



INSTRUCTION MANUAL

Digital Clamp Meter

Model : 8110

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


Thank you for purchasing our product. Please read this instruction manual before using the meter and keep it for future use.


Phone:360-738-8230
Fax:360-734-4195
Email:conductor@blueseas.com
Internet Address:www.blueseas.com
Customer Service:
800-222-7617 United States & Canada

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

PRECAUTION :

To avoid hazards or damage during operation process, the following symbols are used as prompt for points for attentions.

 : **Warning** : Improper use of the product may result in body injury or even death, please read the operation carefully .

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 : **Dual insulation**

 : **AC - Alternating Current**

 : **DC - Direct Current**

 : **Grounding - Earth Terminal**

Warning

■ **To prevent electrical shock or fire!**

- Before getting measured, make sure that the test leads and function switch has been set properly.
- Before switching among functions, remove the test leads off the measured object.
- Before measurement, make sure the current of the circuit or object won't exceed the maximum measurement range.
- Do not use this instrument, if there's any crack or damage in the case of meter or test leads.
- Do not open the case of meter during measurement.
- When measuring with test leads, always put your hands behind the guard ring of the test leads.
- When measuring with sensing clamp, put your hands behind the guard ring of the meter.
- Before undergoing resistance measurement, switch off the power to the circuit that will be tested.
- Never use the meter under rainy or humid environments or with wet hands.
- Before undergoing current measurement, make sure to remove the test leads from the input terminals.

⚠ Warning

■ **To prevent damage or electrical shock to the meter!**

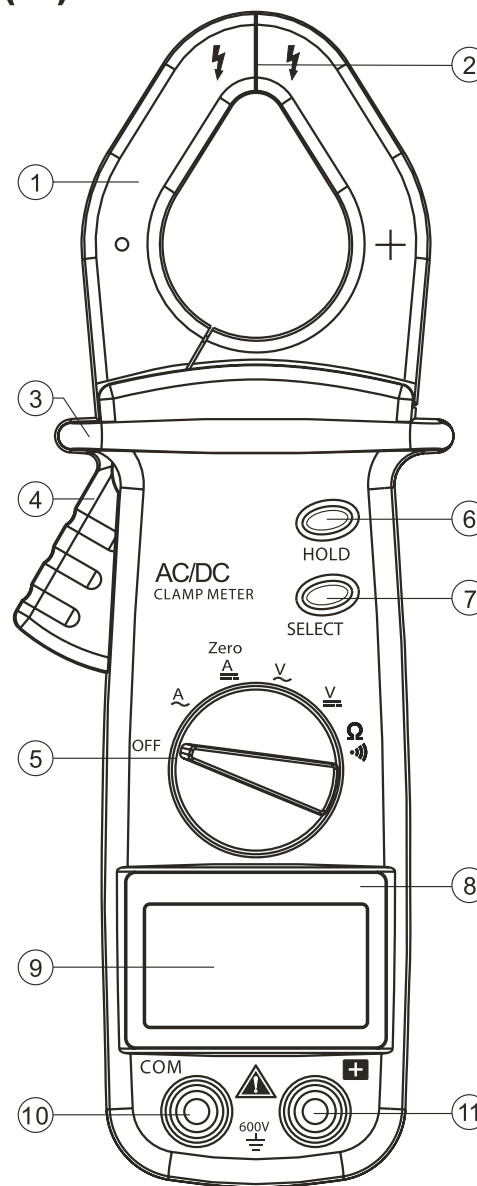
According to the safety standard, the maximum voltage input power is classified as follows to protect the users against transient impulse voltage in power lines.

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

⚠ Caution

- Do not use the meter near equipment emitting noise in environment s with sudden temperature changes. Unstable or erroneous reading will appear.
- Take the batteries out of the meter if it will be left idle for a length of time.
- After measurement, switch the function knob to OFF. There is a slight power consumption under auto power OFF mode.
- When measuring current, position the conductor in the center of the clamp to ensure the accuracy.
- When measuring current, make sure to keep out of high current to ensure the accuracy.
- Do not use organic solvent to clean the meter. Wipe it with a soft cloth, if necessary.
- Do not expose the meter to direct sunlight, extreme temperatures or moisture .
- When the measurement values appear to be irregular or the **+** symbol displays, replace the batteries immediately to ensure normal operation.

(1) NAME OF PARTS



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

(2) DESCRIPTION OF PARTS

1.Function Switch

OFF	Turn off the power
\tilde{A}	AC current measurement
\tilde{A} Zero	DC current measurement / Zero set for DC 40A measurement
\tilde{V}	AC voltage measurement
\tilde{V}	DC voltage measurement
Ω $\cdot\cdot\cdot$)	Resistance measurement / Continuity check

2.Hold

Press **HOLD** key during measuring, **D-H** symbol will appear on the LCD and lock the reading value. Press **HOLD** key again to release this function when the held data is no longer needed.

Note : Under DATA HOLD mode, the Auto Power Off function will be disabled and Power On mode will turn on automatically for remaining the data.

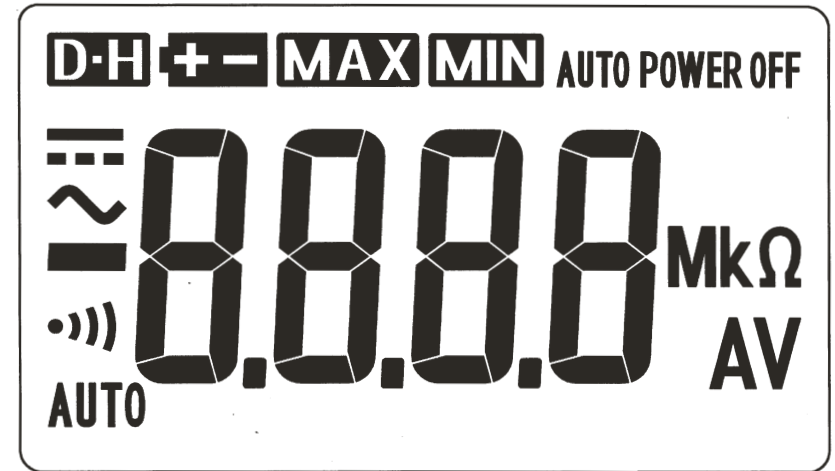
3.Select

Press **SELECT** key to switch among the following functions.

\tilde{A} Zero	Select the measurement of DC current or Zero set at DC 40A range
Ω $\cdot\cdot\cdot$)	Select for measuring Resistance or Continuity check

4.LCD

Symbols on LCD



Displaying the measuring symbol, unit and value.

Symbol and unit	Description
\equiv	Lit when in DC mode measurement
\sim	Lit when in AC mode measurement
$-$	Polarity indicator - lit when the polarity is negative
$\cdot\cdot\cdot$)	Lit when in continuity check
AUTO	Auto range indicator
$+ -$	Lit when the batteries are low
A	Unit for current measurement
V	Unit for voltage measurement
MΩ, kΩ, Ω	Unit for resistance measurement

AUTO POWER OFF	Auto Power Off mode NOTE: To cancel this function, hold down HOLD key and set the function switch knob from OFF to the position of any desired measurement mode.
D-H	Data hold indicator
.8.8.8	Display the measured values

5.COMterminal

For connecting the negative input end for DCV, ACV, Ω & $\bullet\text{)}\text{)}$ (black test lead) measurement .

6. \oplus terminal

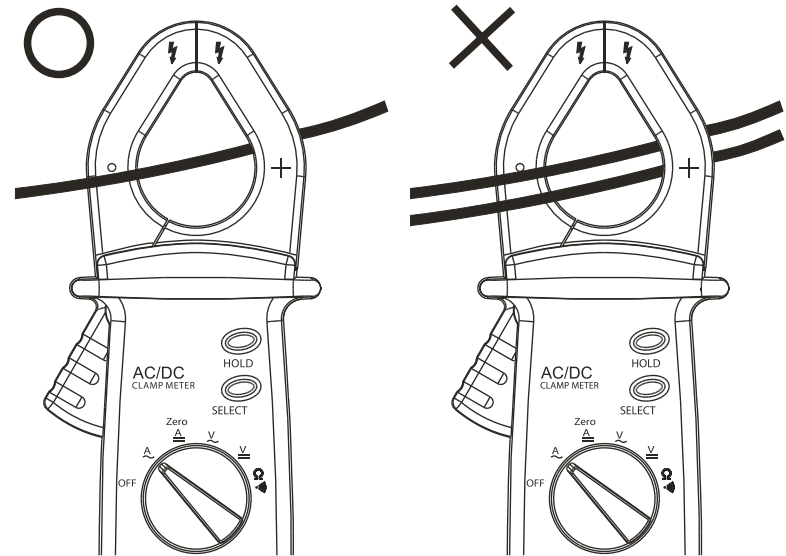
For connecting the positive input end for DCV, ACV, Ω & $\bullet\text{)}\text{)}$ (red test lead) measurement .

(3) MEASURING INSTRUCTIONS

■ AC Current Measurement (\tilde{A})

Measuring range : 40A~400A (2 ranges, will change automatically)

- 1.Switch the function switch knob to \tilde{A} .
- 2.Pull the clamp trigger to open the clamp. Place one conductor only in the center of the clamp (as below drawing).
- 3.The meter will choose the appropriate range for measuring automatically.
- 4.Read the value of AC current on LCD when it stabilizes.
- 5.When finished, set the function switch knob to OFF position and turn off the meter.



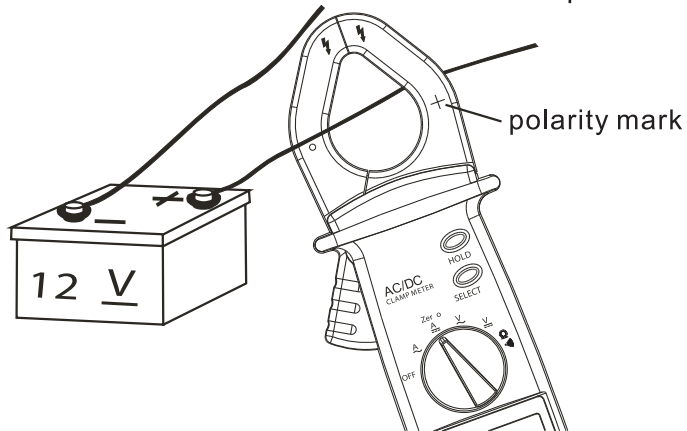
■ DC Current Measurement ($\underline{\underline{A}}$)

Measuring range : 40A~400A (2 ranges, will change automatically)

1. Set the function switch knob to $\underline{\underline{A}}$ Zero.
2. Press the SELECT key for zero set. (Please note the zero set function working on 40A range exclusively).
3. Pull the clamp trigger to open the clamp. Place one conductor only in the center of the clamp (as below drawing). Read the value of DC current on LCD when it stabilizes .
4. The meter will choose the appropriate range for measuring automatically.
5. When finished, set the function switch knob to OFF position and turn off the meter.

Note 1: If "-" symbol appears, it means that the direction of the measured conductor is opposite to the polarity mark on the clamp.

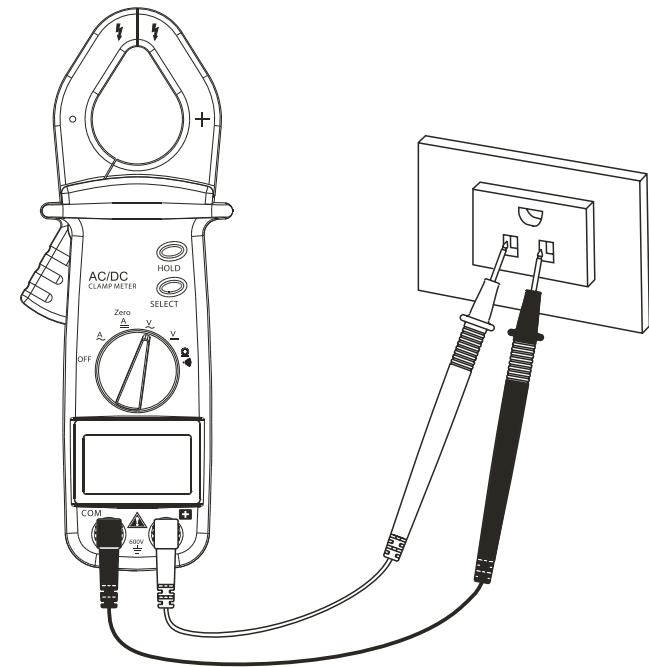
2: When taking measuring in place where indicated values are hard to read, press HOLD key to lock on the value and then read it in other place.



■ DC Current Measurement (\underline{V})

Measuring range : 4V~600V (4 ranges, will change automatically)

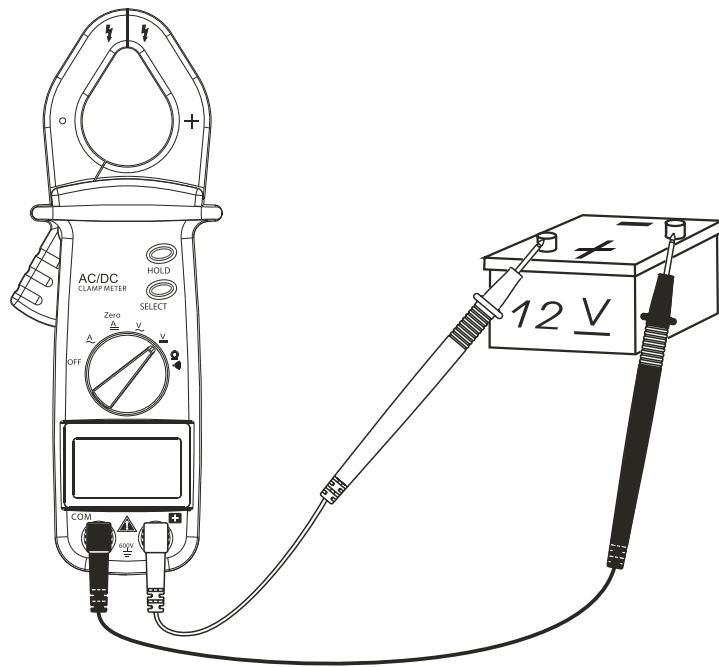
1. Set the function switch knob to \underline{V} .
2. Plug the black test lead into the COM terminal and the red test lead into the \oplus terminal.
3. Connect the test leads to the circuit under test and then read the value when it stabilizes.
4. The meter will choose the appropriate range for measuring automatically.
5. When finished, set the function switch knob to OFF position and turn off the meter.



■ DC Voltage Measurement ($\underline{\underline{V}}$)

Measuring range : 4V~600V (4 ranges, will change automatically)

1. Set the function switch knob to $\underline{\underline{V}}$.
2. Plug the black test lead into the COM terminal and the red test lead into the \oplus terminal.
3. Connect the test leads to the circuit under test and then read the value when it stabilizes.
4. The meter will choose the appropriate range for measuring automatically.
5. When finished, set the function switch knob to OFF position and turn off the meter.



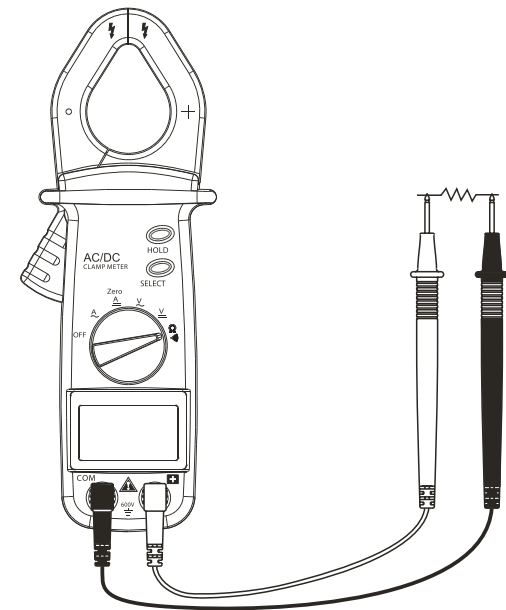
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■ Resistance Measurement (Ω)

Measuring range : 400 Ω ~ 40M Ω (6 ranges, will change automatically)

1. Set 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. Connect the test leads to the object under test and then read the value when it stabilizes.
4. The meter will choose the appropriate range for measuring automatically.
5. When finished, set the function switch knob to OFF position and turn off the meter.

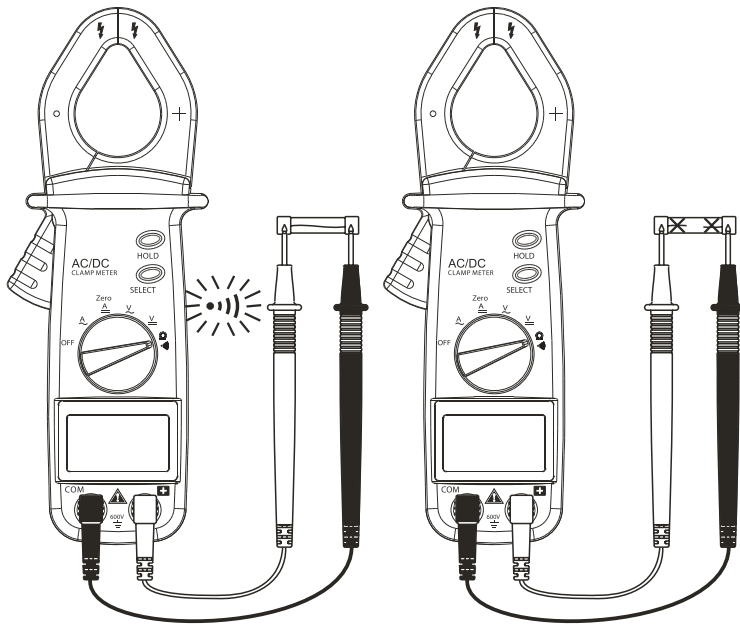
Note : Before undergoing resistance measurement, switch off the power to the circuit under test firstly and fully discharge the capacitor.



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■ Continuity Check (••))

1. Set the function switch knob to Ω ••)) and press SELECT key until display ••)) symbol on LCD.
2. Plug the black test lead into the COM terminal and the red test lead into the \oplus terminal.
3. Connect the test leads to the circuit under test. If the circuit is continuous or less than 50Ω ($\pm 25\Omega$), the beeper will sound.
4. When finished, set the function switch knob to OFF position and turn off the meter.



(4) AUTO POWER OFF (POWER SAVING) DEVICE

When the power is left on, after 10 minutes of non-use, the power will turn off automatically.

- One minute before turning off, the alarm sounds to warn the users.
- You can press any key but SELECT to postpone the power-off time.
- If the meter has turned off automatically, press any key except SELECT will restart the meter.

Note: SELECT key will active postpone power-off time or restart the meter only when the function switch knob is set at A Zero or Ω ••)).

(5) CANCEL AUTO POWER OFF

To cancel Auto Power Off function, hold down the HOLD key and set the function knob from OFF position to any measuring function you desire. The AUTO POWER OFF indication turns off when the function is canceled. To resume the function, switch the function knob back to OFF position temporarily and then select any measuring function you want.

(6) REPLACING BATTERIES

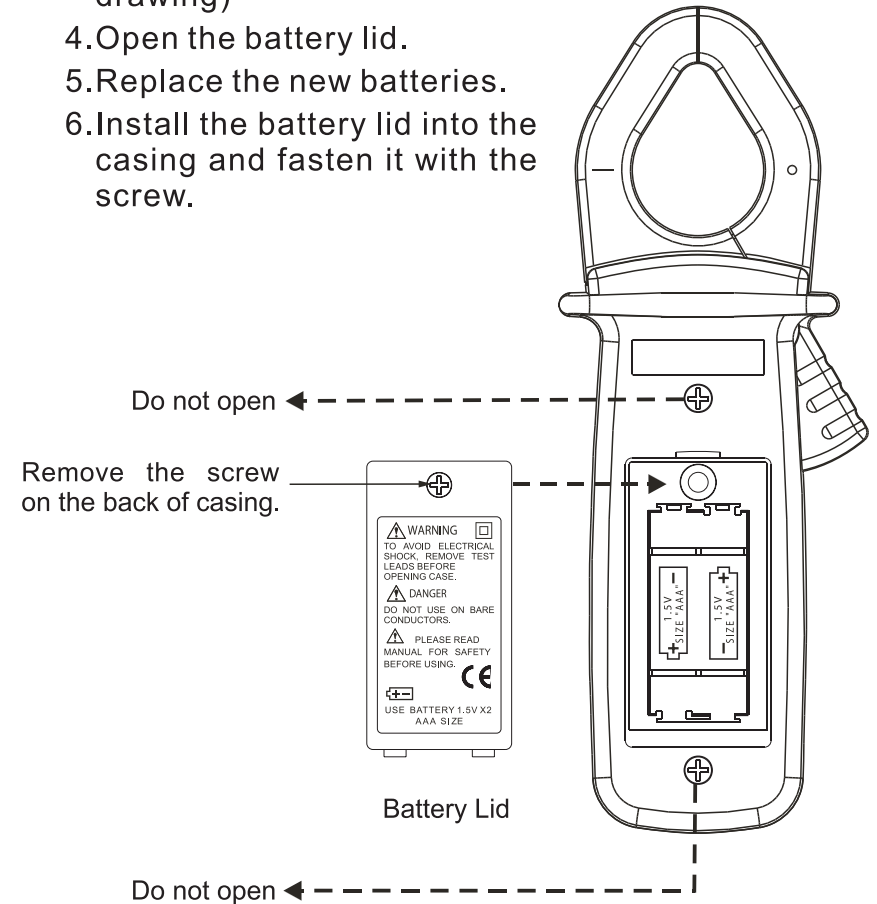
If "⊕" symbols appears, the batteries fall below the normal operation voltage. Replace them with 2 new batteries. (Standard alkaline UM-4 or R03 AAA batteries. You can also use non-alkaline batteries, however, the life time of the batteries will be shorter.)

⚠ Caution

- Before replacing batteries, make sure to disconnect the clamp meter from the circuit under test.
- Replace two new batteries at the same time, and make sure you put the batteries at correct polarities.


(7) STEPS FOR REPLACING BATTERIES

1. Abort the measuring action.
2. Switch the function switch knob back to OFF.
3. Remove the screw on the back of casing. (as drawing)
4. Open the battery lid.
5. Replace the new batteries.
6. Install the battery lid into the casing and fasten it with the screw.



(8) SPECIFICATION

1.General Specifications:

- **Max Clamp Size :** ϕ 30mm or 10x35mm
- **Measurement Functions :**
ACA, DCA, ACV, DCV, Ω & \cdot)
- **Additional Functions :**
Data hold, Overload display, Auto power off selection.
- **LCD Display :**
Unit & function Indication, Maximum reading value is 4369 digits, Negative polarity indicator, Overload indicator ("OL" and beeper sound indicating overload of voltage and current. "----" indicating overload of resistance and beeper), " " indicating low battery.
- **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~140° F) / Below 70% R.H. (No Condensation).
- **Power Supply :** 2 standard alkaline UM-4 or R03 AAA batteries.
- **Battery Life Time :** Approx. 100 hours (alkaline battery).
- **Dimension :** 190mm(L)x71mm(W)x37mm(H)
- **Weight:** Approx.220g(including the batteries)

- Comply with Safety Standard :
IEC61010 600V CAT III pollution 2.
- Accessories: AAA 1.5V (installed)... 2
 Test Leads..... 1
 Instruction Manual.....1
 Carrying Case.....1

2. Electrical Specifications:

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

● ACA (set on \tilde{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 \tilde{A} Zero)

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

● ACV (set on \tilde{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		10M Ω , <50pF	
400V	0.1V			
600V	1V			

● DCV (set on \tilde{V})

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

● Resistance (set on Ω \bullet)

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 \bullet)

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 the product described above may be revised for modification without prior notice.