) The flexible probe into the "Probe Locker" (3-2, Fig. 1) After locking means according to FIG direction, can be measured ACA currents.
4) The meter can measure the 600ACA / 3000ACA true rms automatically.

5-5 Continuity Check

1) Connect BLACK test lead into " COM " terminal (3-9,Fig 1.)
2) Connect RED test lead into " •)) " treminal (3-10,Fig 1)
3) Select the " Function switch " (3-7, Fig. 1) to the " Ω " position.
4) The LCD display will show the " SMART ",the meter is under " Smart " mode for auto scanning Continuity measurement.
5) When the resistance value is less than 20 ohm, the beeper sound will be generated. The display will show " •)) " indicator.

5-6 Diode Test

1) Connect BLACK test lead into " COM " terminal (3-9,Fig 1.)
2) Connect RED test lead into " Ω " terminal (3-10, Fig 1.)
3) Select the " Function switch " (3-7, Fig. 1) to the " Ω " position.
4) The LCD display will show the " SMART " , the meter is under " Smart " mode for auto scanning Diode measurement.
5) a. When connected with polarity as shown in Fig. 2, a forward current flow is established and the approx. Diode Forward Voltage (VF) value in volt will appears on the display reading. If the diode under test is defective, " 0.000 " or near " 0.000 " value (short circuit) " OL " (open circuit) will be displayed.

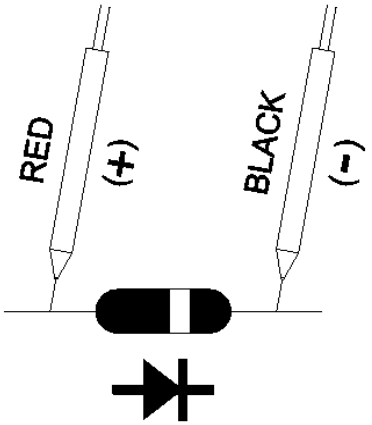


Fig. 2

b. When connected as shown in Fig. 3, a reverse check on the diode is made. If the diode under test is good, " OL " will be displayed. If the diode under test is defective, " 0.000 " or other numbers will be displayed. Proper diode testing should include both steps a. and b. above.

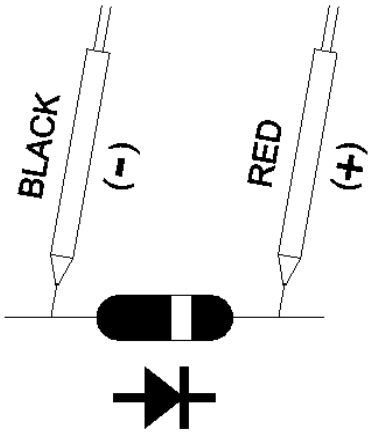


Fig. 3

5-7 Capacitance Measurement

1) Select the " Function switch " (3-7, Fig. 1) to the " Ω " position.
2) Connect the tested capacitor to " Input terminals " directly.

   * *If the measured capacity existing the polarity, then should connect the " + " polarity of the measured capacitor to the " V " terminal (3-10, Fig. 1), connect the " - " polarity of the measured capacitor to the " COM " terminal (3-9, Fig. 1),*
   * *Full discharge the measured capacitor before the make the measurement.*

3) The LCD display will show the " SMART " , the meter is under " Smart " mode for auto scanning Capacitance measurement.
4) The meter can measure the capacitance value automatically and with auto range selection.

5-8 Smart/Auto function selection

When the Display show the " SMART ", the meter is ready for the Smart mode. Under the " Smart " mode if press the " SELECT button " (3-6, Fig. 1) once (or once in sequence) then can select the individual function, for example ACV, DCV , Ohm, Diode, Capacitance, Continuity...testing. In the same time the Display will show the " AUTO " indicator (auto range).

5-9 Data Hold Operation

1) During the measurement, pushing the " Hold button " (3-5, Fig. 1) once a while will freeze the measured value & the LCD will indicate " **H** "symbol.
2) Push the " Hold Button " again to cancel the data hold function.

6. MAINTENANCE

6-1 Battery replacement

Caution : *Remove test leads before opening the battery cover !*

1) When the LCD display showing the mark of "  "it is necessary to replace the battery, However in-spec. measurement may still be made for several hours after " Low battery indicator " appears before the instrument become inaccurate.

2) Open the screw of " Battery Cover " (3-8, Fig. 1) by loosing the screws, then move the battery.

3) Replace with DC 1.5V X2 batteries and reinstate the cover.

6-2 Cleaning

Caution : *Cleaning - Only use the dry cloth to clean the plastic case !*

7. OPTIONAL ACCESSORIES & ADAPTERS

Item	*Model*
Carrying Case	*CA-05A*

8. THE ADDRESS OF AFTER SERVICE CENTER