KUSAM-MECO®

An ISO 9001:2008 Company

3000A AC TRMS AC / DC DIGITAL DUAL DISPLAY CLAMP MULTIMETER

Model 860A

13 FUNCTIONS 10 RANGES

Preliminary Data

SPECIAL FEATURES :

- Dual display 6000 Counts (1 display in front & 1 display at bottom)
- Auto / Manual range selection
- Relative measurement display " " sign.
- The knife like part at the top side of clamp allows user to separate the wires without touching with hand & helps in increasing safety while taking measurement.
- Analog Bar Graph display
- Automatic zero adjustment.
- Low battery indication.
- Data Hold Function.
- LED light for proper connection in dimly light areas, which turns on when the clamp jaws are opened.
- Magnet at the back side of meter allows user to fix the meter on metal surface making the measurement procedure easy.

GENERAL SPECIFICATIONS :

- **Sensing :** AC True RMS Sensing
- **Jaw size :** 65mm
- **Polarity :** Automatic negative polarity indication.
- **Over range indication :** The "OL" or "-OL" display.
- **Auto Power Off :** after approx. 15 minutes .
- **Operating Temperature :** 0°C ~ 40°C (32°F~104°F); Relative Humidity 80% R.H.
- **Storage Temperature :** -20°C ~ 60°C (-4°F~140°F); Relative Humidity 90% R.H.
- **Power Supply :** Standard 9V battery.
- **Dimension :** 275(H) x 120(W) x 32(D) mm
- **Weight :** Approx. 562gm. (Including Battery).

SAFETY :

- **Safety :** The meter is up to the standards of IEC1010 Double insulation.
- **Pollution Degree :** 2
- **CE EMC/ LVD.**
- **CAT II 1000V.**
- **Overvoltage CAT II.**

ACCESSORIES :

Test leads (pair), User's manual, & Carrying case.

ELECTRICAL SPECIFICATIONS : 860A

Accuracy : ± (% reading digits + Number of digits)at 23 ± 5°C, 75% R.H.

DC VOLTAGE

Range	Resolution	Accuracy
60 mV	0.01 mV	±(0.8%rdg + 10 dgts)
600 mV	0.1 mV	±(0.5%rdg + 15 dgts)
6 V	1 mV	
60 V	10 mV	
600 V	100mV	
1000 V	1 V	±(0.8%rdg + 10 dgts)

Overload Protection : 1000V DC or 750V AC rms
Impedance : 10M

AC VOLTAGE (TRMS)

Range	Resolution	Accuracy					Sensitivity
		50Hz-500Hz	500Hz-1KHz	1K-5KHz	5k-10KHz	10K-20KHz	
60 mV	0.01 mV	±(1.2% rdg + 10 dgts)	±(1.5% rdg + 10 dgts)	±(2% rdg + 10 dgts)	±(3.5% rdg + 10 dgts)	±(4.5% rdg + 10 dgts)	50 mV
600 mV	0.1 mV	±(1.2% rdg + 10 dgts)	±(1.5% rdg + 10 dgts)	±(2% rdg + 10 dgts)	±(3.5% rdg + 10 dgts)	±(4.5% rdg + 10 dgts)	500 mV
6 V	1 mV	50Hz - 1KHz : ±(3.0% rdg + 15 dgts)					1 V
60 V	10 mV	50Hz - 400Hz : ±(1.5% rdg + 10 dgts)					1 V
600 V	100 mV						1 V
750 V	1 V						1 V

Overload Protection : 1000V DC or 750V AC rms
Impedance : 10M

All Specifications are subject to change without prior notice.

ELECTRICAL SPECIFICATIONS : KM 860A

AC CURRENT (TRMS)

Range		Resolution	Accuracy	
			50-500Hz	500-1KHz
400A		0.1 A	±(3.5% rdg + 25 dgts)	±(3.5% rdg + 35 dgts)
3000A	0-1000	1 A	±(3.5% rdg + 30 dgts)	±(3.5% rdg + 40 dgts)
	1000-2000	1 A	±(5.5% rdg + 30 dgts)	±(4.0% rdg + 40 dgts)
	2000-3000	1 A	±(6.5% rdg + 50 dgts)	±(5.5% rdg + 60 dgts)

Overload Protection : 3000A DC or AC rms

DC CURRENT

Range		Resolution	Accuracy
400A		0.1 A	±(3.0%rdg + 10 dgts)
3000A	0-1000	1 A	±(3.5%rdg + 20 dgts)
	1000-2000	1 A	±(5.5%rdg + 20 dgts)
	2000-3000	1 A	±(6.5%rdg + 40 dgts)

Overload Protection : 3000A DC or AC rms

RESISTANCE

Range	Resolution	Accuracy
600	0.1	±(1.2%rdg + 10 dgts)
6 k	1	
60 k	10	
600 k	100	
6 M	1 k	
60 M	10 k	±(2.5%rdg + 15 dgts)

Overload Protection : 250V DC or AC rms

CAPACITANCE

Range	Resolution	Accuracy
40 nF	10 pF	±(5.0%rdg + 10 dgts)
400 nF	100 pF	±(2.5%rdg + 5 dgts)
4 F	1 nF	
40 F	10 nF	±(5.0%rdg + 10 dgts)
400 F	100 nF	±(20.0%rdg + 20 dgts)
4000 F	1 F	

Overload Protection : 250V DC or AC rms

DIODE & AUDIBLE CONTINUITY TEST

Range	Description	Test Condition
	Display read approx. Forward voltage of diode.	Forward DC current approx. 0.4mA Reverse DC Voltage approx. 2.8V
	Built-in buzzer sounds if resistance is less than 100	Open circuit voltage approx. 0.5V

Overload Protection : 250V DC or AC rms

FREQUENCY

Range	Resolution	Accuracy
10 Hz	0.01 Hz	±(0.5%rdg + 5dgts)
100 Hz	0.1 Hz	
1000 Hz	1 Hz	
10 kHz	10 Hz	
100 kHz	100 Hz	
1000 kHz	1 KHz	
10 MHz	10 KHz	

Sensitivity : Range of input Voltage : 1.5V ~ 10V, if input voltage over range, need adjust

Overload Protection : 250V DC or AC rms

TEMPERATURE

Range	Resolution	Accuracy	
°C / °F	1°C / 1°F	-20~150°C -4 ~ 302°F	±(3°C + 2)
		150 ~ 300°C 302 ~ 572°F	±(3% rdg + 2 dgts)
		300 ~ 1000°C 572 ~ 1800°F	±(3.5%rdg + 10dgts)

NiCr-NiSi sensor. Sensor accuracy not included in above specified accuracy.

Overload Protection : 36V DC or AC rms

DUTY CYCLE

Range	Accuracy	Frequency
0.1% ~ 99.9%	±(2.0% rdg + 2 dgts)	<10kHz

Sensitivity : sine wave 0.6Vrms

Overload Protection : 250V DC or AC rms

All Specifications are subject to change without prior notice.

KUSAM-MECO®
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WHAT IS DC + AC TRUE RMS

DC AC TRUE RMS

DC AC True RMS is a term which identifies a DMM that responds accurately to the total effective RMS value regardless of the waveform, and is given by the expression :

$$\sqrt{DC^2 + (AC\ rms)^2}$$

DC + AC True RMS voltage is the total effective voltage having the same heating value corresponding a DC voltage. With DC + AC True RMS voltage measurement, you can accurately measure the voltage values regardless of the waveforms such as: square, sawtooth, triangle, pulse trains, spikes, as well as distorted waveforms with the presence of harmonics and DC components / Harmonics and DC components may cause:

1) Overheated transformers, generators and motors to burn out faster than their rated life
2) Circuit breakers to trip prematurely
3) Fuses to blow
4) Neutrals to overheat due to triplen harmonics present on the neutral (180Hz)
5) Bus bars and electrical panels to vibrate

Only AC or True RMS and Average responding meters can introduce significant errors in many applications.

See TABLE 2 for typical example.

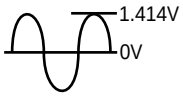
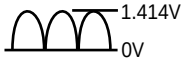
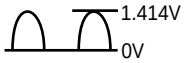
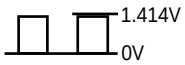
INPUT WAVEFORM	DC + AC TRMS	AC RMS	AVERAGE RESPONSE
Sine 	1.000V ERROR= 0% CF=1.414	1.000V ERROR= 0% CF=1.414	1.000V ERROR= 0%
Full wave rectified Sine 	1.000V ERROR= 0% CF=1.414	0.436V ERROR= 56.4% CF=3.247	0.421V ERROR= 57.9%
Half wave rectified Sine 	0.707V ERROR= 0% CF=2.000	0.546V ERROR= 22.7% CF=2.591	0.550V ERROR= 22.2%
50% duty pulse train 	1.000V ERROR= 0% CF=1.414	0.707V ERROR= 29.3% CF=2.000	0.785V ERROR= 21.5%

TABLE 2. WAVEFORMS AND CREST FACTORS

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USE TRUE RMS WHEN MEASURING AC WAVEFORMS

The waveforms on today's AC power lines are anything but clean. Electronic equipment such as office computers, with their switching power supplies, produce harmonics that distort power-line waveforms. These distortions make measuring AC voltage inaccurate when you use an averaging DMM.

Average voltage measurements work fine when the signal you're measuring is a pure sine wave, but errors mount as the waveform distorts. By using true RMS measurements, however, you can measure the equivalent heating effect that a voltage produces, including the heating effects of harmonics. Table 1 shows the difference between measurements taken on averaging DMMs & those taken on true RMS DMMs. In each case, the measured signal's peak-to-peak value is 2V. Therefore, the peak value is 1V.

For a 1-V peak sine wave, the average & RMS values are both 0.707V. But when the input signal is no longer a sine wave, differences between the RMS values & the average readig values occur. Those errors are most prominent when you are measuring square waves & pulse waveforms, which are rich in harmonics.

Table 1. Average versus true RMS comparison of typical waveforms.

Waveform	Actual Pk-Pk	True RMS Reading	Average Reading	Reading Error
Sine Wave	2.000	0.707	0.707	0%
Triangle Wave	2.000	0.577	0.555	-3.8%
Square Wave	2.000	1.000	1.111	+11.1%
Pulse (25% duty Cycle)	2.000	0.433	0.416	-3.8%
Pulse (12.5% duty Cycle)	2.000	0.331	0.243	-26.5%
Pulse (6.25% duty Cycle)	2.000	0.242	0.130	-46.2%

One limitation to making true RMS measurements is crest factor, and you should consider crest factor when making AC measurements. Crest factor is the ratio of a waveform's peak ("crest") voltage to its RMS voltage. Table 2 shows the crest factors for ideal waveforms.

Table 2. Crest factors of typical waveforms.

Waveform	Crest Factor
DC	1.000
Square Wave	1.000
Sine Wave	1.414
Triangle Wave	1.732
Pulse (25% duty Cycle)	1.732
Pulse (12.5% duty Cycle)	2.646
Pulse (6.25% duty Cycle)	3.873

A DMM's specifications should tell you the maximum crest factor that the meter can handle while maintaining its measurement accuracy. True RMS meters can handle higher crest factors when a waveform's RMS voltage is in the middle of the meter's range setting. Typically, a DMM may tolerate a crest factor of 3 near the top of its scale but it might handle a crest factor of 5 that's in the middle of the range. Therefore, if you're measuring waveforms with high crest factors (greater than 3), you should adjust the DMM so the measured voltage is closest to the center of the measurement range.

Another limitation of true RMS is speed. If you're measuring relatively clean sine waves, then you can save time & money by using as averaging DMM. True RMS meters cost more than averaging meters and can take longer to produce measurements, especially when measuring millivolt-level AC signals. At those low levels, true RMS meters can take several seconds to stabilize a reading. Averaging meters won't leave you waiting.

LIST OF PRODUCTS

* UL Approved Digital Multimeter
* Digital AC & AC/DC Clampmeter
* Transistorised Electronic Analog & Digital Insulation Resistance Testers
* Earth Resistance Testers
* Digital Sound Level Meter & Sound Level Calibrator
* Digital contact & Non-contact Type Tachometer
* Digital Non-contact (infrared) Thermometer
* Thermo Hygrometer & Thermo Anemometer
* Wood / Paper / Grain Moisture Meter
* Distance Meter
* Digital Hand Held Temperature Indicators
* Digital Lux Meter
* Power Factor Regulator
* Maximum Demand Controller/Digital Power Meter
* Gas Analysers
* Calibrators
* Laboratory Instruments
* Phasing Sticks
* 500KV High Voltage Non contact detector.
* Transducers & Transmitters
* Programmable Panel Meters

KUSAM-MECO

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www.kusam-meco.co.in

KUSAM-MECO

DIGITAL DUAL DISPLAY AC/DC CLAMP METER MODEL-860A

OPERATION MANUAL

KUSAM-MECO

WARRANTY

Each “KUSAM-MECO” product is warranted to be free from defects in material and workmanship under normal use & service. The warranty period is one year (12 months) and begins from the date of despatch of goods. In case any defect occurs in functioning of the instrument, under proper use, within the guarantee period, the same will be rectified by us free of charges, provided the to and fro freight charges are borne by you.

This warranty extends only to the original buyer or end-user customer of a “KUSAM-MECO” authorized dealer.

This warranty does not apply for damaged Ic’s, fuses, disposable batteries, carrying case, test leads, or to any product which in “KUSAM-MECO’s” opinion, has been misused, altered, neglected, contaminated or damaged by accident or abnormal conditions of operation or handling.

“KUSAM-MECO” authorized dealer shall extend this warranty on new and unused products to end-user customers only but have no authority to extend a greater or different warranty on behalf of “KUSAM-MECO”.

“KUSAM-MECO’s” warranty obligation is limited, at option, free of charge repair, or replacement of a defective product which is returned to a “KUSAM-MECO” authorized service center within the warranty period.

THIS WARRANTY IS BUYER’S SOLE AND EXCLUSIVE REMEDY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. “KUSAM-MECO” SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, INCLUDING LOSS OF DATA, ARISING FROM ANY CAUSE WHATSOEVER.

All transaction are subject to Mumbai Jurisdiction.

KUSAM-MECO

DIGITAL DUAL DISPLAY AC/DC CLAMP METER MODEL-860A

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MUMBAI

TEST CERTIFICATE

DIGITAL DUAL DISPLAY
AC / DC CLAMP METER

This Test Certificate Warranty that the product has been inspected and tested in accordance with the published specifications.

The instrument has been calibrated by using equipment which has already been calibrated to standards traceable to national standards.

MODEL NO. **860 A**

SERIAL NO. _____

DATE: _____

ISO 9001
REGISTERED

QC
KUSAM-MECO
PASS

5. MAINTENANCE

1) Before open the battery door, disconnect both test lead and never use the meter before the battery door is closed.
2) To avoid contamination or static damage, do not touch the circuit board without proper static protection.
3) If the meter is not going to be used for a long time, take out the battery and do not store the meter in high temperature or high humidity environment.
4) When taking current measurement, keep the cable at the center of the clamp for more accurate test result.
5) Repairs or servicing not covered in this manual should be done only by qualified personal. Periodically wipe the case with a dry cloth and detergent. Do not use abrasives or solvents on the meter.
6) Please take out the battery when not using for a long time.

1. SAFETY INFORMATION SAFETY SYMBOLS

Warning ! Dangerous Voltage (Risk of electric shock).

Caution ! Refer to the user's manual before using this meter.

Double! Insulation (Protection Class II).

Alternating Current **(AC)**

Direct Current **(DC)**

Either **DC** or **AC**

Ground (maximum permitted voltage between terminal and ground).

The symbol indicating separate collection for electrical and electronic equipment.

The user Shall be made aware that, if the instrument is used in a manner not specified by the manufacturer, the protection provided by the instrument may be impaired.

The finger or any part of your body shall not be beyond the barrier of the test probe when measuring.

Individual protective equipment must be used if HAZARDOUS LIVE parts in the installation where measurement is to be carried out could be ACCESSIBLE.

Not to use the CURRENT SENSOR if the wear indicator in the JAW OPENING is visible.

The following safety information must be observed to insure maximum personal safety during the operation of this meter.

1.1 Do not operate the meter if the body of meter or the test lead look broken.
1.2 check the main function dial and make sure it is at the correct position before each measurement.
1.3 Do not perform resistance, capacitance, temperature, diode and continuity test on a live power system.
1.4 Do not apply voltage between the test terminals and test terminal to ground that exceed the maximum limit Value in this manual.
1.5 Exercise extreme caution when measuring live system with voltage greater than 60V DC or 30V AC.
1.6 Keep the fingers after the protection ring when measuring through the clamp.
1.7 Change the battery when the" " symbol appears to avoid incorrect data.
1.8 Use the DMM indoor, altitude up to 2000m and temperature 5°C to 40°C.
Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C.
1.9 In locations subject to radio frequency interference, the product may malfunction and it resets automatically when leaving this environment.

3.9 Data Hold
On any range, press the **"D. HOLD"** key to lock display value, and the **"HOLD"** sign will appear on the display, press it again to exit.

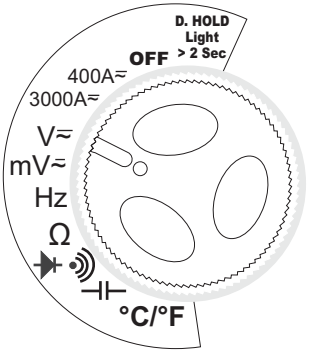
3.10 MAX/MIN
Press the **"MIN/MIN"** key to lock **MAX** or **MIN** value, and the **"MAX"** or **"MIN"** sign will appear on the display, press it over 2 seconds to exit.

3.11 Back Light
On any range, press the **"D. HOLD"** key over 2 seconds to light the back light, press it again for more than 2 seconds to Shut the light. The light can Shut automatically after 10 seconds too.

3.12 Relative measurement
Press the **"REL**Δ" key, you can measure the relative value and "Δ" sign will appears on the display, the auto range mode be changed to manual range mode. Press it again to exit relative measurement and **"Δ"** sign disappears, but you can not go back to auto range mode. This function can be used to zero the reading on **DCA** range. This function is non effective on **Hz/DUTY** measurement .

4. Battery Replacement

1) When the battery voltage drop below proper operation range, the "+ -" symbol will appear on the LCD display and the battery need to be changed.
2) Before changing the battery, set the selector switch to **"OFF"** position.
Open the cover of the battery cabinet by a screwdriver .
3) Replace the old battery with the same type battery
4) Close the battery cabinet cover and fasten the screw.
Caution : Dispose the used batteries according to the rules, which are defined by each community.



Push Button

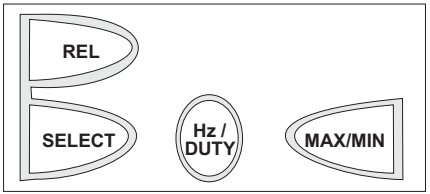


Figure 3. Push Button

1. REL △

- Pressing this button, the meter enters relative measuring mode, "REL▲" is displayed on the LCD and the present reading becomes the reference value and displayed on the secondary display. Relative measurement has two modes. *REL* ▲ = measurement value-reference value, the other is REL%= (REL▲/Reference value) x100%(press SELECT to select REL △ or REL % mode)..

3.3 AC Current Measurement

1) Set the selector switch to desired **"400A≂"** or **"3000A~"** position.
2) Press **"SELECT"** key to choose **"AC"** measurement.
3) Disconnect the test leads from the meter.
4) Clamp the Jaws around the **one** conductor to be measured. Center the conductor within the Jaw using the Centering Marks as guides.
5) Read the result from the LCD panel.

3.4 Resistance Measurement

1) Connect the black test lead to **"COM"** socket and red test lead to the **"VΩHz"** socket.
2) Set the selector switch to desired **"Ω ⊣◀)))"** position.
3) Press **"SELECT"** key to choose **Resistance** measurement.
4) Connect tip of the test leads to the points where the value of the resistance is needed.
5) Read the result from the LCD panel.

Note : When take resistance value from a circuit system, make sure the power is cut off and all capacitors need to be discharged.

3.5 Capacitance Measurement

1) Connect the black test lead to **"COM"** socket and red test lead to the **"VΩHz"** socket.
2) Set the selector switch to desired "⊣⊢" position.
3) Connect tip of the test leads to the points where the value of the capacitance is needed.
4) Read the result from the LCD panel.

Note :

a) Before testing, discharge the capacitor by shorting its leads together. Use caution in handling capacitors because they may have a charge on them of considerable power before discharging.

b) Before testing, press **"REL△"** key to eliminate the zero error.

c) When testing 4000μF capacitor, note that there will be approx. 30 seconds time lag.

3.6 Diode And Audible continuity Test

1) Connect the black test lead to **"COM"** socket and red test lead to the **"VΩHz"** socket.

2) Set the selector switch to desired **"Ω ⊣◀))) "** position.

3) Press **"SELECT"** key to choose **Diode** or **Audible Continuity** measurement

4) Connect the test leads across the diode under measurement, display shows the approx. Forward Voltage of this diode.

5) Connect the test leads to two point of circuit, if the resistance is lower than approx. 100Ω, the buzzer sounds.

Note : Make sure the power is cut off and all capacitors need to be discharged under this measurement.

3.7 Frequency and Duty cycle measurement

1) Connect the black test lead to **"COM"** socket and red test lead to the **"VΩHz**" socket.

2) Set the selector switch to desired **"Hz"** position.

3) Press **"Hz/DUTY"** key to choose Frequency or **Duty cycle** measurement.

4) Connect the probe across the source or load under measurement.

5) Read the result from the LCD panel.

3.8 Temperature measurement

1) Connect the black test lead of the sensor to **"COM'** socket and red test lead to the **"VΩ**Hz" socket.

2) Set the selector switch to desired "°C/°F" position.

3)Press "SELECT" key to choose "°C" or "°F" measurement.

4) Put the sensor probe into the temperature field under measurement.

5) Read the result from the LCD panel.

6) Please use special probe for high temperature test .

METER DESCRIPTION

❑ Terminals

Refer to table 1 for terminal function

Terminal	Function
COM	Common terminal for all measurement
V/Ω/Hz	Volts, Ohm, Diode, Freq., Temp. and Cap. Measurement and square wave output terminal

Table 1. Terminals

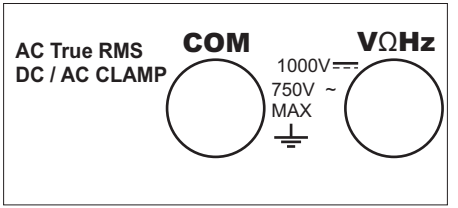


Figure 1. terminals

ROTARY SWITCH

Position of Rotary switch	Function
400A ≂	DC& AC Ampere current
3000A ≂	DC&AC Ampere current
V ≂	DC&AC Voltage
mV ≂	DC&AC millivolts
Hz	Duty cycle / Frequency
Ω ⊣◀)))	Resistance, Diode & continuity
⊣⊢	Capacitance
°C/°F	Temperature
off	Power off

Table 2.Rotary switch functions

2.2.10 Temperature

Range	Accuracy		Resolution
°C/°F	-20~150°C -4~302°F	± (3°C+2)	1°C / 1°F
	150~300°C 302~572°F	± (3% of rdg + 2 digits)	
	300~1000°C 572~1800°F	± (3.5% of rdg +10 digits)	

NiCr - NiSi sensor
Overload protection : 36V DC or AC rms

3. OPERATION

3.1 DC and AC Voltage Measurement

1) Connect the black test lead to **"COM"** socket and red test lead to the **"VΩHz**" socket.
2) Set the selector switch to desired **"mV ~"** or **"V~"** position,
3) Press "SELECT" key to choose **"DC"** or **"AC"** measurement
4) Measure the voltage by touch the test lead tips to the test circuit where the value of voltage is needed.
5) Read the result from the LCD panel.

3.2 DC Current Measurement

1) Set the selector switch to desired **"400A~"**or **"3000A~"**position .
2) Press **"SELECT"** key to choose **"DC"** measurement.
3) Zero the reading by pressing **"REL△"** key for a reading of zero on the display.
4) Disconnect The Test Leads From The Meter.
5) Clamp the Jaws around the **one** conductor to be measured. Center the conductor within the Jaw using the Centering Marks as guides.
6) Read the result from the LCD panel. The arrow in the Jaw indicates the direction of positive current flow (positive to negative)

- Set up reference value for your measurement.
- select your measurement function and your range.
- Press SET once, then press SELECT twice to select the reference value for a measurement.
- Pressing the REL △ button for more than 2 seconds returns the meter to normal state.

Pressing the button turns the backlight on, look the selector Knob more clearly, pressing it again turns it off.

2. SELECT

- Press this button to select your measurement mode.

3. Hz / Duty

- Pressing the button display the Duty Cycle, pressing it again display frequency.

4. MAX/MIN

- Pressing this button the meter enters the dynamic record mode
- In the dynamic record mode, pressing this button again cycles *MAX, MIN, AVG, MAX-MIN* and present Reading on.

5. HOLD

- Pressing this button, the meter enters the auto data hold mode "HOLD" is displayed on the LCD.
- The data hold function allows the operator to hold a displayed value on the LCD while the analog bar graph continues to display the updated value.
- In the auto hold mode the meter can display a new value when a new and stable value is on the input and the Beeper will sound.
- Pressing this button for more than 1 seconds,

the meter exits the HOLD mode and returns to the normal state.

• Pressing the button for more than 2 seconds turns the backlight on, look the selector knob more clearly, pressing it again turns it off.

2. SPECIFICATIONS

2.1 GENERAL SPECIFICATIONS

Display : 6000 Counts LCD with a max. reading of 6000.

Range Control : Auto range & Manual range control

Polarity : Automatic negative polarity indication.

Zero adjustment : Automatic.

Over range indication : The "OL" or "-OL" display.

Low battery indication : Display "⊟" sign.

Date hold : Display "HOLD" sign.

Relative measurement : Display "△" sign.

Bar graph display

Clamp opening Size : 65mm.

Auto Power off : When measurement exceeds 15 minutes without switching mode and pressing key, the meter will switch to standby mode. Press any key to exit standby mode. When restart the system, press and hold any key to disable auto power off.

2.2.6 Capacitance

Range	Accuracy	Resolution
40nF	± (0.5% of rdg + 10 digits)	10pF
400nF	± (2.5% of rdg + 5 digits)	100pF
4μF		1nF
40μF	± (5.0% of rdg + 10 digits)	10nF
400μF	± (20.0% of rdg + 20digits)	100nF
4000μF		1μF

Overload protection : 250V DC or AC rms

2.2.7 Diode and Audible continuity test

Range	Description	Test condition
	Display read approximately forward voltage of diode	Forward DC current approx. 0.4mA reversed DC voltage approx .2.8V
	Built-in buzzer sounds if resistance is less than 100Ω	Open circuit voltage approx. 0.5V

Overload protection : 250V DC or AC rms

2.2.8 Frequency

Range	Accuracy	Resolution
10Hz	± (0.5% of rdg + 5 digits)	0.01Hz
100Hz		0.1Hz
1000Hz		1Hz
10kHz		10Hz
100kHz		100Hz
1000kHz		1kHz
10MHz		10kHz

Sensitivity : Range of input voltage : 1.5V~10V, if input Voltage over range, need adjust
Overload protection : 250V DC or AC rms

2.2.9 Duty cycle

0.1%~99.9% : ±(2.0% of rdg + 2digits)
frequency lower than 10kHz.
Sensitivity : sine wave 0.6V rms
Overload protection : 250V DC or AC rms

2.2.3 DC Current

Range		Accuracy	Resolution
400A		±(3.0% of rdg+10digits)	0.1A
3000A	0-1000	±(3.5% of rdg+20digits)	1A
	1000-2000	±(5.5% of rdg+20digits)	1A
	2000-3000	±(6.5% of rdg+40digits)	1A

Overload protection : 3000A DC or AC rms

2.2.4 AC Current (True RMS)

Range		Accuracy		Resolution
		50-500Hz	500-1KHz	
400A		±(3.5% of rdg +25 digits)	±(3.5% of rdg +35 digits)	0.1A
3000A	0-1000	±(3.5% of rdg +30 digits)	±(3.5% of rdg +40 digits)	1A
	1000-2000	±(5.5% of rdg +30 digits)	±(4.0% of rdg +40 digits)	1A
	2000-3000	±(6.5% of rdg +50 digits)	±(5.5% of rdg +60 digits)	1A

Overload protection : 3000A DC or AC rms

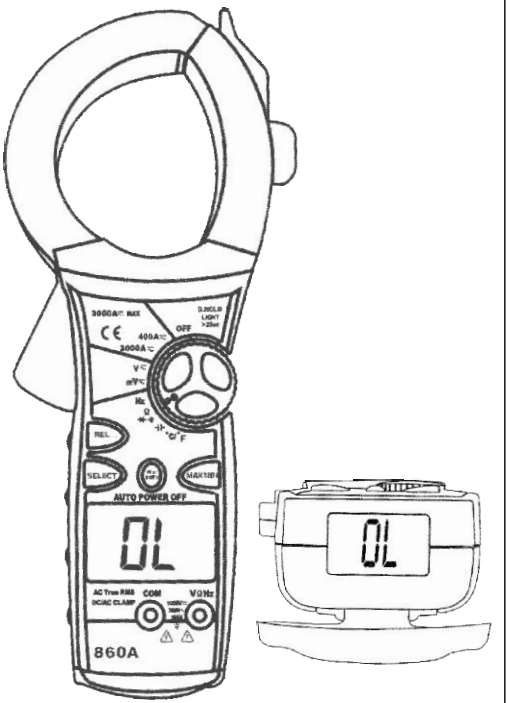
2.2.5 Resistance

Range	Accuracy	Resolution
600Ω	± (1.2% of rdg + 10 digits)	0.1Ω
6kΩ		1Ω
60kΩ		10Ω
600kΩ		100Ω
6MΩ		1kΩ
60MΩ	± (2.5% of rdg + 15 digits)	10k Ω

Overload protection : 250V DC or AC rms

Express Function :

1. Display : LCD Dual Display, facilitates to read the data.



2. Clamp Light easy for test the electric current in poorly lighted places.

2.2.2 AC Voltage (True RMS)

Range	Resolution	Accuracy					Sensitivity
		50-500Hz	50-1kHz	1K-5KHz	5k-10KHz	10K-20KHz	
60mV	0.01mV	±(1.2%of rdg +10digits	±(1.5%of rdg +10digits	±(2%of rdg +10digits	±(3.5%of rdg +10digits	±(4.5%of rdg +10digits	50mV
600mV	0.1mV	±(1.2%of rdg +10digits	±(1.5%of rdg +10digits	±(2%of rdg +10digits	±(3.5%of rdg +10digits	±(4.5%of rdg +10digits	500mV
6V	1mV	50Hz-1KHz : ±(3.0 % of rdg + 15 digits)					1V
60V	10mV	50Hz-1KHz : ±(1.5 % of rdg + 10 digits)					1V
600V	100mV						1V
750V	1V						1V

Average sensing, calibrated to rms of sine wave
Overload protection : 1000V DC or 750V AC rms
Impedance : ⩾10MΩ

Operating environment :

Temperature 32 to 104°F (0°C to 40°C),

Humidity < 80% RH.

Storage environment :

Temperature -4 to 140°F (-20 °C to 60°C),

Humidity < 90% RH.

Power supply : 9V battery.

Dimension : 275(H)x120(W)x32(D) mm

Weight : Approx : 562 g (including battery).

2.2 ELECTRICAL SPECIFICATIONS

Accuracies are ± (% of reading + number in last digit)at 23 ± 5°C, < 75%RH.

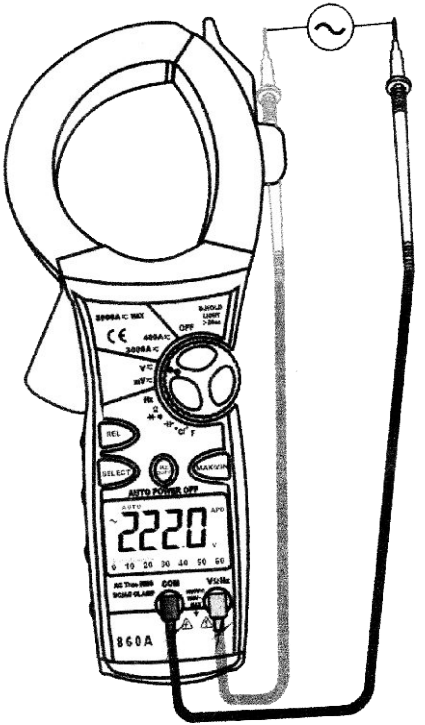
2.2.1 DC Voltage

Range	Accuracy	Resolution
60mV	±(0.8%of rdg+10digits)	0.01mV
600mV	±(0.5%of rdg+15digits)	0.1mV
6V		1mV
60V		10mV
600V		100mV
1000V	±(0.8%of rdg+10digits)	1V

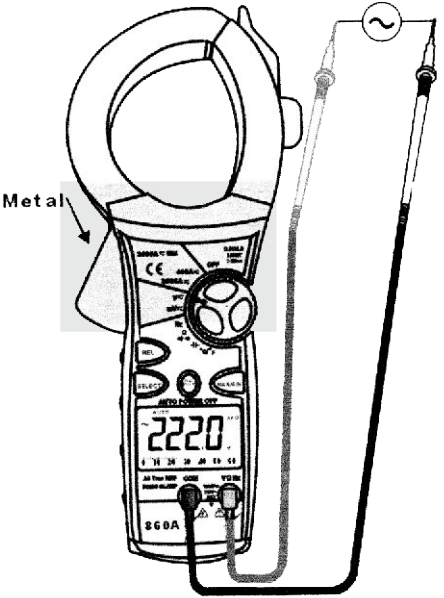
Overload protection : 1000V DC or 750V AC rms

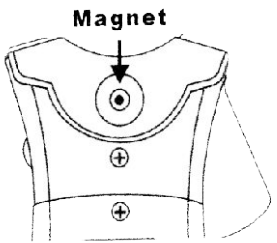
Impedance : 10MΩ

3. Leads Cramp in the clamp Easy for fixeding one Lead when you need test two separation vertices.

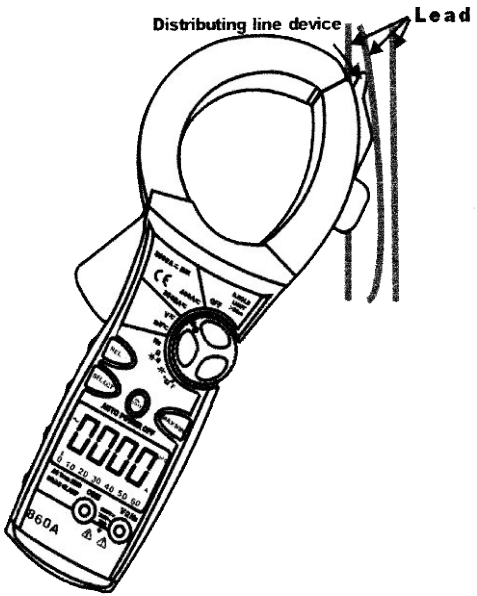


4. Magnet in the meter back for fixing instruments on metal shelves, Measured convenient operation.





5. The distributing line device will avoid the dangerous when distributing electrical wire with hands.



Safety standards : CE **EMC/LVD**. **CAT II 1000V.** The meter is up to the standards of IEC1010 Double Insulation Pollution degree 2, over voltage Category II.