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# AC/DC Current Probe

## CPL5100 (100A/600kHz)



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## Preface

First of all, thank you for purchasing our products, this instruction manual is the description about the function, usage, operation attention points, etc. Before use, please read the instructions carefully and use correctly.

Manual annotation will use the following symbols to distinguish.



**This symbol means it is harmful to the machine and human body; you must strictly follow the instruction manual to operate.**

**Warning**

**In the case of wrong operation, the user risk injury. The content under this mark records the relevant matters needing attention to avoid such dangers.**

**Notice**

**The user may suffer minor injuries and material damage with the wrong operation. To avoid such situation, the matters under this mark need attention.**

**Note**

**This symbolizes important note about how to use the machine.**



**Warning**

- To avoid short out and deadly accident, the circuit under test should not surpass 600VAC
- This probe is not designed for naked conductor.
- Do not touch the conductor under test and the transducer probe during measuring.
- When the oscilloscope is connected to other test terminal, please be careful for these points:
  - ✧ Please use the fundamental insulation equipment with fitful voltage range and pollution rate while the probe's test terminal is connected to the other terminals.
  - ✧ Please do not surpass the safe voltage range if the fundamental insulation of the test terminal cannot be met.
  - ✧ Please operate under correct guidance about electric safety.
- There could be deadly electric shock if the device is damp or the users' hand is wet.

**Attention**

- The probe consists of precision components such as Magnetic core and Hall sensor, which could be possibly damaged because of the sudden temperature change or external force impact. Please be careful for vibration or impact.
- The product is neither waterproof nor dustproof; please do not operate in the environment filled with dust and water.
- The probe's upper and lower contact surfaces is made by precise polishing process. Please protect this part or the probe could be malfunction.

**Note**

- When the battery voltage is lower than 6.5V, the probe will indicate a low voltage alert, please change the battery. You can use a 9V alkaline battery for longer time.

**CPL5100 Brief Summary**

Type	Max current (DC+Pk)	Max RMS value	Band width (-3dB)	Range	Current transfer ratio
CPL5100	100A	70.7 Arms	600kHz	100A	0.01V/A
				10A	0.1V/A

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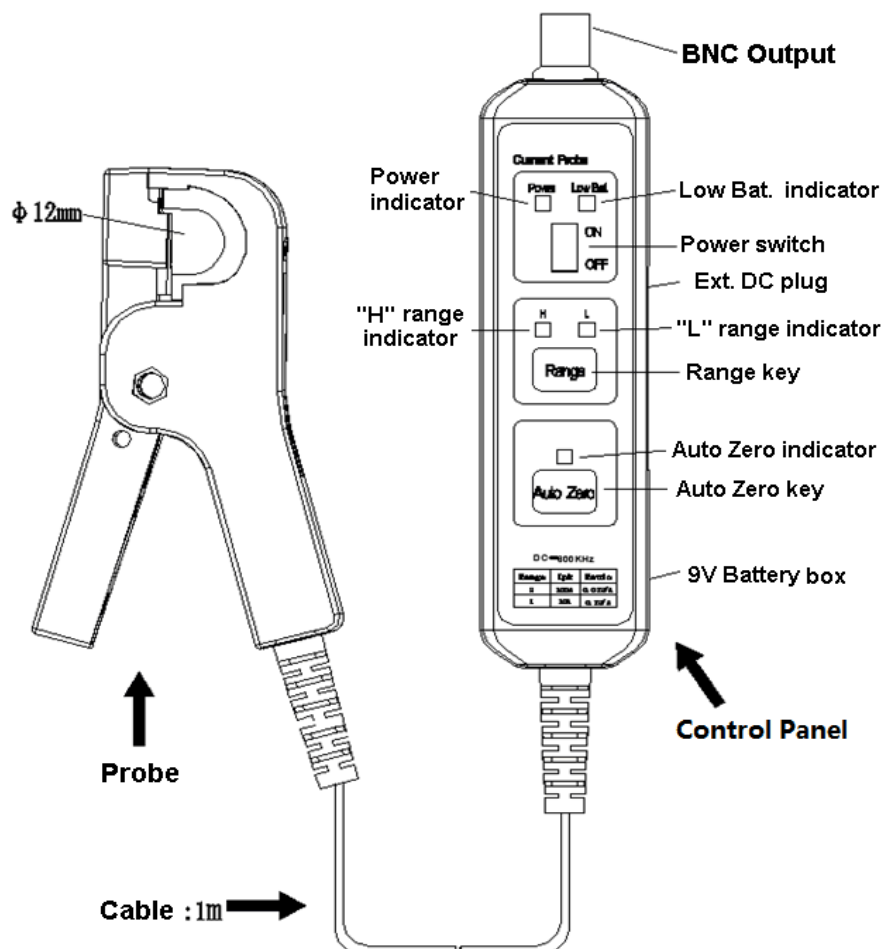
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## 1. Summary

**CPL5100** is a kind of current probe that can measure both DC and AC current up to 100A (70.7Arms). The band width of CPL5100 is 600 kHz (-3dB).CPL5100 provides two range option of 10A and 100A, the users may choose the correct range according to the current value. The auto zero function make it easy for the users to operate, and it also has power and low voltage indicator as well as overload sound alert. The probe can be powered by battery or external power supply, which makes the measurement a lot more convenient. With standard BNC output port, the probe can connect to any oscilloscope, and it can also connect to multimeter with BNC-banana plug. The CPL5100 is usually used in power supply , motor drive and power supply.

## 2. Introduction about probes and accessories

- **Probe**



- ◇ **Power Switch:**

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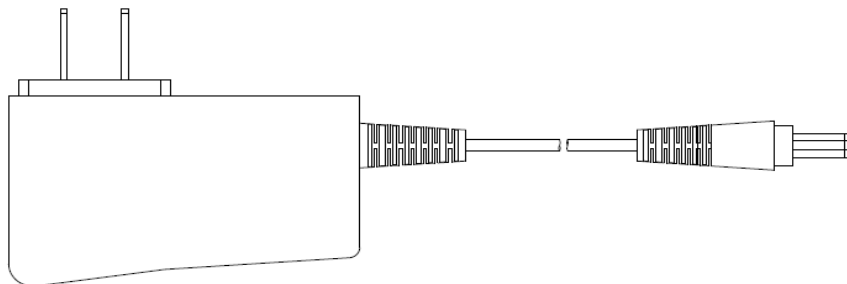
ON: Power on and probe work; OFF:Power off and probe do not work.

- ❖ **Power indicator:** When the power switch is on, the indicator is lighted green.
- ❖ **Battery Low Voltage Indicator:** when the voltage of the battery is lower than 6.5V, the power indicator will light red, reminding the users to change battery.
- ❖ **Range Switch:** press the button switch to change between H and L Range.
- ❖ **Range Indicator:** indicating the current Range choice. H level: 100A; L level: 10A.
- ❖ **Auto Zero button:** to make accurate measurement, users need to do zero degaussing before measuring to avoid the influence of environment factors like earth magnetic field and temperature shift.
- ❖ **Auto Zero Indicator:** when Auto Zero, the indicator is lighted on and in green and will be turned off when the Auto Zero is finished.
- ❖ **Clamp:** the clamp used for current measurement; the max diameter for the cable is 12mm.
- ❖ **External Power Supply Plug:** powered by external DC supply.
- ❖ **Battery Box:** standard 9V alkaline battery is used. Please turn off the switch and disconnect from the conductor under test & oscilloscope when changing battery.

- **Accessories**



Output Cable (CK-310):1 meter



Power Supply Adaptor (CK-612): DC12V/1.2A

### 3. Electronic Characteristics

Test Condition: 23°C, 60%RH, cable under test get through the test center, load resistance 1MΩ

Range level	L	H
Current range	50mA~10A Peak	1A~100A Peak
Attenuation accuracy	0.1V/A	0.01V/A
Typical DC precision	3% ±50mA	500mA~40A Peak : 4% ±50mA; 40A~100A Peak : ±15% Maximum
Band-width(-3dB)	DC-600kHz Refer to the typical Amplitude frequency characteristic (Figure 1)	
Max current VS frequency characteristics curve	Figure 2	
Phase shift	DC~65Hz: <1.5 °	DC~65Hz: <1 °
Typical DC linearity	The typical DC linearity at H level(0.01V/A), Figure 3	
Rise time	≤583ns	
Max operation current	Please refer to voltage and current rating table	
Max operation voltage	Please refer to voltage and current rating table	
Max floating voltage	Please refer to voltage and current rating table	
Operating voltage RMS	CATI 600V CATII 600V CATIII 300V	
Common mode voltage RMS	CATI 600V CATII 600V CATIII 300V	
Typical battery type and life.	9V alkaline layer-built battery/ 15H	
Low power indication	When battery voltage is lower than 6.5V, battery indicator will turned red and alert.	
Overload indication	When the current under test surpasses the range, the buzzer will buzz	

#### Voltage and current rating table

Parameter	Max operating current (A)		Max operating	Max floating
	H(0.01V/A)	L(0.1V/A)		

			voltage (V)	voltage(V)
<b>DC</b>	100	10	600	600
<b>DC+AC peak value</b>	100	10	600	600
<b>AC peak value</b>	100	10	600	600
<b>AC peak to peak value</b>	200	20	1200	--
<b>RMS CAT III</b>	70.7	7.07	300	300
<b>RMS CAT II</b>	70.7	7.07	600	600
<b>RMS CAT I</b>	70.7	7.07	600	600

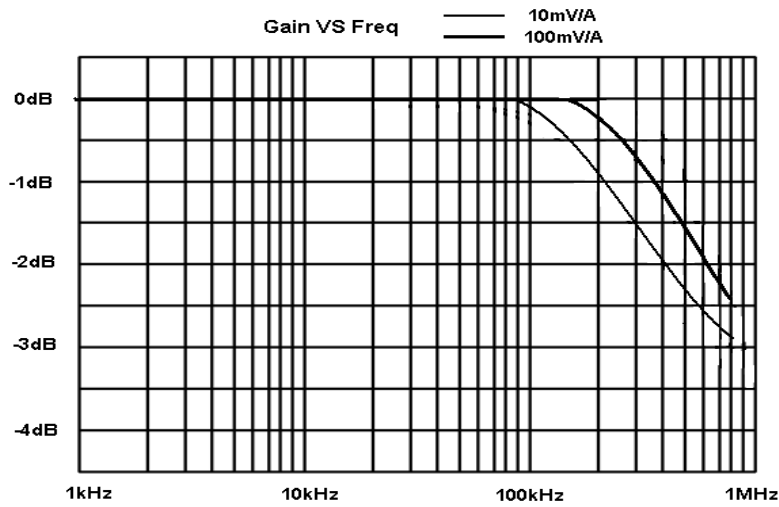


Figure 1 CPL5100 Typical Gain VS Frequency curve

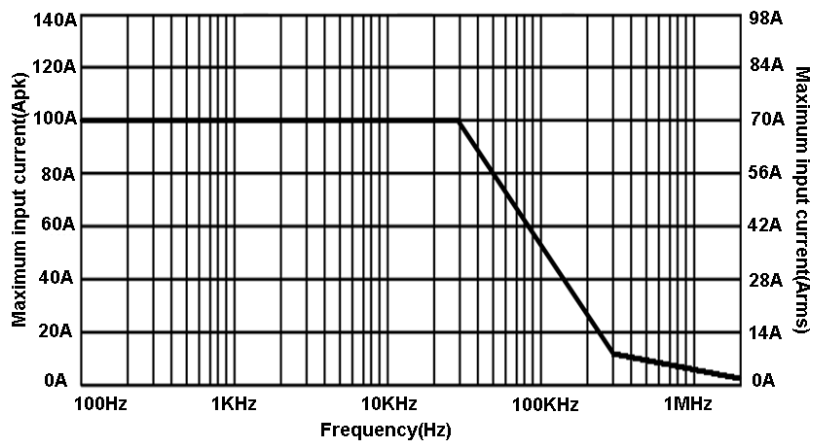


Figure 2 Max current VS Frequency curve



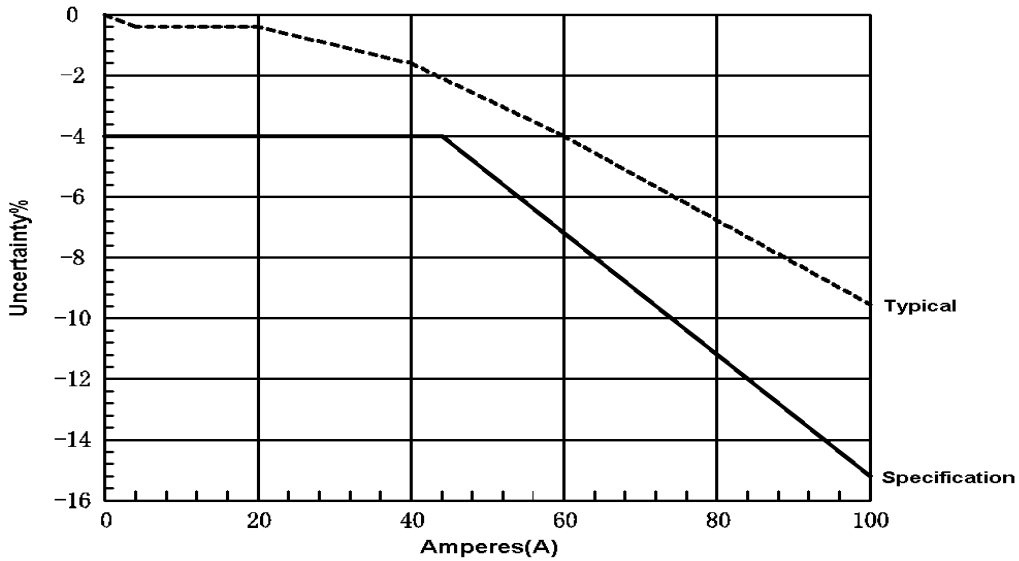


Figure 3 Typical DC linearity (0.01V/A level)

#### 4. Operating instruction

✧ Set the coupling mode of the oscilloscope to DC and the input impedance to  $1M\Omega$ ; To make it easy to read, users can set the display unit of the oscilloscope from voltage to current display. If user's oscilloscope doesn't have such function, user have to manually set the corresponding attenuation ratio, for instance, if the probe is H level (0.01V/A), the oscilloscope should be 100X; if the probe is L level (0.1V/A), oscilloscope is 10X. User can connect the BNC output port with the input port of the oscilloscope with standard double terminal BNC cable.

✧ Turn the switch to ON, and the power indicator will light up green.

✧ According to the value of the current under test, choose the correct range by pressing button.

Attention: Different ranges correspond to different attenuation ratio of the oscilloscope.

✧ Press the Auto Zero button. The buzzer will beep for twice, or it will have a long and continuous beep meaning the failure of Auto Zero. The external magnetic field can have a little influence to the DC zero, so do not move the device after Auto Zero.

✧ Open the clamp of the probe and clamp the conductor under test.

Attention: There's direction tip on the current probe clamp. If the direction of the current fits the tip, output will be positive; On the contrary, the result is negative.

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- ✧ Adjust the vertical sensitivity of the oscilloscope to get a stable waveform.

## 5. Mechanic Characteristics

Size of the front current clamp	About 100*20*60mm
Size of the back output box	About 137*33*35mm
Operation altitude	0~2000 meter
Maximum diameter of the conductor under test	12mm $\phi$
Length of the cable connecting current clamp and output box	1 meter
Length of double terminal BNC cable	1 meter
Weight	About 223g(without battery)

## 6. Environment characteristics

Operating temperature	0°C ~ +50°C
Storing temperature	-20°C ~ +80°C
Operating relative humidity	0°C to +40°C, 95%RH; +40°C ~ +50°C, 45%RH
Pollution Degree	Level 2

## 7. Maintenance

**If the product is in the warranty period and used correctly, and at the same time the malfunction is caused by the flaws of product itself and have not been disassemble, the company will give free repair to the product.**

- ✧ **Clamp:** Please keep the clamp clean. After long time use, please use soft cloth together with alcohol to erase the dirt. Please keep the clamp away from damp environment, not to mention direction contact with water.
- ✧ **Handle:** Please use clean cloth or sponge to clean the handle. Please use little alcohol instead of water to erase the dirt and parch it.

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- ✧ To maintain the performance of the product, there can be one check or calibration every year.

## 8. Troubleshoot

<b>Problem</b>	<b>Reason</b>	<b>Treatment</b>
No output signal or amplitude is low	Power is off	Turn on the power.
	Oscilloscope is AC mode	Please set it to DC mode
	Clamp isn't closed	Check the clamp, close it completely.
Power indicator is off when the probe is on.	Battery voltage is lower than 6.5V	Change the battery
Amplitude is half	The input impedance is 50Ω	Set it to 1MΩ

## 9. Packing List

<b>Packaging</b>	
<b>Name</b>	<b>Quantity</b>
Current probe	1
9V battery	1
DC12V/1.2A adaptor	1
BNC output cable(CK-310)	1
Tool box	1
Instruction book	1
Warranty card	1