



INSTRUCTION MANUAL

Mini Clamp Multimeter

Model: 8110

- True RMS
- 4300 Count
- Auto Range
- Auto Power OFF
- Data Hold
- AC/DC Clamp
- 40A/400A
- 600V CAT III
- Ohms
- Continuity

Blue Sea Systems, Inc.
425 Sequoia Drive
Bellingham, WA 98226 USA

Thank you for purchasing this Blue Sea Systems Mini Clamp Multimeter. To get the maximum benefit from your new meter, please take a few minutes to read this instruction manual and keep it with the meter for future reference.

These instructions are intended to provide assistance with the basic use of this product, and are not a substitute for a more comprehensive knowledge of electrical system diagnosis and troubleshooting. Working around electricity can be dangerous.

p 360.738.8230

p 800.222.7617 United States & Canada

f 360.734.4195

conductor@blueseas.com

www.blueseas.com

For safe operation, please read the instructions carefully before using the meter and keep this manual with the meter for future use.

HAZARDS:

The following symbols are used to identify hazards:



WARNING: Improper or careless use may result in injury or death.



CAUTION: Improper or careless use may result in damage to the meter or other equipment



Dual insulation



AC - Alternating Current



DC - Direct Current



Grounding - Earth Terminal

 **WARNING** 


To prevent electrical shock or fire:

- Set function switch to the correct setting before taking measurements.
- Remove the test leads from the circuit being tested before switching functions.
- Do not use the meter if the meter case or test leads are damaged.
- Do not open the meter case while using the meter.
- When using the test leads, always keep fingers behind the guard rings.
- When using the clamp, always keep hands behind the guard ring.
- When measuring resistance, first switch off the power to the circuit under test, and verify that the voltage is zero.
- Keep the meter dry. Do not use it if there is moisture in or on the meter.
- Before using the clamp, remove the test leads from the input terminals.

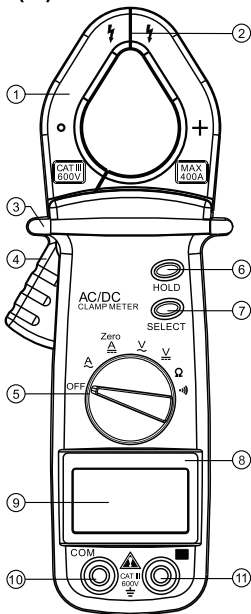
 **WARNING** 

Over-voltage Category (CAT.)	Maximum input voltage
CAT III	600V

 **CAUTION** 

- Do not use the meter near equipment emitting noise or in environments with sudden temperature changes. Unstable or inaccurate readings may occur.
- Take the batteries out of the meter if it will not be used for several weeks.
- Switch the function knob to OFF when testing is finished, since there is a slight power consumption in Auto Power OFF mode.
- To get an accurate current measurement, position the wire in the center of the clamp.
- If it is necessary to clean the meter, use a soft cloth. Never use solvents.
- Do not expose the meter to direct sunlight, extreme temperatures, or moisture.
- When measurement values are irregular, or when the  symbol displays, replace the batteries immediately.






(1) PARTS IDENTIFICATION



- ① Clamp
- ② Clamp opening
- ③ Guard ring
- ④ Clamp trigger
- ⑤ Function switch knob
- ⑥ HOLD key
- ⑦ SELECT key
- ⑧ Name Plate
- ⑨ Liquid crystal display (LCD)
- ⑩ Input terminal COM (negative)
- ⑪ Input terminal + (positive)

(2) DESCRIPTION OF PARTS

1. Function Switch Knob

OFF	Turn the power OFF
	AC current (amperes)
 Zero	DC current (amperes) / Zero set for DC 40A measurement
	AC voltage
	DC voltage
	Resistance (Ohms) / Continuity check

2. Hold



To retain data during measuring, press HOLD.

The **D-H** symbol will appear on the LCD, and the meter reading will be locked. Press the HOLD key again to erase the held data.

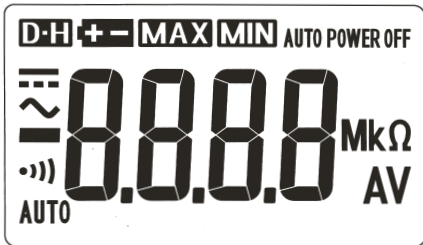
Note: Under DATA HOLD mode, the Auto Power OFF function will be disabled.

3. Select

Press SELECT to switch between the following functions:



 Zero	measure DC current (amperes) / Zero the meter at DC 40A range
	measure resistance (Ohms) / continuity check

4. Display



Displaying the measuring symbol, unit and value.

Symbol and unit	Description
	DC measurement mode
	AC measurement mode
	Polarity is reversed
	Continuity check mode
AUTO	Auto range mode
	Replace the batteries
A	Amperage measurement
V	Voltage measurement
MΩ, kΩ, Ω	Resistance measurement

AUTO POWER OFF	Auto Power OFF mode enabled
	Data hold indicator
	Numeric display

5. COM

Connect the negative (black) test lead to this terminal.

6.

Connect the positive (red) test lead to this terminal.

Note about DATA HOLD:

When taking measurements in places where it is hard to read the meter display, press the HOLD button to lock the reading value.

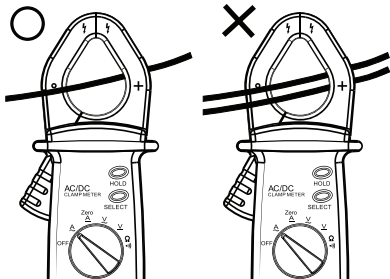
Remove the meter from the measuring location, then read the value.

(3) MEASURING INSTRUCTIONS

AC Current Measurement (A) True RMS

Range: 40A – 400A (2 ranges; will change automatically)


1. Turn the function switch knob to **A**.
2. Squeeze the clamp trigger to open the clamp.
Place a single conductor in the center of the clamp, as shown in the drawing.
3. Allow time for the value to stabilize, then read the AC current measurement on the LCD.
4. When finished, turn the meter OFF.

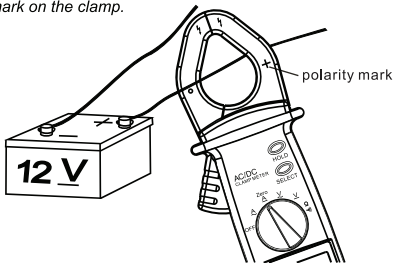


DC Current Measurement (A)

Range: 40A – 400A (2 ranges; will change automatically)

1. Turn the function switch knob to A Zero.
2. Squeeze the clamp trigger to open the clamp.
Place a single conductor in the center of the clamp, as shown in the drawing.
3. Allow time for the value to stabilize, then read the DC current measurement on the LCD.
4. When finished, turn the meter OFF.

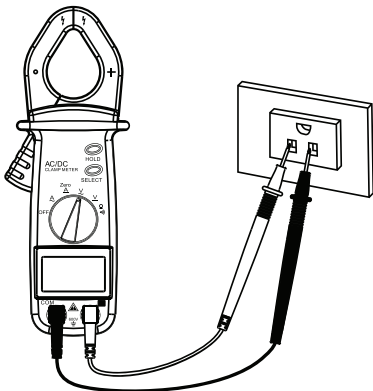
Note: If  symbol displays, it means that the direction of current flow in the conductor is opposite to the polarity mark on the clamp.



AC Voltage Measurement (\surd) **True RMS**

Range: 4V – 600V (4 ranges; will change automatically)

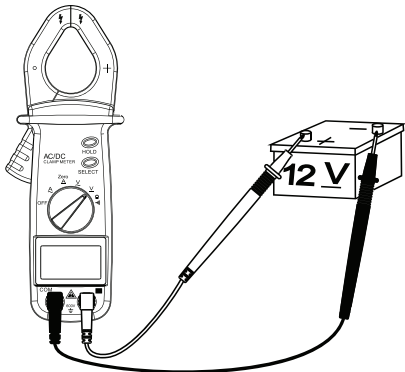
1. Turn the function switch knob to \surd .
2. Plug the black test lead into the COM terminal and the red test lead into the \oplus terminal.
3. Apply the test leads to the circuit to be tested.
4. Allow time for the value to stabilize, then read the AC voltage measurement on the LCD.
5. When finished, turn the meter OFF.



DC Voltage Measurement (V)

Range: 4V – 600V (4 ranges; will change automatically)

1. Turn the function switch knob to V.
2. Plug the black test lead into the COM terminal and the red test lead into the **+** terminal.
3. Apply the test leads to the circuit to be tested.
4. Allow time for the value to stabilize, then read the DC voltage measurement on the LCD.
5. When finished, turn the meter OFF.

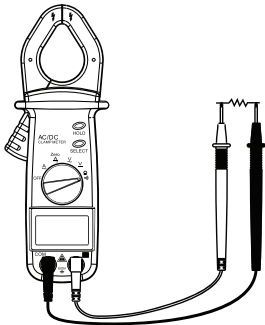


Resistance Measurement (Ω)

Range: $400\Omega - 40M\Omega$ (6 ranges; will change automatically)

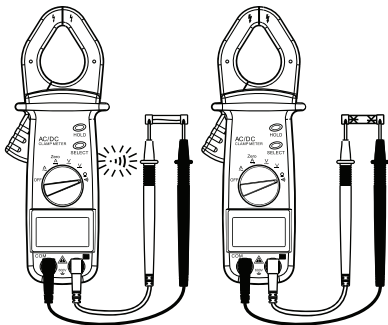
1. Turn the function switch knob to Ω .
2. Plug the black test lead into the COM terminal and the red test lead into the \oplus terminal.
3. Apply the test leads to the item to be tested.
4. Allow time for the value to stabilize, then read the resistance measurement on the LCD.
5. When finished, turn the meter OFF.

Note: Before testing the resistance of a circuit, first switch the power off to that circuit and fully discharge any capacitors.



Continuity Check (••|)

1. Turn the function switch knob to Ω (••|) and press the SELECT key until the ••| symbol displays on the LCD.
2. Plug the black test lead into the COM terminal and the red test lead into the \oplus terminal.
3. Apply the test leads to the circuit to be tested. If the circuit is continuous or has a resistance of $< 50\Omega$ (+/-25 Ω), the beeper will sound.
4. When finished, turn the meter OFF.



(4) AUTO POWER OFF (POWER SAVING) FUNCTION

When the power is left on, the meter will turn off automatically after ten minutes of inactivity. This feature preserves battery life.

- One minute before the meter turns off automatically, an alarm sounds.
- Postpone AUTO POWER OFF by pressing any button except SELECT.
- If the meter has turned off, press any button except SELECT to turn it on again.

Note: The SELECT button will only postpone the AUTO POWER OFF or turn the meter on again only when the function switch knob is set to $\frac{A}{\Omega}$ Zero or Ω $\bullet\bullet\bullet$.

(5) CANCEL AUTO POWER OFF

To cancel the AUTO POWER OFF function, hold down the HOLD button and set the function switch knob to any measuring function. The AUTO POWER OFF indicator turns off when the function is cancelled.

To turn the AUTO POWER OFF feature back on, turn the function switch knob back to OFF temporarily and then to any measuring function.

(6) REPLACING BATTERIES

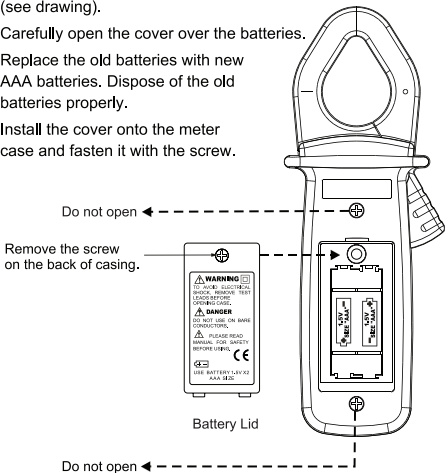
If the **+** symbol appears, the battery voltage has fallen below required operating voltage. Replace the batteries with 2 new AAA size alkaline batteries. Non-alkaline AAA batteries may be used, but they will not last as long as alkaline batteries.

- Before replacing the batteries, remove the clamp meter or test leads from the circuit being tested.
- Always replace both batteries at the same time.
- Be sure to install the new batteries with correct polarities.

(7) REPLACING BATTERIES

(step-by-step instructions)

1. Stop any measurements that are underway and remove test leads from circuit being tested.
2. Turn the function switch knob to OFF.
3. Remove the single screw on the back of the meter case (see drawing).
4. Carefully open the cover over the batteries.
5. Replace the old batteries with new AAA batteries. Dispose of the old batteries properly.
6. Install the cover onto the meter case and fasten it with the screw.



(8) SPECIFICATION

1. General Specifications

- **Maximum Clamp:** \varnothing 30mm or 10x35mm
- **Measurement Functions:** ACA, DCA, ACV, DCV, Ω & $\bullet\bullet$
- **Additional Features:**
Data Hold, Overload display, Auto Power OFF selection.
- **Liquid Crystal Display (LCD):** Unit & function indication, 4300 count, reverse polarity indicator, overload indicator, low battery indicator, **+ -**
- **Range:** Auto range.
- **Sampling Rate:** 2 times per second approx.
- **Operation Temperature/Humidity:** 0°C~50°C (32°F~122°F) /Below 80% R.H. (No Condensation).
- **Storage Temperature/Humidity:** -10°C~60°C (14°F~142°F) /Below 70% R.H. (No Condensation).
- **Power Supply:** 2 standard alkaline UM-4 or R03 AAA batteries.
- **Battery Life:** Approx. 100 hours (alkaline battery).
- **Dimension:** 7.44"(189mm) x 2.79"(71mm) x 1.45"(37mm)
- **Weight:** Approximately 220g (including the batteries)

- **Compliance with Safety Standard:**
IEC61010 600V CAT III pollution 2
- **Accessories:** AAA 1.5V (installed) (x2)
Test Leads (1 pair)
Instruction Manual (x1)
Carrying Case (x1)

2. Electrical Specifications

- $23 \pm 5^\circ \text{C}$, 80% R.H. MAX.
- Accuracy: \pm (%rdg +dgt)

- ACA (set on $\overset{\text{A}}{\text{A}}$)

*50~400Hz

Range	Resolution	True RMS Accuracy	Maximum Input Current
40A	0.01A	1.5% + 10	430A
400A	0.1A	1.5% + 5	

- DCA (set on $\overset{\text{A}}{\text{0}}$ Zero)

Range	Resolution	Accuracy	Maximum Input Current
40A	0.01A	1.5% + 10	430A
400A	0.1A	1.5% + 5	

- DCA (set on $\overset{\text{V}}{\text{V}}$)

*40~500Hz

Range	Resolution	True RMS Accuracy	Input Impedance	Maximum Input Voltage
4V	0.001V	1.0% + 5	11M Ω , <50pF	600V rms
40V	0.01V			
400V	0.1V		10M Ω , <50pF	
600V	1V			

- DCA (set on $\overset{\text{V}}{\text{0}}$)

Range	Resolution	Accuracy	Input Impedance	Maximum Input Voltage
4V	0.001V	0.75% + 2	11M Ω	600V
40V	0.01V			
400V	0.1V		10M Ω	
600V	1V			

• Resistance (set on Ω ●●)

Range	Resolution	Accuracy	Measuring Current	Open-Loop Voltage	Maximum Input Voltage
400 Ω	0,1 Ω	0,9% + 2	<1mA	<3,4V	600V
4k Ω	0,001k Ω		<0,5mA	<1,0V	
40k Ω	0,01k Ω		<70 μ A	<0,7V	
400k Ω	0,1k Ω		<7 μ A		
4M Ω	0,001M Ω	2% + 2	<0,7mA		
40M Ω	0,01M Ω	5% + 2	<70nA		

• Continuity Check (set on Ω ●●)

Range	Resolution	Accuracy	Open-Loop Voltage	Maximum Input Voltage
400 Ω	0,1 Ω	The buzzer turns on for resistances low than 50 Ω \pm 25 Ω	<3,4V	600V

Specifications and external appearance of this product may be revised or modified without prior notice

WARRANTY

All Blue Sea Systems digital meters are warranted to be free from defects in materials or workmanship for three years from the date of first purchase.

“Date of first purchase” means:

- (i) the date on which the product was purchased by the first retail customer.
- (ii) the date on which the first retail customer purchases a vessel on which the product was installed.

Blue Sea Systems will (at its sole discretion) repair or replace any product which is:

- (i) proven to be defective in materials or workmanship.
- (ii) returned to Blue Sea Systems (or its agent) during the warranty period in accordance with this warranty.

Replacement products may be new or refurbished in as-new condition. Such repair or replacement will be the sole remedy by Blue Sea Systems under this warranty.

Any repaired or replacement product will be warranted in accordance with this warranty, for the unexpired balance of the warranty period on the original product.

WARRANTY REGISTRATION

Blue Sea Systems is committed to exceptional customer service. Please allow us to serve you better by registering your product online at <http://blueseasystems.com/viewresource/1325>.

If you would prefer to register your product by fax, please call 360.738.8230 or Toll Free in the USA and Canada 800.222.7617 for a fax-ready Warranty Registration card.