

Multi-Range DC Power Supply

PSW Series

QUICK START GUIDE

GW INSTEK PART NO. 825W-80401M01



ISO-9001 CERTIFIED MANUFACTURER

GW INSTEK

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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.



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



Caution: Identifies conditions or practices that could result in damage to the PSW 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 Guideline



CAUTION

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

(Measurement categories) EN 61010-1:2010 and EN 61010-2-030 specify the measurement categories and their requirements as follows. The PSW falls under category II.

- 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.

Power Supply



WARNING

- AC Input voltage range: 85VAC~265VAC
 - Frequency: 47Hz~63Hz
 - To avoid electrical shock connect the protective grounding conductor of the AC power cord to an earth ground.
-

-
- Cleaning the PSW
- 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.
-

Operation Environment

- Location: Indoor, no direct sunlight, dust free, almost non-conductive pollution (Note below)
- Relative Humidity: 20%~ 85%
- Altitude: < 2000m
- Temperature: 0°C to 50°C

(Pollution Degree) EN 61010-1:2010 and EN 61010-2-030 specify the pollution degrees and their requirements as follows. The PSW 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
 - Temperature: -25°C to 70°C
 - Relative Humidity: <90%, no condensation
-

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 power supply 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 0.75mm² 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 power supply in a nutshell, including its main features and front / rear panel introduction.



PSW Series Overview

Series lineup

The PSW series consists of 15 models, divided into 3 different model types covering 3 power capacities: Type I (360 Watt), Type II (720 Watt) and Type III (1080 Watt).

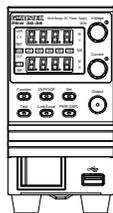
Model name	Type	Voltage Rating	Current Rating	Power
PSW 30-36	Type I	0~30V	0~36A	360W
PSW 80-13.5	Type I	0~80V	0~13.5A	360W
PSW 160-7.2	Type I	0~160V	0~7.2A	360W
PSW 250-4.5	Type I	0~250V	0~4.5A	360W
PSW 800-1.44	Type I	0~800V	0~1.44A	360W
PSW 30-72	Type II	0~30V	0~72A	720W
PSW 80-27	Type II	0~80V	0~27A	720W
PSW 160-14.4	Type II	0~160V	0~14.4A	720W
PSW 250-9	Type II	0~250V	0~9A	720W

PSW 800-2.88	Type II	0~800V	0~2.88A	720W
PSW 30-108	Type III	0~30V	0~108A	1080W
PSW 80-40.5	Type III	0~80V	0~40.5A	1080W
PSW 160-21.6	Type III	0~160V	0~21.6A	1080W
PSW 250-13.5	Type III	0~250V	0~13.5A	1080W
PSW 800-4.32	Type III	0~800V	0~4.32A	1080W

Apart from the differences in output, each unit differs in size. The 720 and 1080 watt models are larger than the 360 watt models to accommodate the increase in power.

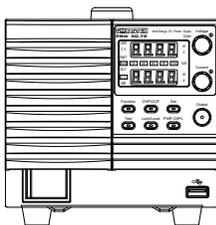
360 Watt models

Type I



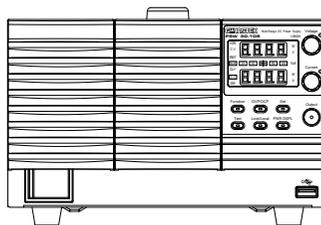
720 Watt models

Type II



1080 Watt models

Type III



Main Features

Performance

- High performance/power
- Power efficient switching type power supply
- Low impact on load devices
- Fast transient recovery time of 1ms
- Fast output response time

Features

- OVP, OCP and OTP protection
 - Adjustable voltage and current slew rates
 - User adjustable bleeder control to quickly dissipate the power after shutdown to safe levels.
 - Extensive remote monitoring and control options
 - Support for serial* and parallel connections.
*(30, 80, 160 volt models only)
 - Power on configuration settings.
 - Supports test scripts
 - Web server monitoring and control
-

Interface

- Ethernet port
- Analog connector for analog voltage and current monitoring
- USB host and device port

Accessories

PSW 30/80/160 Accessories

Standard Accessories	Part number	Description
	CD-ROM	User manual, programming manual
	82SW-80401M*1	Quick start guide
	4323-30600101	Power cord (Type I/II)
	4320-91001101	Power cord (Type III)
	PSW-009	Output terminal cover
	GTL-123	Test leads: 1x red, 1x black
	GTL-240	USB Cable
	PSW-004	Basic Accessory Kit: M4 terminal screws and washers x2, M8 terminal bolts, nuts and washers x2, Air filter x1, Analog control protection dummy x1, Analog control lock level x1
Optional Accessories	Part number	Description
	GET-001	Extended terminal
	PSW-001	Accessory Kit: Pin contact x10, Socket x1, Protection cover x1
	PSW-002	Simple IDC Tool 
	PSW-003	Contact Removal Tool 

PSW-005	Series operation cable for 2 units.
PSW-006	Parallel operation cable for 2 units.
PSW-007	Parallel operation cable for 3 units.
GRA-410-J	Rack mount adapter (JIS)
GRA-410-E	Rack mount adapter (EIA)
GUG-001	GPIB to USB adapter
GTL-240	USB Cable
PSW-010	Large filter (Type II/III)

Download	Name	Description
	psw_cdc.inf	USB driver

PSW 250/800 Accessories

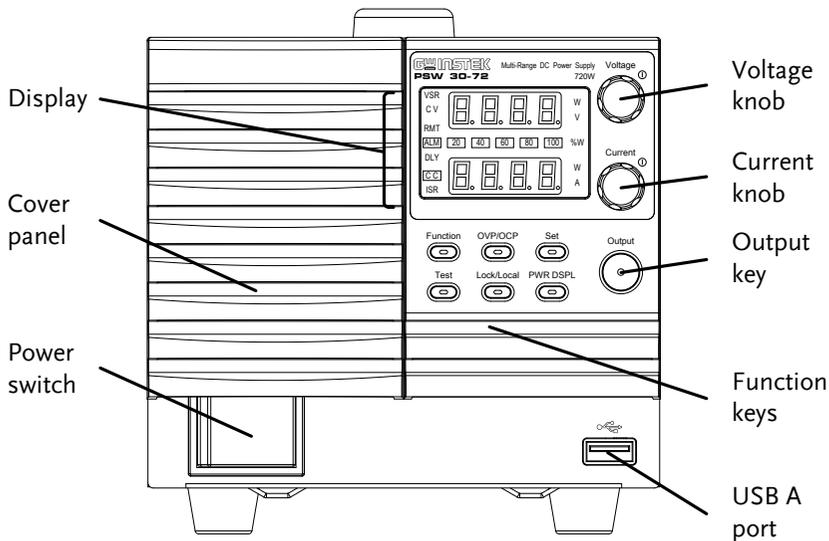
Standard Accessories	Part number	Description
	CD-ROM	User manual, programming manual
	4323-30600101	Power cord (Type I/II)
	4320-91001101	Power cord (Type III)
	PSW-011	High voltage output terminal cover
	GTL-240	USB Cable
	PSW-012	High voltage output terminal
	PSW-008	Basic Accessory Kit: (Air filter x1, Analog control protection dummy x1, Analog control lock level x1)

Optional Accessories	Part number	Description
	GET-002	Extended terminal
	PSW-001	Accessory Kit: Pin contact x10, Socket x1, Protection cover x1
	PSW-002	Simple IDC Tool 
	PSW-003	Contact Removal Tool 
	PSW-006	Parallel operation cable for 2 units.
	PSW-007	Parallel operation cable for 3 units.
	GRA-410-J	Rack mount adapter (JIS)
	GRA-410-E	Rack mount adapter (EIA)
	GTL-130	Test leads: 2x red, 2x black
	GUG-001	GPIB to USB adapter
	GTL-240	USB Cable
	PSW-010	Large filter (Type II/III)
Download	Name	Description
	psw_cdc.inf	USB driver

Appearance

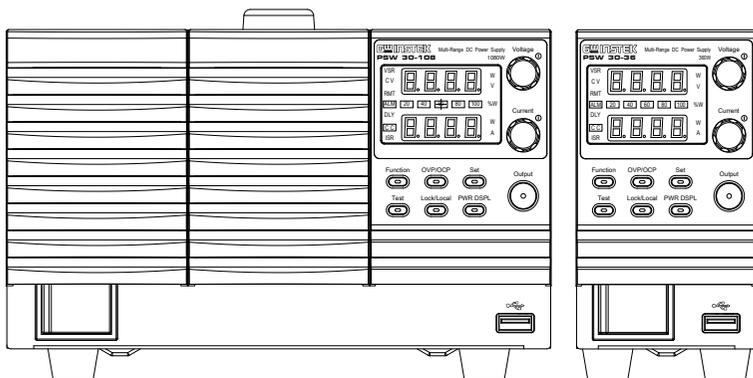
PSW Front Panel

720W: PSW 30-72, 80-27, 160-14.4, 250-9, 800-2.88



1080W: PSW 30-108, 80-40.5, 160-21.6,
250-13.5, 800-4.32

360W: PSW 30-36,
80-13.5, 160-7.2,
250-4.5, 800-1.44



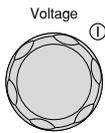
Function Keys	The Function keys along with the Output key will light up when a key is active.	
	Function 	The Function key is used to configure the power supply.
	OVP/OCP 	Set the over current or over voltage protection levels.
	Set 	Sets the current and voltage limits.
	Test 	Used to run customized scripts for testing.
	Lock/Local 	Locks or unlocks the panel keys to prevent accidentally changing panel settings.
	PWR DSPL 	Toggles the display from viewing V/A → V/W or A/W*. *Press the Voltage knob for V/W, press the Current knob for A/W.
Display Indicators	VSR C V RMT ALM DLY CC ISR	Voltage Slew Rate Constant Voltage Mode Remote Control Mode Alarm on Delay Output Constant Current Mode Current Slew Rate

20 **40** **60**
80 **100** % W

Power bar

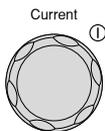
Indicates the current power output as a percentage.

Voltage Knob



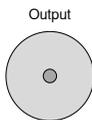
Sets the voltage.

Current Knob



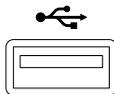
Sets the current.

Output



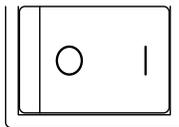
Press to turn on the output. The Output key will light up when the output is active.

USB



USB A port for data transfer, loading test scripts etc.

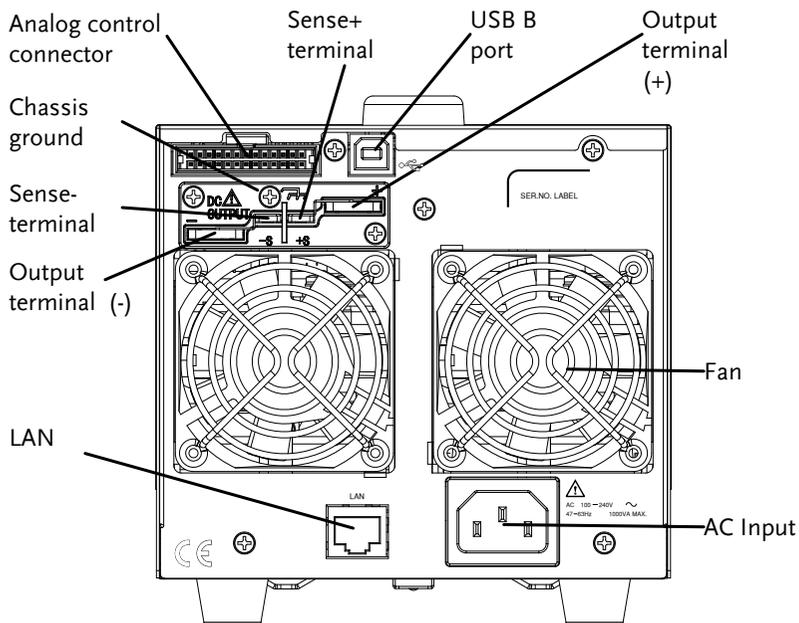
Power Switch



Used to turn the power on/off.

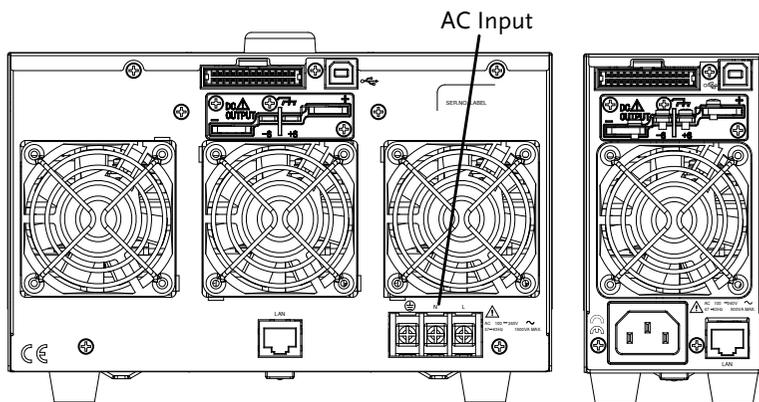
Rear Panel

720W: PSW 30-72, 80-27, 160-14.4

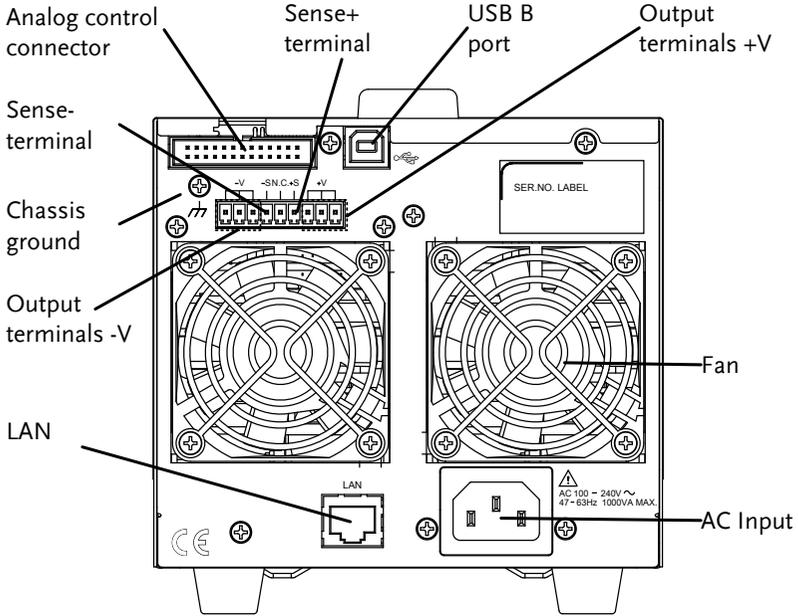


1080W: PSW 30-108, 80-40.5, 160-21.6

360W: PSW 30-36,
80-13.5, 160-7.2

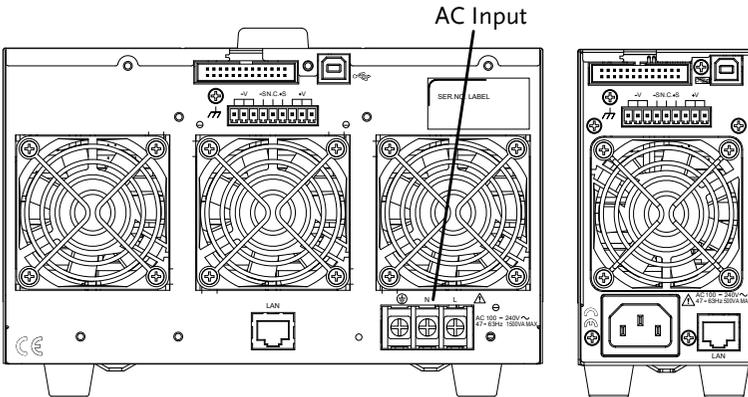


720W: PSW 250-9, 800-2.88



1080W: PSW 250-13.5, 800-4.32

360W: PSW 250-4.5,
800-1.44



Analog Control Connector

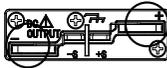


Standard 26 pin MIL connector (OMRON XG4 IDC plug).

The analog control connector is used to monitor current and voltage output, machine status (OVP, OCP, OTP etc.), and for analog control of the current and voltage output.

Use an OMRON XG5 IDC socket as the mating socket.

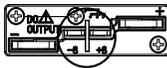
Output Terminals (30, 80, 160 volt models)



Positive (+) and negative (-) output terminals.



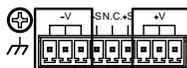
Chassis ground



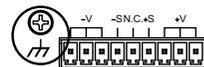
Sense (-S) and Sense (+S) terminals.

Output Terminals (250, 800 volt models)

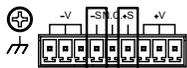
The 250 and 800 volt models use a 9 pin connector and a plug for the output and sense terminal connections. The plug is a MC420-38109Z plug by DECA SwitchLab Inc. This plug is also available separately (GW part number PSW-012).



Positive (V+) and negative (V-) output terminals (3 of each).

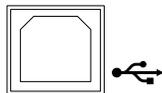


Chassis ground



Sense (-S) and Sense (+S) terminals.

USB B port

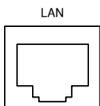


The USB B port is used for remote control.

Fans

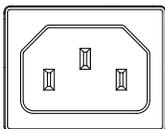
Temperature controlled fans

Ethernet Port



The ethernet port is used for remote control and digital monitoring from a PC.

Line Voltage Input
(Type I/TypeII)

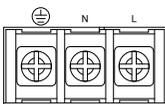


Type I: PSW 30-36/80-13.5/
160-7.2/250-4.5, 800-1.44

Type II: PSW 30-72/80-27/
160-14.4/250-9, 800-2.88

- Voltage Input: 100~240 VAC
- Line frequency: 50Hz/60 Hz (Automatically switchable)

Line Voltage Input
(Type III)



Type III:
PSW 30-108/80-40.5/160-21.6/
250-13.5/800-4.32

- Voltage Input: 100~240 VAC
- Line frequency: 50Hz/60 Hz (Automatically switchable)

OPERATION

Set Up

Line Voltage Connection – Type III Models

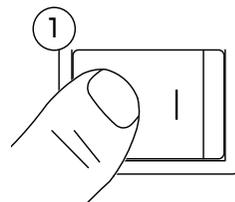
Background The Type III (PSW 30-108/80-40.5/160-21.6/250-13.5/800-4.32) models use a universal power input that can be used with 100 and 200 VAC systems. To connect or replace the power cord (GW Instek part number: 4320-91001101, use the procedure below:



The following procedure should only be attempted by competent persons.

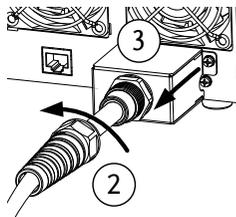
Ensure the AC power cord is not connected to power.

Removal 1. Turn off the power switch.



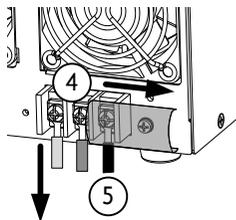
2. Unscrew the power cord protective sheath.

3. Remove the 2 screws holding the power cord cover and remove.



4. Slide the cover off the AC terminals.

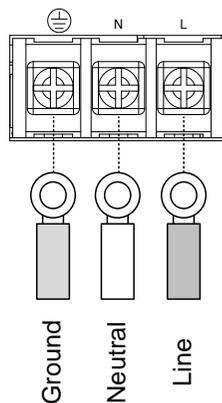
5. Remove the AC power cord wires.



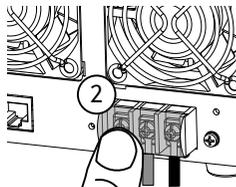
Installation

1. Connect the AC power cord wires to the AC input terminals.

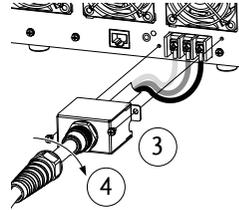
- White/Blue → Neutral (N)
- Green/Green-yellow → GND (⊕)
- Black/Brown → Line (L)



2. Set the cover back over the AC terminals.



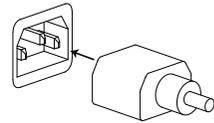
3. Re-install the power cord cover.
4. Screw the power cord sheath back onto the cover.



Power Up

Steps

1. Type I or II: Connect the power cord to the rear panel socket.

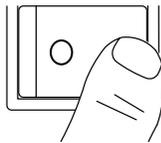


Type III: Connect the power cord to the universal power input.

Page 19

2. Press the POWER key. If used for the first time, the default settings will appear on the display, otherwise The PSW recovers the state right before the power was last turned OFF.

For default configuration settings, see the user manual.



CAUTION

The power supply takes around 8 seconds to fully turn on and shutdown.

Do not turn the power on and off quickly. Please wait for the display to fully turn off.

Basic Operation

Setting OVP/OCP Levels

Background

For most models the OVP level has a selectable range of approximately* 10% to 110% of the rated output voltage. Likewise the OCP level for most models has a selectable range of approximately* 10%~ 110% of the rated output current. The OVP and OCP level is set to the maximum by default. The OCP level can also be turned off.

*Note that the *actual* setting range differs for each model.

When one of the protection measures are on, ALM is shown on the panel display. By default, the power switch will turn off when any of the protection levels are tripped.



Before setting the OVP or OCP level:

- Ensure the load is not connected.
- Ensure the output is set to off.

Setting Ranges

PSW (360W)	30-36	80-13.5	160-7.2	250-4.5	800-1.44
OVP Range (V)	3-33	8-88	16-176	20-275	20-880
OCP Range (A)	3.6-39.6	1.35-14.85	0.72-7.92	0.45-4.95	0.144-1.584
PSW (720W)	30-72	80-27	160-14.4	250-9	800-2.88

OVP Range (V)	3-33	8-88	16-176	20-275	20-880
OCP Range (A)	5-79.2	2.7-29.7	1.44-15.84	0.9-9.9	0.288-3.168
PSW (1080W)	30-108	80-40.5	160-21.6	250-13.5	800-4.32
OVP Range (V)	3-33	8-88	16-176	20-275	20-880
OCP Range (A)	5-118.8	4.05-44.55	2.16-23.76	1.35-14.85	0.432-4.752

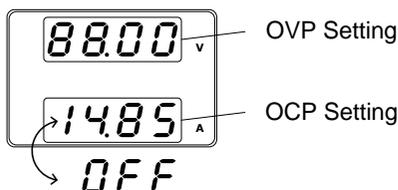
Steps

1. Press the OVP/OCP key. The OVP/OCP key lights up.

OVP/OCP

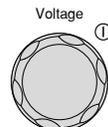


2. The OVP setting will be displayed on the top and the OCP setting (or OFF) will be displayed on the bottom.



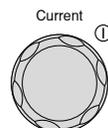
OVP Level

3. Use the Voltage knob to set the OVP level.



OCP Level

4. Use the Current knob to set the OCP level, or to turn OCP off.



5. Press OVP/OCP again to exit. The OVP/OCP indicator will turn off.

OVP/OCP



Clear OVP/OCP protection

The OVP or OCP protection can be cleared after it has been tripped by holding the OVP/OCP button for 2 seconds.

OVP/OCP



(hold)

(Using the default settings, only applicable when the power switch trip setting is disabled [F-95 = 1])

Set to C.V. Mode

When setting the power supply to constant voltage mode, a current limit must also be set to determine the crossover point. When the current exceeds the crossover point, the mode switches to C.C. mode. For details about C.C. operation, please see the user manual. C.C. and C.V. mode have two selectable slew rates: High Speed Priority and Slew Rate Priority. High Speed Priority will use the fastest slew rate for the instrument while Slew Rate Priority will use a user-configured slew rate.

Background

Before setting the power supply to C.V. mode, ensure:

- The output is off.
- The load is connected.

Steps

1. Press the Function key. The Function key will light up.

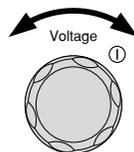
Function



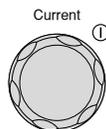
2. The display should show F-01 on the top and the configuration setting for F-01 on the bottom.



3. Rotate the Voltage knob to change the F setting to F-03 (V-I Mode Slew Rate Select).



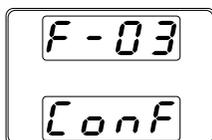
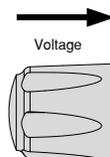
4. Use the Current knob to set the F-03 setting.



Set F-03 to 0 (CV High Speed Priority) or 2 (CV Slew Rate Priority).

F-03 0 = CV High Speed Priority
 2 = CV Slew Rate Priority

5. Press the Voltage knob to save the configuration setting. Conf will be displayed when successful.



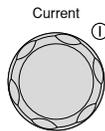
6. If CV Slew Rate Priority was chosen as the operating mode, repeat steps 3~5 to set F-04 (Rising Voltage Slew Rate) and the F-05 (Falling Voltage Slew Rate) and save.

F-04 / F-05 0.1V/s~60V/s (PSW 30-XX)
 0.1V/s~160V/s (PSW 80-XX)
 0.1V/s~320V/s (PSW 160-XX)
 0.1V/s~500.0V/s (PSW 250-XX)
 1V/s~1600V/s (PSW 800-XX)

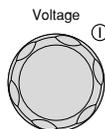
7. Press the Function key again to exit the configuration settings. The function key light will turn off.



8. Use the Current knob to set the current limit (crossover point).



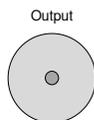
9. Use the Voltage knob to set the voltage.



Note

Notice the Set key becomes illuminated when setting the current or voltage. If the Voltage or Current knobs are unresponsive, press the Set key first.

10. Press the Output key. The Output key becomes illuminated.



CV and the Power Bar will become illuminated (top left & center)



Note

Only the voltage level can be altered when the output is on. The current level can only be changed by pressing the Set key.

For more information on the Normal Function Settings (F-00 ~ F-61, F-88~F-89), please see the user manual.

Set to C.C. Mode

When setting the power supply to constant current mode, a voltage limit must also be set to determine the crossover point. When the voltage exceeds the crossover point, the mode switches to C.V. mode. For details about C.C. operation, please see the user manual. C.C. and C.V. mode have two selectable slew rates: High Speed Priority and Slew Rate Priority. High Speed Priority will use the fastest slew rate for the instrument while Slew Rate Priority will use a user-configured slew rate.

Background Before setting the power supply to C.C. mode, ensure:

- The output is off.
- The load is connected.

Steps

1. Press the Function key. The Function key will light up.

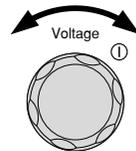
Function



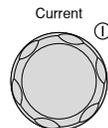
2. The display should show F-01 on the top and the configuration setting for F-01 on the bottom.



3. Rotate the Voltage knob to change the F setting to F-03 (V-I Mode Slew Rate Select).



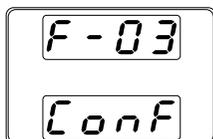
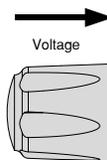
4. Use the Current knob to set the F-03 setting.



Set F-03 to 1 (CC High Speed Priority) or 3 (CC Slew Rate Priority) and save.

F-03 1 = CC High Speed Priority
 3 = CC Slew Rate Priority

5. Press the Voltage knob to save the configuration setting. ConF will be displayed when successful.



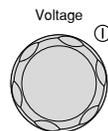
6. If CC Slew Rate Priority was chosen as the operating mode, set F-06 (Rising Current Slew Rate) and F-07 (Falling Current Slew Rate) and save.

F-06 / F-07 0.01A/s~72.00A/s (PSW 30-36)
 0.1A/s~144.0A/s (PSW 30-72)
 0.1A/s~216.0A/s (PSW 30-108)
 0.01A/s~27.00A/s (PSW 80-13.5)
 0.01A/s~54.00A/s (PSW 80-27)
 0.01A/s~81.00A/s (PSW 80-40.5)
 0.01A/s~14.40A/s (PSW 160-7.2)
 0.01A/s~28.80A/s (PSW 160-14.4)
 0.01A/s~43.20A/s (PSW 160-21.6)
 0.001A/s~9.000A/s (PSW 250-4.5)
 0.01A/s~18.00A/s (PSW 250-9)
 0.01A/s~27.00A/s (PSW 250-13.5)
 0.001A/s~2.880A/s (PSW 800-1.44)
 0.001A/s~5.760A/s (PSW 800-2.88)
 0.001A/s~8.640A/s (PSW 800-4.32)

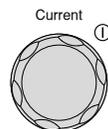
7. Press the Function key again to exit the configuration settings. The function key light will turn off.



8. Use the Voltage knob to set the voltage limit (crossover point).



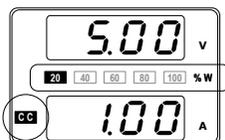
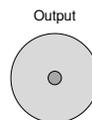
9. Use the Current knob to set the current.



Note

Notice the Set key becomes illuminated when setting the current or voltage. If the Voltage or Current knobs are unresponsive, press the Set key first.

10. Press the Output key. The Output key becomes illuminated.



CC and the Power Bar will become illuminated (bottom left & center)



Note

Only the current level can be altered when the output is on. The voltage level can only be changed by pressing the Set key.

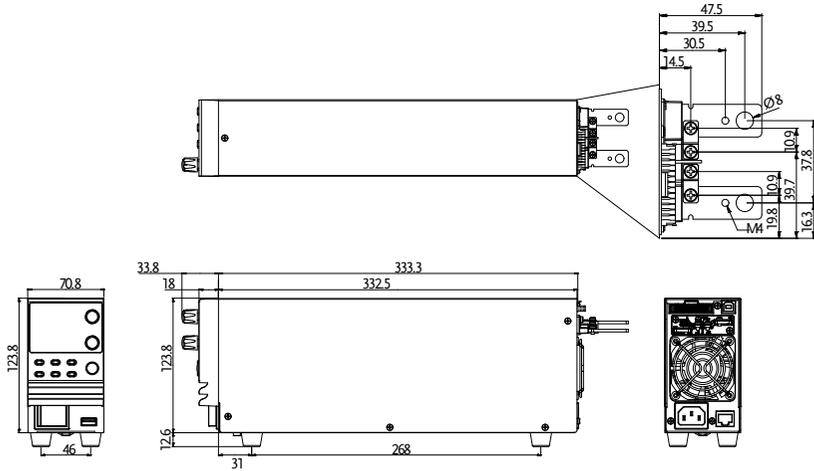
For more information on the Normal Function Settings (F-00 ~ F-61, F-88~F-89), please see the user manual.

APPENDIX

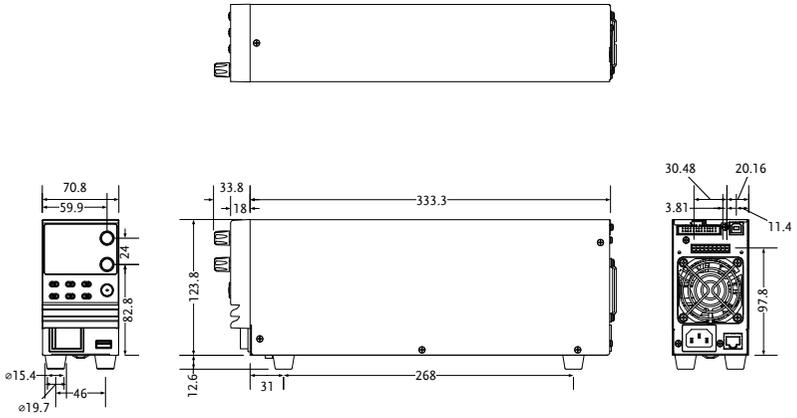
PSW Dimensions

Type I

PSW 160-7.2/PSW 80-13.5/PSW 30-36 (scale: mm)

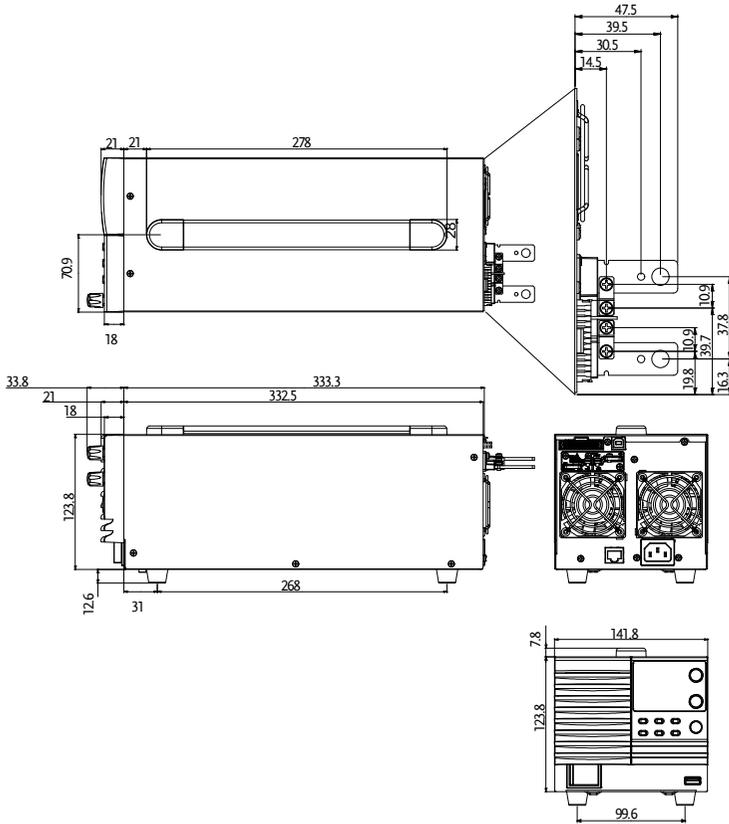


PSW 250-4.5/PSW 800-1.44 (scale: mm)



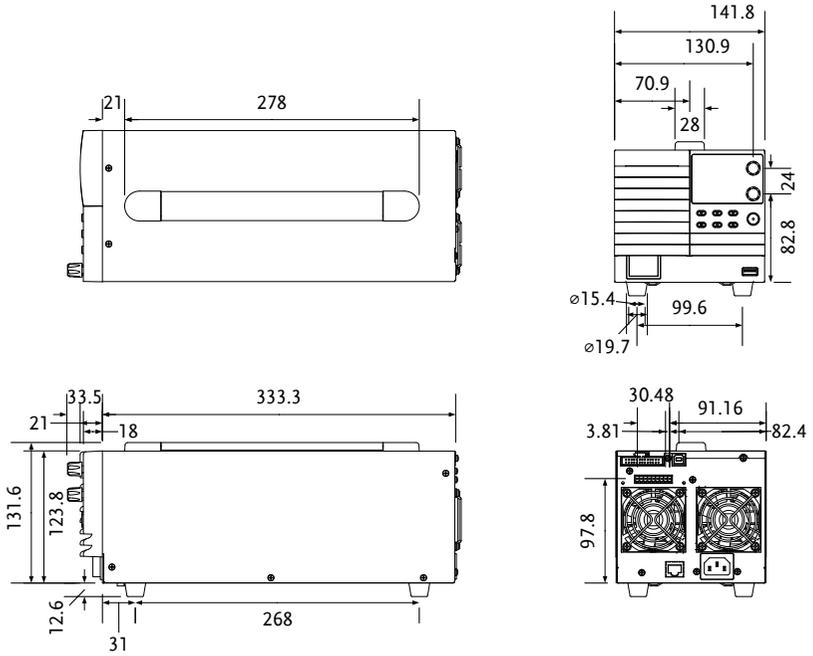
Type II

PSW 160-14.4/PSW 80-27/PSW 30-72 (scale: mm)



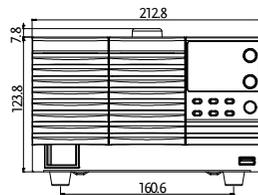
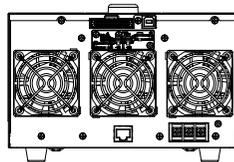
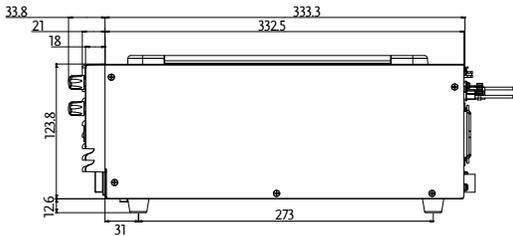
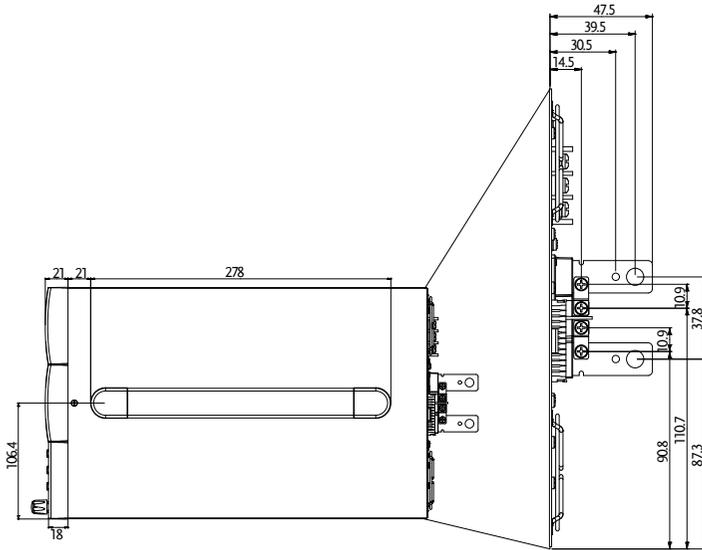
Type II

PSW 250-9/PSW 800-2.88 (scale: mm)



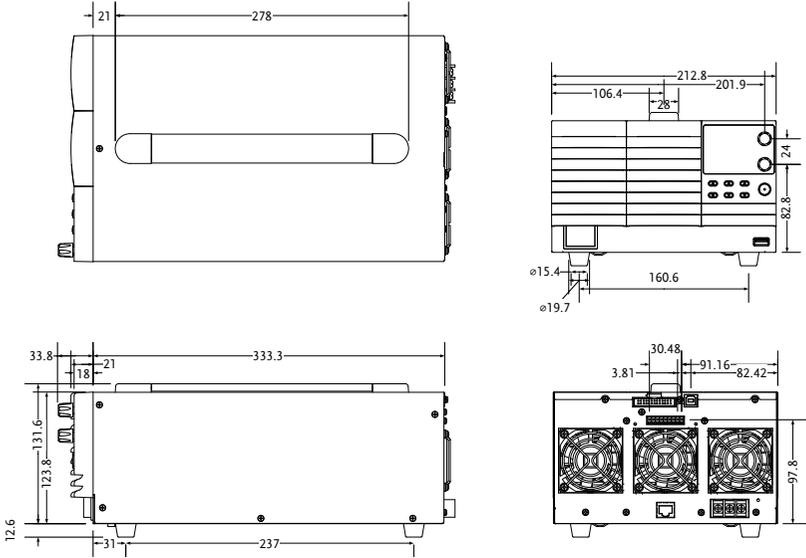
Type III

PSW 160-21.6/PSW 80-40.5/PSW 30-108 (scale: mm)



Type III

PSW 250-13.5/PSW 800-4.32 (scale: mm)



Declaration of Conformity

We

GOOD WILL INSTRUMENT CO., LTD.

No. 7-1, Jhongsing Rd, Tucheng Dist., New Taipei City 236, Taiwan

GOOD WILL INSTRUMENT (SUZHOU) CO., LTD.

No. 69 Lushan Road, Suzhou New District Jiangsu, China.

declare that the below mentioned product

Type of Product: Multi-Range DC Power Supply

Model Number: PSW 30-36, PSW 80-13.5, PSW 160-7.2, PSW 30-72, PSW 80-27, PSW 160-14.4, PSW 30-108, PSW 80-40.5, PSW 160-21.6, PSW 250-4.5, PSW 800-1.44, PSW 250-9, PSW 800-2.88, PSW 250-13.5, PSW 800-4.32

are herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Law of Member States relating to Electromagnetic Compatibility (2004/108/EC) and Low Voltage Directive (2006/95/EC).

For the evaluation regarding the Electromagnetic Compatibility and Low Voltage Directive, the following standards were applied:

◎ EMC	
EN 61326-1: EN 61326-2-1:	Electrical equipment for measurement, control and laboratory use -- EMC requirements (2013)
Conducted & Radiated Emission EN 55011: 2009+A1:2010	Electrostatic Discharge EN 61000-4-2: 2009
Current Harmonics EN 61000-3-2: 2006+A1: 2009+A2: 2009	Radiated Immunity EN 61000-4-3: 2006+A1:2008+A2:2010
Voltage Fluctuations EN 61000-3-3: 2008	Electrical Fast Transients EN 61000-4-4: 2012
-----	Surge Immunity EN 61000-4-5: 2006
-----	Conducted Susceptibility EN 61000-4-6: 2009
-----	Power Frequency Magnetic Field EN 61000-4-8: 2010
-----	Voltage Dip/ Interruption EN 61000-4-11: 2004

Low Voltage Equipment Directive 2006/95/EC	
Safety Requirements	EN 61010-1: 2010 EN 61010-2-030: 2010

