



致力于电子测试、维护领域!

# Programmable Power Supply

PSH series

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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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# Safety Instructions

This chapter contains important safety instructions that must be followed when operating PSH and when keeping it in storage. Read the following before any operation to insure safety and to keep the best condition for PSH.

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## Safety Symbols

These safety symbols may appear in this manual or on PSH.

---



**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 PSH or to other properties.

---



DANGER High Voltage



Attention Refer to Manual



Protective Conductor Terminal



Earth (ground) Terminal

---

## Safety Guidelines

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### General Guideline

- Do not place any heavy object on PSH.
- Avoid severe impacts or rough handling that leads to damaging PSH.



**CAUTION**

- Do not discharge static electricity to PSH.
  - Do not block or obstruct cooling fan vent opening.
  - Do not perform measurements at power source and building installation site (Note below).
  - Do not disassemble PSH unless you are qualified as service personnel.
- 

(Note) EN 61010-1 specifies the measurement categories and their requirements as follows. PSH 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.

**Power Supply**



**WARNING**

- Input voltage: 90 ~ 264 V AC, Frequency: 47~63 Hz
- Connect the protective grounding conductor of the power cord to earth ground, to avoid electrical shock.

**Fuse**



**WARNING**

PSH-2018A	6.3A/250V x2
PSH-3610A	
PSH-3620A	6.3A/250V x2 0.5A/250V x1 15A/250V x1
PSH-3630A	6.3A/250V x3 0.5A/250V x1 20A/250V x1

- Make sure the correct type of fuse is installed before powering up.
- Replace the fuse with the specified type and rating only, for continued fire protection.
- Disconnect the power cord before fuse replacement.
- Make sure the cause of the fuse blowout is fixed before fuse replacement.

**Cleaning PSH**

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

**Operation  
Environment**

Location: Indoor, no direct sunlight, dust free,  
almost non-conductive pollution (Note below)

**WARNING**

Relative Humidity: < 85%

Altitude: < 2000m

Temperature: 0°C to 40°C

Input Breaker Capacity: Over 20A (PSH-3630A)

This is a Class A product which may cause  
radio interference in a domestic environment.  
In such case, take adequate measures.

(Note) EN 61010-1 specifies the pollution degrees and their requirements as follows. PSH 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



## Power cord for the United Kingdom

When using PSH 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 colours 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 the letter E or by the earth symbol  or coloured Green or 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, 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 moulded mains connector that requires removal /replacement must be destroyed by removal of any fuse & fuse carrier and disposed of immediately, as a plug with bared wires is hazardous if engaged in live socket. Any re-wiring must be carried out in accordance with the information detailed on this label.

# PSH Overview

PSH Series are modular-type programmable switching power supplies designed for broad range of applications. The series consists of 12 models, output ranging from 360W to 1000W. Switching technology and built-in PFC control give PSH higher power efficiency, power density, and power factor compared with other linear power supplies. Protection mechanisms keep the output voltage, current, and temperature within limit. Remote control interface equipped with SCPI command set and Lab-View Driver facilitates ATE software development.

This chapter describes PSH series features and appearances in a nutshell.

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**descriptions**

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## Main Features

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- Performance**
- 4 models: 20V/18A, 36V/10A, 36V/20A and 36V/30A
  - High power factor with PFC control
  - High efficiency power conversion
  - Compact size, light weight
- 

- Operation**
- Constant voltage operation
  - Constant current operation
  - Output On/Off control
  - Built-in buzzer
  - Self test and calibration
  - LCD display
- 

- Protection**
- Over voltage protection (OVP)
  - Over current protection (OCP)
  - Over temperature protection (OTP)
- 

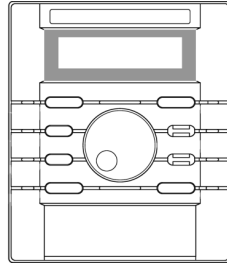
- Interface**
- RS-232 (standard) / GPIB (optional) interface
  - IEEE 488.2/SCPI compatible command set
  - LabView driver
- 

- Optional items**
- GPIB remote control interface
  - 19 inch standard rack mounting

## PSH Series Lineup

PSH series consist of the following 12 models with various output voltage and current ratings. For the detailed specifications, see page 72.

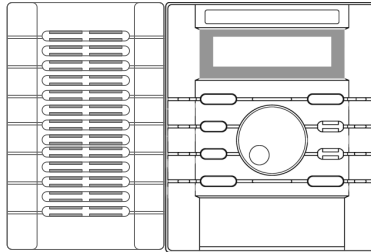
**360W  
(Mainframe  
only)**



**PSH-2018A**  
20V, 18A

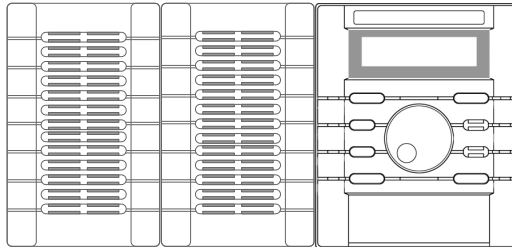
**PSH-3610A**  
36V, 10A

**720W  
(Mainframe +  
one slave  
module)**



**PSH-3620A**  
36V, 20A

**1080W  
(Mainframe +  
two slave  
modules)**

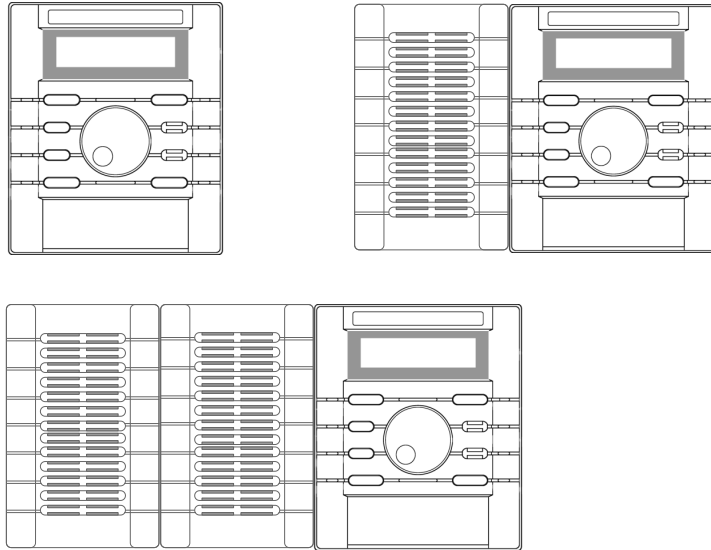


**PSH-3630A**  
36V, 30A

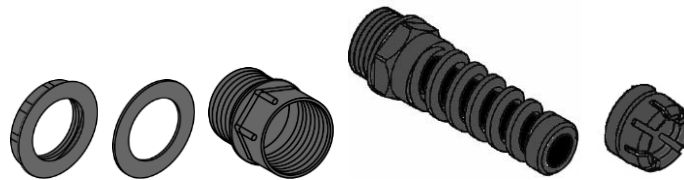
# Package Contents

Check the contents before using PSH series. Contact your local dealer in case there is a missing item.

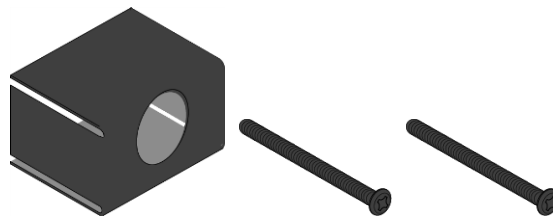
**Main unit**



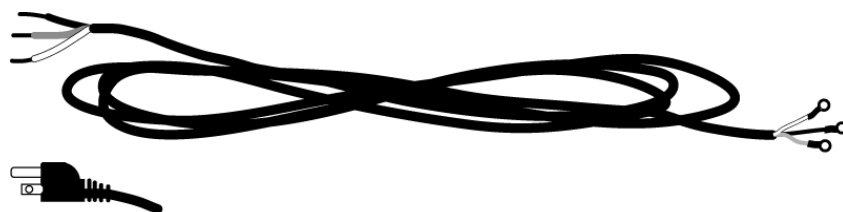
**AC input cable kit**



- Terminal cover



- AC power input cord



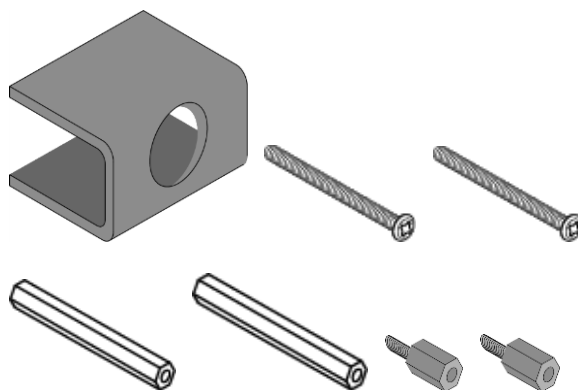
(US/Taiwan/Japan only)

## Package Contents (cont.)

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### Output connection kit

- Terminal cover



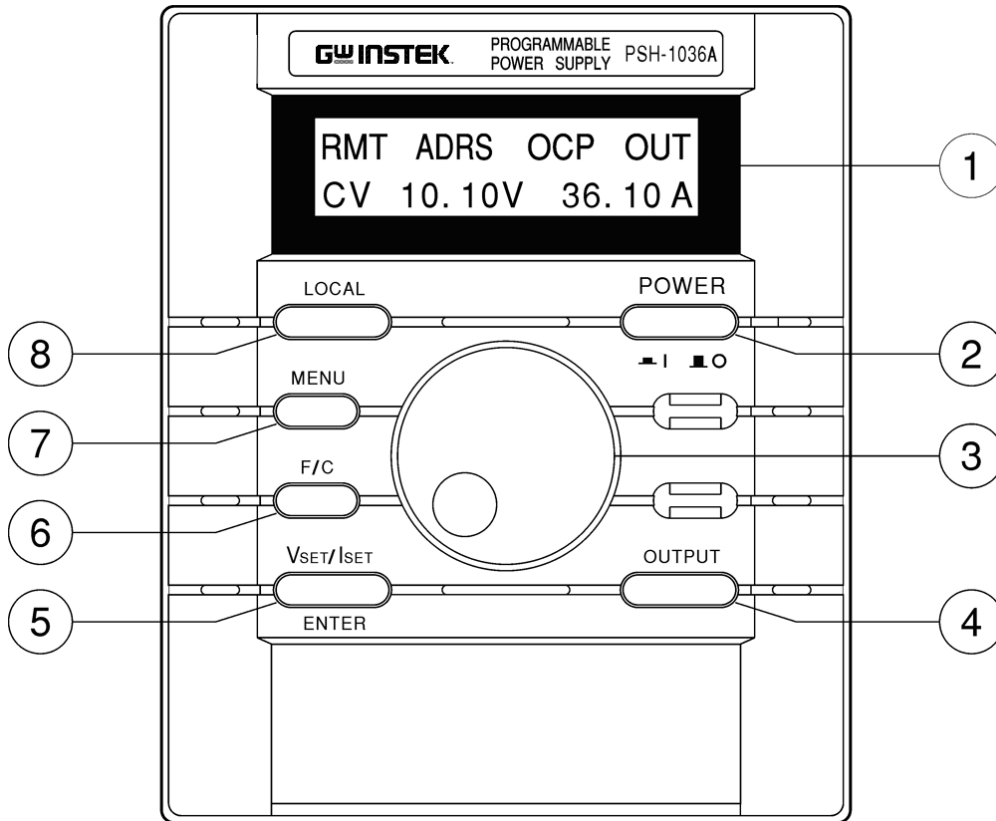
- Output cable screw



### Manual

- User manual (this document)
- Programming manual

## Front Panel



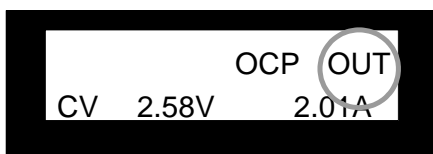
**1 LCD Display** Shows the output and the configuration status. See page 19 for details.

**2 Power Switch**  On  Off

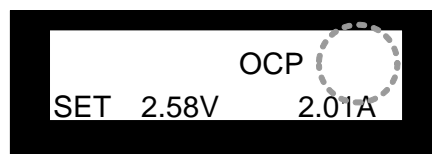
**3 Wheel knob** Sets parameters. Turn right: increase, turn left: decrease.

**4 Output Switch** Turns the output On or Off. When On, the “OUT” sign appears on the display.

Out On



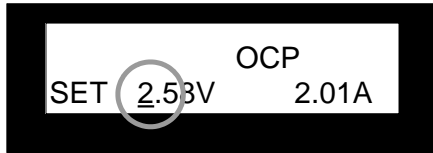
Out Off



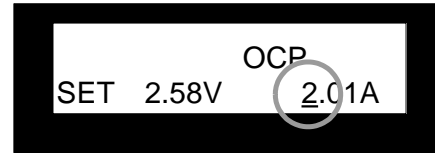


- 5 Vset/ Iset/ Enter key** Switches between voltage setting mode and current setting mode, or confirm the entered value in the menu mode (see page45).

Vset (edit Voltage)

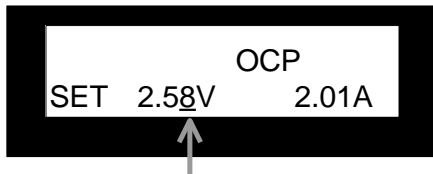


Iset (edit Current)

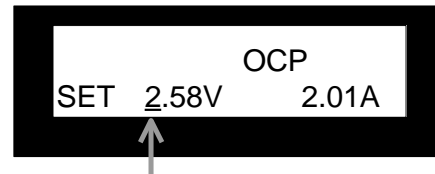


- 6 F/C (Fine/ Coarse) key** Switches the editing location and resolution: before (coarse) or after (fine) the decimal point.

Fine (after decimal)

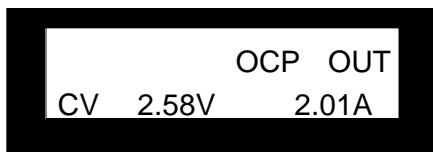


Coarse (before decimal)

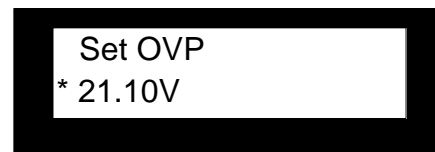


- 7 Menu key** Enters into the menu mode. For details, see page45.

Default mode

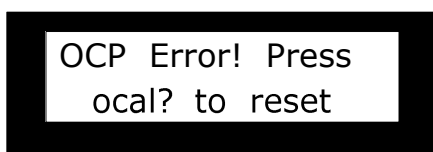


Menu mode (OVP setting)

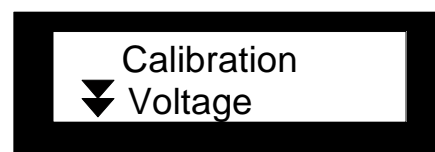


- 8 Local key** Switches from remote control mode to local operation mode (page57), OR releases OVP/OCP error messages and go back to normal operation (page38), OR enters the calibration mode when pressed for more than 5 seconds (page62).

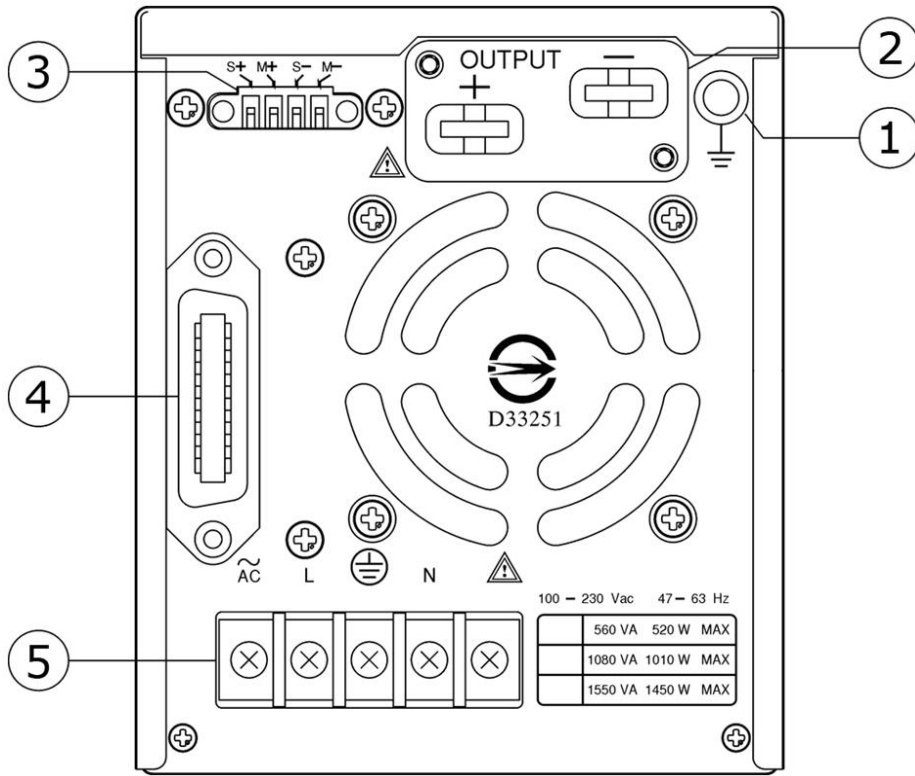
Error message example



Calibration mode



## Rear Panel

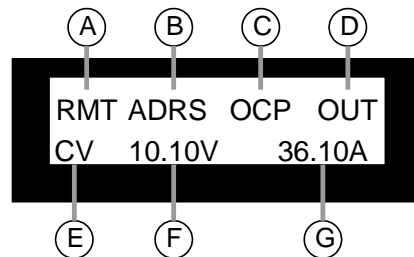


- 
- 1 Ground Terminal**      Connect the output line shield (page25) and the remote sensing line shield (page33).
- 
- 2 Output Terminal**      Connect DUT (Device Under Test). For details, see page24.
- 
- 3 Sense Terminal**      Connect the feedback line to compensate for cable loss. For details, see page24 (theory), page33 (cable connection).
- 
- 4 RS232/ GPIB Terminal**      Connect the remote control line. For remote control details, see page53. GPIB requires an optional module. For installation details, see the service manual.  
 Note: Only one interface module (RS232 or GPIB) can be installed at a time.
- 
- 5 AC input Terminal**      Connect the AC power input cable. For details, see page22.

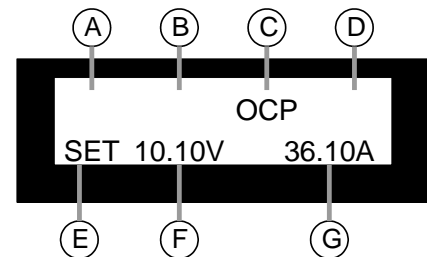
## Display

### Default display

#### Display mode




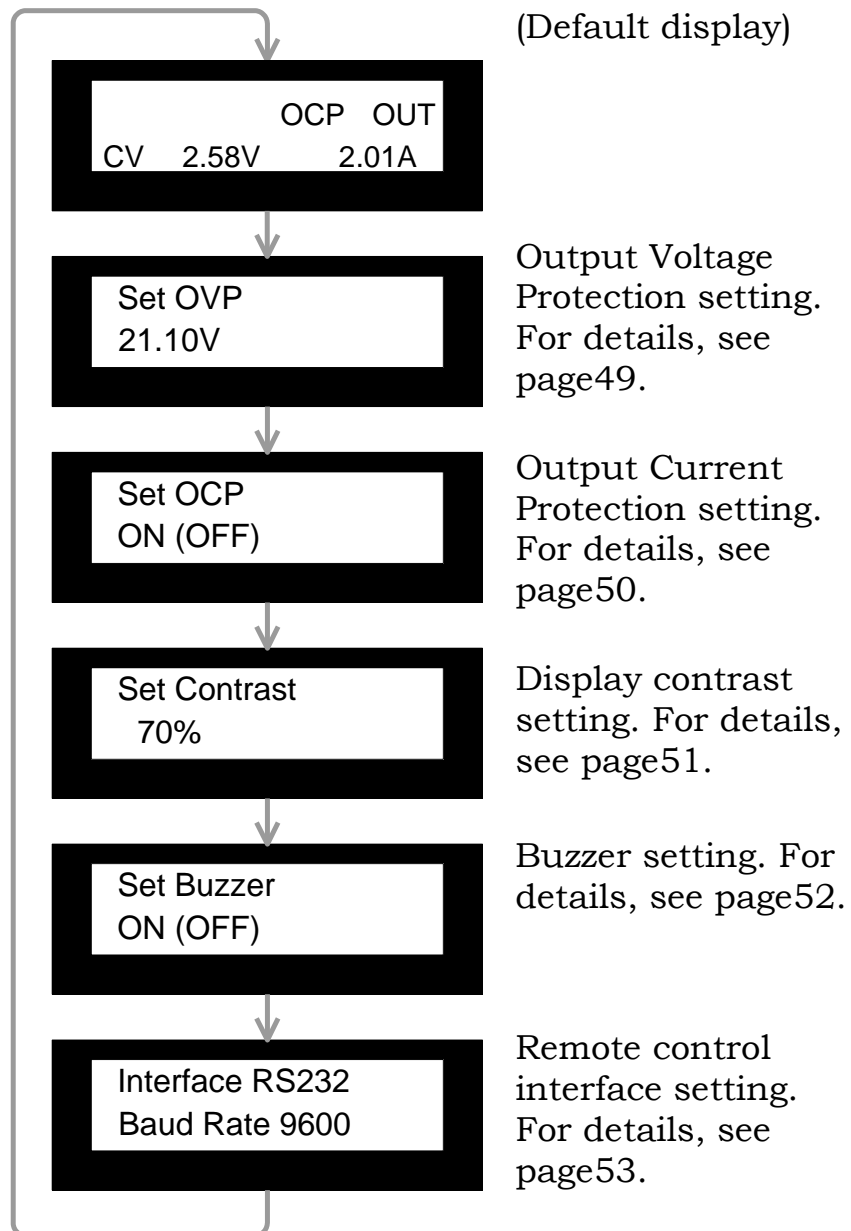
#### Editing mode



- A RMT: remote control mode  
(Nothing): panel operation mode  
Not available in editing mode
- B ADRS: RS-232 or GPIB address  
(available in remote control)  
Not available in editing mode
- C OCP: Output Current Protection On  
(Nothing): Output Current Protection Off
- D OUT: Output On  
(Nothing): Output Off  
Not available in editing mode
- E CV/CC: Current and Voltage display mode (Constant Voltage/ Constant Current)  
SET: Current and Voltage editing mode
- F Output Voltage readback value (display mode)  
Output Voltage setting value (editing mode)
- G Output Current readback value (display mode)  
Output Current setting value (editing mode)

## Display (cont.)

**Menu mode display** The following displays appear when pressing the Menu key . To move to the next configuration, press the Menu key repeatedly. When inactive for more than 5 seconds, the display goes back to the default mode.



# Setup

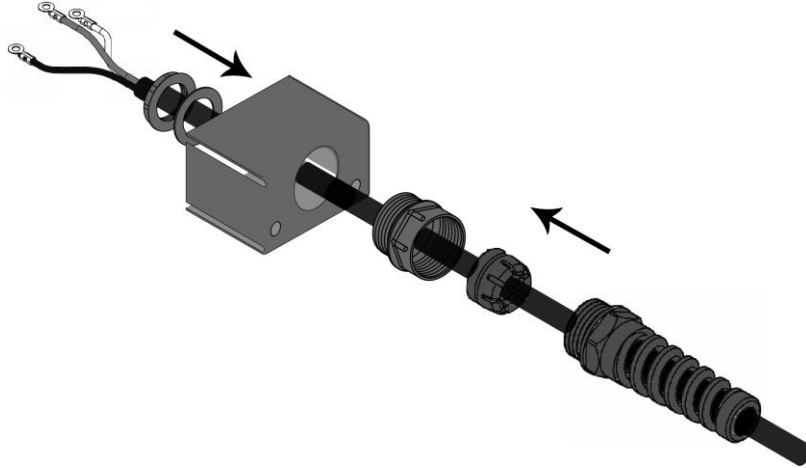
This chapter describes load configurations and setup procedures. Follow these instructions to properly install PSH series.

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## AC Power Cable Assembly

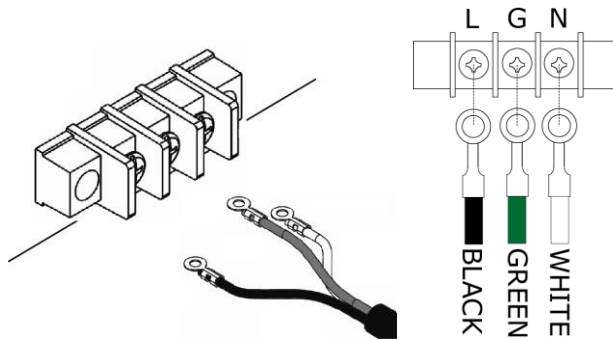
### 1 Cable gland + Terminal Cover

Put the power cable through the cable gland and the terminal cover, screw them together.



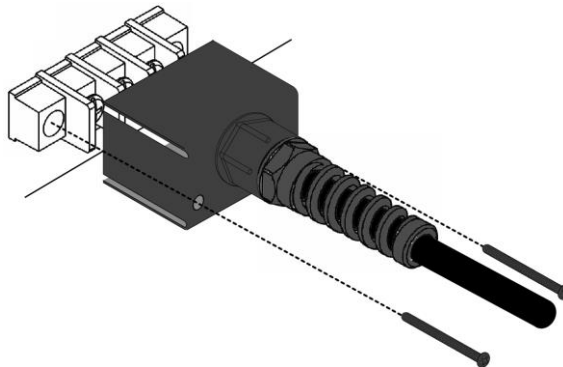
### 2 Cable wire + Terminal

Screw the wire onto the AC input terminal. Note the wire color: Neutral (white), GND (green), and Line (black).



### 3 Terminal cover + Terminal

Screw the terminal cover onto the terminal.



## AC power cable requirement

Here is the AC power cable specification, in case of using cables other than the attached one.

---

**Cable length**       $\leq 3\text{m}$

---

**Cable gland**      KSS or PG-2013

---

**Cable type**      Model: SJT  
**(recommended)**    Type: 3 x 14 AWG stranded copper  
Rating: 60°C min, 300V  
Diameter: 9.143~10.03 mm

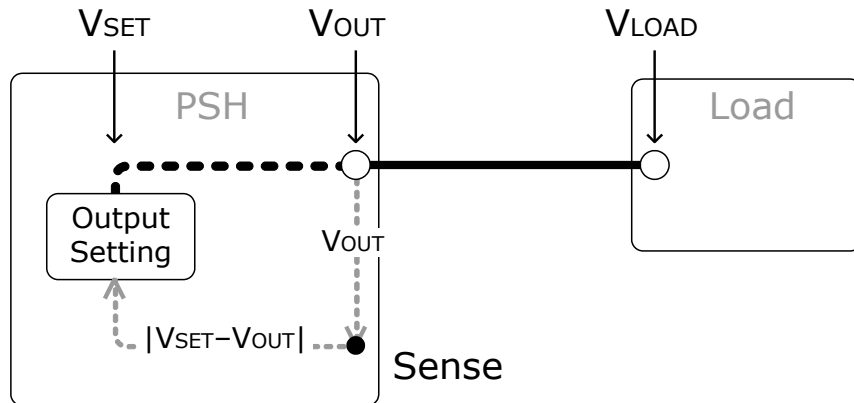
Model: H05 VV-F  
Type: 3G 1.5mm<sup>2</sup> stranded copper  
Rating: 300V/500V  
Diameter: 8.5 ± 0.2 mm

## Remote Sensing and Local Sensing

Remote sensing compensates the cable loss between PSH and load, up to 0.5V. Use remote sensing whenever the load voltage has to be accurate.

### Local Sensing (default)

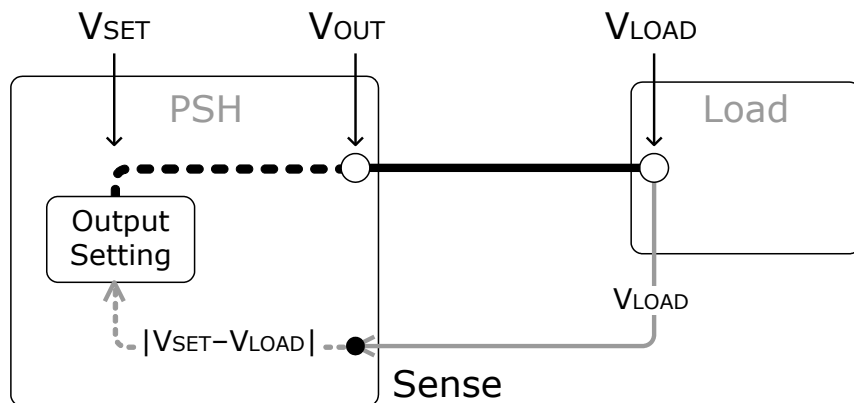
$V_{SET} = V_{OUT}$   
 $V_{OUT} > V_{LOAD}$



The sense terminal is internally connected to the PSH output terminal. The delta between the voltage setting level ( $V_{SET}$ ) and the actual output level ( $V_{OUT}$ ) is compensated. The load terminal voltage ( $V_{LOAD}$ ) might become lower than the output due to cable loss.

### Remote Sensing

$V_{SET} = V_{LOAD}$   
 $V_{OUT} > V_{SET}$



The sense terminal is connected to the load input terminal. The delta between the voltage setting level ( $V_{SET}$ ) and the actual load voltage ( $V_{LOAD}$ ) is compensated. The output voltage ( $V_{OUT}$ ) might become higher than the setting due to the compensation.



## Load / Remote Sensing Wire Selection

The following instructions apply to both load wire and remote sensing wire, unless noted.

**Wire size (FOR LOAD ONLY)** Load wires must have enough current capacity to minimize cable loss and load line impedance. Voltage drop across a wire should not exceed 0.5V. The following list is the wire current rating at 450A/cm<sup>2</sup>.

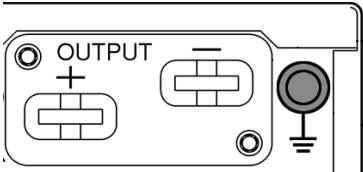
Wire size (AWG)	Max. current (A)	Wire size (AWG)	Max. current (A)
20	2.5	6	61
18	4	4	97
16	6	2	155
14	10	1	192
12	16	1/0	247
10	21	2/0	303
8	36		

**Wire length** To avoid excessive cable loss, shorten the distance between PSH and load as much as possible. Remote sensing compensates cable loss up to 0.5V.

**Wire shielding** To minimize noise effect and load line impedance, use shielded pair wiring. Twisted wires are more effective, especially for remote sensing.



Wire shield should be connected to the rear panel ground connector.



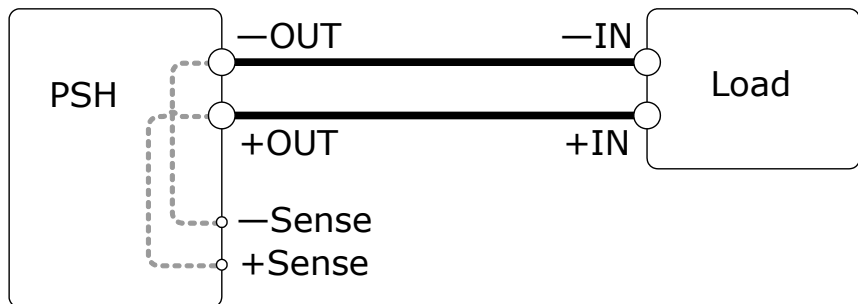
## Load Configuration

Select the appropriate configuration for the target application. For local sensing and remote sensing explanation, see the previous page.

For connection guideline, see page25 (wire selection), page31 (load connection), page33 (remote sensing connection).

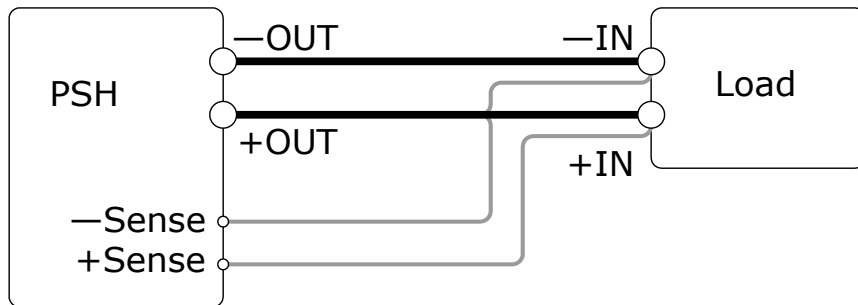
### Single PSH + single load

#### Single Load + Local Sensing



Connect the output wire to the load and the sense terminal to the PSH local output monitor.

#### Single Load + Remote Sensing

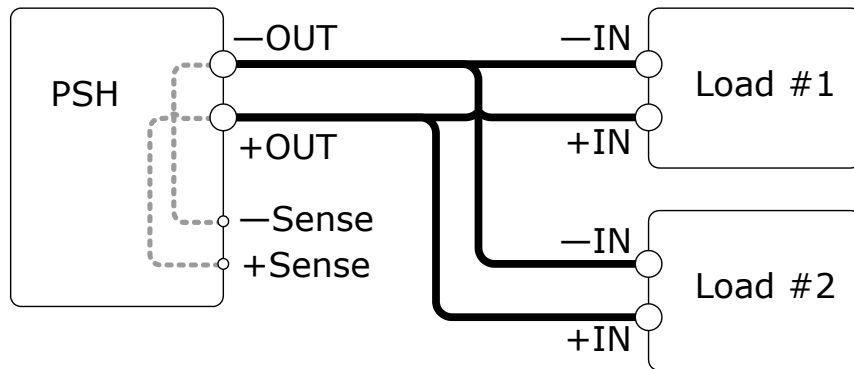


Connect both the output wire and the remote sensing wire to the load.

## Single PSH + multiple Load

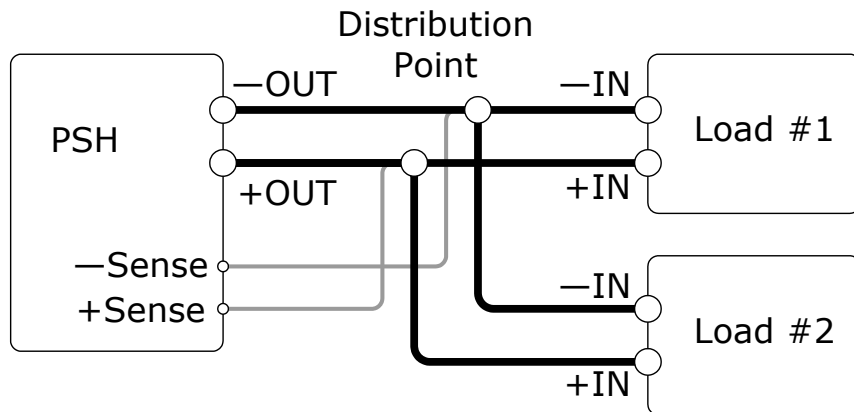
- Condition**
- Output current for each load follows the load requirement.
  - When the sum of the load current surpasses the rating, PSH automatically switches to CC (Constant Current) mode.

**Multiple Loads + Local Sensing**



All loads share one PSH output.

**Multiple Loads + Remote Sensing**



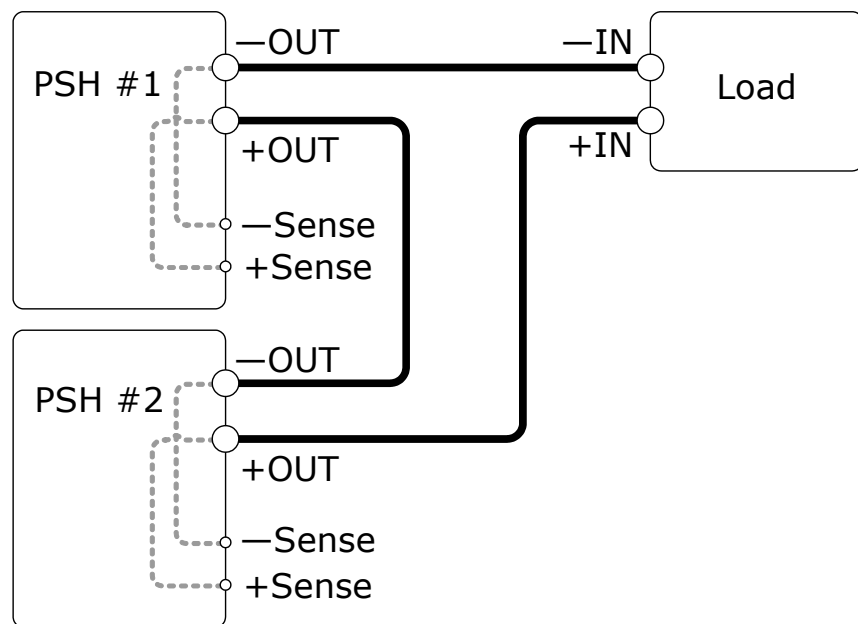
Create a distribution point between PSH and the loads. PSH compensates the cable loss up to the distribution point.

To maximize compensation, make sure the distribution point is closer to the load side.

## Multiple PSH + single load (series operation)

- Condition**
- Up to four PSH series (with identical output ratings) can be cascaded.
  - Output voltage is the sum of the cascaded PSH.
  - Output current is the same as a single PSH.

**Series  
Operation +  
Local Sensing**



First PSH:

Negative output → Negative load input

Positive output → The next PSH negative output

Intermediate PSH:

Negative output → The previous PSH positive output

Positive output → The next PSH negative output

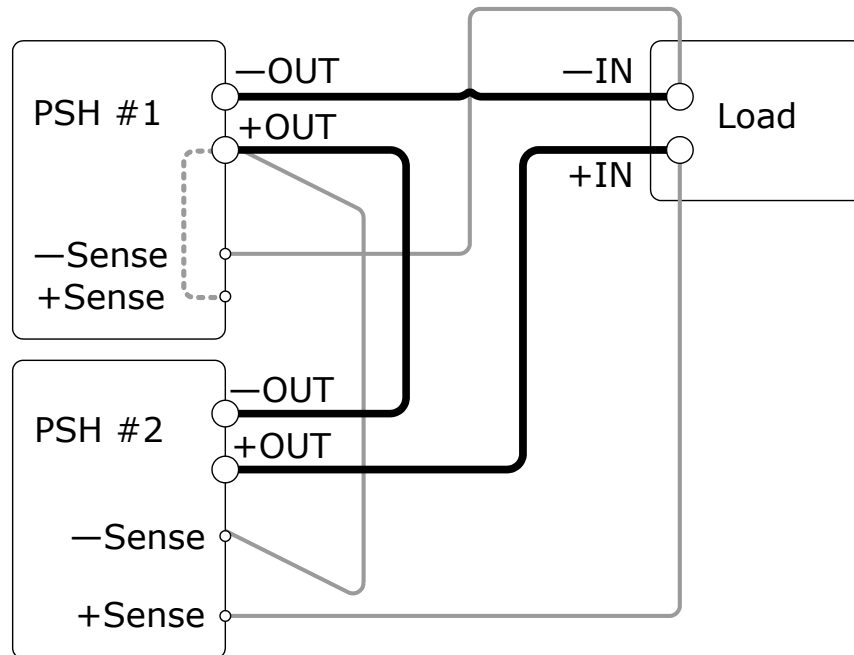
Last PSH:

Negative output → The previous PSH positive output

Positive output → Positive load input

## Series Operation (cont.)

### Series Operation + Remote Sensing



#### First PSH:

- Negative output → Negative load input
- Positive output → The next PSH negative output
- Negative sense → Negative load input
- Positive sense → Positive output monitor

#### Intermediate PSH:

- Negative output → The previous PSH positive output
- Positive output → The next PSH negative output
- Negative sense → The previous PSH positive output
- Positive sense → Positive output monitor

#### Last PSH:

- Negative output → The previous PSH positive output
- Positive output → Positive load input
- Negative sense → The previous PSH positive output
- Positive sense → Positive load input

## Load Wire Assembly

---

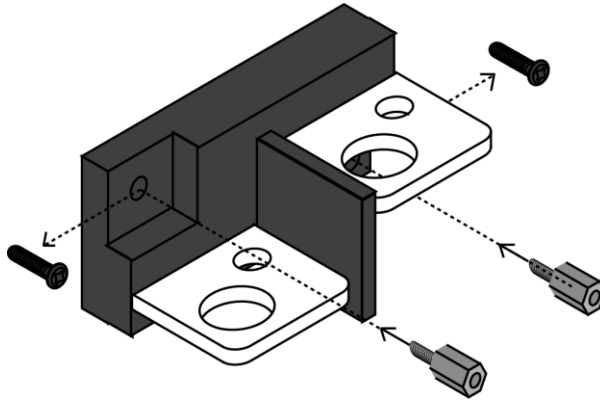
### 1. Wire selection

Select the appropriate wire according to the guideline on page 25.

---

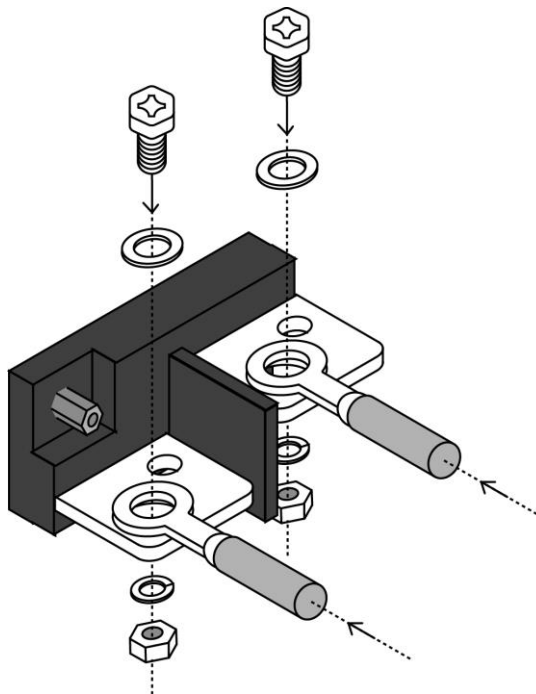
### 2. Terminal screw replacement

Replace the two screws on the output terminal with the hex screw in the output connection kit.



### 3. Terminal connection

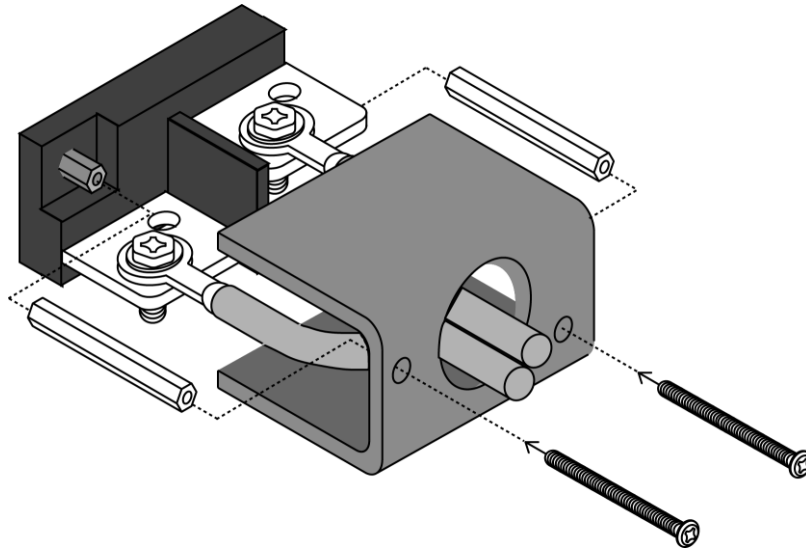
Screw load wires to the terminal.



## Load Wire Assembly (cont.)

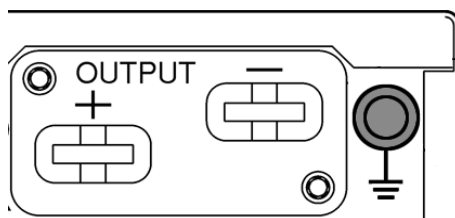
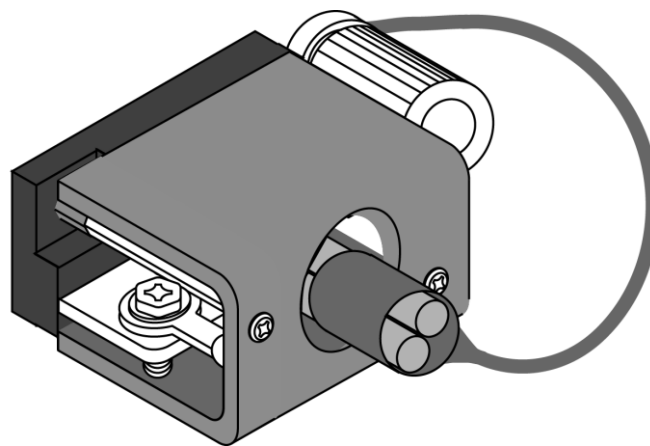
**4. Terminal cover assembly**

Screw the output terminal cover to the rear panel.



**5. Wire shield connection (recommended)**

Connect the load wire shield to the rear panel ground connector.



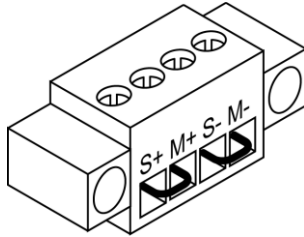


## Remote Sensing Wire Assembly

Select the appropriate wire according to the guideline on page 25.

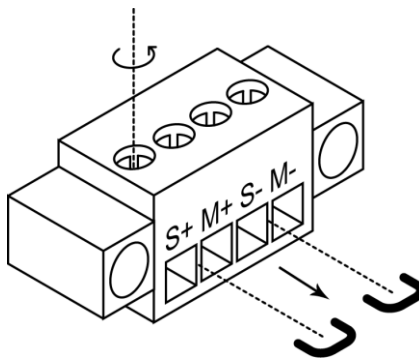
### Local sensing

The sense terminal is connected to the output monitor terminal with bare wires.

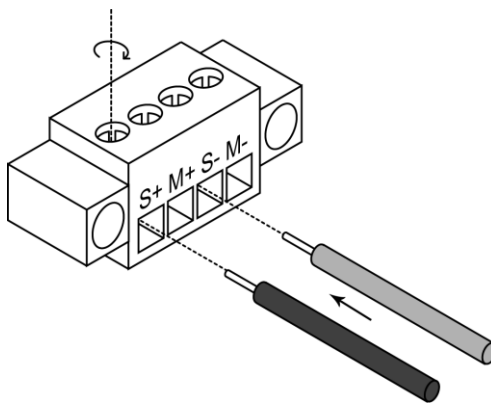


### Remote Sensing

1. Take off the wire jumpers.



2. Screw wires to the sense (S) side.



### CAUTION

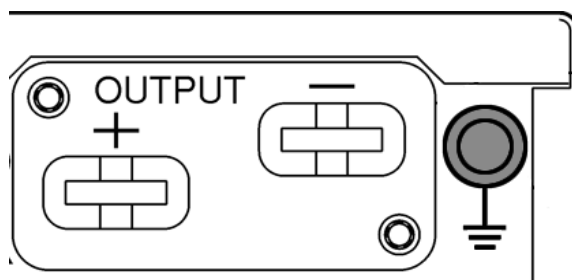
- Do not screw remote sensing wires to the monitor (M) side.
- M+, M- are for output monitoring only. NEVER screw load wires to the remote sensing terminal.

## Remote Sensing Wire Assembly (cont.)

---

### 5. Wire shield connection

To minimize noise effect, we recommend covering the remote sensing wire with ground shield and connect it to the ground terminal.



### CAUTION

An open remote sense circuit leads to output level overshoot. Make sure the line is securely connected.

## Functionality Check

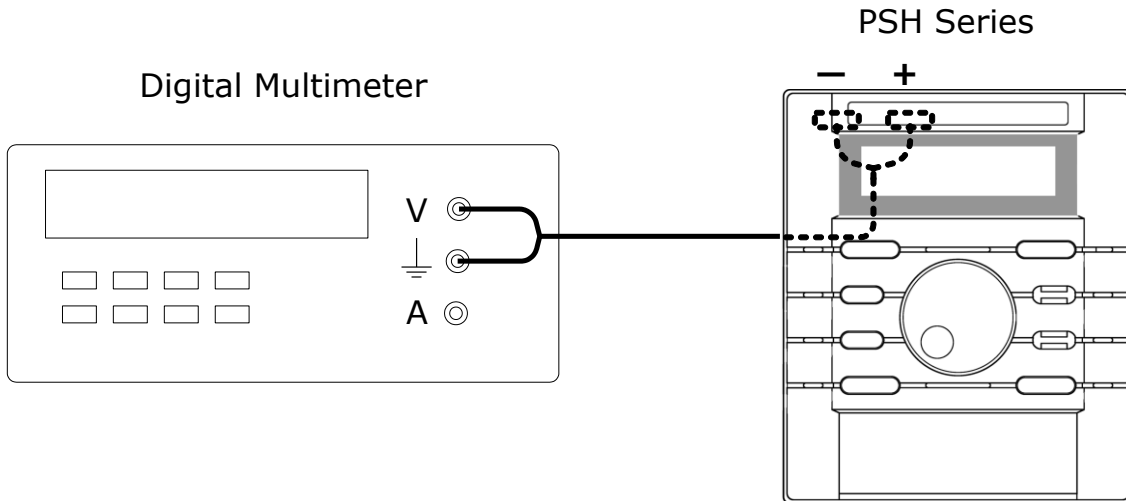
Check the PSH basic functionalities before operation.

### Preparation

<b>Check items</b>	<ul style="list-style-type: none"> <li>• Output Voltage</li> <li>• OVP functionality</li> <li>• Output Current</li> <li>• OCP functionality</li> </ul>								
<b>Equipment</b>	<table border="0"> <tbody> <tr> <td>Digital Multimeter</td> <td> <ul style="list-style-type: none"> <li>• DC Voltage Accuracy: <math>&lt;\pm 0.1\%</math></li> <li>• Recommended model: GDM-8245, GDM-8246</li> </ul> </td> </tr> <tr> <td>Current Shunt</td> <td> <ul style="list-style-type: none"> <li>• Current range: <math>&gt;100\text{A}</math></li> <li>• Accuracy: <math>&lt;\pm 0.1\%</math></li> </ul> </td> </tr> <tr> <td>PSH – Current Shunt cable</td> <td> <ul style="list-style-type: none"> <li>• Voltage rating: <math>&gt;70\text{V}</math></li> <li>• Current rating: <math>&gt;100\text{A}</math></li> </ul> </td> </tr> <tr> <td>Multimeter – Current Shunt cable</td> <td> <ul style="list-style-type: none"> <li>• N/A</li> </ul> </td> </tr> </tbody> </table>	Digital Multimeter	<ul style="list-style-type: none"> <li>• DC Voltage Accuracy: <math>&lt;\pm 0.1\%</math></li> <li>• Recommended model: GDM-8245, GDM-8246</li> </ul>	Current Shunt	<ul style="list-style-type: none"> <li>• Current range: <math>&gt;100\text{A}</math></li> <li>• Accuracy: <math>&lt;\pm 0.1\%</math></li> </ul>	PSH – Current Shunt cable	<ul style="list-style-type: none"> <li>• Voltage rating: <math>&gt;70\text{V}</math></li> <li>• Current rating: <math>&gt;100\text{A}</math></li> </ul>	Multimeter – Current Shunt cable	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
Digital Multimeter	<ul style="list-style-type: none"> <li>• DC Voltage Accuracy: <math>&lt;\pm 0.1\%</math></li> <li>• Recommended model: GDM-8245, GDM-8246</li> </ul>								
Current Shunt	<ul style="list-style-type: none"> <li>• Current range: <math>&gt;100\text{A}</math></li> <li>• Accuracy: <math>&lt;\pm 0.1\%</math></li> </ul>								
PSH – Current Shunt cable	<ul style="list-style-type: none"> <li>• Voltage rating: <math>&gt;70\text{V}</math></li> <li>• Current rating: <math>&gt;100\text{A}</math></li> </ul>								
Multimeter – Current Shunt cable	<ul style="list-style-type: none"> <li>• N/A</li> </ul>								
<b>When there is a problem...</b>	Run calibrations (page62). If this does not solve the issue, refer to the service center.								

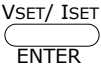


# Output Voltage & OVP Check

## Connection

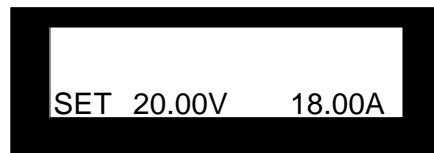


## Checking step

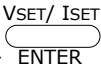
1. Power On PSH and connect the Multimeter Voltage measurement terminal.
2. Set Output Voltage and Output Current to the rating value.

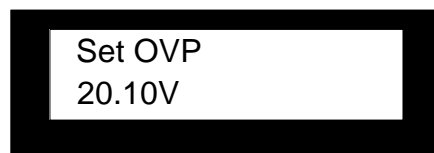
- Vset/Iset/Enter key  switches the cursor between Voltage and Current.
- F/C key  switches the cursor between before and after the decimal point.
- Wheel knob  changes the value.


### PSH-2018A (20V, 18A)



3. Press the Menu key once and set the OVP value to rating voltage + 100mV.

Press the Vset/Iset/Enter key  to confirm the OVP setting.




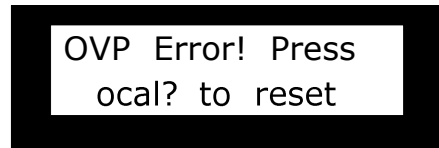
4. Make sure the Multimeter shows no value (No output).
5. Press the Output key  and turn On the output.

The display changes into CV (Constant Voltage) mode and shows the OUT sign on the top right corner.



6. Make sure the Multimeter reading and the PSH display show approximately the same Voltage.
7. Increase the PSH output voltage beyond the OVP value.
8. Make sure the display shows an error message.

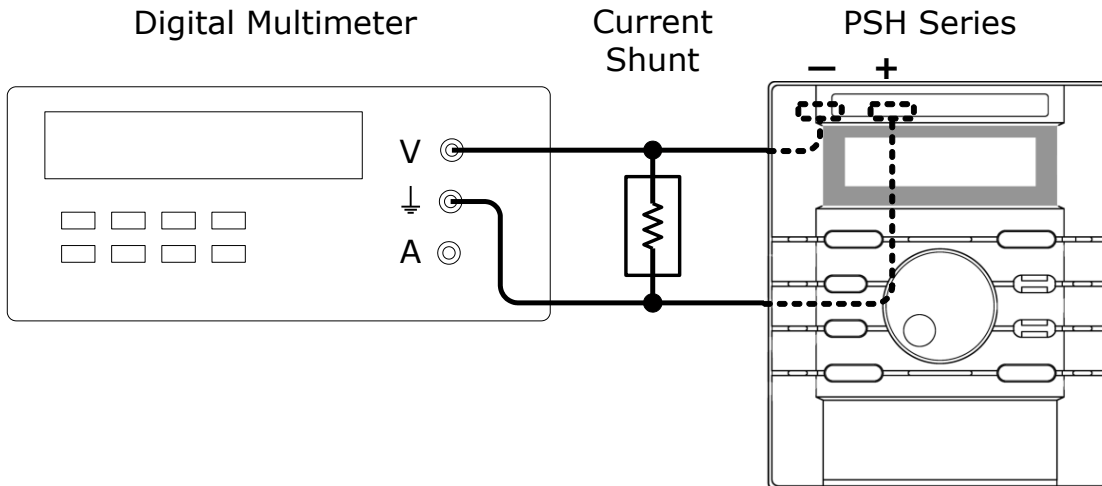
Press the Local key  to get back to the normal display.



9. Make sure the output is now turned Off in the display and the Multimeter shows no value (No output).


## Output Current Check

### Connection





### Checking step


1. Power On PSH and connect the Multimeter/ Current Shunt terminal.
2. Set the Output Voltage and Current value to the rating.

- Vset/Iset/Enter key  switches the cursor between Voltage and Current.

#### PSH-2018A (20V, 18A)

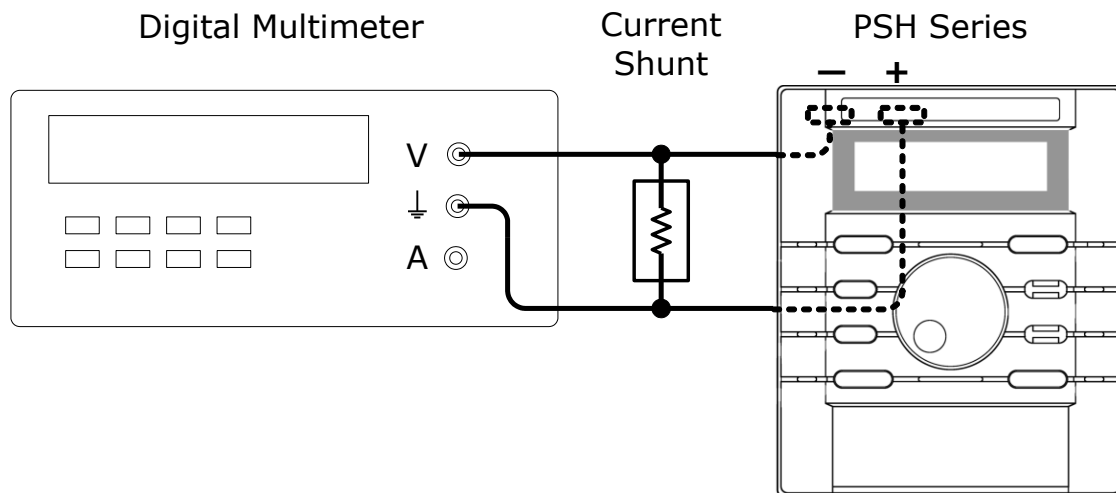


- F/C key  switches the cursor before and after the decimal point.
- Wheel knob  changes the value.

3. Make sure the Multimeter/Current Shunt shows no output.
4. Press the Output key  and turn On the output.
5. Make sure the Multimeter/Current Shunt reading and the PSH display show approximately the same Current.


## OCP Check

### Connection





### Checking step

1. Power On PSH and connect the Multimeter / Current Shunt terminal.
2. Set the Output Voltage and Current value to the rating.


- Vset/Iset/Enter key  switches the cursor between Voltage and Current.

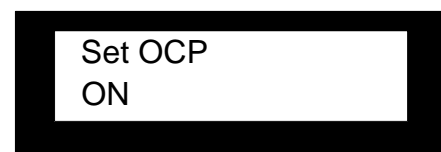
#### PSH-2018A (20V, 18A)




- F/C key  switches the cursor before and after the decimal point.
- Wheel knob  changes the value.

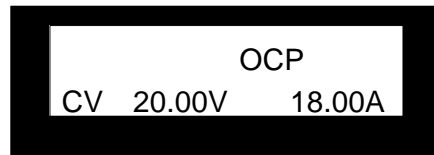
3. Press the Menu key twice to view the OCP setting.


Turn the wheel knob  to change OCP setting to ON.




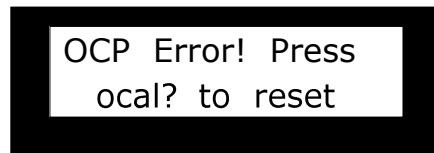
Press the Vset/Iset/Enter key  to confirm the setting.

The OCP sign appears on the upper side of the display.



4. Press the Output key  and turn On the output.
5. Make sure the display shows the error message.

Press the Local key  to get back to the normal display.



6. Make sure the output is now turned Off in the display and the Multimeter / Current Shunt shows no value (No output).



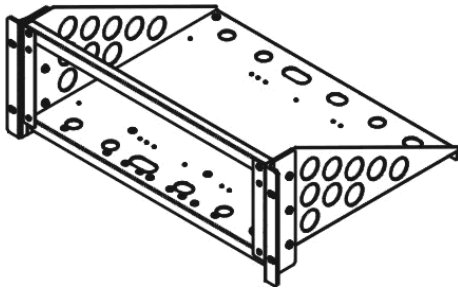
## Rack Mounting (Optional)

PSH can be mounted on standard 19 inch rack using GRA-403 rack mounting kit.

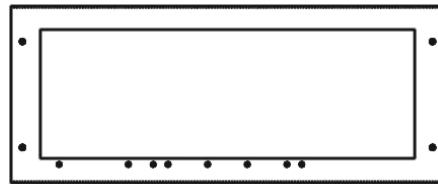
### Rack mounting kit contents

---

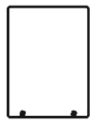
Main bracket x 1



Front panel x 1



Large decoration board x 1



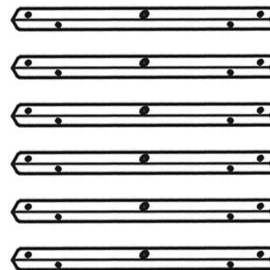
Medium decoration board x 2



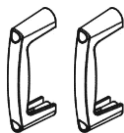
Small decoration board x 2



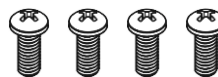
Binding plate x 6



Handle x 2



Screw M4 \* 0.7 L=10mm x 4



Screw M3 \* 0.5 L = 8mm x 18

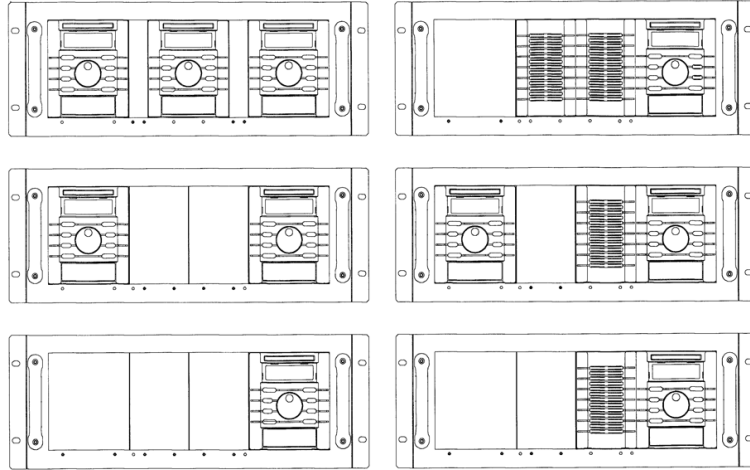


**Rack mounting assembly**

---

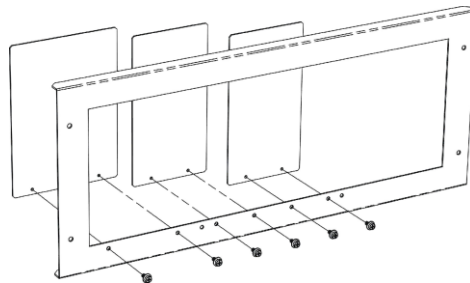
**1. Rack mounting layout**

Confirm the rack mount layout. Make sure there is a space between each PSH. Below is the example of rack mounting layout.



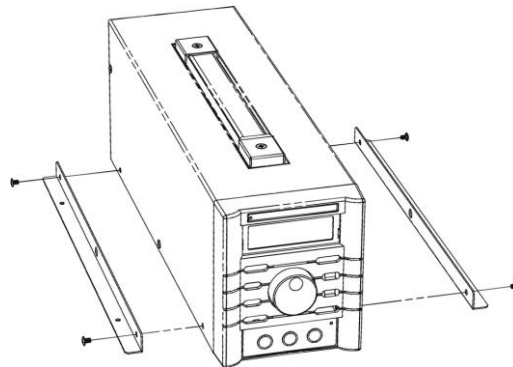
**2. Decoration board assembly**

Once the layout is fixed, screw the decoration boards to the front panel using M3 screws.



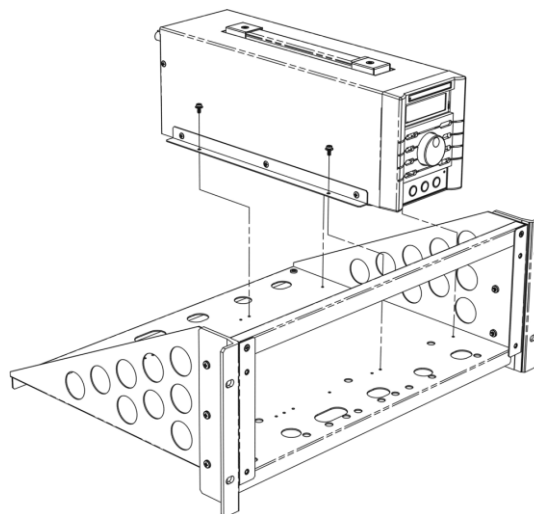
**3. Binding plate assembly**

Take off two M3 screws from PSH side panels, front and rear. Hold the binding plate between PSH and drive the same screws in.

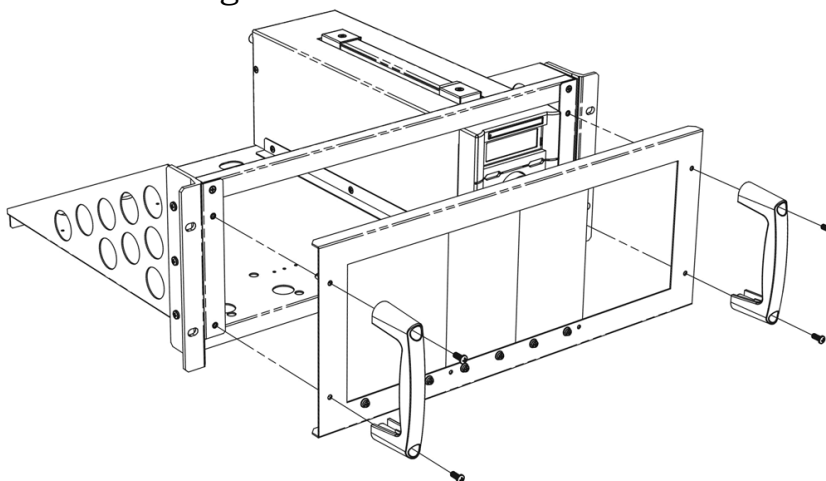


#### 4. Main bracket assembly

Fix the PSH to the main bracket using M3 screws.



Fix the front panel and the handle to the main bracket using M4 screws.




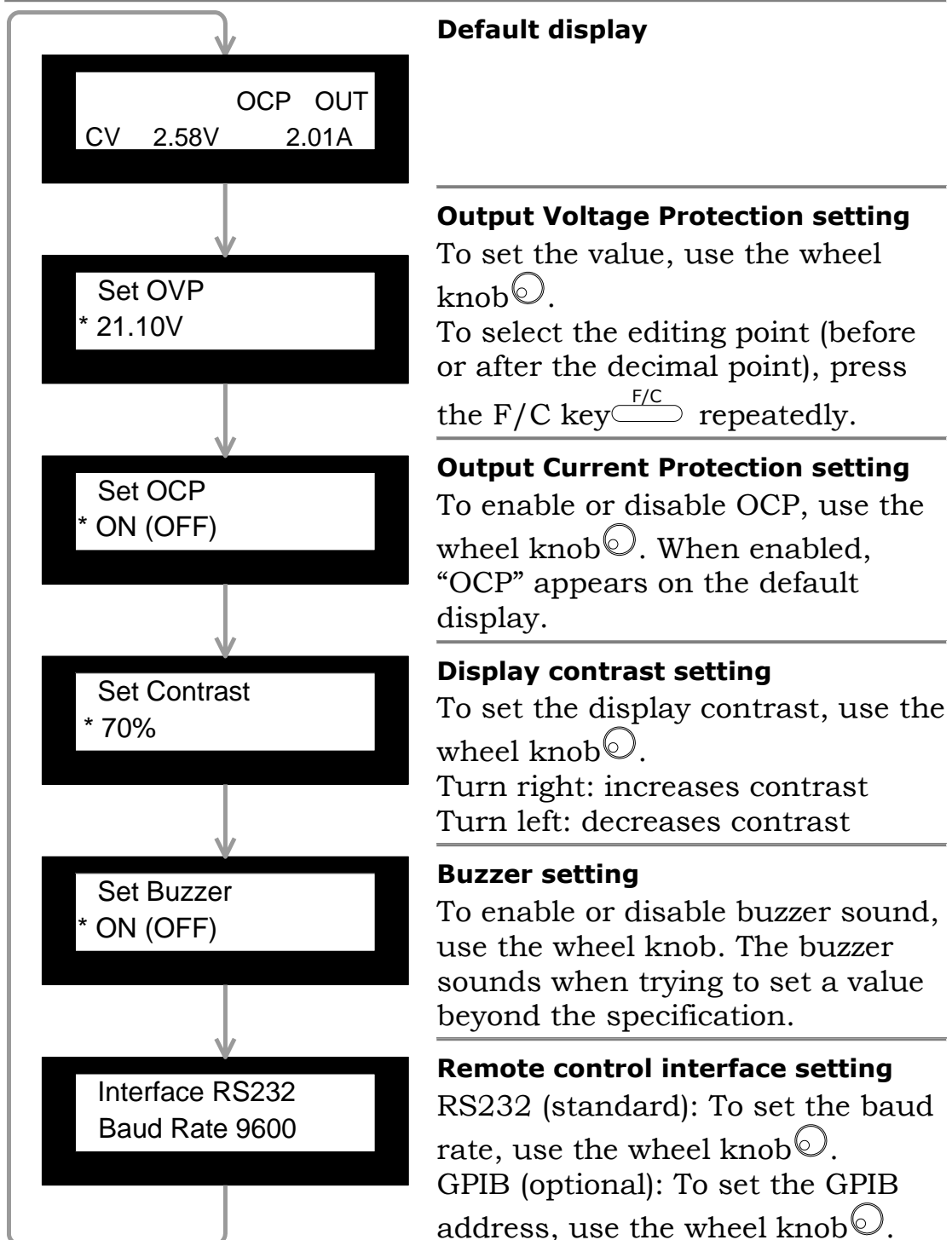
# P anel Operation

This chapter describes the manual operations done at the front panel, together with the constant voltage/ constant current crossover characteristics.

<b>Menu key overview</b>	Menu Key Overview.....	45
<b>CV/ CC characteristic</b>	Constant Voltage/ Constant Current Crossover Characteristic .....	46
<b>Output Voltage setting</b>	Output Voltage Setting .....	47
<b>Output Current setting</b>	Output Current Setting .....	48
	Note.....	48
<b>OVP setting</b>	Set the OVP value.....	49
	Clear OVP error .....	49
<b>OCP setting</b>	Turn the OCP On/Off .....	50
	Clear OCP error .....	50
<b>Display contrast setting</b>	Display Contrast Setting .....	51
<b>Buzzer sound setting</b>	Buzzer sound Setting .....	52
	Buzzer condition .....	52



## Menu Key Overview

Press the Menu key . To move to the next item, press the Menu key repeatedly.




### Default display


### Output Voltage Protection setting

To set the value, use the wheel knob . To select the editing point (before or after the decimal point), press the F/C key  repeatedly.

### Output Current Protection setting

To enable or disable OCP, use the wheel knob . When enabled, "OCP" appears on the default display.



### Display contrast setting

To set the display contrast, use the wheel knob . Turn right: increases contrast  
Turn left: decreases contrast

### Buzzer setting

To enable or disable buzzer sound, use the wheel knob. The buzzer sounds when trying to set a value beyond the specification.

### Remote control interface setting

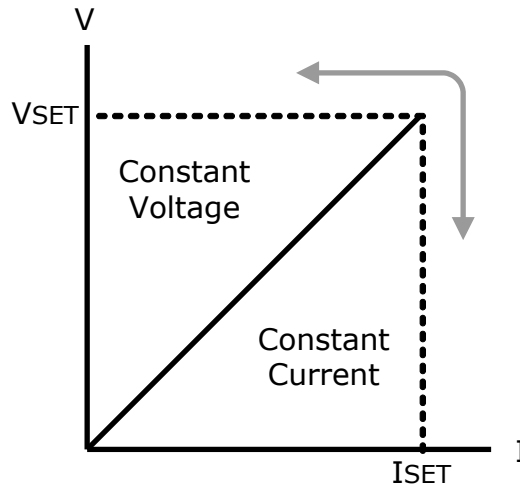
RS232 (standard): To set the baud rate, use the wheel knob . GPIB (optional): To set the GPIB address, use the wheel knob .

# Constant Voltage/ Constant Current

## Crossover Characteristic

PSH series automatically switch between constant voltage mode and constant current mode, according to the load change.

When **the load current is smaller** than the limit (ISET), PSH operates in **Constant Voltage mode**, changing the current level according to the load but keeping the Voltage level at the limit (VSET).



VSET = Output Voltage setting  
 ISET = Output Current setting

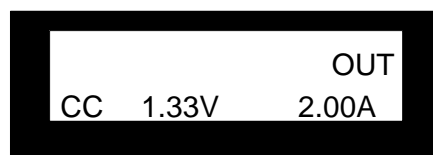
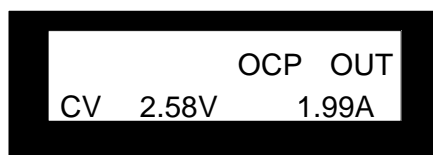
When **the load current is the same** as the limit (ISET), PSH operates in **Constant Current mode**, changing the Voltage level according to the load but keeping the Current level at the limit (ISET).

Let's take recharging a 12V battery as an example. PSH output setting is 13.8V, 1A. An empty battery puts a heavy current load on the power supply. PSH starts running at Constant Current mode, supplying full 1A current but keeping the voltage lower than 13.8V. As the battery becomes charged, the load also becomes smaller. PSH then switches to Constant Voltage mode, supplying less than 1A current but supplying full 13.8V.

**Display** The display indicates CV (Constant Voltage) or CC (Constant Current) on the left side.

Constant Voltage

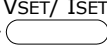
Constant Current

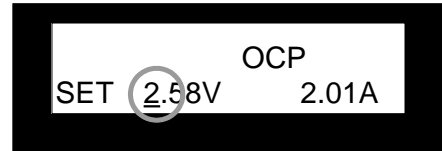



## Output Voltage Setting

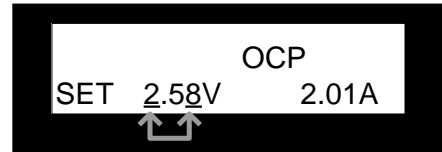
---


### Operation

1. Press the Vset/ Iset key  repeatedly to move the underline to the Voltage side.



2. Press the F/C key  to move the underline before or after the decimal point.



3. Use the wheel knob  to change the output voltage.

---

**Range**                    0.00V ~ rating voltage

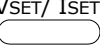
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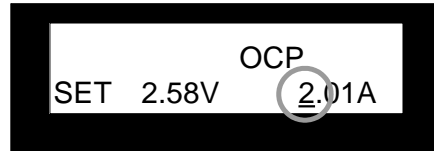
**Step**                    10mV (rating voltage < 36V)  
                               20mV (rating voltage ≥ 36V)


## Output Current Setting

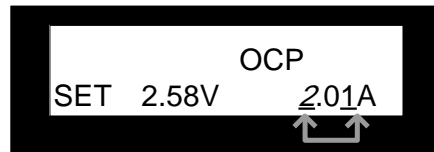
---


### Operation

1. Press the Vset/ Iset key  repeatedly to move the underline to the Current side.



2. Press the F/C key  to move the underline before or after the decimal point.



3. Use the wheel knob  to change the output current.

---

**Range**                    0.00A ~ rating current

---

**Step**                     10mA


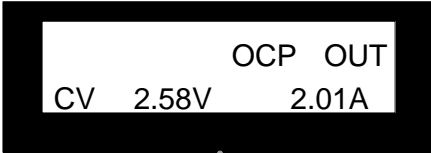





---

**Note**                    When the output current exceeds the setting value, PSH automatically switches from CV (Constant Voltage) to CC (Constant Current) mode.

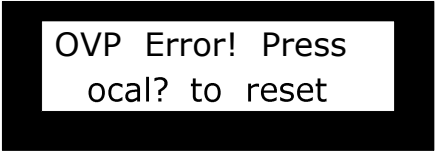
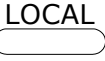


## OVP (Output Voltage Protection) Setting

### Set the OVP value

- Press the Menu key  repeatedly until the OVP menu appears.
 

- Press the F/C key  to move the underline before or after the decimal point.
 
- Use the wheel knob  to change the value.
- Press the Iset/Vset/Enter key  to confirm the value.

### Clear OVP error

- When the output voltage exceeds OVP value, the output is shut off and an OVP error message appears on the display.
 
- Press the Local key  to clear the error message (the output is still Off).


**Range** 0.00V ~ rating voltage

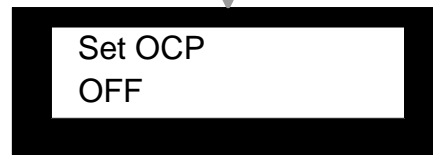
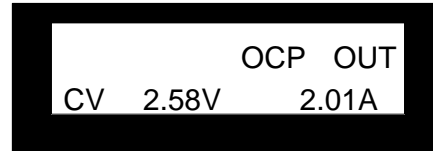
**Step** 10mV (rating voltage < 36V)  
20mV (rating voltage ≥ 36V)


## OCP (Output Current Protection) Setting

---

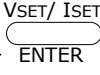
### Turn the OCP On/Off

1. Press the Menu key  repeatedly until the OCP menu appears.



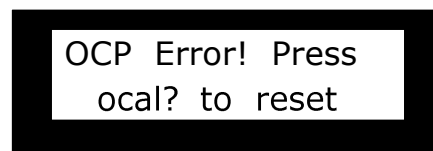
2. Use the wheel knob  to change the status to ON (or OFF).

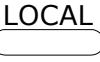


3. Press the Iset/Vset/Enter key  to confirm the setting.

### Clear OCP error

1. When the output current exceeds the current setting, the output is shut off and an OCP error message appears on the display.



2. Press the Local key  to clear the error message (the output is still Off).


---

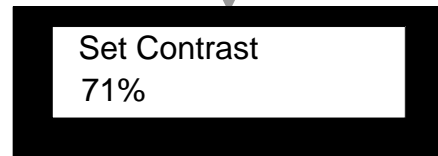
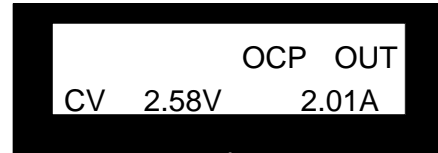
**Range** According to the output current


## Display Contrast Setting

---

### Operation

1. Press the Menu key  repeatedly until the Contrast menu appears.



2. Use the wheel knob  to change the contrast. Clockwise: increase, Counterclockwise: decrease.

---

**Range** 5% ~ 95%


---

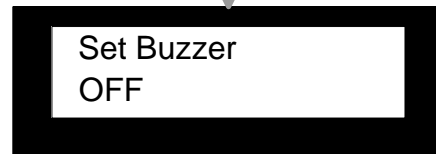
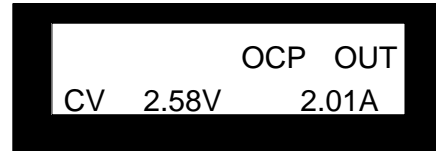
**Step** 6%


## Buzzer sound Setting

---

### Operation

1. Press the Menu key  repeatedly until the Buzzer menu appears.



2. Use the wheel knob  to change the buzzer setting to ON (or OFF).
3. Press the Iset/Vset/Enter key to confirm the value.



### Buzzer condition

When "Set Buzzer ON", the buzzer sounds under the following conditions.

- \* When pressing the panel keys
- \* When the value setting exceeds the limit

# Remote Operation

This chapter describes the IEEE 488.2 based remote control configuration, command syntax, and command set overview. For further descriptions and examples, refer to the programming manual.

---

<b>Interface configuration</b>	RS232 (Standard).....	54
	GPIB (Optional) .....	56
	Interface functionality check .....	57


---

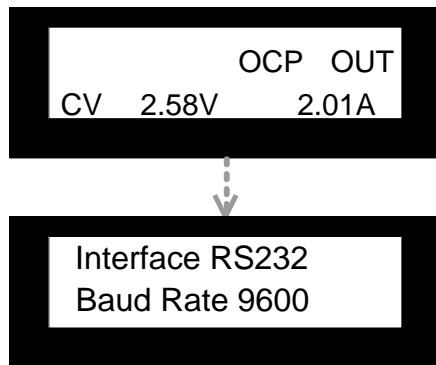
<b>Command set</b>	Command Syntax .....	58
	General commands .....	59
	Status commands .....	60
	Miscellaneous commands .....	61


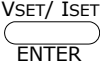
# Interface Selection

## RS232 (Standard)

**Baud rate setting**

1. Press the Menu key  repeatedly until the Interface menu appears.

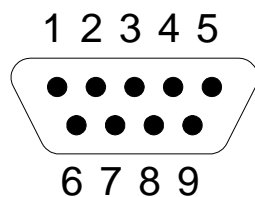


2. Use the wheel knob  to select the baud rate.
3. Press the Iset/Vset/Enter key  to confirm the setting.
4. Connect the RS232 cable between your PC and PSH rear panel. PSH switches to remote control mode as soon as the connection is established.

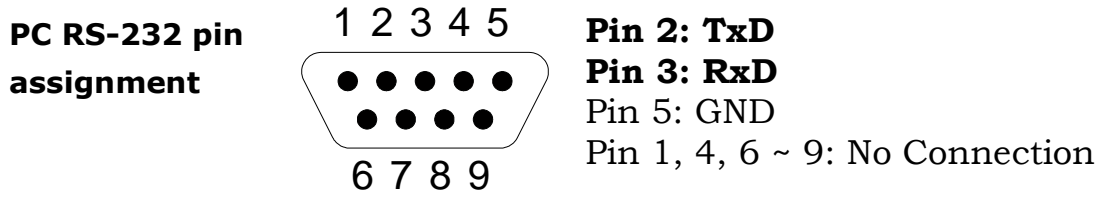
**RS-232 interface protocol**

Baud rate: 9600, 4800, 2400, 1200 (selectable)  
 Parity: None (fixed)  
 Stop bit: 1 (fixed)  
 Data bit: 8 (fixed)

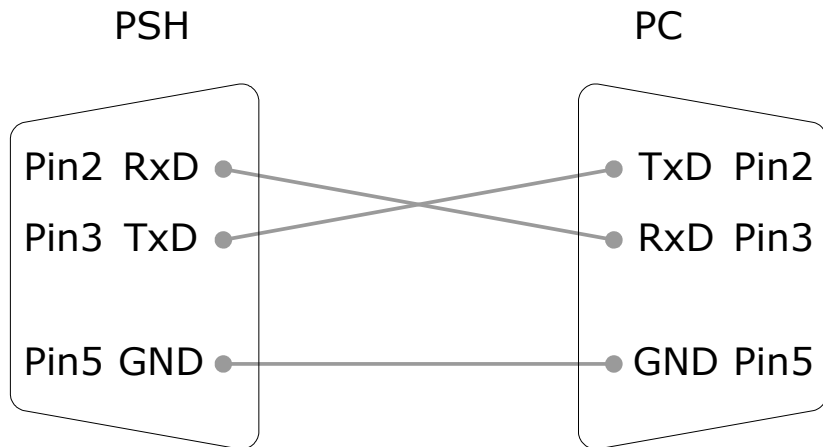
**PSH RS-232 pin assignment**



**Pin 2: RxD**  
**Pin 3: TxD**  
 Pin 5: GND  
 Pin 1, 4, 6 ~ 9: No Connection



**PSH – PC connection** Null-modem connection, in which transmit (TxD) and receive (RxD) lines are crosslinked, is required.




## GPIB (Optional)

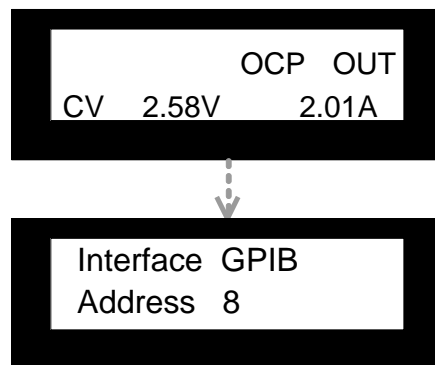
Refer to the service manual for GPIB module installation.



Note: The RS232 module has to be replaced with the GPIB module: they cannot be used together.

---

### Address setting

1. Press the Menu key  repeatedly until the Interface menu appears.



2. Use the wheel knob  to select the address. GPIB address: 1 ~ 30
  3. Press the Iset/Vset/Enter key  to confirm the setting.
  4. Connect the GPIB cable between your PC and PSH rear panel. PSH switches to remote control mode as soon as the connection is established.
- 

### GPIB constraints

- Address range: 1 ~ 30
- Altogether less than 15 devices, less than 20m total cable length, maximum 2m between each device
- Unique address assigned for each device
- At least 2/3 of the GPIB devices turned On
- No loop or parallel structure

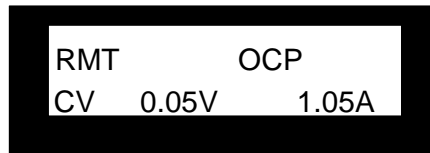


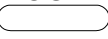
## Interface functionality check

---

### Remote mode display

In the remote control mode, the display shows “RMT” on the top left corner. The panel operation is disabled.



To enable panel operation, press the Local key . This also disconnects the remote control.

---

### Functionality check

Run this query command via the terminal.

```
*idn?
```

This should return the Manufacturer, Model number, Serial number, and Firmware version in the following format.

**GW.Inc,PSH-2018A,12345678,FW1.00**

## Command Syntax

The commands are fully compatible with IEEE488.2 (1992) standard and partially compatible with SCPI (1994) standard.

### Example command

`:chan1:prot:curr <0/1> LF`

1: Command Header

2: Single space

3: Parameter

4: Message Terminator OR Message Separator

### Command Header

Several command header elements (nodes) can be concatenated to form a complex command.

The above example can be separated into:

`:chan1:` (root node) + `prot:` + `curr:`

### Parameter example

`<0/1>` 0 or 1.

`<1~4>` Integer between 1, 2, 3, or 4.

`<0.01~5>` Decimal number between 0.01 and 5.

### Message Terminator

Marks the end of a command line. Any of the following is acceptable, in accordance with IEEE488.2 standard.

`LF^END` Line feed code (hexadecimal 0A) with END message

`LF` Line feed code

`<dab>^END` Last data byte with END message

### Message Separator

`;` (semicolon) Command separator.

## Command Set

Commands are **non**-case sensitive.

For more detailed information, refer to the Programming Manual which is downloadable from [www.gwinstek.com.tw](http://www.gwinstek.com.tw).

### General commands

:chan1:curr?	Returns the output current (unit: A). Range: 0.01~rating current
:chan1:curr <0.01~rating>	Sets the output current (unit: A). Range: 0.01~rating current
:chan1:volt?	Returns the output voltage (unit: V). Range: 0.01~rating voltage
:chan1:volt <0.01~rating>	Returns the output voltage (unit: V). Range: 0.01~rating current
:chan1:meas:c urr?	Returns the actual output load current (unit: A).
:chan1:meas:v olt?	Returns the actual output load voltage (unit: V).
:chan1:prot:cu rr?	Returns the Over Current Protection status. Range: 0 (Off), 1 (On)
:chan1:prot:cu rr <0/1>	Sets the Over Current Protection. Range: 0 (Off), 1 (On)
:chan1:prot:vol t?	Returns the Over Voltage Protection value. Range: 0.01~rating (unit: V)
:chan1:prot:vol t <0.01~rating>	Sets the Over Voltage Protection value. Range: 0.01~rating (unit: V)
:chan1:prot:cle	Clears the OCP & OVP protection message from the display.
:outp:stat?	Returns the output status. Range: 0 (Output Off), 1 (Output On)
:outp:stat <0/1>	Sets the output status. Range: 0 (Output Off), 1 (Output On)

## Status commands

*cls	Clears all event status registers (Output Queue, Operation Event Status, Questionable Event Status, Standard Event Status)
*ese?	Returns the ESER (Event Status Enable Register) contents. Example: 130→means ESER=10000010
*ese <0~255>	Sets the ESER contents. Example: *ese 65→sets ESER to 01000001
*esr?	Returns and clears the SESR (Standard Event Status Register) contents. Example: 198→means SESR=11000110
*sre?	Returns the SRER (Service Request Enable Register) contents. Example: 3→means SRER=00000011
*sre <0~255>	Sets the SRER contents. Example: *SRE 7→SRER=00000111
*stb?	Returns the SBR (Status Byte Register) contents. Example: 81→means SBR=01010001
:stat:oper:cond?	Returns the Operation register contents.
:stat:oper:enab?	Returns the mask conditions of the event register. Range: 0~32767 Example: 32767 means all 15bits are set to 1.
:stat:oper:enab <0~32767>	Returns the mask conditions of the event register. Range: 0~32767 Example: 32767 sets all 15bits to 1.
:stat:oper:even?	Returns the operation register contents. Example: 32767 means all 15bits are set to 1.
:stat:pres	Sets the operation register and questionable enable register to zero.
:stat:ques:enab?	Returns the mask conditions of the event register. Range: 0~32767 Example: 32767 means all 15bits are set to 1.
:stat:ques:enab <0~32767>	Returns the mask conditions of the event register. Range: 0~32767 Example: 32767 sets all 15bits to 1.
:stat:oper:even?	Returns the questionable register contents. Example: 32767 means all 15bits are set to 1.

## Miscellaneous commands

*idn?	Returns the power supply ID as Manufacturer, Model No, Serial No, Firmware version. Example: GW.Inc,PSH-2018A,12345678,FW1.00
*opc?	“1” is placed in the output queue when all the pending operations are completed.
*opc	Sets the operation complete bit (bit0) in SERS (Standard Event Status Register) when all the pending operations are completed.
*rcl <1~99>	Recalls the panel setup from internal memory. Example: *RCL 1→recalls setup from memory1
*rst	Recalls the default panel setup (reset the device).
*sav <1~99>	Saves the panel setup to internal memory. Example: *SAV 1→saves setup to memory1
*tst?	Run the self-test for RAM and ROM and returns 0 (successful) or -300 (unsuccessful).
*wai	Prevents execution of further commands until all the pending operations are completed.
:syst:err?	Returns the error number followed by the error message from the queue. Example: 0, “No error”
:syst:vers?	Returns the SCPI version. Example: 1994.0

# C Calibration

Run calibration when the output exceeds the specification, or when the functionality check (page35) fails. To get the optimal result, make sure PSH is powered for at least 30 minutes before the calibration.

---

<b>Setup</b>	Calibration Preparation ..... 63
	Entering calibration mode ..... 64
<b>Calibration</b>	Output Voltage calibration ..... 65
	Output Current calibration..... 67
	OVP Calibration ..... 69

## Calibration Preparation

---

### Calibration condition



- At least 30 minutes of warm-up time
  - Temperature:  $23 \pm 5$  °C
  - Relative Humidity:  $\leq 80\%$
- 

### Calibration items

- Minimum/ Maximum Output Voltage
  - Minimum/ Maximum Output Current
  - OVP functionality
- 

### Calibration Equipment

Digital Multimeter

- DC Voltage Accuracy:  $<\pm 0.1\%$
  - Recommended model: GDM-8245, GDM-8246
- 

Current Shunt

- Current range:  $>100\text{A}$
  - Accuracy:  $<\pm 0.1\%$
- 

PSH – Current Shunt cable

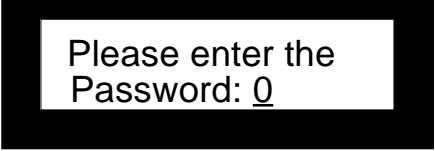
- Voltage rating:  $>70\text{V}$
  - Current rating:  $>100\text{A}$
- 

Multimeter – Current Shunt cable

- N/A


## Entering calibration mode


1. Press the Local key for 5 seconds. The password entry menu appears.



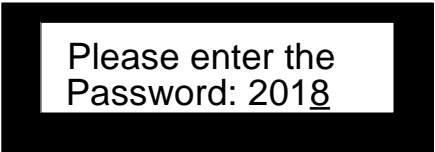
Please enter the Password: 0

2. Enter the model number as the password.


Wheel knob  changes the digit.


F/C key  moves the cursor to the next digit.

**(PSH-2018A)**



Please enter the Password: 2018

3. Press the Vset/Iset/Enter key  as confirmation.

4. The calibration menu appears.  
Wheel knob  selects the item.

Vset/Iset/Enter key  confirms the selection.

- Minimum/Maximum output voltage calibration



Calibration  
▼ Voltage

- Minimum/Maximum output current calibration



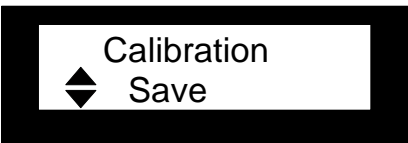
Calibration  
◆ Current

- Over Voltage Protection calibration



Calibration  
◆ OVP

- Save the calibration result and exit the calibration menu



Calibration  
◆ Save

- Exit calibration menu without saving the calibration result

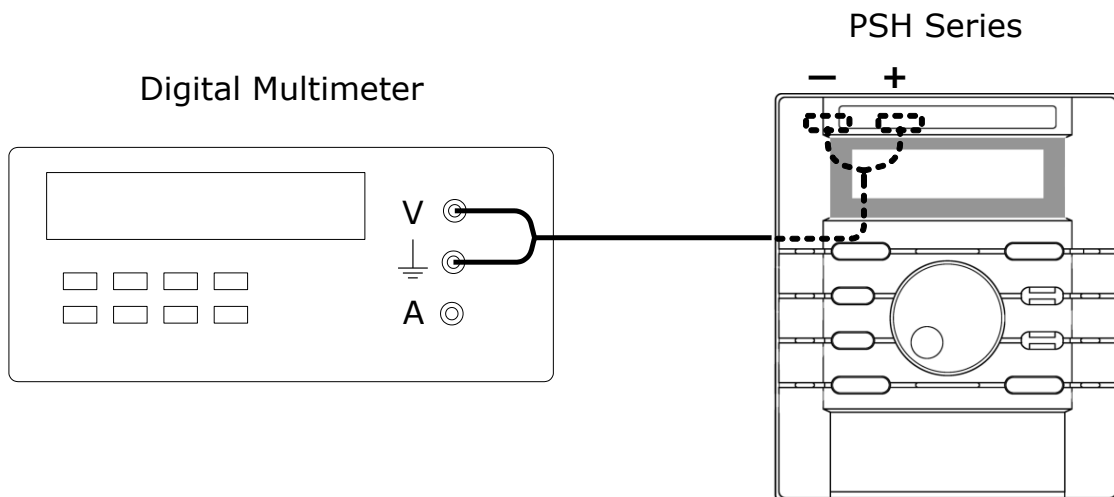


Calibration  
▲ Exit

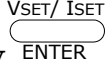


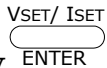


## Output Voltage calibration

### Connection



### Calibration step

1. Enter the Voltage calibration menu. See page 64 for details.
2. Press the Vset/Iset/Enter key  and enter Minimum Voltage calibration mode.
3. Adjust the display value to the Multimeter reading. Wheel knob  changes the value. F/C key  moves the cursor before and after the decimal point.
4. Press the Vset/Iset/Enter key  to confirm the setting. The display enters Maximum Voltage calibration mode.



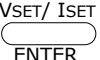
Calibration  
▼ Voltage

Calibration  
Voltmin 0.00V

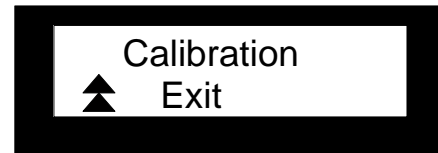
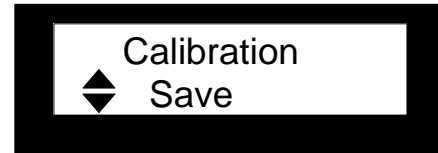
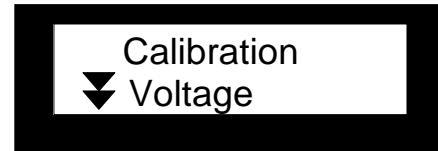
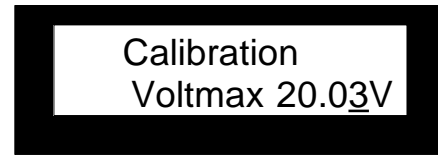
**Multimeter reading: 0.02V**

Calibration  
Voltmin 0.02V

Calibration  
Voltmax 20.00V

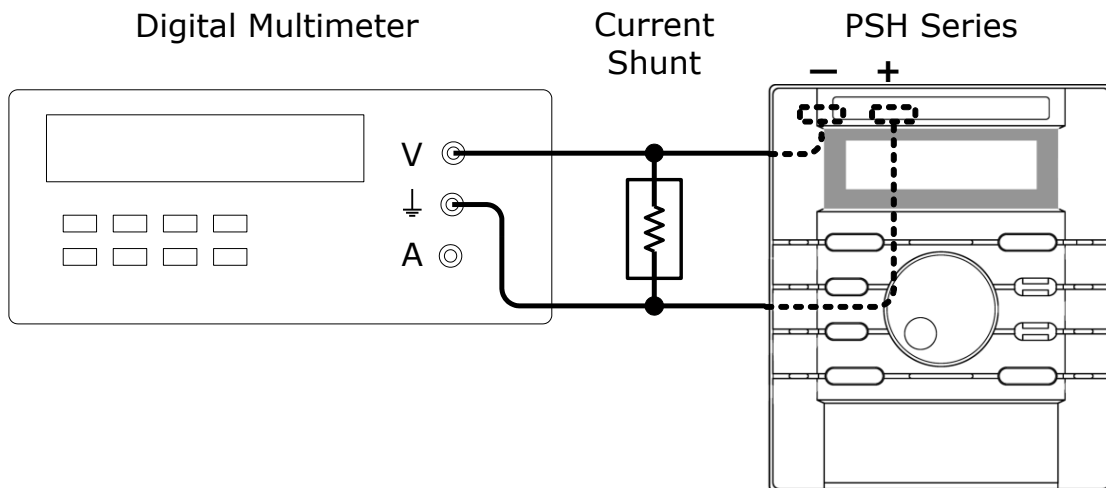
- 5. Adjust the display value to the Multimeter reading.  
Wheel knob  changes the value.  
F/C key  moves the cursor before and after the decimal point.
- 6. Press the Vset/Iset/Enter key  to confirm the setting. The display goes back to the default calibration menu.
- 7. Save the result and exit the calibration mode (Save), OR Exit the calibration mode without saving the result (Exit).

**Multimeter reading:  
20.03V**



## Output Current calibration

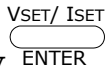
### Connection





### Calibration step

1. Enter the Current calibration menu. See page64 for details.

Calibration  
◆ Current

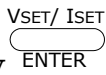
2. Press the Vset/Iset/Enter key  and enter Maximum Current calibration mode.

Calibration  
CurrMax 18.00A



3. Adjust the display value to the Multimeter / Current Shunt reading.  
Wheel knob  changes the value.  
F/C key  moves the cursor before and after the decimal point.

**Multimeter**  
**reading:18.02A**

Calibration  
CurrMax 18.02A


4. Press the Vset/Iset/Enter key  to confirm the setting. The display enters Minimum Current calibration mode.

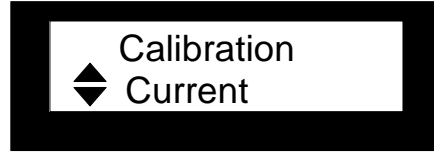
Calibration  
CurrMin 0.00A

- Adjust the display value to the Multimeter / Current Shunt reading.  
Wheel knob  changes the value.  
F/C key  moves the cursor before and after the decimal point.

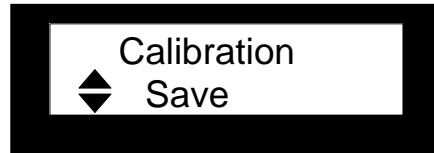
**Multimeter reading: 0.02A**



- Press the Vset/Iset/Enter key  to confirm the setting. The display goes back to the default calibration menu.



- Save the result and exit the calibration mode (Save), OR Exit the calibration mode without saving the result (Exit).

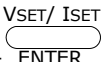


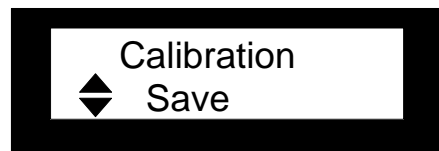
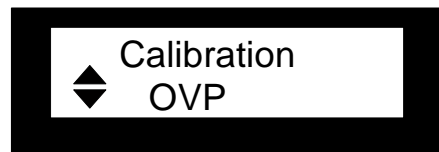
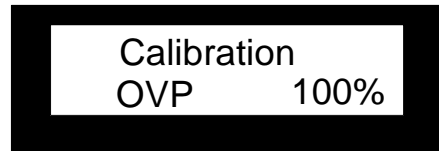
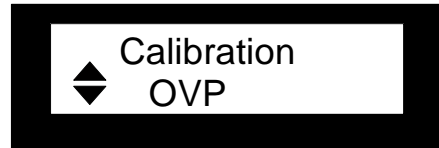
## OVP Calibration

### Connection

No connection required

### Calibration step

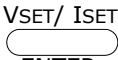
1. Enter the Voltage calibration menu. See page64 for details.
2. Press the Vset/Iset/Enter key . PSH calibrates OVP automatically.
3. The display goes back to the default calibration menu.
4. Save the result and exit the calibration mode (Save), OR Exit the calibration mode without saving the result (Exit).



## FAQ

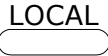
---

The OVP value/ OCP status has not been changed.

After editing OVP value and OCP status, press the Vset/Iset/Enter key  to confirm. Otherwise the setting does not change.

---

The front panel does not respond.

When in remote control mode, PSH does not respond to panel operations. Terminate the remote operation or press the Local key  on the front panel. The “RMT” message disappears from the display and panel operation is resumed.

---

The actual output is lower than the setting.

The cable loss might be causing the load voltage lower than the setting. Upgrade the output cable to a better capacity and/or use the remote sense to compensate for the voltage drop. See page25 (theory) and page25 (cable assembly).

---

The actual output is much higher than the setting.

The remote sensing (page24) compensates for the cable loss for up to 0.5V. If the output level goes much higher, the remote sensing terminal might be disconnected. Make sure the connection is secure. See page33 for details.

---

The load wire does not fit into the terminal.

Make sure you are NOT connecting the load wire to the remote sensing terminal. Refer to page31 for connection details.

---

If there is still a problem, please contact your local dealer or  
GWInstek at [www.gwinstek.com.tw](http://www.gwinstek.com.tw) / [marketing@goodwill.com.tw](mailto:marketing@goodwill.com.tw).

# Appendix

## Specifications

The specifications apply under the following conditions: PSH is powered on for at least 30 minutes, within +20°C~+30°C.

### Common specification

<b>Recovery Time</b>	CV mode	≤ 2ms (50% step load change from 25%~75%)
<b>Response Time</b>	Voltage Up	≤ 150ms (10%~90% ≤ 95% rating load)
	Voltage Down	≤ 150ms (90%~10% ≥ 10% rating load)
<b>Ripple &amp; Noise</b>	Voltage (mVrms)	≤ 10mVrms, 100mVpp, 20Hz~20MHz
	Current (mArms)	≤ 0.2% + 40mA
<b>Temperature Coefficient</b>	Voltage (25±5°C)	≤ 100ppm/ °C
<b>Protection</b>	Over Voltage Protection, Over Current Protection, Over Heat Protection, Inrush Current Protection	
<b>Output On/Off</b>	Available	
<b>Nominal Input rating</b>	100-240Vac, 50Hz to 60 Hz, single phase.	
<b>Input voltage range</b>	90Vac-264Vac	
<b>Input frequency range</b>	47Hz-63Hz	
<b>Operation Condition</b>	Location	Indoor
	Altitude	≤ 2000m
	Ambient temperature	Specification: 10°C~35°C (50°F~95°F)



---

	Operation: 0°C~40°C (32°F~104°F)
Relative Humidity	85% RH (maximum), non condensing
Installation	Category II (for details, see page6)
Pollution	Degree 2 (for details, see page8)
<b>Storage Condition</b>	-10°C~70°C, 70% RH (maximum)
<b>Accessories</b>	User manual, Programming manual, Cable gland, AC power cord, AC input cover, O/P terminal cover

**PSH-2018A/ 3610A**

<b>Output</b>	PSH-2018A	20V, 18A
	PSH-3610A	36V, 10A
<b>Regulation (C.V.)</b>	Load	$\leq 0.1\% + 5\text{mV}$
	Line	$\leq 0.05\% + 5\text{mV}$
<b>Regulation (C.C.)</b>	Load	$\leq 0.2\% + 5\text{mA}$
	Line	$\leq 0.2\% + 5\text{mA}$
<b>Ripple &amp; Noise</b>	Voltage (mVrms)	$\leq 10\text{mVrms}, 100\text{mVpp},$ 20Hz~20MHz
	Current (mArms)	$\leq 0.2\%$
<b>Program Accuracy</b>	Voltage	$\leq 0.05\% + 25\text{mV}$ (rating $\leq 36\text{V}$ ) $\leq 0.05\% + 50\text{mV}$ (rating $> 36\text{V}$ )
	OVP	$\leq 0.1\% + 50\text{mV}$ (rating $\leq 36\text{V}$ ) $\leq 0.1\% + 100\text{mV}$ (rating $> 36\text{V}$ )
	Current	$\leq 0.2\% + 30\text{mA}$
<b>Program Resolution</b>	Voltage & OVP	10mV (rating $\leq 36\text{V}$ ) 20mV (rating $> 36\text{V}$ )
	Current	10mA
<b>Readback (Meter) Accuracy</b>	Voltage	$\leq 0.05\% + 25\text{mV}$ (rating $\leq 36\text{V}$ ) $\leq 0.05\% + 50\text{mV}$ (rating $> 36\text{V}$ )
	Current	$\leq 0.2\% + 30\text{mA}$
<b>Readback (Meter) Resolution</b>	Voltage	10mV (rating $\leq 36\text{V}$ ) 20mV (rating $> 36\text{V}$ )
	Current	10mA
<b>Fuse</b>	6.3A/ 250V AC x 2	
<b>Dimensions</b>	108 x 141 x 388 mm	
<b>Weight</b>	Approx. 3.3kg	

**PSH-3620A**

<b>Output</b>	PSH-3620A	36V, 20A
<b>Regulation (C.V.)</b>	Load	$\leq 0.1\% + 5\text{mV}$
	Line	$\leq 0.05\% + 5\text{mV}$
<b>Regulation (C.C.)</b>	Load	$\leq 0.2\% + 10\text{mA}$
	Line	$\leq 0.2\% + 10\text{mA}$
<b>Ripple &amp; Noise</b>	Voltage (mVrms)	$\leq 10\text{mVrms}, 100\text{mVpp},$ 20Hz~20MHz
	Current (mArms)	$\leq 0.2\% + 20\text{mA}$
<b>Program Accuracy</b>	Voltage	$\leq 0.05\% + 25\text{mV}$ (rating $\leq 36\text{V}$ )
		$\leq 0.05\% + 50\text{mV}$ (rating $> 36\text{V}$ )
	OVP	$\leq 0.1\% + 50\text{mV}$ (rating $\leq 36\text{V}$ )
		$\leq 0.1\% + 100\text{mV}$ (rating $> 36\text{V}$ )
Current	$\leq 0.2\% + 60\text{mA}$ (rating $\leq 10\text{V}$ )	
	$\leq 0.2\% + 30\text{mA}$ (rating $\leq 60\text{V}$ )	
<b>Program Resolution</b>	Voltage & OVP	10mV (rating $\leq 36\text{V}$ )
		20mV (rating $> 36\text{V}$ )
	Current	20mA (rating $\leq 10\text{V}$ ) 10mA (rating $\leq 60\text{V}$ )
<b>Readback (Meter) Accuracy</b>	Voltage	$\leq 0.05\% + 25\text{mV}$ (rating $\leq 36\text{V}$ )
		$\leq 0.05\% + 50\text{mV}$ (rating $> 36\text{V}$ )
<b>Readback (Meter) Resolution</b>	Voltage	10mV (rating $\leq 36\text{V}$ )
		20mV (rating $> 36\text{V}$ )
<b>Readback (Meter) Resolution</b>	Current	20mA (rating $\leq 10\text{V}$ )
		10mA (rating $\leq 60\text{V}$ )
<b>Fuse</b>	6.3A/ 250VAC x 2, 0.5A/ 250VAC x 1, 15A/ 250VAC x 1	
<b>Dimensions</b>	188 x 141 x 388 mm	
<b>Weight</b>	Approx. 6.2kg	

**PSH-3630A**

<b>Output</b>	PSH-3630A	36V, 30A
<b>Regulation (C.V.)</b>	Load	$\leq 0.1\% + 5\text{mV}$
	Line	$\leq 0.05\% + 5\text{mV}$
<b>Regulation (C.C.)</b>	Load	$\leq 0.2\% + 15\text{mA}$
	Line	$\leq 0.2\% + 15\text{mA}$
<b>Ripple &amp; Noise</b>	Voltage (mVrms)	$\leq 10\text{mVrms}$ , 100mVpp, 20Hz~20MHz
	Current (mArms)	$\leq 0.2\% + 40\text{mA}$
<b>Program Accuracy</b>	Voltage	$\leq 0.05\% + 25\text{mV}$ (rating $\leq 36\text{V}$ )
		$\leq 0.05\% + 50\text{mV}$ (rating $> 36\text{V}$ )
	OVP	$\leq 0.1\% + 50\text{mV}$ (rating $\leq 36\text{V}$ )
		$\leq 0.1\% + 100\text{mV}$ (rating $> 36\text{V}$ )
Current	$\leq 0.2\% + 90\text{mA}$ (rating $\leq 10\text{V}$ )	
	$\leq 0.2\% + 60\text{mA}$ (rating $\leq 20\text{V}$ )	
	$\leq 0.2\% + 30\text{mA}$ (rating $\leq 60\text{V}$ )	
<b>Program Resolution</b>	Voltage & OVP	10mV (rating $\leq 36\text{V}$ )
		20mV (rating $> 36\text{V}$ )
	Current	30mA (rating $\leq 10\text{V}$ )
		20mA (rating $\leq 20\text{V}$ ) 10mA (rating $\leq 60\text{V}$ )
<b>Readback (Meter) Accuracy</b>	Voltage	$\leq 0.05\% + 25\text{mV}$ (rating $\leq 36\text{V}$ )
		$\leq 0.05\% + 50\text{mV}$ (rating $> 36\text{V}$ )
	Current	$\leq 0.2\% + 90\text{mA}$ (rating $\leq 10\text{V}$ )
		$\leq 0.2\% + 60\text{mA}$ (rating $\leq 20\text{V}$ ) $\leq 0.2\% + 30\text{Ma}$ (rating $\leq 60\text{V}$ )
<b>Readback (Meter) Resolution</b>	Voltage	10mV (rating $\leq 36\text{V}$ )
		20mV (rating $> 36\text{V}$ )
	Current	30mA (rating $\leq 10\text{V}$ )
		20mA (rating $\leq 20\text{V}$ ) 10mA (rating $\leq 60\text{V}$ )
<b>Fuse</b>	6.3A/ 250VAC x 3, 0.5A/ 250VAC x 1, 20A/ 250VAC x 1	
<b>Dimensions</b>	268 x 141 x 388 mm	
<b>Weight</b>	Approx. 9.3kg	

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**北京海洋兴业科技股份有限公司** (证券代码: 839145)

北京市西三旗东黄平路19号龙旗广场4号楼 (E座) 906室

电话: 010-62176775 62178811 62176785

企业QQ: 800057747 维修QQ: 508005118

企业官网: [www.hyxyyq.com](http://www.hyxyyq.com)

邮编: 100096

传真: 010-62176619

邮箱: [market@oitek.com.cn](mailto:market@oitek.com.cn)

购线网: [www.gooxian.com](http://www.gooxian.com)



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