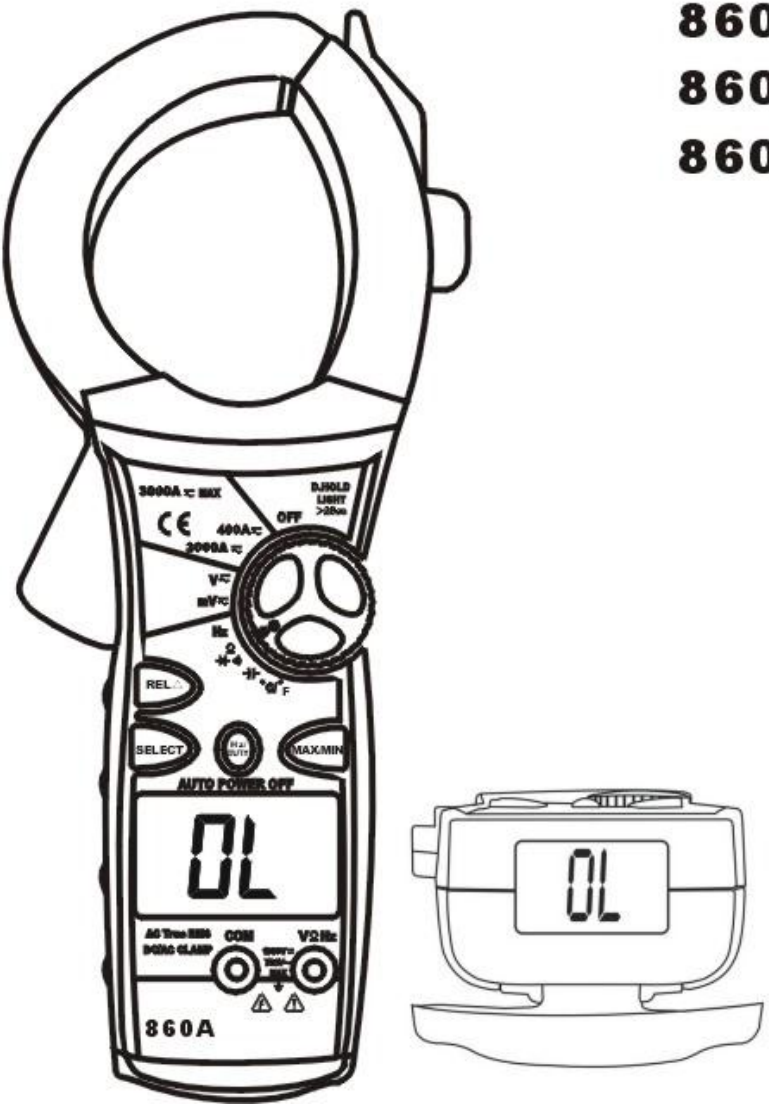
DIGITAL DUAL DISPLAY
AC/DC CLAMP MULTIMETER
OPERATION MANUAL

860A

860B

860C



1. ATION SAFETY INFORM 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 RESPONSIBLE BODY 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 at 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 record 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.

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

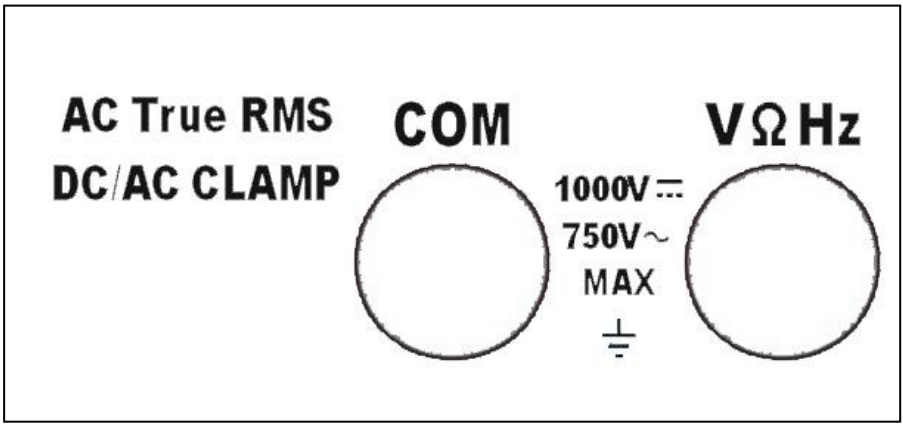
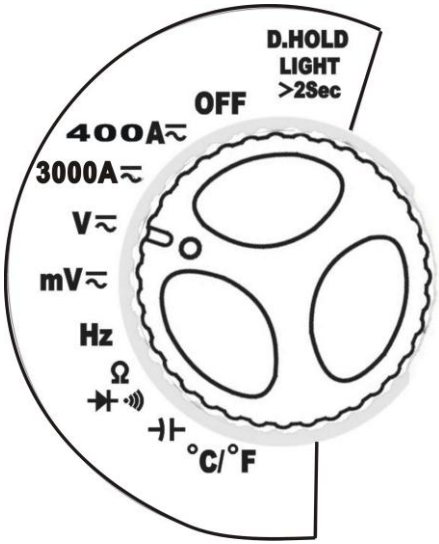


Figure1.terminal

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
℃/℉	Temperature
OFF	Power off

Table 2. Rotary switch functions



Push button

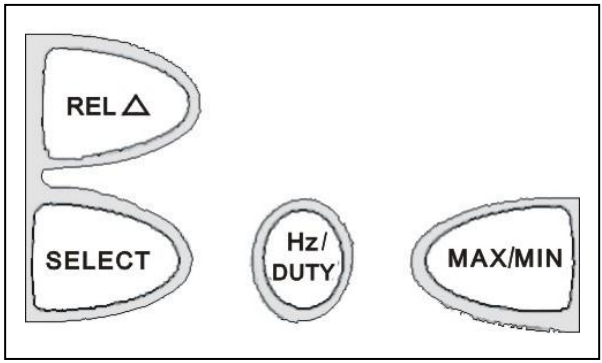


Figure3. Push button

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. R*EL▲=measurement value-Reference value*, the other is *REL%=(REL▲/Reference value)×100%* (press SELECT to select REL△ or REL% mode)..

● 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 and “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.

Data hold: Display “**HOLD**” sign.

Relative measurement: Display “△” sign.

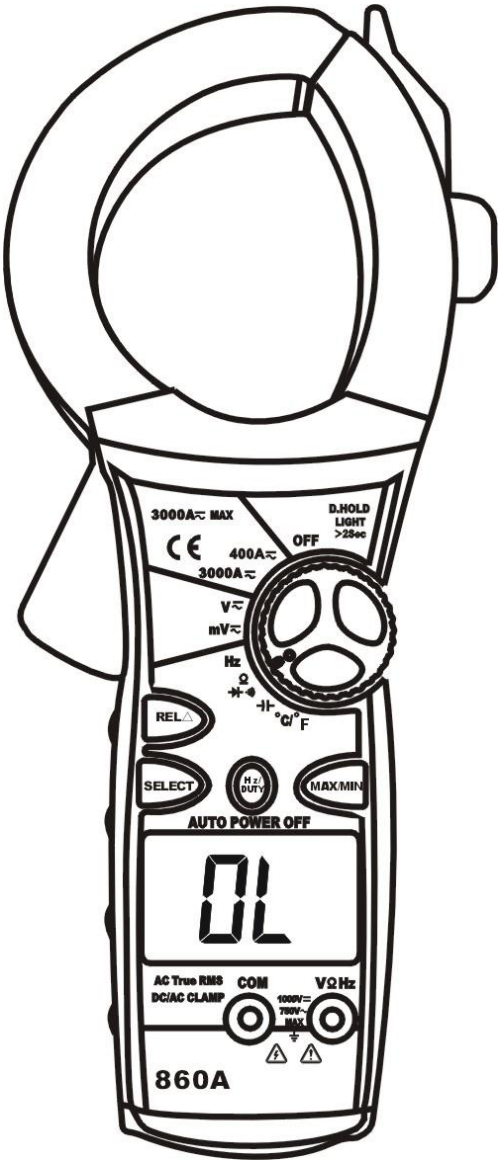
Bar graph display

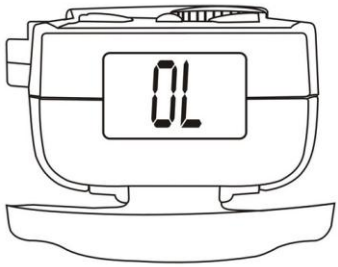
Clamp opening size: 65mm.

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.

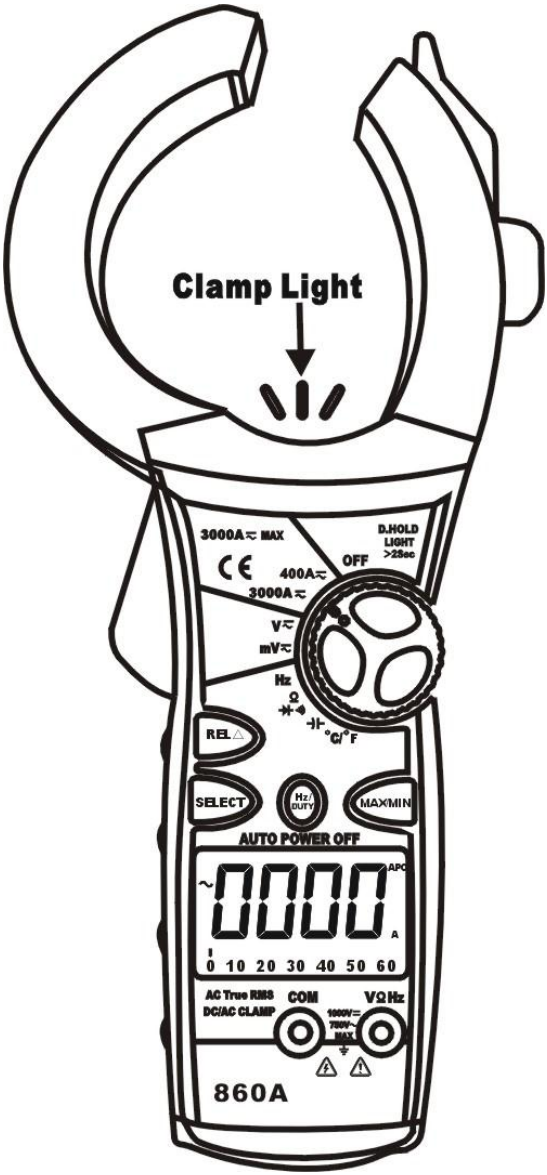
Express function：

1、 Display: LCD Dual Display, facilitates reads the data.

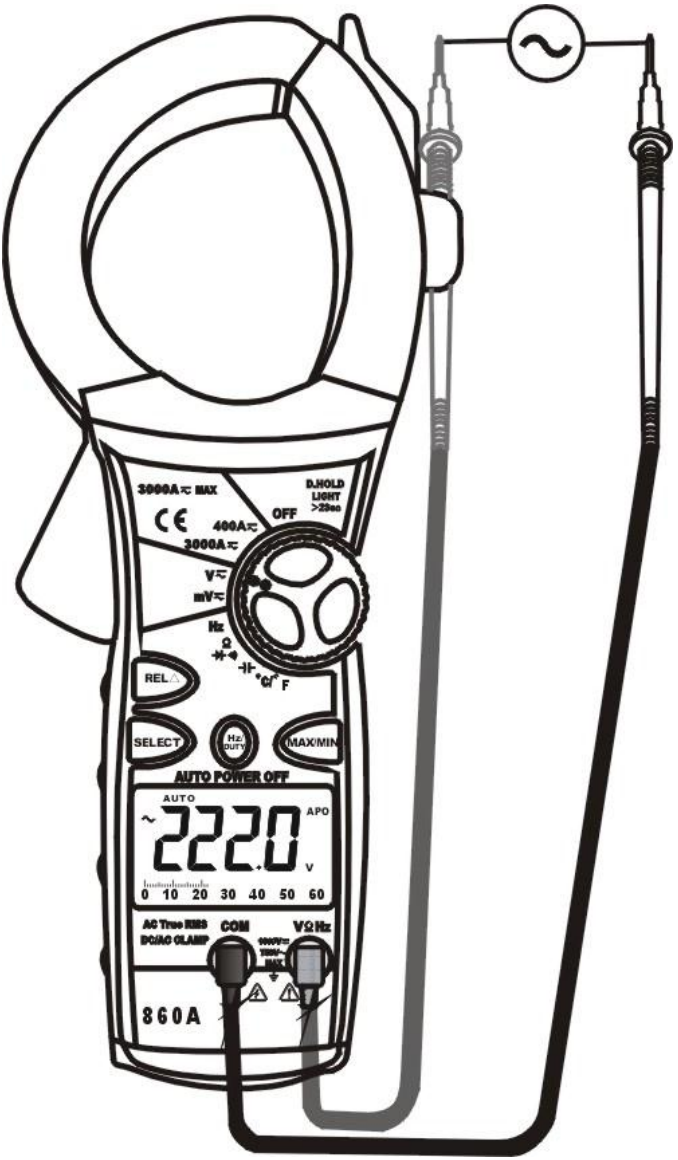




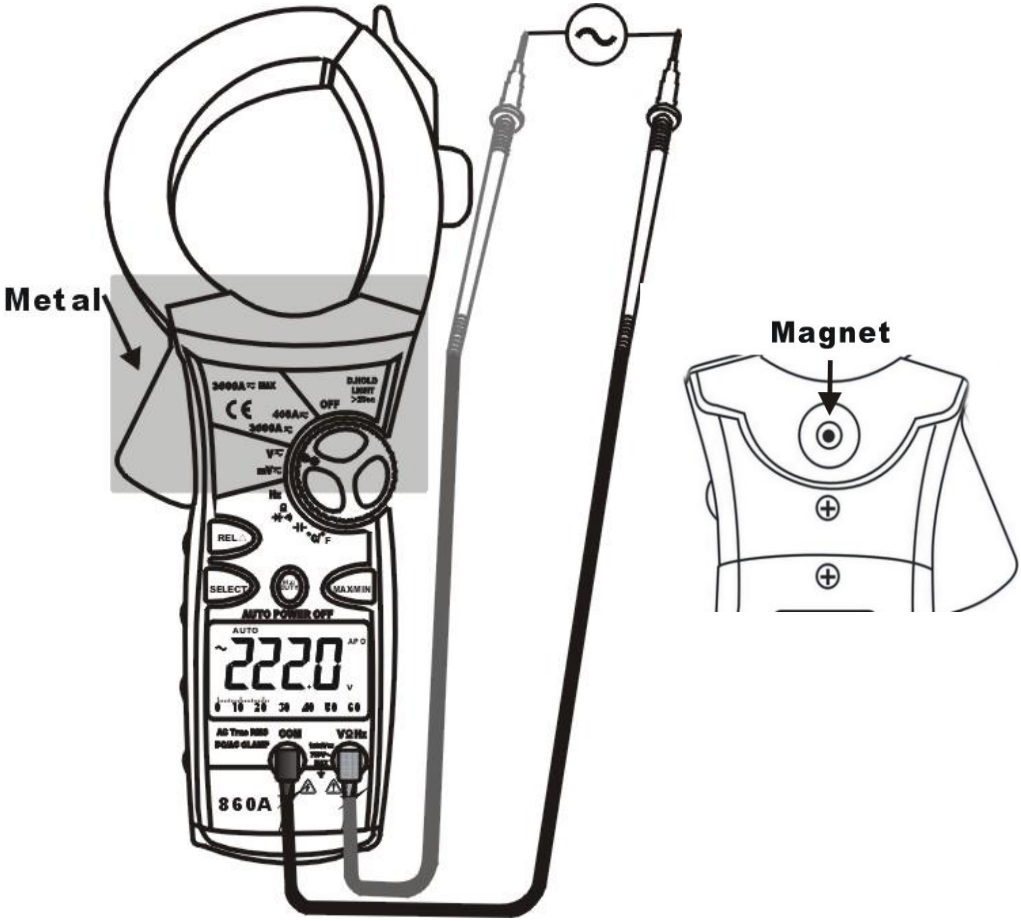
2、 Clamp Light easy for test the electric current in hidden place.



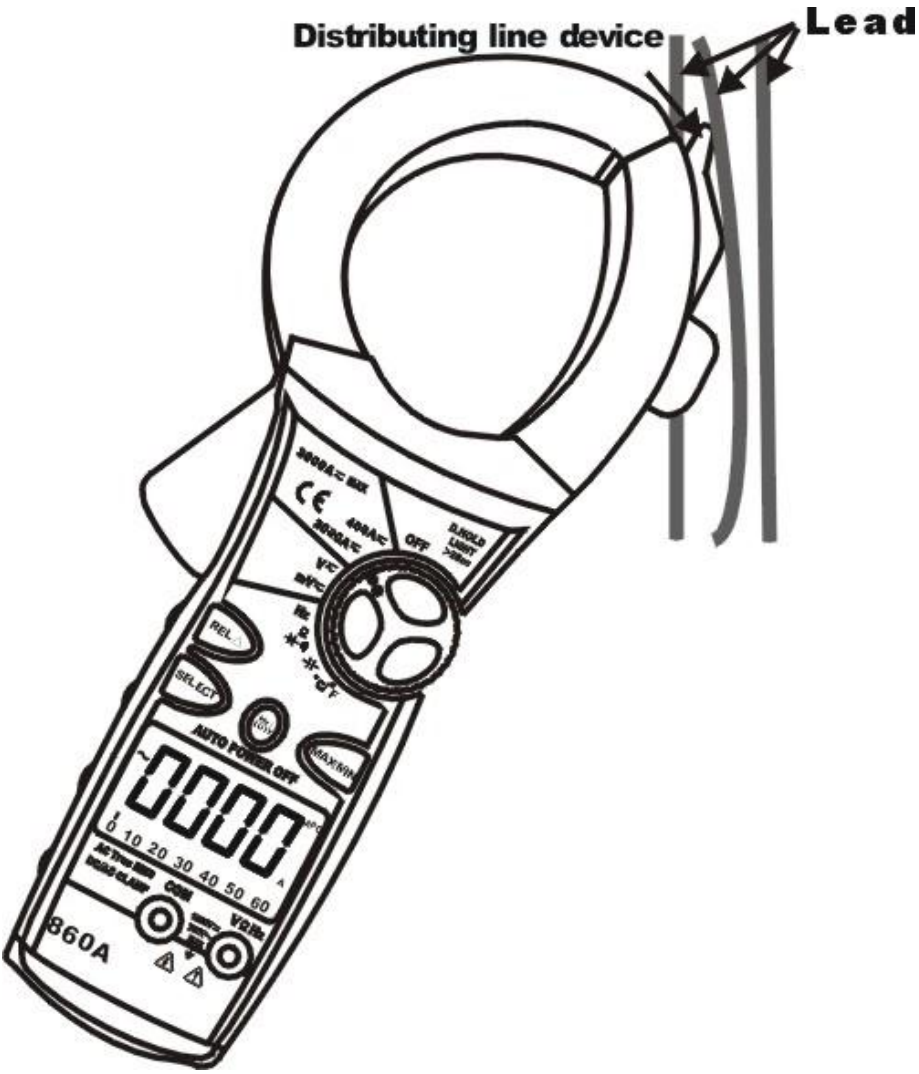
3、 Leads Cramp in the Clamp easy for fixed one Lead when you need test two separation vertices.



4、Magnet in the meter back for fixed 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 Ⅲ 1000V.**
The meter is up to the standards of IEC1010 Double

Insulation,Pollution Degree2,Overvoltage Category Ⅲ.
Operating environment:
Temperature 32 to104°F (0°C to 40°C),
Humidity ≤ 80% RH.
Storage environment:
Temperature -4 to140°F (-20°C to 60°C),
Humidity ≤ 90% RH.
Power supply: 9V battery.
Dimension: 275(H) x120(W) x 32(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+15 digits)	0.1mV
6V		1mV
60V		10mV
600V		100mV
1000V	± (0.8% of rdg+10 digits)	1V

Overload protection: 1000V DC or 750V AC rms
Impedance: 10MΩ

2.2.2 AC Voltage（AVG only860B/860C）

Range	Accuracy	Resolution
60mV	± (2.0% of rdg+10 digits)	0.01mV
600mV		0.1mV
6V		1mV
60V	± (1.5% of rdg+10 digits)	10mV
600V		100mV
750V	± (2.0% of rdg+10 digits)	1V

Frequency: 40～400Hz
Overload protection: 1000V DC or 750V AC rms
Impedance: 10MΩ

2.2.3 AC Voltage(True RMS/only860A)

Range	Resolution	Accuracy					Sensitivity
		50-500Hz	500-1KHz	1K-5KHz	5k-10KHz	10K-20KHz	
60mV	0.01mv	± (1.2% of rdg +10digits)	± (1.5% of rdg +10 digits)	± (2% of rdg +10 digits)	± (3.5% of rdg +10 digits)	± (4.5% of rdg +10 digits)	50mV
600mV	0.1mV	± (1.2% of rdg +10 digits)	± (1.5% of rdg +10 digits)	± (2% of rdg +10 digits)	± (3.5% of rdg +10 digits)	± (4.5% of rdg +10 digits)	500mV
6V	1mV	50Hz-1KHz: ± (3.0% of rdg+15 digits)					1V
60V	10mV	50Hz-400Hz: ± (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: $\geqslant$10MΩ

2.2.4 DC Current(only860A/860B)

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+40 digits)	1A

Overload protection: 3000A DC or AC rms

2.2.5 AC Current（AVG only860B/860C）

Range		Accuracy	Resolution
400A		± (3.5% of rdg+10 digits)	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+40 digits)	1A

Frequency: 40～60Hz

Overload protection: 3000A DC or AC rms

2.2.6 AC Current(True RMS/only860A)

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)	± (5.5% 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

2.2.7 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)	10kΩ

Overload protection: 250V DC or AC rms

2.2.8 Capacitance

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

Overload protection: 250V DC or AC rms

2.2.9 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

2.2.10 Frequency

Range	Accuracy	Resolution	Sensitivity
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

2.2.11 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

2.2.12 Temperature

Range	Accuracy		Resolution
℃/℉	**-20~150℃ -4~302℉**	**± (3℃+2)**	**1℃/1℉**
	150~300℃ 302~572℉	**± (3% of rdg+2digits)**	
	300~1000℃ 572~1832℉	**± (3.5% of rdg+10digits)**	

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).

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 handing 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 "**VΩHz**" socket.
2) Set the selector switch to desired "**℃/℉**" position.
3) Press "**SELECT**" key to choose "℃" or "℉" 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 test high temperature

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/MAX**" 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 wink the light. The light can wink automatically after 10 seconds too.

3.12 Relative measurement

Press the "**REL△**" key, you can measure the relative value and "△" sign will appears on the display, the auto range mode be changed to manual range mode. Press it again to exit relative measurement and "△" 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 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.

5. MAINTENANCE

1) Before open the battery door, disconnect both test lead and never uses 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 take current measurement, keep the cable at the center of the clamp will get more accurate test result.
5) Repairs or servicing not covered in this manual should 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.

Delton

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