DC Power Supply

GPE-1323/GPE-1205

USER MANUAL

GW INSTEK PART NO.

ISO-9001 CERTIFIED MANUFACTURER

GW INSTEK

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

Table of Contents

SAFETY INSTRUCTIONS

This chapter contains important safety instructions that you must follow when operating the GPE series and when keeping it in storage. Read the following before any operation to ensure your safety and to keep the best condition.

Safety Symbols

These safety symbols may appear in this manual.

 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 GPE series 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.

Safety Guidelines

General Guidelines ⚠ CAUTION	• Do not place any heavy object on the device. • Avoid severe impacts or rough handling that leads to damaging the device. • Do not discharge static electricity to the device. • Do not block or obstruct the cooling fan vent opening. • Do not perform measurement at circuits directly connected to Mains. • Do not disassemble the device unless you are qualified as service personnel.
Power Supply ⚠ WARNING	• AC Input voltage: 100 V / 120 V / 220 V / 240 VAC ± 10 %, 50 or 60 Hz • Connect the protective grounding conductor of the AC power cord to an earth ground, to avoid electrical shock.
Fuse ⚠ WARNING	• Fuse type: 100 V / 120 V: T3.15A / 250 V 220 V / 240 V: T1.6A / 250 V • Make sure the correct type of fuse is installed before power up. • To ensure fire protection, replace the fuse only with the specified type and rating. • Disconnect the power cord before fuse replacement. • Make sure the cause of fuse blowout is fixed before fuse replacement.

Cleaning the device	• 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 or cleaners containing harsh products such as benzene, toluene, xylene, and acetone.
Operation Environment	• Location: Indoor, no direct sunlight, dust free, almost non-conductive pollution (note below) • Relative Humidity: < 80 % • Altitude: < 2000 m • Temperature: 0 °C to 40 °C
	(Pollution Degree) EN 61010-1:2010 specifies the pollution degrees and their requirements as follows. The GPE series 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.
Storage environment	• Location: Indoor • Relative Humidity: < 70 % • Temperature: −10° C to 70 °C

OVERVIEW

This chapter describes the GPE series in a nutshell, including its main features and front/rear panel introduction. After going through the overview, follow the Setup chapter (page 20) to properly power up and set operation environment.

GPE-1000 Series Overview

Series lineup

The GPE-1000 Series consists of 2 models: GPE-1323 and GPE-1205. Note that throughout the user manual, the term "GPE-1000" refers to all the models in the GPE-1000 Series lineup, unless stated otherwise.

Model	Output Voltage	Output Current	Output Power
GPE-1323	32 V	3 A	96 W
GPE-1205	20 V	5 A	100 W

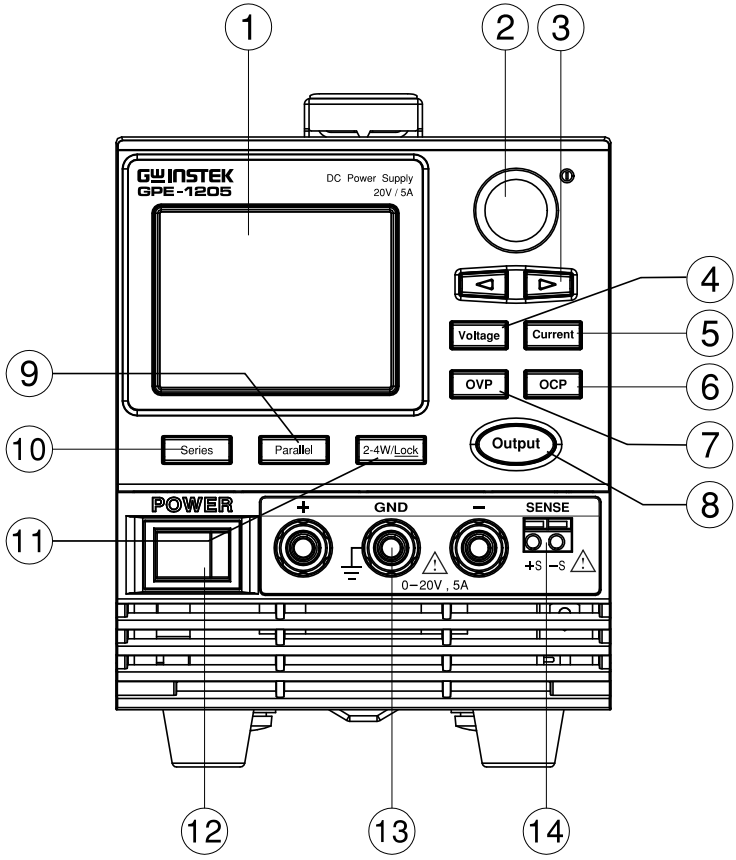
Main Features

Performance	• 2.4-inch TFT-LCD Panel. • Low noise: Temperature controlled cooling fan • Remote sensing to compensate for voltage drop in load leads • Set resolution : 1 mV / 0.1 mA Read back resolution : 0.1 mV / 10 uA
Operation	• Constant voltage/Constant current operation • Series Tracking / Parallel Tracking operation • Output On/Off control • Function for locking the setting
Protection	• OVP, OCP and OTP protection • Key misoperation protection (Lock) • Reverse polarity protection

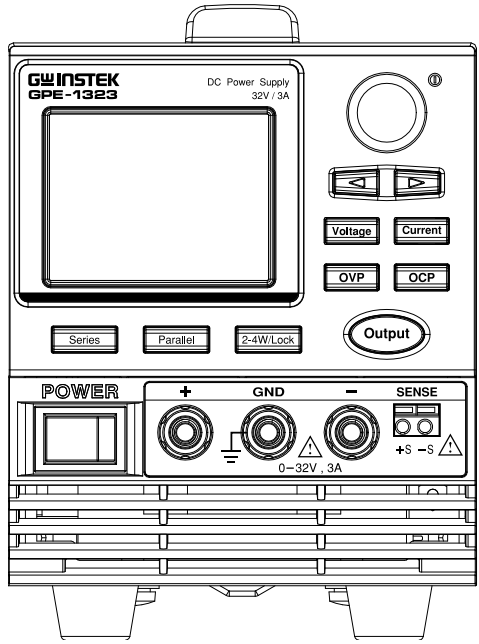
Appearance

Front Panel Overview

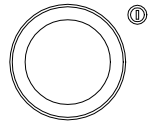
GPE-1205

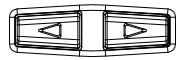


GPE-1323



1. Display area
   The display area shows set values, output values and parameter settings.

2. Knob Key
   
   Used to configure or confirm voltage/current, etc.
   Holding the Knob key will clear any protection alarms.

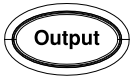
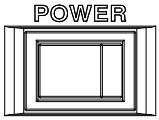
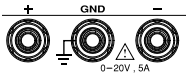
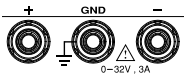
3. Left/Right Arrow Keys
   
   Used to select a parameter number in the Function settings.

4. Voltage
   

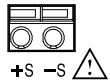
   Sets the constant voltage level.

5. Current
   

   Sets the constant current level.

6.	OCP		Sets the over current protection level.
7.	OVP		Sets the over voltage protection level.
8.	Output Button		Used to turn the output on or off.
9.	Parallel Key		Activates parallel tracking operation.
10.	Series Key		Activates series tracking operation.
11.	2-wire/4-wire setting & lock/unlock		Used to 2-wire/4-wire setting. Holding the key will Locks/Unlocks the front panel keys to prevent accidentally changing panel settings. Note: The output can still be turned off when the key lock in active.
12.	Power Switch		Turns on the mains power.
13.	Output terminal	 	DC output terminal of the GPE-1205 GPE-1205 the max. output is 20 V / 5 A / 100 W DC output terminal of the GPE-1323 GPE-1323 the max. output is 32 V / 3 A / 96 W

14. Sensing Terminal



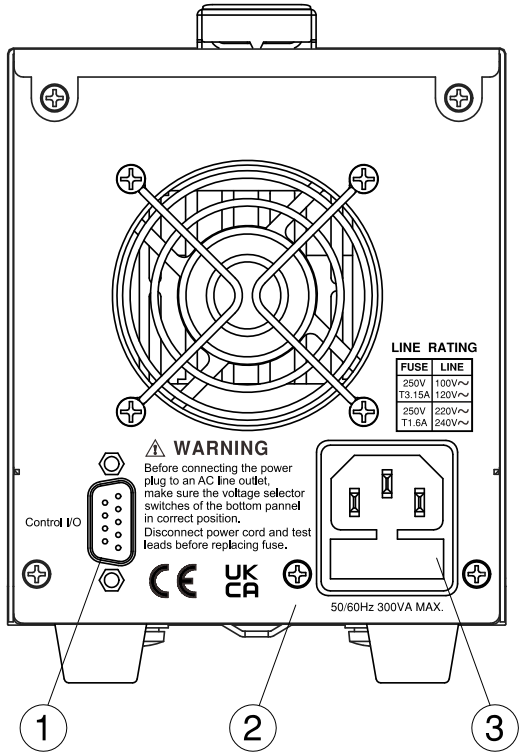
Terminal to connect the sensing cables, which compensate voltage drop occurred in load leads.

Display Area

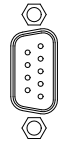
2W	2-wire indicator.
4W	4-wire indicator.
	When the lock mode is activated, the icon will be shown.
OTP	Over temperature protection functions is tripped.
OVP	Over voltage protection functions is tripped.
OCP	Over current protection functions is tripped.

OFF	Indicates if the output is OFF.	CC	Indicates that the output is in CC mode.
CV	Indicates that the output is in CV mode.	SM	Master Series
SS	Slave Series	PM	Master Parallel
PS	Slave Parallel		

Rear Panel Overview

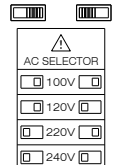


1. I/O Ports



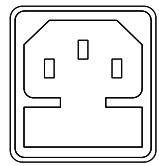
The Connector is used for parallel/series control.

2. AC Select Switch



The AC selector is located at the bottom side of the unit. Switch Voltage to 100 V, 120 V, 220 V or 240 V.

3. Power Cord / Fuse Socket



The power cord socket accepts the AC mains. For power up details, see page 23.
The fuse holder contains the AC mains fuse. For fuse replacement details, see page 46.

Theory of Operation

The theory of operation chapter describes the basic principles of operation, protection modes and important considerations that must be taken into account before use.

Operating Description

Background

The GPE-1000 power supplies are regulated DC power supplies with a stable voltage and current output. These operate within a switch automatically between constant voltage and constant current according to changes in the load.

Note

Suitable supply cord set for use with the equipment:

Mains plug: shall be national approval

Mains connector: C13 type

Cable:

1. Length of power supply cord: less than 3 m
2. Cross-section of conductors: at least 0.75 mm^2
3. Cord type: shall meet the requirements of IEC 60227 or IEC 60245 (e.g.: H05VV-F, H05RN-F)

Caution

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

CC and CV Mode

CC and CV mode Description

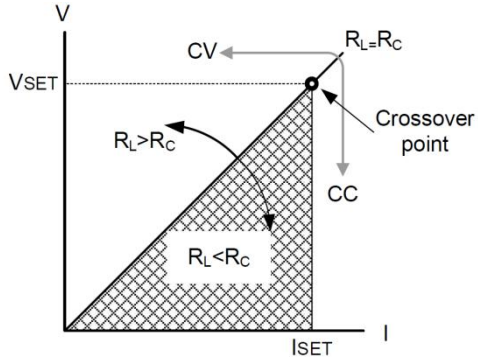
When the power supply is operating in constant current mode (CC) a constant current will be supplied to the load. When in constant current mode the voltage output can vary, whilst the current remains constant. When the load resistance increases to the point where the set current limit (ISET) can no longer be sustained the power supply switches to CV mode. The point where the power supply switches modes is the crossover point.

When the power supply is operating in CV mode, a constant voltage will be supplied to the load, whilst the current will vary as the load varies. At the point that the load resistance is too low to maintain a constant voltage, the power supply will switch to CC mode and maintain the set current limit.

The conditions that determine whether the power supply operates in CC or CV (VSET), the load resistance (RL) and the critical resistance (RC). The critical resistance is determined by VSET/ISET. The power supply will operate in CV mode when the load resistance is greater than the critical resistance. This means that the voltage output will be equal to the VSET voltage but the current will be less than ISET. If the load resistance is reduced to the point that the current output reaches the ISET level, the power supply switches to CC mode.

Conversely the power supply will operate in CC mode when the load resistance is less than the critical resistance. In CC mode the current output is equal to ISET and the voltage output is less than VSET.

Diagram



Alarms

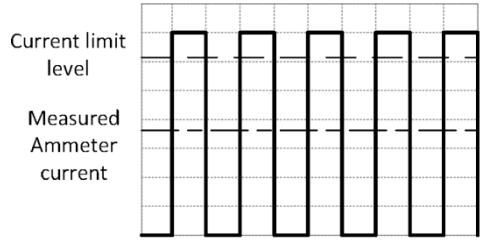
The GPE-1000 has many protective features. If one of these items is triggered, the alarm information is displayed on the screen and the corresponding alarm icon (OCP, OVP, etc.) appears in the status bar. At the same time, the output is automatically turned off according to the alarm type and control Settings (see page 27). How to clear alarms or how to set protected mode, see page 29.

OVP	Over voltage protection (OVP) prevents a high voltage from damaging the load. This alarm can be set by the user.
OCP	Over current protection prevents high current from damaging the load. This alarm can be set by the user.
OTP	Over temperature protection is a hardware protection function.

Considerations

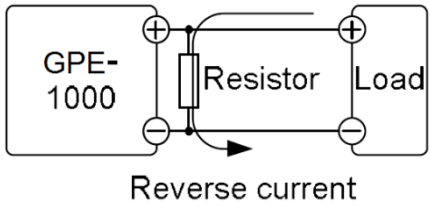
The following situations should be taken into consideration when using the power supply.

Inrush current	When the power supply switch is first turned on, an inrush current is generated. Ensure there is enough power available for the power supply when first turned on, especially if a number of units are turned on at the same time.
Pulsed or Peaked loads	When the load has current peaks or is pulsed, it is possible for the maximum current to exceed the mean current value. The GPE-1000 power supply ammeter only indicates mean current values, which means for pulsed current loads, the actual current can exceed the indicated value. For pulsed loads, the current limit must be increased, or a power supply with a greater capacity must be chosen. As shown below, a pulsed load may exceed the current limit and the indicated current on the power supply ammeter.



Reverse Current: Regenerative load

When the power supply is connected to a regenerative load such as a transformer or inverter, reverse current will feed back to the power supply. The GPE-1000 power supply cannot absorb reverse current. For loads that create reverse current, connect a resistor in parallel to the power supply to bypass the reverse current. This description only applies when the bleed resistance is off.

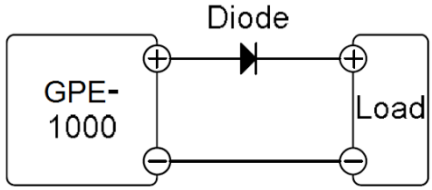


Note

The current output will decrease by the amount of current absorbed by the resistor. Ensure the resistor used can withstand the power capacity of the power supply/load.

Reverse Current: Accumulative energy.

When the power supply is connected to a load such as a battery, reverse current may flow back to the power supply if the bleed resistance is on. To prevent damage to the power supply under this condition, use a reverse-current-protection diode in series between the power supply and load. If the bleed resistor is turned off or set to auto, there is no need to add a diode.



Caution

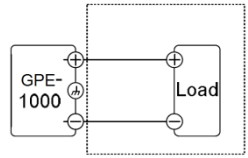
Ensure the reverse withstand voltage of the diode is able to withstand 2 times the rated output voltage of the power supply and the forward current capacity can withstand 3 times to 10 times the rated output current of the power supply. Ensure the diode is able to withstand the heat generated in the following scenarios. When the diode is used to limit reverse voltage, remote sensing cannot be used.

Grounding

The output terminals of the GPE-1000 power supplies are isolated with respect to the protective grounding terminal. The insulation capacity of the load, the load cables and other connected devices must be taken into consideration when connected to the protective ground or when floating.

Floating

As the output terminals are floating, the load and all load cables must have an insulation capacity that is greater than the isolation voltage of the power supply.



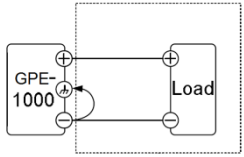
(·····) Insulation capacity ≥ isolation voltage of power supply

Warning

If the insulation capacity of the load and load cables are not greater than the isolation voltage of the power supply, electric shock may occur.

Grounded output terminal

If the positive or negative terminal is connected to the protective ground terminal, the insulation capacity needed for the load and load cables is greatly reduced. The insulation capacity only needs to be greater than the maximum output voltage of the power supply with respect to ground.

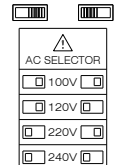
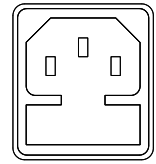


(·····) Insulation capacity ≥ voltage of power supply with respect to ground

SETUP

This chapter describes how to properly power up and configure the GPE series before operation.

Power Up

Select AC voltage	Before powering up the power supply, select the AC input voltage from the rear panel.	
Connect AC power cord	Connect the AC power cord to the rear panel socket.	
Power On	Press the power switch to turn on the power. The machine starts to initialize, and after TFT, it will display the voltage, current, set value, and status.	
Power Off	Press the power switch again to turn off the power.	

Wire Gauge Considerations

Background

Before connecting the output terminals to a load, the wire gauge of the cables should be considered.
It is essential that the current capacity of the load cables is adequate. The rating of the cables must equal or exceed the maximum current rated output of the instrument.

Recommended wire gauge

Wire Gauge	Nominal Cross Section	Maximum Current
28	0.1	3
26	0.15	4
24	0.25	5
22	0.35	7
20	0.55	9
18	1	12

The maximum temperature rise can only be 60 degrees above the ambient temperature. The ambient temperature must be less than 30 degrees.

Output Terminals

Background

Before connecting the output terminals to the load, first consider whether voltage sense will be used, the gauge of the cable wiring and the withstand voltage of the cables and load.

Warning

Dangerous voltages. Ensure that the power to the instrument is disabled before handling the power supply output terminals. Failing to do so may lead to electric shock.

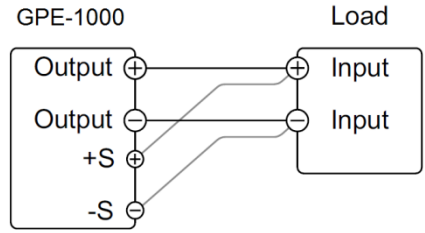
Steps

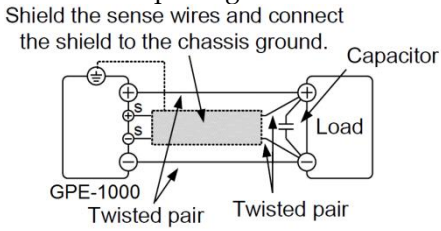
1. Turn the power switch off.

2.Connect the test lead includes in the accessory parts to front panel output terminal.
3.Fix the load cables firmly to eliminate loose connections from the front output terminals and load cables.

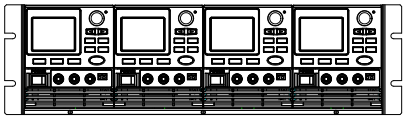
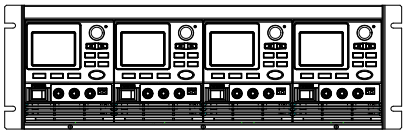
Remote Sense

Background	Remote sense is used to compensate for the voltage drop seen across load cables due to the resistance inherent in the load cables. The remote sense terminals are connected to the load terminals to determine the voltage drop across the load cables. Remote sense can compensate up to 1 volt for GPE-1000. Load cables should be chosen with a voltage drop less than the compensation voltage.
⚠ Warning	Ensure the output is off before handling the remote sense connector. Use sense cables with a voltage rating exceeding the isolation voltage of the power supply. Never connect sensing cables when the output is on. Electric shock or damage to the power supply could result.
Output terminal Connector Overview	When using the remote sensing, make sure the wires that are used follow the following guidelines: Wire gauge: AWG 20 to AWG 14 Strip length: 6.5 mm // 0.26 inch  +S: + Sense terminal -S: - Sense terminal
⚠ Note	Be sure to remove the Sense joining cables so the units are not using local sensing.
Single Load	1. Connect the +S terminal to the positive potential of the load. Connect the -S terminal to the negative potential of the load.



	2. Operate the instrument as normal. See the Basic Operation chapter for details.
Wire Shielding and Load line impedance	To help to minimize the oscillation due to the inductance and capacitance of the load cables, use an electrolytic capacitor in parallel with the load terminals. To minimize the effect of load line impedance use twisted wire pairing. 

Using the Rack Mount Kit

Background	The GPE-1000 series has an optional Rack Mount Kit (GW Instek part number: GRA-441-J [JIS], GRA-441-E [EIA]) that can be used to hold up to 4 GPE-1000 units into rack.
GRA-441-E [EIA] Rack mount diagram	
GRA-441-J [JIS] Rack mount diagram	

Operation

Setting the Output Voltage Level

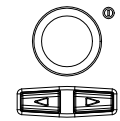
Background

The voltage setting sets the voltage level of the power supply.

Steps

1. Press the Voltage key. The V Set parameter will be editable.

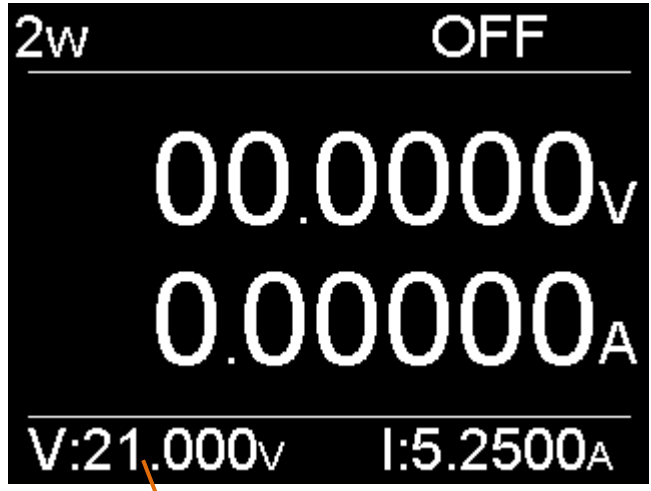
2. Set the voltage with the scroll wheel/arrow keys.



   Range 0 volts to 105 % full range
3. Click knob key to confirm the voltage setting.

Note

The voltage level can be set when the output is on.



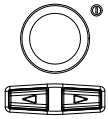
Setting the Output Current Level

Background The current setting sets the current level of the power supply.

Steps

1. Press the Current key. The A Set parameter will be editable.

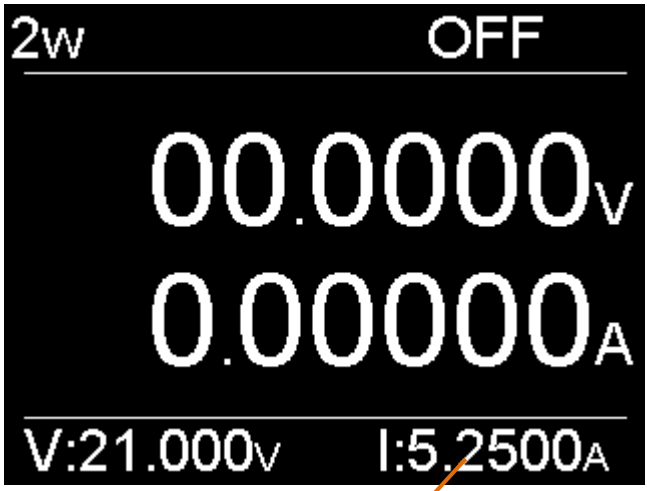
2. Set the current with the scroll wheel/arrow keys.



Range 0 amps to 105 % full range

3. Click knob key to confirm the current setting.

Note The current level can be set when the output is on.



Current setting

Setting the OVP Level

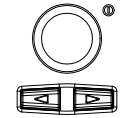
Background

The over voltage protection (OVP) protects the unit from overvoltage. When the voltage level crosses the OVP threshold, the output is automatically turned off.

Steps

1. Press the OVP key. The V Protect parameter will be editable.

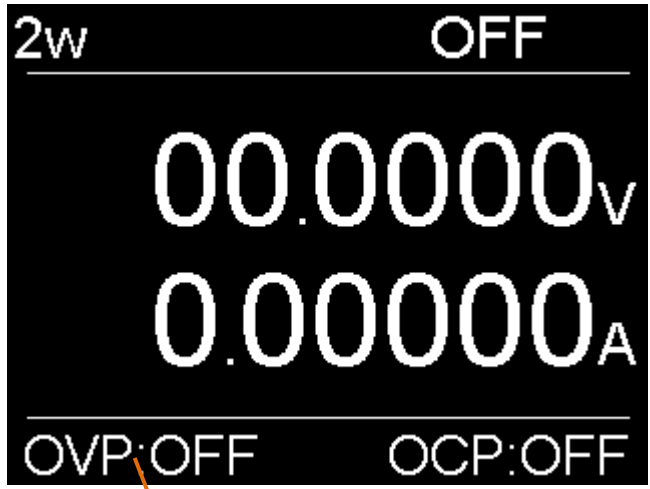
2. Set the OVP threshold level with the scroll wheel/arrow keys.



   Range 0 volts to 110 % full range
3. Click knob key to confirm the OVP setting.

Note

If the OVP threshold is set outside the OVP range, the screen is raised. The scope error message is displayed and the output is closed.
The OVP threshold level can be set when the output is on.



Setting the OCP Level

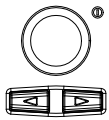
Background

The over current protection (OCP) protects the unit from overcurrent. When the current level crosses the OCP threshold level, the output is automatically turned off.

Steps

1. Press the OCP key. The A Protect parameter will be editable.

2. Set the OCP threshold level with the scroll wheel/arrow keys.



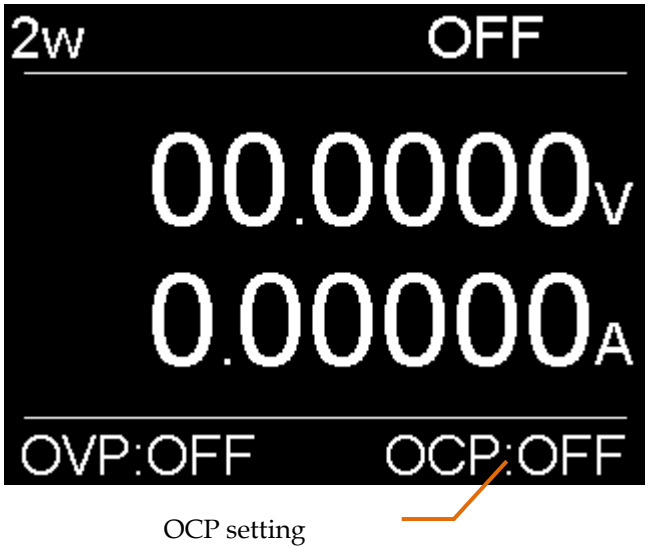
Range 0 amps to 110 % full range

3. Click knob key to confirm the OCP setting.

Note

If the OVP threshold is set outside the OVP range, the screen is raised. The scope error message is displayed and the output is closed.

The OCP threshold level can be set when the output is on.



OCP setting

Alarm Clear

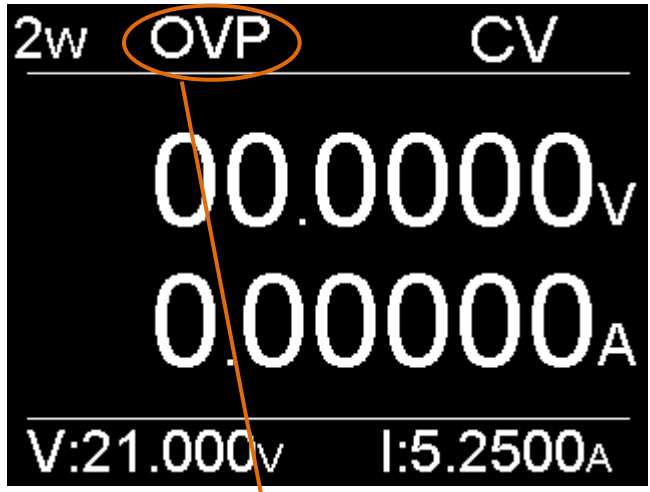
Background

The CLR_PROT (Clear Protection) function will clear any protection alarms.

Applicable Alarms: OVP, OCP, OTP

Steps

1. Press and hold the knob key to clear any alarms.



Alarm message

Sense Control

2 Wire

Press the 2-4W/Lock key. The 2W will be displayed in the status bar to indicate that the 2 wire is Activate.

4 Wire

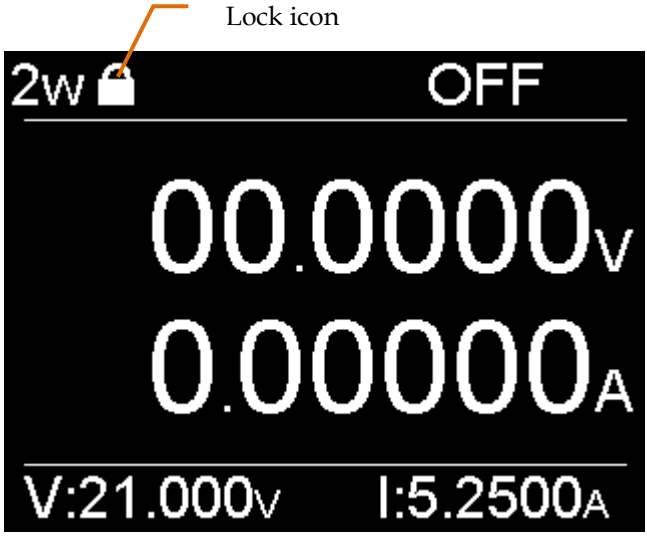
Press the 2-4W/Lock key. The 4W will be displayed in the status bar to indicate that the 4 wire is Activate.

Panel Lock

The panel lock feature prevents settings from being changed accidentally. When activated, all keys and knobs except the

Lock/Unlock key and the Output key will be disabled.

Activate the panel lock	Press and hold the Lock key to active the panel lock.	
	The padlock icon at the top of the display will become "locked" when the panel keys are locked.	
Disable the panel lock	Press and hold the Lock key to turn off the panel lock. the padlock icon will disappear.	



Turning the Output On

Turn Output On	Press the *Output* key. The Output key will turn green and CC or CV will be displayed in the status bar to indicate that the output is on.	  
Turn Output Off	Press the *Output* key. The Output key light will go out and OFF will be displayed in the status bar to indicate that the output is off.	 

Master-Slave Series Overview

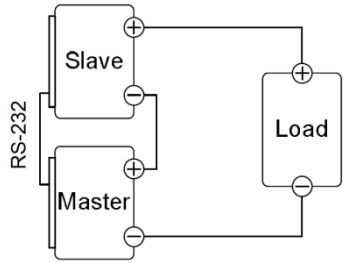
Background

When connecting GPE-1000 power supplies in series, up to 2 units can be used in series and all units must be of the same model. When operated in series, the power supplies can be used to increase the voltage output or setup the power supplies to output both positive and negative polarities. Series operation only requires configuration of the slave, the master unit remains in local mode.

In order for the master unit to control the slave units, the master unit must use the Analog Programming connector on the rear panel to control the slave unit.

When using a I/O interface, the interface must be properly connected to the main and secondary power sources using RS-232 lines in series.

Series power supplies require some pre-setting and limitations

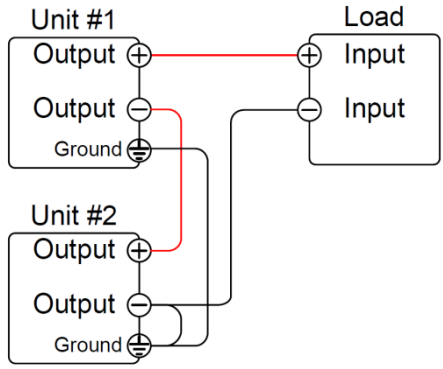


Limitations	Display Only the master unit displays the voltage. The total voltage is the sum of the units. Only the master unit displays the current. OVP/OCP The master unit can shut down the slave unit when OVP/OCP is tripped on the master unit (if the slave connector is wired for shut down on alarm). The OVP and OCP levels of the master determine the entire OVP and OCP

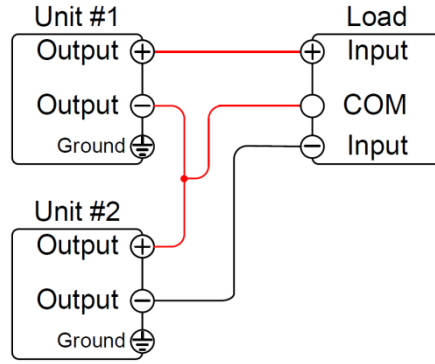
Output Voltage/ Output Current	Model	Number of series unit :	
		1 unit	2 units
	GPE-1323	32 V / 3 A	64 V / 3 A
	GPE-1205	20 V / 5 A	40 V / 5 A

Series Output Connection	If grounding the positive or negative terminals to the reference ground, be sure to ground the appropriate terminal on each unit (either positive or negative).

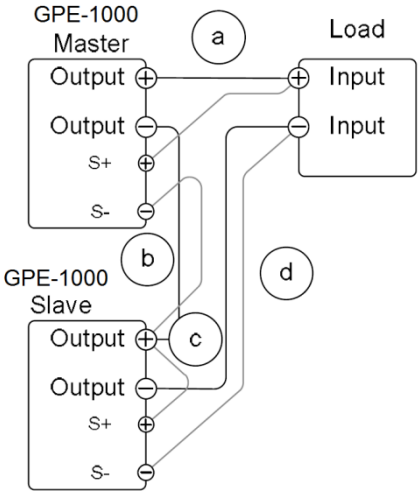
Series Connection to increase Voltage Output



Series Connection to Output Positive and Negative Polarity



Caution When connecting the units in series, diodes should be connected across each output to prevent reverse voltage.

Series Sense Connection	For remote sense connections, connect the sense terminals as shown below: a. Connect the Master S+ terminal to the positive potential of the load. b. Connect the Master S- terminal to the positive output terminal of the slave unit. c. Connect the slave S+ terminal to the positive terminal of the slave unit. d. Connect the slave S- terminal to negative terminal of the load. 
Steps	1. Ensure the power is off on both power supplies. 2. Connect the master and slave unit in series as shown above to either increase the voltage output or to create a positive and negative output. Remember that how the units are grounded depends on the configuration of the series connection.
Note	Ensure load cables have sufficient current capacity.

Series Operation

Series Configuration	Before using the power supplies in series, the master and slave units need to be configured.
	1. Configure the OVP and OCP settings for the master unit. 2. Master and slave power supply tracking Set series power supply master (S/M), slave (S/S)

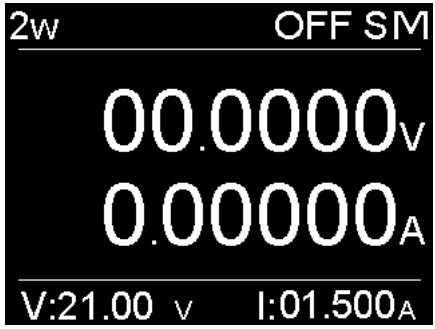
Unit	Tracking Setting
Master Unit with 1 slave:	S/Master
Slave Unit:	S/Slave

	3. If using voltage remote sensing, set the 2-4W/Lock key to enable the 4-wire function 4. Cycle the power on the units (reset the power).
⚠ Note	Return the master machine to local (independent) mode and the slave machine to local (independent) operation When entering parallel mode, the status of the slave machine will change to match that of the master machine, and the slave machine will be locked Only the master computer displays V Settings, A Settings, OVP, and OCP Settings Each power supply OTP works independently
Master-Slave Operation	Only operate the power supplies in series if the units are configured correctly.

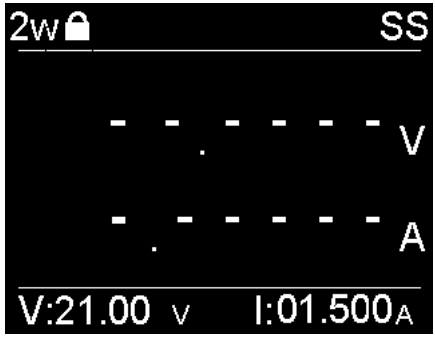
Steps

1. Turn on the master and slave units. In series, only the main power supply displays voltage and total current

Master unit



Slave unit



2. Operation of both units is controlled by the master unit. Operation of the master unit is the same as for a single unit. Please see the basic operation chapter for details.
3. Press the Output key to begin. The output key will turn green.

⚠ Caution	Only operate the power supplies in series if using units of the same model number. Only a maximum of 2 units can be used in series.
⚠ Caution	Ensure that the insulation capacity of the wiring is sufficient when connected in series. See page 21 for insulation capacity and grounding details.

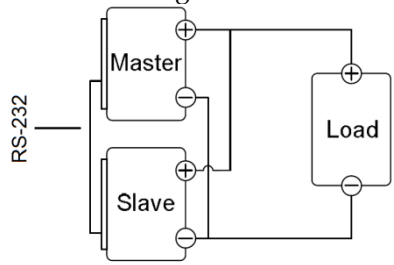
Master-Slave Parallel Overview

Background

When connecting the GPE-1000 power supplies in parallel, up to 2 units can be used in parallel and all units must be of the same model with similar output settings.

Power supplies in parallel must use the "master-slave" setting. The "master" power supply controls other connected "slave" power supplies and must use the digital programming interface on the rear panel.

When using a I/O interface, the interface must be properly connected to the primary and secondary power sources using RS-232.



Limitations

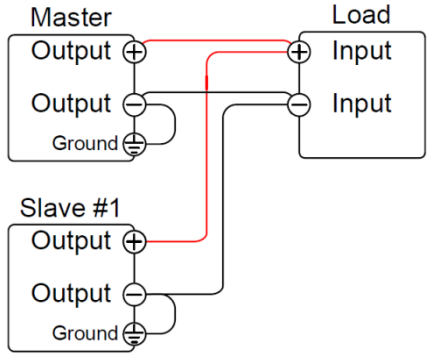
Display

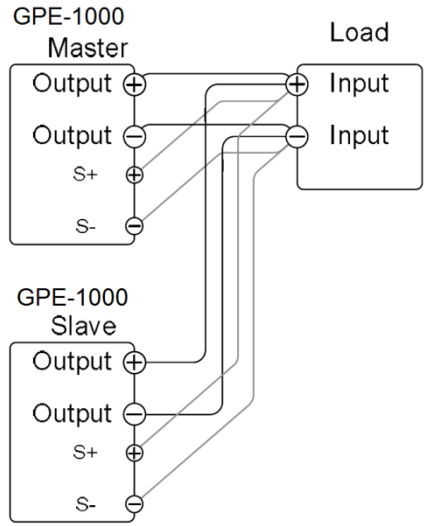
Only the master unit will display the voltage and current.

OVP/ OCP

Slave unit follow the settings of the master when OVP/OCP is tripped on the master unit.

Output Voltage/ Output Current	Model	Number of parallel units:	
		1 unit	2 units
	GPE-1323	32 V / 3 A	32 V / 6 A
	GPE-1205	20 V / 5 A	20 V / 10 A

Digital Programming Connector Connection	To operate the power supplies in parallel with the analog programming connectors, connect the analog programming connectors on the master and slave units as shown in the diagram below:
Parallel Output Connection	If grounding the positive or negative terminals to the reference ground, be sure to ground the appropriate terminal on each unit (either positive or negative)
Example with negative terminal connected to ground	

Parallel Sense Connections	For remote sense connections, connect the S+ terminals to the positive potential of the load. Connect the S- terminals to the negative potential of the load. 
Steps	1. Ensure the power is off on all power supplies. 2. Choose the master and the slave unit(s). 3. RS-232 port Connects the main control and slave power supplies. 4. Connect the master and slave unit in parallel as shown above. 5. If using remote sense, connect the master and slave sense cables as shown above.
Note	Ensure the load cables have sufficient current capacity. The load wires and remote sense wires should use twisted-paired wiring of the shortest possible length.

Parallel Operation

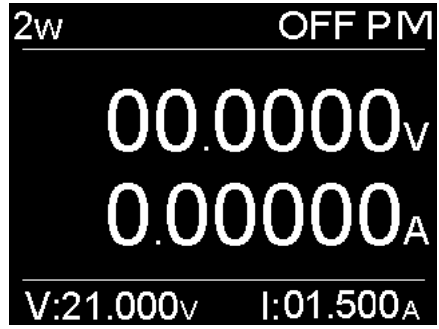
Master-Slave Configuration	Before using the power supplies in parallel, the master and slave units need to be configured.

<table>
<tr><td>Steps</td><td>1. Configure the OVP and OCP settings for the master unit.
2. Master and slave power supply tracking Set parallel power supply master (P/M), slave (P/S)
<table><tr><th>Unit</th><th>Tracking Setting</th></tr><tr><td>Master Unit with 1 slave:</td><td>P/Master</td></tr><tr><td>Any Slave Units:</td><td>P/Slave</td></tr></table>3. If using voltage remote sensing, set the 2-4W/Lock key to enable the 4-wire function.
4. Cycle the power on the units (reset the power).</td></tr>
<tr><td>⚠Note</td><td>Return the master machine to local (independent) mode and the slave machine to local (independent) operation.
When entering parallel mode, the status of the slave machine will change to match that of the master machine, and the slave machine will be locked
Only the master computer displays V Settings, A Settings, OVP, and OCP Settings.
Each power supply OTP works independently.</td></tr>
<tr><td>Master-Slave Operation</td><td>Only operate the power supplies in parallel if the units are configured correctly.</td></tr>
</table>

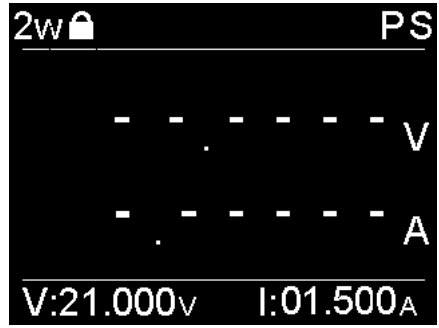
Steps

1. Power on from the main and secondary power sources. The slave power supply screen is not displayed.

Master unit



Slave unit



2. The main control computer controls two power supplies. The operation of the main control machine is the same as that of a single power supply. See Basic Operations section
3. Press the Output key to start. Output key turns green

Caution

Only operate the power supplies in parallel if using units of the same model number.

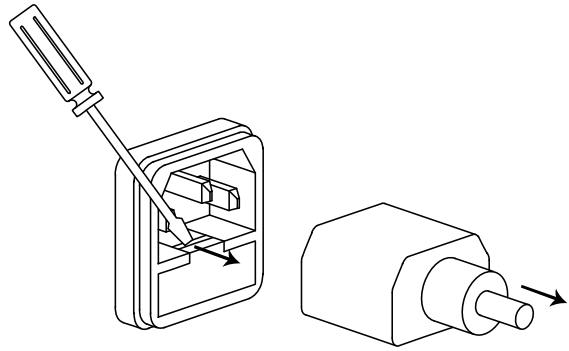
⚠ Note	The panel controls are disabled on slave unit, including the output key.
⚠ Caution	Ensure that the insulation capacity of the wiring is sufficient when connected in parallel. See page 21 for insulation capacity and grounding details.

APPENDIX

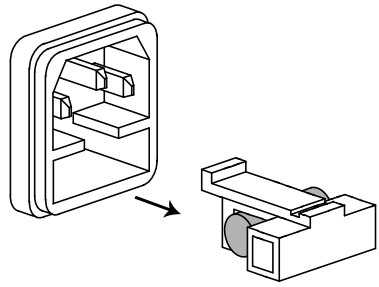
Fuse Replacement

Steps

1. Take off the power cord and remove the fuse socket using a minus driver.



2. Replace the fuse in the holder.



Rating

- 100 V / 120 V:T3.15 A / 250 V
- 220 V / 240 V:T1.6 A / 250 V

Specifications

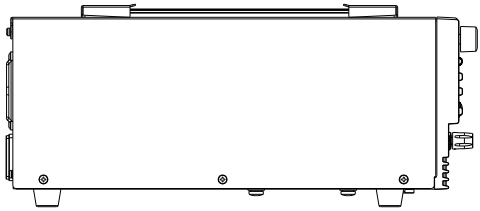
The specifications apply when the GPE are powered on for at least 30 minutes under +20 °C – +30 °C.

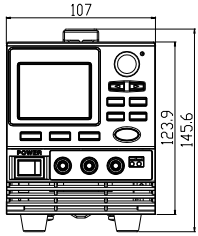
CH1/ CH2 Output Ratings	Independent	0 to 32 V, 0 to 3 A (GPE-1323) 0 to 20 V, 0 to 5 A (GPE-1205)
	Series	0 to 64 V, 0 to 3 A (GPE-1323) 0 to 40 V, 0 to 5 A (GPE-1205)
	Parallel	0 to 32 V, 0 to 6 A (GPE-1323) 0 to 20 V, 0 to 10 A (GPE-1205)
Voltage Regulation	Line Regulation	≤ 0.01 % + 3 mV
	Load Regulation	≤ 0.01 % + 3 mV ≤ 0.01 % + 5 mV (≥ 3 A)
	Ripple & Noise	≤ 0.5 mVrms (5 Hz to 1 MHz)
	Setting range	0 V to 33.6 V (GPE-1323) 0 V to 21 V (GPE-1205)
	Setting/Read back Accuracy	± (0.03 % of reading + 10 mV)
	Setting/Read back Resolution	programming 5 digits, readback 6 digits
	Maximum remote sensing compensation voltage	0.5 V
	Recovery Time	≤ 100 µs (50 % load change, minimum load 0.5 A)
	Temperature Coefficient	≤ 300ppm/°C
Current Regulation	Line Regulation	≤ 0.2 % + 3 mA
	Load Regulation	≤ 0.2 % + 3 mA
	Ripple & Noise	≤ 2 mArms
	Setting range	0 A to 3.15 A (GPE-1323) 0 A to 5.25 A (GPE-1205)

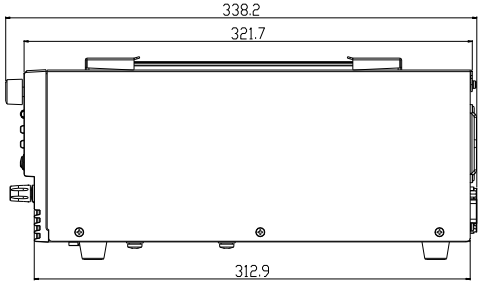
	Setting/Read back Accuracy	± (0.3 % of reading + 10 mA)
	Setting/Read back Resolution	programming 5 digits, readback 6 digits
	Temperature Coefficient	≤ 300 ppm/°C
OVP	Range	OFF, ON(1.8 V to 35.2 V) (GPE-1323) OFF, ON(1.0 V to 22.0 V) (GPE-1205)
	Resolution	100 mV
	Accuracy	≤ ± 100 mV
OCP	Range	OFF, ON (0.15 A to 3.3 A) (GPE-1323) OFF, ON (0.25 A to 5.5 A) (GPE-1205)
	Resolution	10 mA
	Accuracy	≤ ± 20 mA
Insulation	Chassis and Terminal	20 MΩ or above (DC 500 V)
	Chassis and AC cord	30 MΩ or above (DC 500 V)
Operation Environment	Indoor use, Altitude: ≤ 2000 m Ambient temperature: 0 °C to 40 °C Relative humidity: ≤ 80 % Installation category: II Pollution degree: 2	
Storage Environment	Ambient temperature: -10 °C to 70 °C Relative humidity: ≤ 70 %	
Power Source	AC 100 V/120 V/220 V/240 V ± 10 %, 50 or 60 Hz	
Power consumption	300 VA	
Accessories	Power Cord x1,Packing List x1 Test lead: Non-European: GTL-104A x1	
Dimensions	107 mm x 124 mm x 313 mm, (W x H x D) mm	

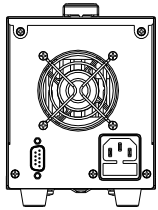
Weight	Approx. 5.2 kg

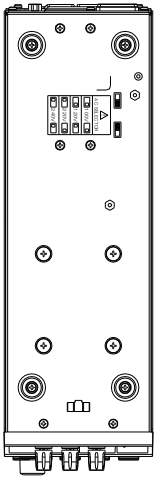
GPE-1000 Dimensions

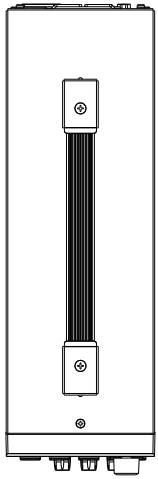












Declaration of Conformity

We
GOOD WILL INSTRUMENT CO., LTD.
declare that the CE marking mentioned product
satisfies all the technical relations application to the product within the scope of council:
Directive: EMC; LVD; WEEE; RoHS
The product is in conformity with the following standards or other normative documents:

◎ **EMC**

EN 61326-1:	Electrical equipment for measurement, control and laboratory use — EMC requirements
Conducted & Radiated Emission EN 55011 / EN 55032	Electrical Fast Transients EN 61000-4-4
Current Harmonics EN 61000-3-2 / EN 61000-3-12	Surge Immunity EN 61000-4-5
Voltage Fluctuations EN 61000-3-3 / EN 61000-3-11	Conducted Susceptibility EN 61000-4-6
Electrostatic Discharge EN 61000-4-2	Power Frequency Magnetic Field EN 61000-4-8
Radiated Immunity EN 61000-4-3	Voltage Dip/ Interruption EN 61000-4-11 / EN 61000-4-34

◎**Safety**

EN 61010-1:	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements

GOOD WILL INSTRUMENT CO., LTD.
No. 7-1, Jhongsing Road, Tucheng Dist., New Taipei City 236, Taiwan
Tel: +886-2-2268-0389 Fax: +866-2-2268-0639
Web: www.gwinstek.com Email: marketing@goodwill.com.tw

GOOD WILL INSTRUMENT (SUZHOU) CO., LTD.
No. 521, Zhujiang Road, Snd, Suzhou Jiangsu 215011, China
Tel: +86-512-6661-7177 Fax: +86-512-6661-7277
Web: www.instek.com.cn Email: marketing@instek.com.cn

GOOD WILL INSTRUMENT EURO B.V.
De Run 5427A, 5504DG Veldhoven, The Netherlands
Tel: +31(0)40-2557790 Fax: +31(0)40-2541194
Email: sales@gw-instek.eu