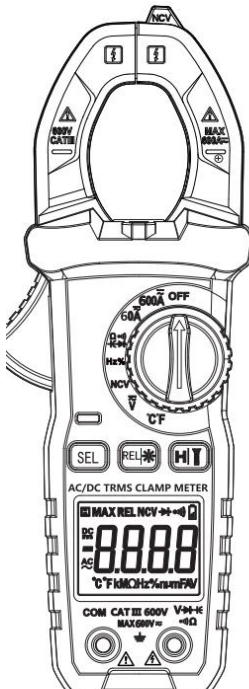
BEETECH®

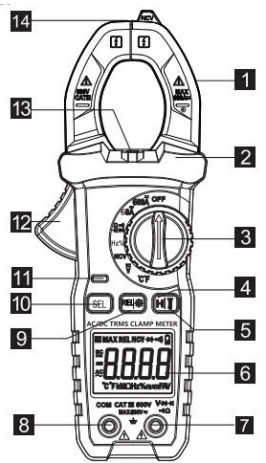
CLAMP MULTIMETER

Model: **B-6020**



Instruction Manual

FRONT PANEL DESCRIPTION



1) Clamp
2) Clamp head lamp
3) Function knob
4) Hold button
5) Lighting button
6) LCD
7) Input port
8) COM common end jack
9) Zero and backlight buttons
10) Function button
11) Caution light
12) Trigger
13) Floodlight
14) NCV

DESCRIPTION OF SWITCHES, BUTTONS AND INPUT JACKS

- **NCV button:** Used to enable non-contact voltage measurement.
- **SEL button:** Used to switch between measurement functions.
- **HOLD button:** For reading hold.
- **LED/BL button:** Flashlight or backlight control.
- **OFF position:** Power off.
- **INPUT jack:** voltage resistance frequency duty ratio, capacitance, diode line on and off File input terminal.
- **COM jack:** voltage resistance frequency duty ratio, capacitance, diode line off File common terminal.
- **Range switch:** Used to select functions and ranges.
- **Clamp head:** Used for measuring electrical current

INTRODUCTION

This Digital AC-DC current clamp meter is of stable performance, safe and reliable portable Measuring instrument. Function switch is one-handed operation for easy measurement, with overload protection and low battery indicator, with clamp head frequency measurement function. The circuit design of the whole machine takes intelligent IC double integral A/D converter as the core, and is equipped with full Range overload protection circuit, novel appearance. Can be used to measure AC current, Ac voltage, DC voltage, frequency, duty ratio, resistance, capacitance, temperature measurement and line Connection test, diode test, is a superior performance of the multifunctional instrument.

SAFETY INFORMATION

WARNING

To fully understand the function of the instrument and ensure safe operation, please read and follow carefully. Follow the instructions in this manual. Special attention should be paid when using this instrument. Improper use may cause electric shock or damage to the instrument.

The instrument conforms to the general technical conditions of GB/T 13978-92 digital multi-purpose table GB4793.1-1995 (IEC-61010-1, IEC-61010-2-032) Electronic measuring instrument safety Full requirements, belong to secondary pollution, in line with CAT III 600V overpressure standard.

Follow the safe operation guide and use the instrument safely.

SAFETY SYMBOLS

	This symbol indicates the user must refer to the manual for further information
	Dangerous voltage
	Double insulation
CAT III	Safety standards for overvoltage (installation) level III and contamination level 2 according to IEC-6010-1.
	In line with European community (EU) standards
	Earth ground

PRECAUTIONS

- When using, the correct function and range must be selected. It is forbidden to measure beyond the range.
- When the meter is connected to the measuring circuit, do not touch the metal part of the marker.
- When measuring, if the measured voltage is higher than 60V DC or 30V AC RMS, care should be taken to always keep the hand behind the pen finger protector.
- If the voltage between the measuring terminal and the ground exceeds 600VAC, do not measure the voltage.
- In manual range state, if the measured value is not known in advance, the highest range should be selected.
- The marker should be removed from the circuit under the test before turning the range switch to change the measuring function.
- Do not measure resistance capacitance diode and line off.
- Do not measure the capacitor to have polarity until the capacitor is fully discharged.
- Do not use this instrument near explosive gas, steam or dust.
- Discontinue use of the meter if any abnormality or malfunction is observed.
- The meter should not be used unless the meter bottom case and battery cover are fully fastened in place.
- Avoid storing or using instruments in direct sunlight, high temperature, and high humidity.
- Symbol indicating that the input voltage or current should not exceed the marked value. This is for protection
- Internal wiring protected from damage.
- When wiring "⚠", connect the common test wire first, and then connect the live test wire. When removing the connection, the Live test wire should be removed first.
- When the "▭" symbol is displayed, the accuracy of measurement is not guaranteed, that is, the battery should be replaced in time.

MAINTENANCE

- Please do not attempt to open the bottom case to adjust or repair the meter, calibration or repair can only be done by a professional Member to carry on.
- Remove the marker from the line under test before opening the bottom case of the meter or the battery cover.
- To avoid an electric shock that may be caused by an incorrect reading, when the meter displays the "▭" symbol, Replace the battery immediately.
- Use a damp cloth and mild detergent to clean the instrument. Do not use abrasives or solvents.
- When the instrument is not in use, the power should be turned OFF and the range switch should be turned off.
- If the meter is not used for a long time, take out the battery to prevent battery leakage from damaging the meter.

REPLACING A BATTERY

1. If the "▭" symbol appears, it indicates that the battery should be replaced.
2. Unscrew and remove the fastening screw from the battery cover of the instrument.
3. Replace the old battery.
4. Install the battery cover as originally installed.

WARNING

- Before opening the battery cover of the meter, remove the marker from the measuring circuit to avoid
- Danger of electric shock.

PAY ATTENTION:

The polarity of the battery cannot be reversed

OPERATING INSTRUCTION

1) **Reading Hold:** When measuring, if you need to hold the reading, you can press the "H" key to display the value of the monitor. Will be locked, press the "H" key again, can release the reading holding state.
2) **Frequency and Duty cycle switching:** Instrument in voltage and current range LCD displays the measured AC voltage and frequency of AC current signal. The meter displays the duty ratio of the measured voltage and current signal at "Hz/ %".
3) **Function Switching**: In "⊣⊢ Ω", press" SEL" key, will be in resistance, diode, on-off detection, capacitance Four gear cycle switch.
4) **Back light source and tongs lighting:** In the process of measurement, if the ambient light is too dark to make the reading difficult, you can press"☼"Button to turn on the backlight and turn it off automatically after 30 seconds. Press the "☼" key during this period to turn off the backlight.
5) **Automatic Shutdown:** If there is no operation within 15 minutes after startup, the instrument will automatically shut down to save power. 1 minute before the shutdown, the buzzer has three prompts, and the shutdown begins after one long sound the state of sleep.

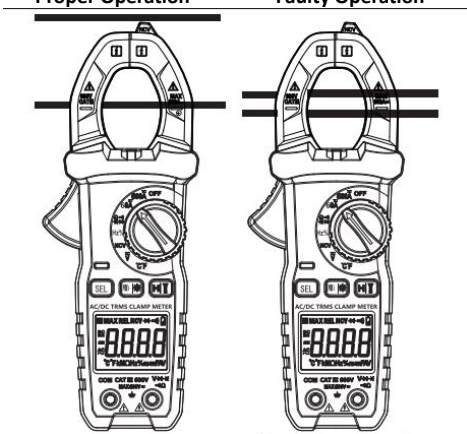
AC CURRENT MEASUREMENT

1. Range switch in 60A or 600A range position. This is the AC current measurement state.
2. Hold the trigger, open the head of the pliers, and clamp a wire of the measured line into the pliers. In LCD Reading on the monitor.

WARNING:

- Danger of electric shock.
- Remove the marker from the meter before measuring with the current clamp.
- Clamping two or more wires of the line under test at the same time cannot obtain correct measurement results.
- For accurate reading, the conductor under test should be centered on the current clamp as far as possible. ·
- "⚠" indicates that the maximum input current is 600A (relative) and the DC current is 600A.

Proper Operation **Faulty Operation**



DC CURRENT MEASUREMENT

1. Range switch in 60A or 600A range position. This is the DC current measurement state.
2. Press “SEL” to enter the DC current measurement, and Press “REL” to return the base number before measurement.
3. Hold the trigger, open the head of the pliers, and clamp a wire of the measured line into the pliers. In LCD Reading on the monitor.

WARNING:

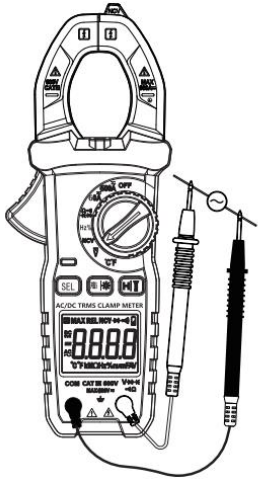
- Danger of electric shock.
- Remove the marker from the meter before measuring with the current clamp.
- Clamping two or more wires of the line under test at the same time cannot obtain correct measurement results.
- For accurate reading, the conductor under test should be centered on the current clamp as far as possible. ·
- "⚠" indicates that the maximum input current is 600A (relative) and the DC current is 600A.

AC VOLTAGE MEASUREMENT

1. Inserting the black watch pen into the COM jack Insert the red marker into the INPUT jack.
2. The range switch is placed in V gear of AC voltage.
3. Connect the marker to both ends of the voltage source or load Take measurements and read them on the LCD.

WARNING

- Danger of electric shock.
- Take extra care to avoid electric shock when measuring high voltages.
- Do not input a voltage higher than AC600V RMS

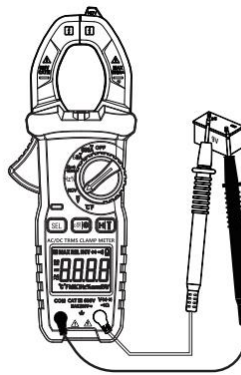


DC VOLTAGE MEASUREMENT

1. Insert the black pen into the COM jack and the red pen into the INPUT jack.
2. The range switch is placed in the DC voltage V, abusive position.
3. Connect the marker to both ends of the voltage source or load for measurement.
4. Reading on the LCD. The polarity display will indicate the polarity of the end to which the red marker is attached.

WARNING

- Danger of electric shock.
- Take extra care to avoid electric shock when measuring high voltages.
- Do not input voltage higher than DC600V.
- In the mV range, with the input open, the meter may have a pulsating reading, which is Normal, this is due to the high sensitivity of the instrument, when the pen is connected to the measured electricity in the road, you will get the true measurement.
- "" Indicates that the maximum input voltage is 600V DC.
- If the meter takes a reading greater than 600V DC, the meter will display "OL" and emit the alarm going "Wow!".



FREQUENCY MEASUREMENT

1. Range switch in the 60A/ 600A range position.
2. Hold the trigger and open the head of the pliers, and clamp one conductor of the measured line into the pliers.
3. Press the "Hz/ %" key to switch to the frequency measurement state.
4. Reading on the LCD monitor.

WARNING

- Danger of electric shock.
- Remove the marker from the meter before measuring with the current clamp.
- Clamping two or more wires of the line under test at the same time will not give correct measurement results.
- Frequency measurement range is 10Hz-1kh z, if the measured frequency is less than 10Hz, LCD Display "00.0"; It is possible to measure frequencies higher than 1kHz, but measurement is not guaranteed Accuracy.
- ": indicates that the maximum input current is 600A AC (valid).

DIODE TEST

1. Insert the black pen into the COM jack and the red pen into the INPUT jack.
2. Range switch in the "⊣▶⊢ Ω" cutting position. Press SEL button to switch to "-▶|-" test state.
3. Connect the red watch pen to the diode anode and the black watch pen to the diode cathode for testing.
4. Reading on the LCD

WARNING

- The meter shows an approximation of the diode forward voltage drop.
- If the pen is reversely connected or the pen is open, the LCD displays "OL".

THROUGH V GEAR

1. Insert the black pen into the COM jack and the red pen into the INPUT jack.
2. Range switch in V gear of AC voltage.
3. Press "Hz/ %" to switch to the frequency measurement state.
4. Connect the marker to the signal source or both ends of the load for measurement and read on the LCD.

WARNING

- Danger of electric shock.
- Take extra care to avoid electric shock when measuring high voltages.
- Do not input voltage higher than AC600 V RMS.
- Frequency measurement range is 10HZ-10khz. If the measured frequency is lower than 10Hz, it will be displayed 00.0; It is possible to measure frequencies higher than 10kHz, but accuracy is not guaranteed.
- "⚠" Indicates that the maximum input voltage is 600V AC (valid value).

TEMPERATURE MEASUREMENT

Switch the rotary switch to ° C / ° F and insert the thermocouple probe into the input sockets. The positive terminal is connected to the red input terminal. The main display displays the temperature measured in degrees Celsius, the secondary displays the Fahrenheit value of the measured temperature.

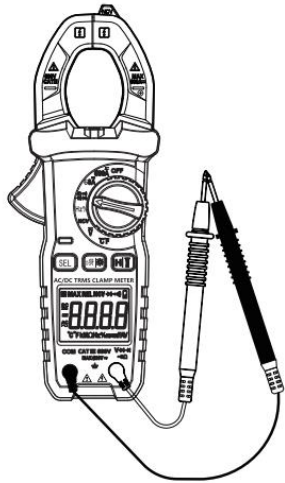
LINE CONNECTION TEST

1. Insert the black watch pen into the COM jack, red the pen is inserted into the INPUT jack.
2. Range switch in Ω position.
3. Press the “SEL" button to switch to line connection test state.
4. Connect the marker to both ends of the line for measurement. If the resistance of the line under test is less than 50 ohms A buzzer inside the meter will sound.

"OL" is displayed if the marker is open or the resistance of the line under test is greater than 600Ω.

WARNING

- Danger of electric shock.
- When testing the circuit on and off, the power should be determined. The circuit power supply is disconnected and the capacitor on the circuit is finished total discharge.



CAPACITANCE MEASUREMENT

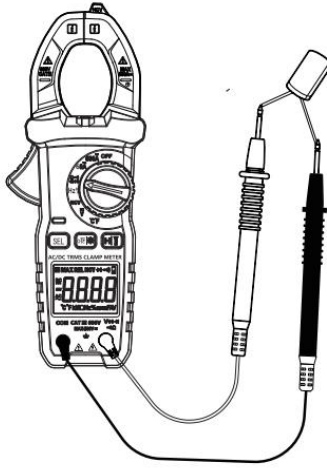
1. Insert the black pen into the COM jack and the red pen into the INPUT jack.
2. Range switch, abusive in the "⊣⊢ Ω" file. Press the “SEL" button to switch to capacitance test state.
3. After the capacitor is completely discharged, connect the marker to both ends of the measured capacitor for measurement. Reading on the LCD.

WARNING

- Danger of electric shock.
- To avoid shock, discharge the capacitor completely before measuring it.

PAY ATTENTION:

A certain amount of time is required to stabilize the reading when measuring large capacitance (60μF and 60mF)



RESISTENCE MEASUREMENT

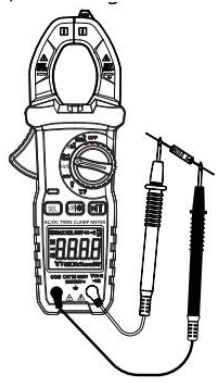
1. Inserting the black Probe into the COM Jack Insert the red Probe into the INPUT jack.
2. Range switch in "⊣(•••)/▶⊢ Ω" position, currently, the meter is in resistance measurement state.
3. Connect the marker to both ends of the resistance or line under test Take measurements and read on the LCD display.

Note:

- When the input is open, the LCD will display "OL" super Range state.
- If the resistance of the measured resistance is higher than 10MΩ, the meter may take a few seconds to stabilize the reading, this is normal for high resistance readings.

WARNING

- Danger of electric shock.
- When measuring the impedance on the line, the circuit power supply should be determined to be off, the capacitor on the line Discharge completely.



THROUGH Hz/%

1. Insert the black pen into the COM jack and the red pen into the INPUT.
2. Range switch in Hz/ DUTY position.
3. Connect the marker to both ends of the signal source or load for measurement.
4. Reading on the LCD.

WARNING

- Danger of electric shock.
- Take extra care to avoid electric shock when measuring high voltages.
- Do not enter a voltage higher than the AC 250V RMS.
- The measurement range of frequency is 10HZ-10mhz. If the measured frequency is lower than 10Hz,"00.0" is displayed. Measuring frequencies greater than 10MHz is possible, but not guaranteed Accuracy of measurement.

DUTY CYCLE MEASUREMENT

1. Insert the black pen into the COM jack and the red pen into the INPUT jack.
2. Range switch in Hz/% position.
3. Connect the marker to the signal source or both ends of the load for measurement and read on the LCD.

WARNING

- Danger of electric shock.
- Take extra care to avoid electric shock when measuring high voltages.
- Do not input voltage higher than AC250V RMS.
- The measurement range of duty cycle is 10-99%. If the duty cycle measured is less than 10%, then “UL" is displayed. If the duty ratio is higher than 99%, "OL" is displayed. The frequency range of the input signal is 10-10 KHZ, and the signal above 10 KHZ is measured. Duty cycle is possible, but measurement accuracy is not guaranteed.

TECHNICAL SPECIFICATION

Display	LCD
Max. allowable voltage between the measuring terminal and ground	600V DC or 600V AC
Battery	1.5V AAA x 2
Auto power off	automatically power off about 15 minutes after meter switched on
Polarity indicator	'-' indicates negative polarity.
Sampling time	About 3times/second
Max. displayed value	6000 digits
HyperView display	“OL” or “- OL”
Operating temperature	0℃-40℃
Temperature coefficient	less than 0.1X accuracy /℃
Technical specification	18℃~28℃; humidity: ≤75% The meter shall specify -- year as the calibration period at ambient temperature
Storage temperature	-10℃-50℃
Battery undervoltage indication	LCD displays "▭" symbol
Dimension	185x71x35mm
Mouth elongation	26mm
Working height	Max. 2000m

- Automatic selection of measuring function and range.
- Full range overload protection.
- Unit display: with function, unit display of electricity.

AC CURRENT

Range	Resolution	Accuracy
60A	0.1A	± (3.0%+ 6digits)
600A	0.1A	

- Maximum input current: 600A AC
- Frequency range: 40 to 400Hz - Response: average value

DC CURRENT

Range	Resolution	Accuracy
60A	0.1A	± (2.5%+ 8digits)
600A	0.1A	

- Maximum input current: 600A DC

AC VOLTAGE

Range	Resolution	Accuracy
6V	0.001V	± (0.8% + 3digits)
60V	0.01V	
600V	0.1V	

- Input impedance: 10MΩ
- Maximum input voltage: 600V AC (effective value)
- Frequency range: 40 to 400Hz - Response: True RMS

DC VOLTAGE

Range	Resolution	Accuracy
600mV	0.1mV	± (1.0% + 2digits)
6V	0.001V	± (0.8% + 3digits)
60V	0.01V	
600V	0.1V	

- Response average input impedance: 10 MΩ
- Maximum input voltage: 600V DC

FREQUENCY

Range	Resolution	Accuracy
99.99Hz	0.01Hz	± (1.5% + 5digits)
999.9Hz	0.1kHz	
>1kHz	0.001kHz	Only reference

- Measuring range: 10Hz-1kHz
- Maximum input current :600A (effective value)
- Input signal range: 4A AC(RMS)
  (As measured frequency increases, input current should also increase)

THROUGH THE V GEAR

Range	Resolution	Accuracy
99.99Hz	0.01Hz	± (1.5% + 5digits)
999.9Hz	0.1kHz	
>1kHz	0.001kHz	Only reference

- Measurement range: 10 Hz-1 KHZ
- Input impedance: 10 MΩ
- Input voltage range: 0.2V AC (RMS) (as measured frequency increases, input voltage should increase accordingly)
- Maximum input voltage :600V AC (valid value)

DIODE TEST

Range	Resolution	Function
⊣▶⊢	0.001V	Display approximate forward voltage of diode

- Forward DC current is about 1mA.
- Reverse DC voltage is about 3.3V
- Overload protection: 250V DC or AC (valid value)

PASSING THE Hz/%SWITCH

Range	Resolution	Accuracy
9.999Hz	0.001Hz	± (0.5% + 2digits)
99.99Hz	0.01Hz	
999.9Hz	0.1Hz	
9.999kHz	0.001kHz	
99.99kHz	0.01kHz	
999.9kHz	0.1kHz	
9.999MHz	0.001MHz	

DUTY CYCLE

Range	Resolution	Function
0.1 - 99.9%	0.1%	±3.0%

- Frequency response: 10-10MHz
- Input impedance: 10MΩ
- Input voltage range: 0.2V AC (effective value) (as the measured frequency increases, the incoming voltage should increase accordingly)
- Maximum input voltage 600V AC (effective value)

RESISTENCE

Range	Resolution	Accuracy
600Ω	0.1Ω	± (0.8% + 3digits)
6kΩ	0.001kΩ	
60kΩ	0.01kΩ	
600kΩ	0.1kΩ	
6MΩ	0.001MΩ	± (1.2% + 3digits)
60MΩ	0.1MΩ	

- Open circuit voltage: approx. 0.4V
- Overload protection: 250V DC or AC (valid value)

CAPACITOR

Range	Resolution	Accuracy
6nF	0.1nF	± (4.5% + 5digits)
600nF	0.1nF	
6uF	0.001uF	
60uF	0.01uF	
600uF	0.1uF	
6mF	1uF	
60mF	0.01mF	

- Overload protection: 250V DC or AC (valid value)

LINE CONNECTION TEST

Range	Resolution	Function
◦•))	0.1Ω	Built-in buzzer will be sounded If resistance is less than 50Ω

- Overload protection: 250V DC or AC (valid value)

TEMPERATURE

Range	Resolution	Function	
℃	1℃	-50℃~1300℃	± (1.0% + 3) reading
° F	1° F	-58° F ~2372° F	± (1.0% + 3) reading

- Accuracy does not include error of thermocouple probe.
- Overload protection 250V DC or AC (valid value).

ATTACHMENTS

1. Marker Note grade:1000V 10A one pay
2. Instruction manual A book
3. Battery AAA1.5V two
4. Thermocouple One payment

BEETECH WARRANTY POLICY

BEETECH Instruments are free from defects in workmanship and functioning, under normal and appropriate use and conditions, for a period of one 1 year from the original invoice date.

During the Warranty period of one year the original purchaser is warranted against the instruments purchased. During this period BEETECH will repair or replace (at its decision) the defective unit subject to verification of the defect or the malfunction (If a manufacturing defect) at Free of Cost (except shipping charges - to & from, handling charges, packing charges, insurance charges, etc., which must be incurred by the customer).

This warranty does not cover disposable batteries, or any damage caused due to abuse, neglect, accident, unauthorized opening or repair, alteration, contamination, or any other abnormal conditions of operation or handling.

Such repairs or replacements are primarily subject to verification of manufacturing defect or malfunction and proof of purchase as confirmed by inspecting the product and the original, dated, purchase invoice. Buyers are to retain purchase invoices for a minimum of one year for warranty

To summarize, warranty does not include:

1) Any condition resulting from other than ordinary and usual use for which the product was not intended.
2) Any condition resulting from incorrect or inadequate usage, application, maintenance, or care.
3) Damage resulting from misuse, incorrect application, abuse, negligence, accidents or shipping damage
4) Normal wear and tear or damage in transportation or in transit.
5) If the device has been opened, inspected, or modified by the user the warranty is void and cannot be claimed.
6) Batteries, Testing leads, and functional accessories are out of warranty policy.
7) Any defect which is not a manufacturing defect.

CALIBRATION CERTIFICATE

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

The instrument has been calibrated by using equipment which is calibrated to standards traceable to International and National standard.

(This instrument does not require further calibration until the period of one year from date of use)