

# Precision Current Shunt Meter

PCS-1000/PCS-1000I

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## USER MANUAL



ISO-9001 CERTIFIED MANUFACTURER

**GW INSTEK**

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**Good Will Instrument Co., Ltd.**  
No. 7-1, Jhongsing Rd., Tucheng Dist., New Taipei City 236, Taiwan.

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# S SAFETY INSTRUCTIONS

This chapter contains important safety instructions that you must follow during operation and storage. Read the following before any operation to insure your safety and to keep the instrument in the best possible condition.

## Safety Symbols

These safety symbols may appear in this manual or on the instrument.

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WARNING

Warning: Identifies conditions or practices that could result in injury or loss of life.



CAUTION

Caution: Identifies conditions or practices that could result in damage to the instrument or to other properties.



DANGER High Voltage



Attention Refer to the Manual



Protective Conductor Terminal



Earth (ground) Terminal



Do not dispose electronic equipment as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased.

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## Safety Guidelines

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### General Guideline



#### CAUTION

- Do not place any heavy object on the instrument.
- Avoid severe impact or rough handling that leads to damaging the instrument.
- Do not discharge static electricity to the instrument.
- Use only mating connectors, not bare wires, for the terminals.
- Do not block the cooling fan opening.
- Do not disassemble the instrument unless you are qualified.

(Measurement categories) EN 61010-1:2010 specifies the measurement categories and their requirements as follows. The instrument falls under category II (600VAC).

- Measurement category IV is for measurement performed at the source of low-voltage installation.
- Measurement category III is for measurement performed in the building installation.
- Measurement category II is for measurement performed on the circuits directly connected to the low voltage installation.
- 0 is for measurements performed on circuits not directly connected to Mains.

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### Power Supply



#### WARNING

- AC Input voltage range: 100V/120V/220V/240V  $\pm 10\%$  (selectable range)
- Frequency: 50/60Hz
- To avoid electrical shock connect the protective grounding conductor of the AC power cord to an earth ground.

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### Cleaning the Instrument

- Disconnect the power cord before cleaning.
  - Use a soft cloth dampened in a solution of mild detergent and water. Do not spray any liquid.
  - Do not use chemicals containing harsh material such as benzene, toluene, xylene, and acetone.
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**Operation Environment**

- Location: Indoor, no direct sunlight, dust free, almost non-conductive pollution (Note below)
- Relative Humidity: Full accuracy to 80% RH, at 40°C
- Altitude: < 2000m
- Temperature: 0°C to 50°C

(Pollution Degree) EN 61010-1:2010 specifies the pollution degrees and their requirements as follows. The instrument falls under degree 2.

Pollution refers to “addition of foreign matter, solid, liquid, or gaseous (ionized gases), that may produce a reduction of dielectric strength or surface resistivity”.

- Pollution degree 1: No pollution or only dry, non-conductive pollution occurs. The pollution has no influence.
  - Pollution degree 2: Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.
  - Pollution degree 3: Conductive pollution occurs, or dry, non-conductive pollution occurs which becomes conductive due to condensation which is expected. In such conditions, equipment is normally protected against exposure to direct sunlight, precipitation, and full wind pressure, but neither temperature nor humidity is controlled.
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**Storage environment**

- Location: Indoor
  - Temperature: -40°C to 70°C
  - Relative Humidity: <90%
- 

**Disposal**

Do not dispose this instrument as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased. Please make sure discarded electrical waste is properly recycled to reduce environmental impact.

## Power cord for the United Kingdom

When using the instrument in the United Kingdom, make sure the power cord meets the following safety instructions.

NOTE: This lead/appliance must only be wired by competent persons


 **WARNING: THIS APPLIANCE MUST BE EARTHED**

IMPORTANT: The wires in this lead are coloured in accordance with the following code:

Green/ Yellow:	Earth
Blue:	Neutral
Brown:	Live (Phase)



As the colours of the wires in main leads may not correspond with the coloured marking identified in your plug/appliance, proceed as follows:

The wire which is coloured Green & Yellow must be connected to the Earth terminal marked with either the letter E, the earth symbol  or coloured Green/Green & Yellow.

The wire which is coloured Blue must be connected to the terminal which is marked with the letter N or coloured Blue or Black.

The wire which is coloured Brown must be connected to the terminal marked with the letter L or P or coloured Brown or Red.

If in doubt, consult the instructions provided with the equipment or contact the supplier.

This cable/appliance should be protected by a suitably rated and approved HBC mains fuse: refer to the rating information on the equipment and/or user instructions for details. As a guide, a cable of 0.75mm<sup>2</sup> should be protected by a 3A or 5A fuse. Larger conductors would normally require 13A types, depending on the connection method used.

Any exposed wiring from a cable, plug or connection that is engaged in a live socket is extremely hazardous. If a cable or plug is deemed hazardous, turn off the mains power and remove the cable, any fuses and fuse assemblies. All hazardous wiring must be immediately destroyed and replaced in accordance to the above standard.

# GETTING STARTED

This chapter describes the instrument in a nutshell, including its main features and front / rear panel introduction.



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## PCS-1000/PCS-1000I Overview

The PCS-1000 & PCS-1000I uses five high-precision shunt resistors as the basis for accurate current and voltage measurements. The 5 shunt ranges are 0.001 $\Omega$ , 0.01 $\Omega$ , 0.1 $\Omega$ , 1 $\Omega$ , 10 $\Omega$  with a current measurement range of 300A, 30A, 3A, 300mA and 30mA, respectively.

### Main Features

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- |             |   |
|-------------|---|
| Performance | <ul style="list-style-type: none"><li>• Wide DC/AC voltage range (200mV ~ 600VAC/1000VDC)</li><li>• Wide AC/DC current range (30mA ~ 300A)</li><li>• Low drift at all ranges</li><li>• Low temperature coefficients</li></ul> |
|-------------|---|
- 

- |          |  |
|----------|--|
| Features | <ul style="list-style-type: none"><li>• Shunts: 0.001<math>\Omega</math>, 0.01<math>\Omega</math>, 0.1<math>\Omega</math>, 1<math>\Omega</math>, 10<math>\Omega</math></li><li>• Current Meter (6 1/2 digits current meter)</li><li>• Voltage Meter (6 1/2 digits voltage meter)</li><li>• Current Monitor</li><li>• Voltage and current can be measured at the same time.</li></ul> |
|----------|--|
- 

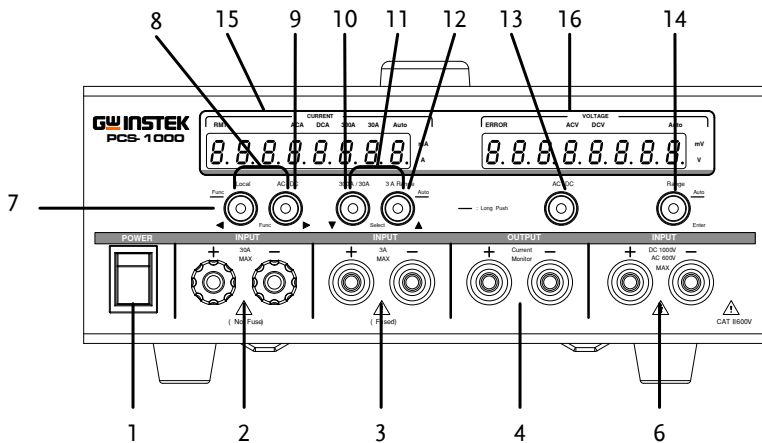
- |           |  |
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| Interface | <ul style="list-style-type: none"><li>• USB</li><li>• GPIB</li></ul> |
|-----------|--|

## Accessories

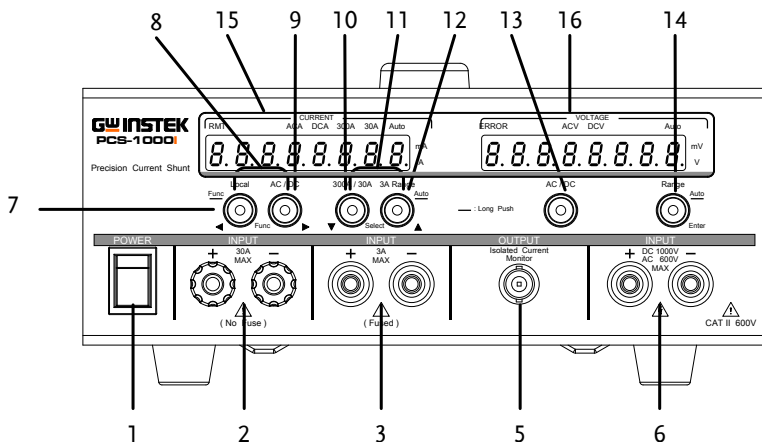
Standard Accessories	Part number	Description
	CD ROM	User manual Quick start guide
	Region dependant	Power cord
	GTL-105A	Alligator clip test leads (3A max): 1x red, 1x black
	GTL-207	Banana plug test leads: 1x red, 1x black
	GTL-240	USB Cable
	PCS-001	Basic Accessory Kit: Bolt HMS M8*16 x2 Nut hexagon M8*0.75P x2 Spring washer M8 8.4*13.7*1.5T x2 Plain washer M8 8.4*16*1.6T x2
Optional Accessories	Part number	Description
	GRA-419-J	Rack mount adapter (JIS)
	GRA-419-E	Rack mount adapter (EIA)

# Appearance

Front Panel - PCS-1000



Front Panel - PCS-1000I

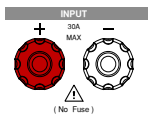


1. Power Switch



Turn on or off the main power.

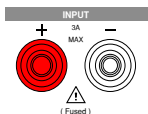
2. AC/DC 30A Terminal



Accepts DC/AC. 30A maximum current input.

**!** Warning: The maximum voltage difference between the negative terminal and earth cannot exceed 500Vpeak.

3. AC/DC 3A Terminal

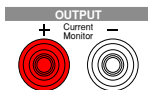


Accepts DC/AC. 3A maximum current input. Internally, there is a fuse which protects the instrument from over current:  
Fuse Rating: T3.5A, 600V

**!** Note: If the fuse is damaged, please contact your dealer or a GW Instek service center to replace the fuse.

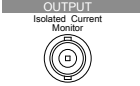
**!** Warning: The maximum voltage difference between the negative terminal and earth cannot exceed 500Vpeak.

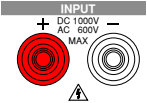
4. Current Monitor Sensor (PCS-1000)




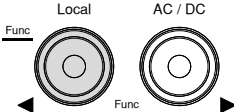
Current Monitor Output.

Range 0~300mV (0~full scale of selected input range).

- |  |   |   |
|--|---|---|
| <p>5. Current Monitor Sensor (PCS-1000I)</p> |  | <p>Isolated Current Monitor Output.</p> <p>Range 0~3V (0~full scale of selected input range).</p> |
|--|---|---|

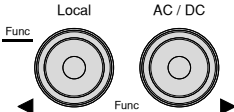
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| <p>6. AC/DC Voltage Terminal</p> |  | <p>Accepts DC 1000V or AC 600V maximum voltage input.</p> |
|----------------------------------|---|---|

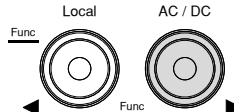
 **Warning:** The maximum voltage difference between the negative terminal and earth cannot exceed 500V<sub>peak</sub>.

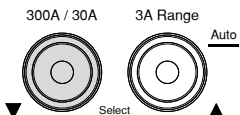
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| <p>7. Local</p> |  | <p>Local: Press to switch to local mode.</p> |
|-----------------|---|--|

Func  
(long push)

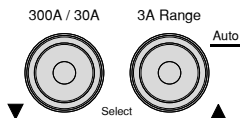
Func: Long push to enter the Function menu. The Function menu is used to configure the instrument.

- |                    |  |  |
|--------------------|--|--|
| <p>8. ◀ Func ▶</p> |  | <p>Use the Func arrows keys to scroll through each function when in the Function menu.</p> |
|--------------------|--|--|

- |                           |   |  |
|---------------------------|---|--|
| <p>9. AC/DC (Current)</p> |  | <p>Selects DC or AC current measurement.</p> |
|---------------------------|---|--|

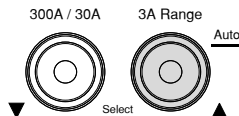
- |                     |   |   |
|---------------------|---|---|
| <p>10. 300A/30A</p> |  | <p>Manually select the 300A or 30A measurement range.</p> |
|---------------------|---|---|

11. ▼ Select ▲



Use the Select arrow keys to edit parameter values when in the Function menu.

12. 3A Range



3A Range: Manually Select the 30mA, 300mA, or 3A measurement range.

Auto  
(long push)

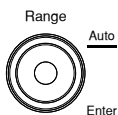
Auto: Long push to automatically select 30mA, 300mA or 3A measurement ranges.

13. AC/DC  
(Voltage)



Selects DC or AC voltage measurement.

14. Range



Manually select the voltage measurement range:  
DC: 200mV, 2V, 20V, 200V, 1000V  
AC: 200mV, 2V, 20V, 200V, 600V

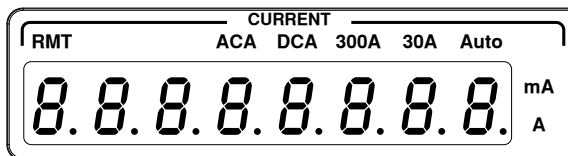
Enter

Secondary function that confirms selections when in the Function menu.

Auto  
(long push)

Voltage auto range.

## 15. Current Meter



Displays current measurement.

RMT	The RMT icon will turn on when the instrument is in remote mode.
ACA	AC current measurement mode indicator.
DCA	DC current measurement mode indicator.
300A	300A measurement range indicator. Equivalent to choosing the rear panel 300A terminal.
30A	30A measurement range indicator. Equivalent to choosing the front panel 30A terminal.
Auto	Autorange indicator for the 30mA, 300mA and 3A ranges. If the Autorange indicator is off, then that indicates that the range has been manually selected.
mA	Milliamp unit indicator.
A	Ampere unit indicator.

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