

**KIKUSUI**

PART NO. Z1-006-580, I0035003
Apr 2024

Setup Guide

Large-Capacity DC Electronic Load
Smart Rack System

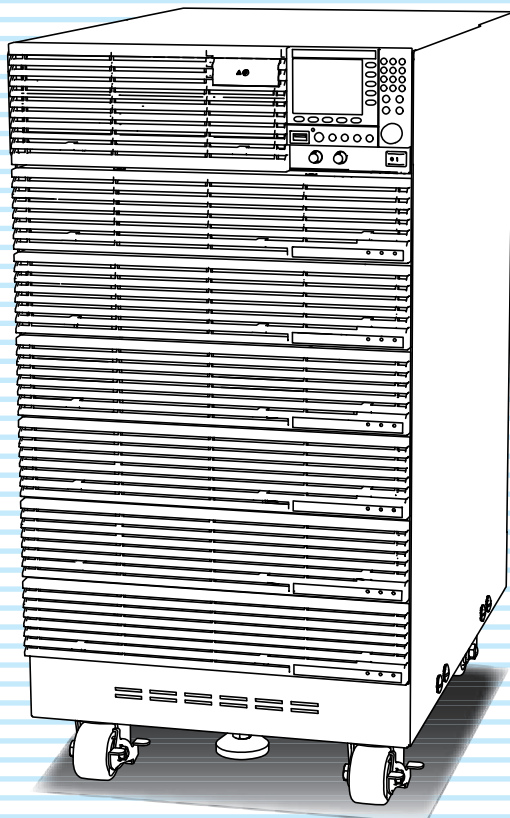
PLZ-5W SR Series

PLZ6005W SR

PLZ10005W SR

PLZ15005W SR

PLZ20005W SR



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About this Manual

This manual provides an overview of the product and notes on usage. It also explains how to configure it, operate it, perform maintenance on it, and so on. Read this manual thoroughly before use, and use the product properly.

Who should read this manual?

These manuals are intended for users of this product and their instructors. Explanations are given under the presumption that the reader has knowledge of power supplies.

Manual construction

- PLZ-5W Series User's Manual 
This manual provides an overview of the PLZ1205W master unit and notes on usage. It also explains how to configure it, operate it, perform maintenance on it, and so on. After reading the Setup Guide and the PLZ-5W SR is ready for use, read this manual to use the available features effectively.
- Specifications 
This document contains the specifications of the PLZ-5W SR series.
- Communication Interface Manual  (partially in PDF)
This manual explains how to control the product remotely using SCPI commands. The interface manual is written for readers with sufficient basic knowledge of how to control measuring instruments using a PC. The command list is provided in PDF format.
- PLZ-5W Series Quick Reference  
The quick reference briefly explains the control panel and the basic operation of it.
- Setup Guide   (this guide)
This guide is intended for users who are using the PLZ-5W SR series for the first time. It covers topics related to setting up the product such as preparing the product, connecting the EUT, and connecting various connectors.
- Booster PLZ2405WB Operation Manual 
This manual explains the PLZ2405WB.
- Safety Information  
This document contains general safety precautions. Keep them in mind and make sure to observe them.

PDF and HTML files are included in the accompanying CD-ROM.

The newest version of the operation manual can be downloaded from Download service of Kikusui website.

Firmware versions that this manual covers

This manual applies to products with firmware versions 1.0X. For information on how to check the firmware version, see "Displaying the Device Information" the PLZ-5W series user's manual.

When contacting us about the product, please provide us with the following information.

- Model (marked in the bottom section of the front panel)
- Firmware version
- Serial number (marked on the top of the load input terminal cover)

For users who own the older models (products with handles)

Handles are implemented on the left and right sides in some older models. But, the handles have not been implemented in the current model.

In this manual, the illustrations of the product without handles are basically used for explanation. Only the explanation about the handles is provided separately with and without handles.

KIKUSUI ELECTRONICS CORP.

1-1-3 Higashiyamata, Tsuzuki-ku, Yokohama,
224-0023, Japan

Phone: +81-45-482-6353

Facsimile: +81-45-482-6261

global.kikusui.co.jp



Product Overview

The PLZ-5W SR is a large current capacity model with a PLZ1205W DC Electronic Load and PLZ2405WB Electronic Load Boosters mounted on a dedicated rack.

You can control the product externally using external analog signals and control it remotely using RS232C, USB, and LAN communication features.

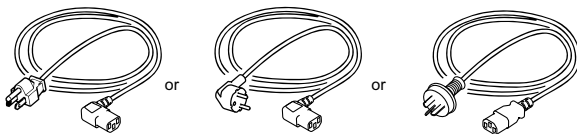
Checking the Package Contents

When you receive the product, check that all accessories are included and that the accessories have not been damaged during transportation.

If the main unit or any of the accessories are damaged or missing, contact your Kikusui agent or distributor.

We recommend that you save all packing materials, in case the product needs to be transported at a later date.

The attached power cord varies depending on the shipment destination.

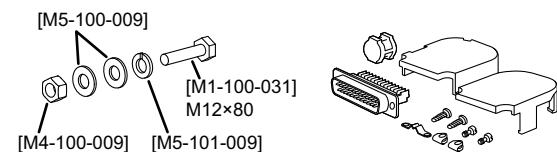


Plug: NEMA5-15
Rating: 125 Vac/10 A
[85-AA-0003]

Plug: CEE7/7
Rating: 250Vac/10A
[85-10-1070]

Plug: GB1002
Rating: 250Vac/10A
[85-10-0791]

☐ Power cord (1 pc., approx. 2.5 m)



☐ Load input terminal
screw set (8 sets)

☐ External control
connector kit (1 set)
[83-20-0190]

☐ Heavy object warning label (1 pc.)

If necessary, attach to the product.

PLZ6005W SR: [A8-900-157]
PLZ10005W SR: [A8-900-158]
PLZ15005W SR: [A8-900-158]
PLZ20005W SR: [A8-900-158]

☐ Setup Guide
(this manual, 1 copy)

☐ CD-ROM (1 disk)

☐ China RoHS sheet (1 sheet)

☐ PLZ-5W Series
Quick Reference
(Japanese (1 sheet),
English (1 sheet))

☐ Safety Information (1 pc.)

Notations Used in This Manual

- In this manual, large-capacity DC electronic loads PLZ6005W SR, PLZ10005W SR, PLZ15005W SR, PLZ20005W SR are referred to as the PLZ-5W SR.
- In this manual, electronic load PLZ1205W is sometimes referred to as PLZ-5W.
- The screen captures and illustrations used in this manual may differ from the actual items.
- The term "PC" is used to refer generally to both personal computers and workstations.
- The following markings are used in the explanations in this manual.

⚠ WARNING

Indicates a potentially hazardous situation which, if ignored, could result in death or serious injury.

⚠ CAUTION

Indicates a potentially hazardous situation which, if ignored, may result in slight injury or damage to the product and other property.

NOTE

Indicates information that you should know.

Contents of the Included CD-ROM

Load the included CD-ROM into the CD-ROM drive. After a moment, an AutoPlay window appears. click Run rundll32.exe to display the start window. You can also open the CD-ROM folder in Windows Explorer and then double-click index.html to display the start window.

The CD-ROM contains the following items.

- PLZ-5W SR Series Setup Guide (PDF)
- PLZ-5W SR Series Specifications (PDF)
- PLZ-5W Series User's Manual (PDF)
- PLZ-5W Series Quick Reference (PDF)
- PLZ-5W Series Communication Interface Manual (HTML, PDF)
- PLZ2405WB Operation Manual (PDF)



Safety Precautions

When using this product, be sure to observe the “Safety Precautions” in the Safety information manual. The following precautions pertain only to this product.

- The rear panel may become hot during operation. If you touch it, you may burn yourself.
- Do not use the product where ventilation is poor. Heat is expelled from vents of the rear panel. To prevent the heat from building up and causing a fire, keep the vents at least 60 cm away from walls. Also, do not place objects within 60 cm of the rear panel.



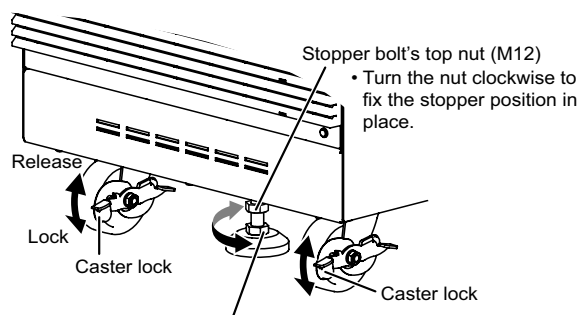
Precautions Concerning Installation Location

When installing this product, be sure to observe the “Precautions Concerning Installation Location” in the Safety information manual. The following precautions pertain only to this product.

- When installing this product, be sure to observe the temperature and humidity ranges indicated below.
Operating temperature range: 0 °C to 40 °C (32 °F to 104 °F)
Operating humidity range: 20 %rh to 85 %rh (no condensation)
- When storing this product, be sure to observe the temperature and humidity ranges indicated below.
Storage temperature range: -20 °C to 70 °C (-4 °F to 158 °F)
Storage humidity range: 90 %rh or less (no condensation)

Fixing the product in place

This product has casters on its bottom side, so it is easy to move the product. To ensure that the product is not moved accidentally while it is being operated, lock the casters, and fix the product in place by lowering the stoppers to the floor.



Stopper bolt's bottom nut (M12)

- Turn the nut clockwise to lower the stopper (lock).
- Turn the nut counterclockwise to raise the stopper (unlock).



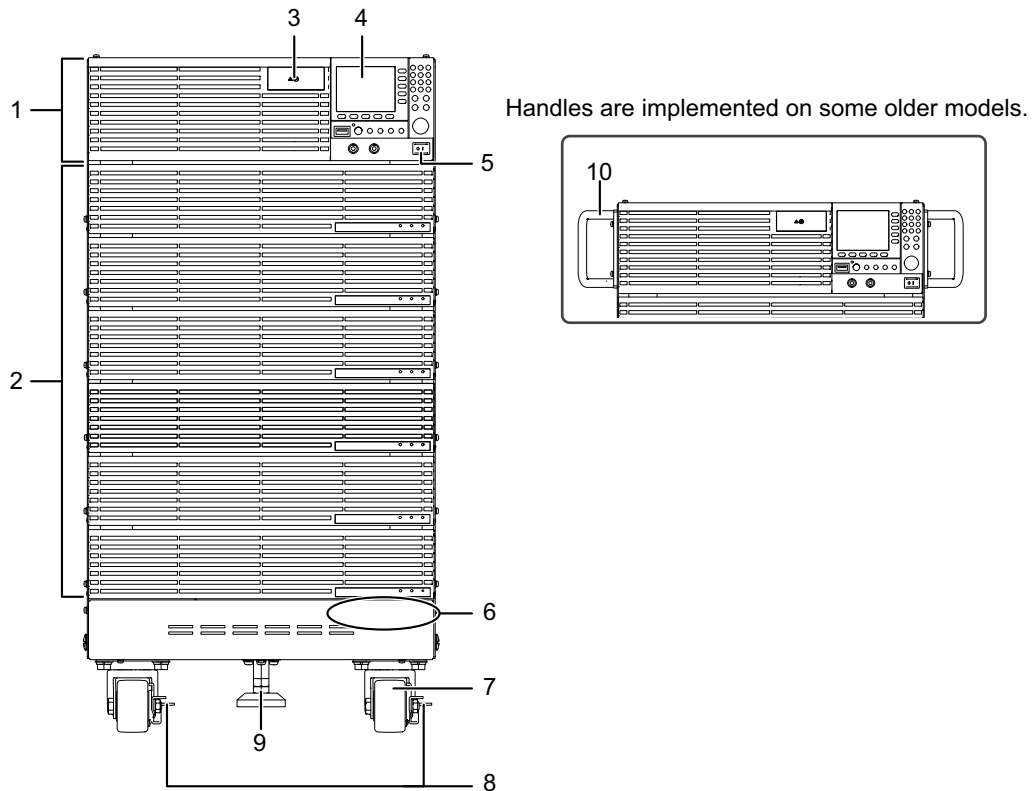
Precautions to Be Taken When Moving the Product

When moving this product, be sure to observe the “Precautions to Be Taken When Moving the Product” in the Safety information manual. The following precautions pertain only to this product.

- If the stopper bolt has been used to fix the product in place, release the stopper. Moving the product without releasing the stopper may cause injuries due to the product falling over.
- When you are moving the product from one location to another, if you must leave it unattended, be sure to use the caster locks or the stopper bolt to ensure that the product stays in place.
- If you are using a forklift to move the product, be sure to slide the forks under the bottom of the product, check that the product is stable, and then raise the product. If you are using a crane to move the product, be sure to slide the band under the bottom of the product, check that the product is stable, and then raise the product.
- If the product has handles, do not use them to lift the product. The handles are for moving the product on its casters. The handles are not strong enough to support the weight of the product.
- Do not tip the product on its side or turn it upside down.

Component Names

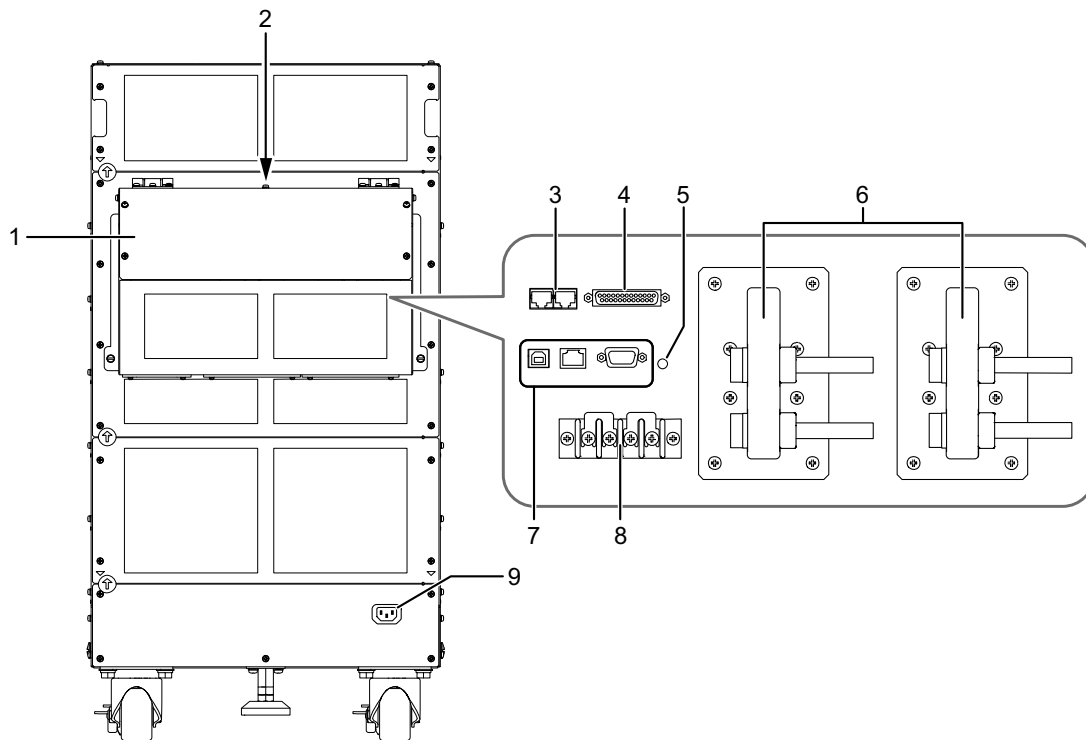
Front panel (example of PLZ15005W SR)



No.	Name	Description	See
1	Master unit (PLZ1205W)	Connected in parallel with boosters.	—
2	Booster (PLZ2405WB)	Connected in parallel with a master unit and boosters. PLZ6005W SR: 2 units, PLZ10005W SR: 4 units, PLZ15005W SR: 6 units, PLZ20005W SR: 8 units	—
3	Front-panel load input terminal cover	Not used. Do not remove the cover.	—
4	Display	Displays the settings, measured values, and other information.	—
5	POWER switch	Press the I side to switch the power on, and the O side to switch the power off.	p.8
6	Model	Indicates the model.	—
7	Casters	Four locations on the bottom side.	—
8	Caster locks	Lock casters.	p.4
9	Stopper bolt	For fixing bottom panel.	p.4
10	Handle	Handle for moving the product on its casters.	—

Component Names (continued)

Rear panel (example of PLZ15005W SR)



No.	Name	Description	See
1	Load input terminal cover	Open this cover when connecting various cables. After making the connections, be sure to close the cover.	p.10
2	Serial number	PLZ-5W SR serial number. Indicated on the top side of the load input terminal cover.	–
3	EXT SYNC connector	Connector for synchronized operation.	p.18
4	EXT CONT connector	External control connector.	p.20
5	DC OUT 5V connector	Used with the optional GPIB converter (PIA5100). For details, see the GPIB converter manual contained in the included CD-ROM.	PIA5100 Operation Manual
6	DC INPUT terminal (load input terminal)	Used to connect the EUT and the PLZ-5W SR.	p.13
7	USB port LAN port RS232C port	Remote control connector. For details on remote control, see the Communication Interface Manual on the included CD-ROM.	p.21 , Interface Manual
8	SENSING connector	Remote sensing connector.	p.16
9	AC INPUT connector	Power inlet.	p.7

1 Preparation

This chapter describes how to connect the power cord and how to turn the power on and off.

Connecting the Power Cord



WARNING

Risk of electric shock.

- This product conforms to IEC Safety Class I (equipment that has a protective conductor terminal). Be sure to earth ground the product to prevent electric shock.
- The product is grounded through the power cord ground wire. Connect the protective conductor terminal to earth ground.

NOTE

- Use the included power cord to connect to the AC line.
If the supplied power cord cannot be used because the rated voltage or the plug shape is incompatible, have a qualified engineer replace it with an appropriate power cord that is 3 m or less in length. If obtaining a power cord is difficult, contact your Kikusui agent or distributor.
- Do not use the supplied power cord with other instruments.
- The power cord with a plug can be used to disconnect the product from the AC power line in an emergency. Connect the plug to an easily accessible power outlet so that the plug can be removed from the outlet at any time.
- Secure adequate space around the power cord plug. Do not insert the power cord plug into an outlet that is difficult to access or place objects around the power cord plug that will make plugging and unplugging difficult.

This product conforms to IEC Overvoltage Category II (energy-consuming equipment that is supplied from a fixed installation).

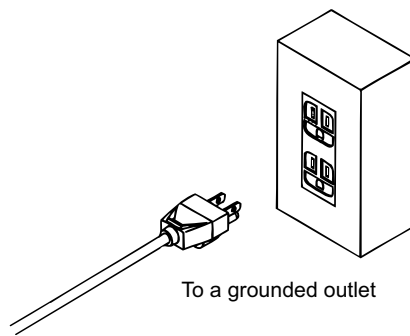
1 Turn the POWER switch off (○).

2 Check that the AC power line meets the nominal input rating of the product.

The product can receive a nominal line voltage in the range of 100 Vac to 240 Vac at 50 Hz or 60 Hz (frequency range: 47 Hz to 63 Hz).

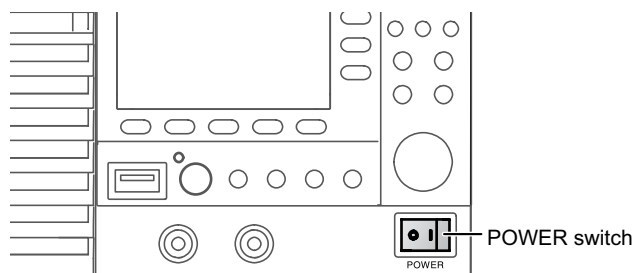
3 Connect the power cord to the AC INPUT inlet on the rear panel.

- 4** Connect the power cord plug to a properly grounded outlet.



Checking Whether the Power Is On or Off

Turning the power on



- 1** Check that the power cord is connected correctly.
- 2** Check that nothing is connected to the load input terminals (DC INPUT).
- 3** Turn the **POWER** switch on (I).
After the startup screen, the load value input screen appears.



If you notice strange sounds, unusual odors, fire, or smoke around or from inside the PLZ-5W SR, turn off the power switch (O), or turn off the switchboard breaker.

By factory default, the panel settings immediately before the POWER switch is turned off are saved. If you turn the power on, the PLZ-5W SR starts in the same state as it was in the last time that it was turned off. (However, the load setting is always Load Off.)

The panel setting state at startup can be changed. For details, see the PLZ-5W Series User's Manual.

When the product does not start properly

If the product does not start when the power is turned on, follow the appropriate remedy shown below. If following the remedy does not solve your problem, contact your Kikusui agent or distributor.

Condition	Remedy
Nothing is shown on the display.	Check that the power cord is not broken and that the connection at the AC INPUT terminal is secure.
An alarm is occurring.	See "Alarm types and operation" and "Clearing an alarm" in the PLZ-5W Series User's Manual, eliminate the root cause of the alarm, and then clear the alarm.

Turning the power off

Press the (O) side of the POWER switch to turn the power off.



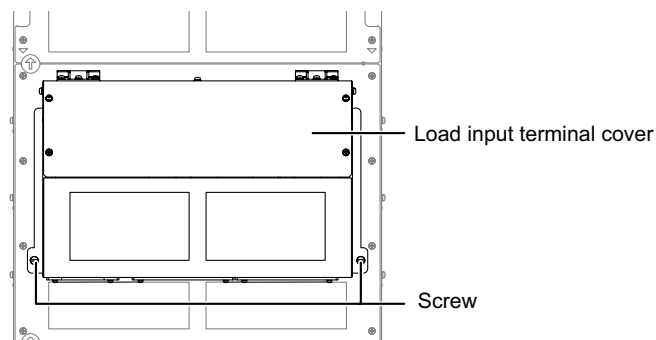
CAUTION If you want to turn the POWER switch back on, wait at least 5 seconds after the fan stops. Repeatedly turning the POWER switch on and off at short intervals can cause damage to the inrush current limiter. Furthermore, this will shorten the service life of the POWER switch, fuse, and other components.

Operating the Load Input Terminal Cover

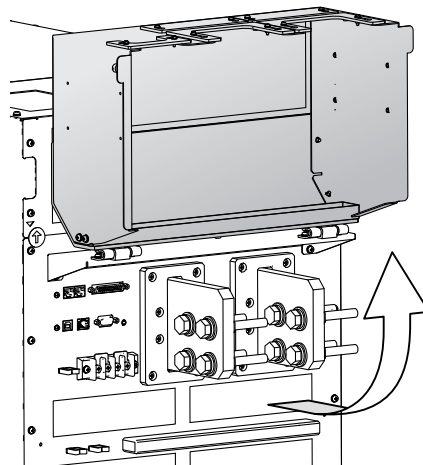
When you open the load input terminal cover, you can connect cables to the terminals and cables on the rear panel. After making the connections, be sure to close the cover. Adjusting the position of the lock plate provided with the load input terminal cover makes the opening narrower for safer use.

Opening the load input terminal cover

- 1 Turn the **POWER** switch off (O).
- 2 Loosen the screws holding the load input terminal cover on the rear panel.

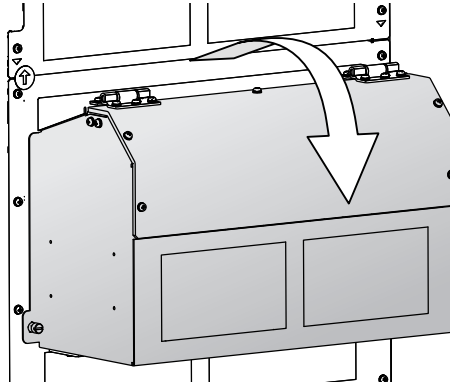


- 3 Open the load input terminal cover.



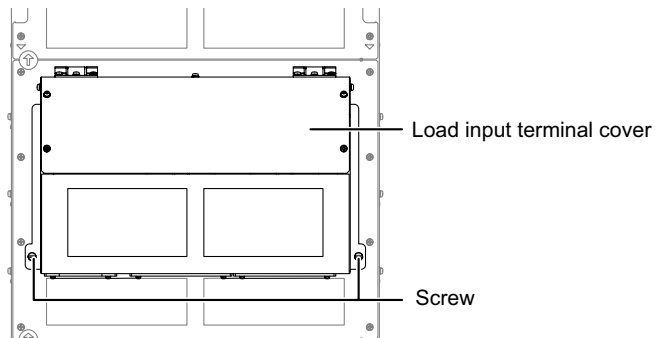
Closing the load input terminal cover

- 1 Close the load input terminal cover.



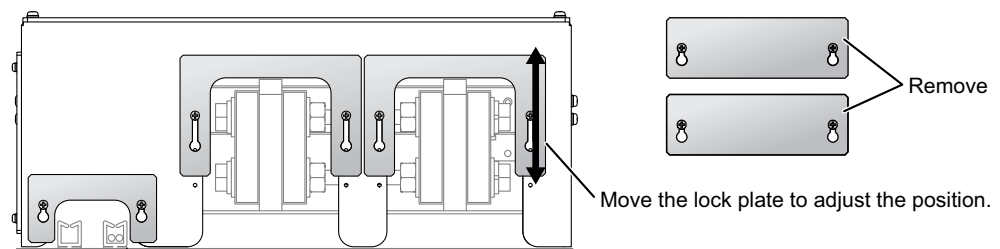
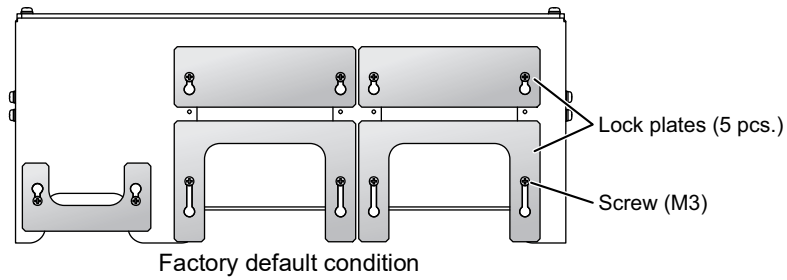
- 2 Tighten the screws holding the load input terminal cover on the rear panel.

Fasten the covers correctly to prevent them from moving.

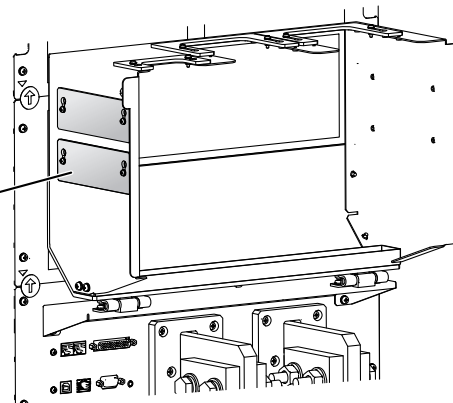


Adjusting the lock plate

You can adjust the opening according to the load cables and other various cables in use.



Removed lock plates can be stored by attaching them to the side of the load input terminal cover.



2 Connecting the EUT

This chapter describes how to connect the EUT to the PLZ-5W SR.

Connecting the Load Cables

Using load cables, connect the EUT to the product through the load input terminals on the rear panel.

The load input terminals on the front panel are for using a standalone PLZ1205W in a simple manner. Do not use these terminals as this product uses parallel operation.

Selecting the load cables

Select load cables that are suitable for the current to be used. You can use the optional large-current load cables. For details on large-current load cables, see the large-current load cable manual in the included CD-ROM.



WARNING

- **Risk of fire. Use load cables whose capacity is adequate for the product's rated input current.**
- **Risk of electric shock. Use load cables with a voltage rating that meets or exceeds the product's isolation voltage (± 500 Vdc).**



CAUTION

- Use load cables with a core diameter that is appropriate for the amount of current being used and with sturdy, flame-resistant insulation.

■ Current capacity of load cables

If the load cable resistance is large, a large voltage drop may occur when current flows through the cables. This may result in the load input terminal voltage being lower than the minimum operating voltage of this product. Refer to the table below, run multiple cables in parallel to provide adequate wiring for the current.

A cable's temperature is determined by the resistive loss based on the current, the ambient temperature, and the cable's external thermal resistance. The following table shows the current capacity of heat-resistant vinyl cables that have a maximum allowable temperature of 60 °C when one of the cables is separated and stretched out horizontally in air in an ambient temperature of 30 °C. The current must be reduced under certain conditions, such as when vinyl cables that have a low heat resistance are used, when the ambient temperature is 30 °C or greater, or when cables are bundled together and little heat is radiated.

Nominal cross-sectional area [mm ²]	AWG (reference cross-sectional area; mm ²)	Allowable current ¹ [A](Ta = 30 °C)	Kikusui-recommended current [A]
80	3/0 (85.01)	257	200
100	4/0 (107.2)	298	-
125	-	344	-
150	-	395	300
200	-	469	400
250	-	556	-
325	-	650	600
400	-	745	-
500	-	842	-
600	-	930	-
800	-	1080	-
1000	-	1260	-

1. Excerpt from Japanese laws related to electrical equipment.

■ Taking measures against noise

When connecting cables that have the same heat resistance, separating the cables as much as possible to increase heat radiation enables a greater amount of current to flow. However, running the + (positive) and - (negative) output load cables side by side or bundling them together is more effective against unwanted noise. The Kikusui-recommended currents shown in "Current capacity of load cables" (p.14) are allowable currents that have been reduced in consideration of the potential bundling of load cables. Use these values as a guideline when connecting cables.

■ Limitations of the remote sensing function

All wires have resistance. As the wire becomes longer or the current becomes larger, the voltage drop in the wire becomes greater. This results in a smaller voltage being applied at the load input terminal. The PLZ-5W SR has a sensing function (p.16) that compensates for this voltage drop, which is the total potential difference between the load input terminals and sensing terminals, by up to approximately 7 V. If the voltage drop exceeds this level, use wires that have a greater cross-sectional area.

Connecting the load cables

Using load cables, connect the EUT to the product through the load input terminals on the rear panel.



WARNING Risk of electric shock.

- Do not touch load input terminals when the output is turned on.
- The load input terminals on the front panel are connected internally to the load input terminals on the rear panel. The voltage applied to the terminal on one side is transmitted directly to the terminal on the other side.

Risk of burns.

- Load input terminals may become hot. Before you touch the load input terminals, turn the POWER switch off, and allow a sufficient amount of time for the terminals to cool off.



CAUTION Risk of damage.

- Do not connect the EUT to the load input terminals while the product's load is turned on.
- Do not use the load input terminals on the front panel.

Risk of overheating.

- Attach crimping terminals to the cables, and use the supplied screws to connect the cables.

1 Open the load input terminal cover (p.10).

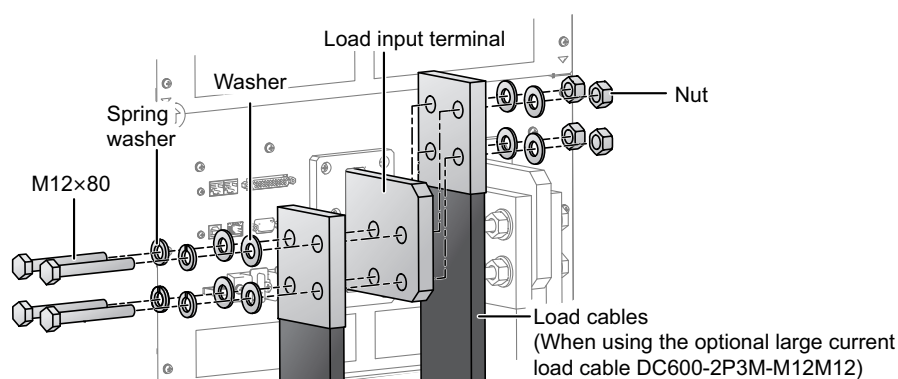
2 Attach crimping terminals to the load cables.

Attach crimping terminals that are appropriate for the bolts (M12) that are to be used.

3 Connect the load cables to the load input terminals.

Use the supplied bolts, nuts, washers, and spring washers to secure the cables or wires in place.

Tightening torque: 33.06 N·m



To connect sensing cables, see "Connecting the Sensing Cables" (p.16) .

4 Adjust the positions of the lock plates for the load input terminal cover (p.12).

5 Close the load input terminal cover (p.11).

Connecting the Sensing Cables

Using the remote sensing function makes it possible to change a voltage measurement point from a load input terminal to an arbitrary sensing point. By setting sensing points at the EUT end, influences such as voltage drops caused by the resistance of the load cables can be reduced, and the load current can be stabilized.

To use remote sensing, connect the sensing cables to the sensing terminals of the PLZ-5W SR and the EUT end, and enable the remote sensing function.

Unlike the load cables, there is no need to consider the current capacity for the sensing cables. However, for adequate mechanical strength, use wires whose nominal cross-sectional area is 0.5 mm^2 or greater.

⚠ CAUTION

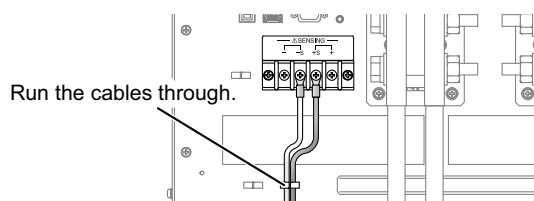
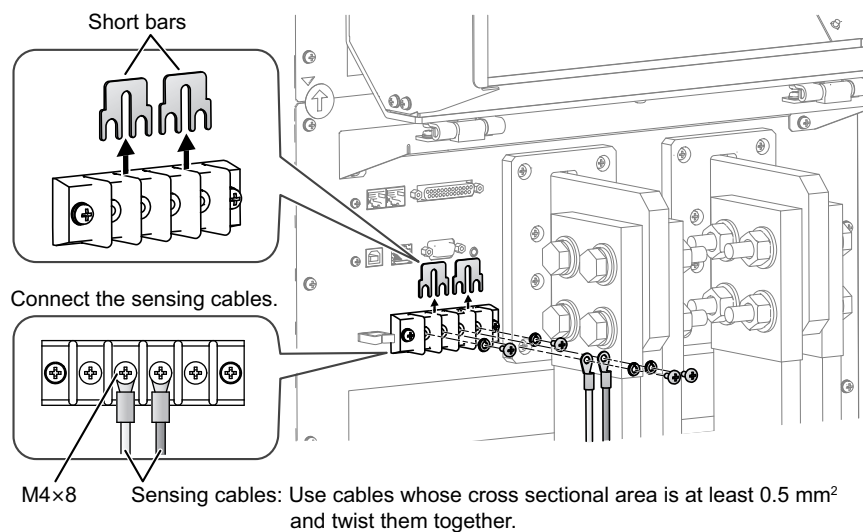
- Risk of damage to the internal circuitry. Do not wire the sensing terminals while the POWER switch is turned on.
- If the remote sensing cables come loose while remote sensing is in use, the PLZ-5W SR and EUT may be damaged. Be sure to connect the cables securely.
- If you are not using remote sensing, remove the sensing cables, and be sure to attach the two short bars to the sensing terminals.

1 Open the load input terminal cover (p.10).

2 Connect the sensing cables.

Remove the two short bars from the sensing terminals, and then connect the cables.

Tightening torque: $1.2 \text{ N}\cdot\text{m}$



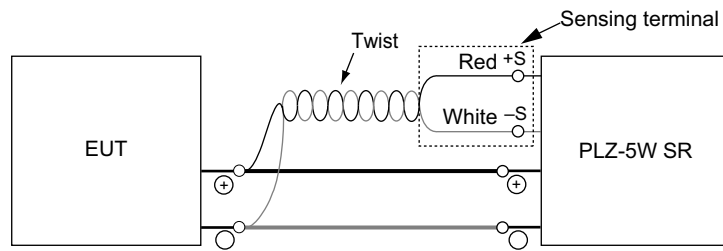
Short bars must be connected to the sensing terminals when remote sensing is not in use. Store the short bars in a safe place.

3 Adjust the positions of the lock plates for the load input terminal cover (p.12).

4 Close the load input terminal cover (p.11).

5 Connect the sensing cables to the EUT.

Connect the cables as shown in the figure.
Connect the cables as close to the EUT as possible.



For details on enabling the remote sensing function, see the PLZ-5W user's manual.

3 Other Connections

This chapter explains how to connect the PLZ-5W SR to other devices when performing synchronized operation, external control, and remote control.

Connection for Synchronized Operation

You can use the synchronization feature simply by connecting several PLZ-5W SRs or PLZ-5W series with LAN cables. For details on the synchronization feature, see the PLZ-5W Series User's Manual.

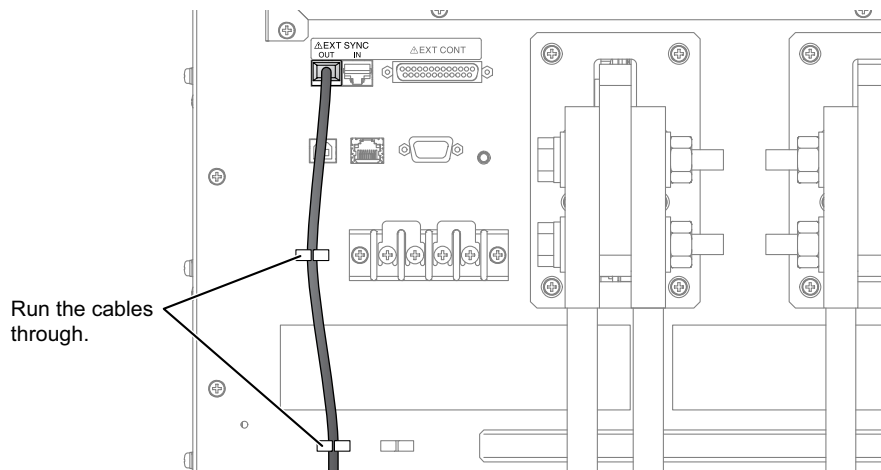
You can connect a mixture of various PLZ-5W SR and PLZ-5W series models (for example, PLZ15005W SR and PLZ1205W). Typical LAN cables (straight) up to 30 m long can be used. To use LAN cables more than 30 m long, please contact your Kikusui agent or distributor.



WARNING Risk of electric shock.

- Do not touch the IN/OUT connectors of EXT SYNC while the power is turned ON.
- Do not leave one end of the LAN cable unconnected while the other end is connected to the EXT SYNC connector.

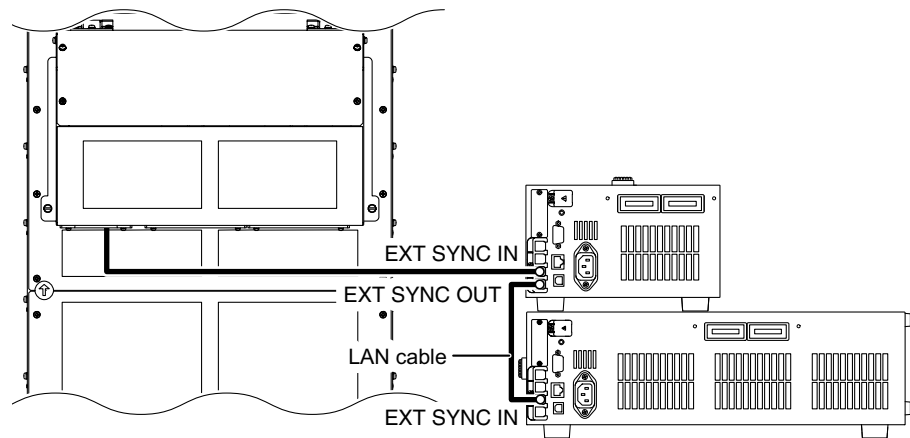
- 1 Turn the **POWER** switches of all the PLZ-5W SRs and PLZ-5W series units that you will connect.
- 2 Open the load input terminal cover (p.10).
- 3 Connect a LAN cable to the **OUT** connector of **EXT SYNC**.



- 4 Adjust the positions of the lock plates for the load input terminal cover (p.12).
- 5 Close the load input terminal cover (p.11).
- 6 Connect a LAN cable to the **IN** connector of **EXT SYNC** on another device that you want to synchronize with.

For details on connecting to the PLZ-5W series, see the PLZ-5W Series User's Manual. For your safety, be sure to attach the SYNC/PARALLEL terminal cover.

7 Connect all PLZ-5W SR and PLZ-5W series units with LAN cables.



Connection example (when connecting the PLZ15005W SR, PLZ205W, PLZ1205W)
This completes the connections.

Connecting the External Control Device

By connecting the rear-panel EXT CONT connector, front-panel BNC connectors (I MON OUT connector, TRIG OUT connector) to an external device with signal cables, you can control and monitor the PLZ-5W SR from the external device (external control).

The BNC connectors are isolated from the chassis and load input terminals.

For details on external control and how to use it, see the PLZ-5W Series User's Manual.

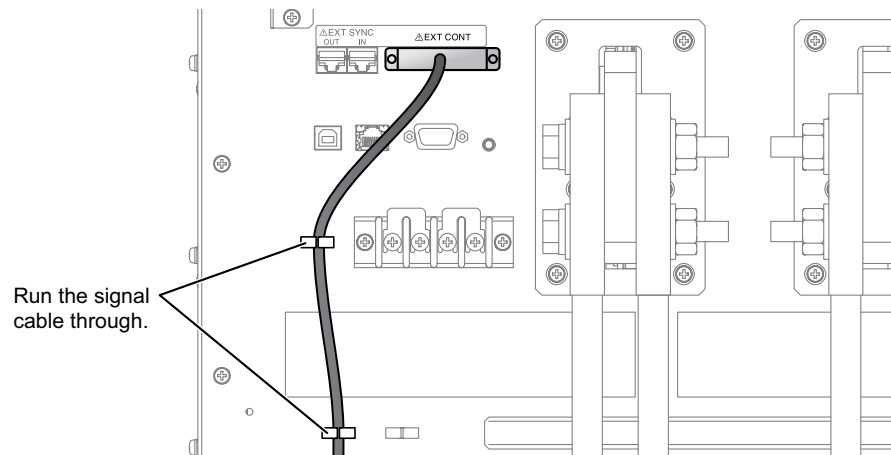
External control connector kit

To connect the signal cable to the EXT CONT connector, use the included external control connector kit. For information about how to use this kit, see the TE Connectivity (formerly AMP) catalog. For information about how to obtain these tools or replacement parts, contact your Kikusui agent or distributor.

Connector model (on the PLZ-5W SR)	5747461-3 [made by TE Connectivity]
Plug model	745211-7 [made by TE Connectivity]
Wire diameter	AWG26 to AWG22
Manual pressure welding tool	Handle assembly 58074-1 [made by TE Connectivity] Head assembly 58063-2 [made by TE Connectivity]
Insertion/extraction tool	91232-1 [made by TE Connectivity] or equivalent

Connecting to the EXT CONT connector

- 1 Open the load input terminal cover (p.10).
- 2 Connect the signal cable to the EXT CONT connector.



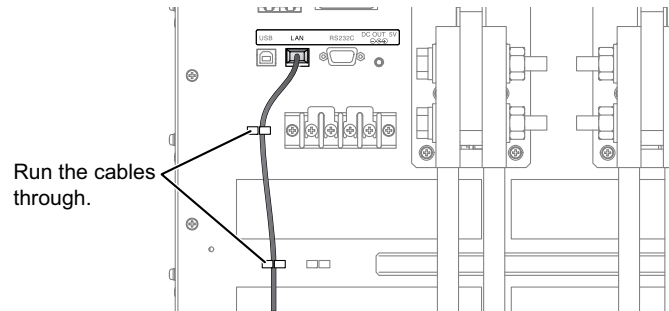
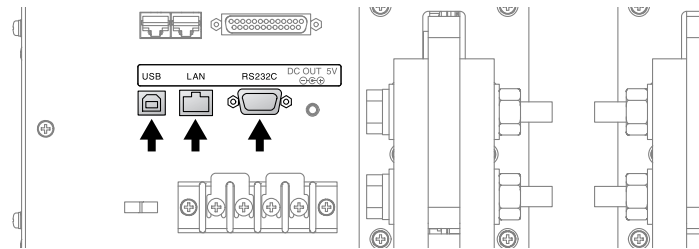
- 3 Adjust the positions of the lock plates for the load input terminal cover (p.12).
- 4 Close the load input terminal cover (p.11).
- 5 Connect the signal cable to the external controller.
This completes the external control connection procedure.

Connecting the Remote Control Device

In addition to using the front panel, you can also control the PLZ-5W SR remotely by sending commands. To use remote control, connect a cable to the interface connector on the rear panel.

For details on remote control and how to use it, see the Communication Interface Manual on the included CD-ROM.

- 1 Open the load input terminal cover ([p.10](#)).
- 2 Connect a cable to the interface connector that you want to use.



Example: When a LAN cable is connected

- 3 Adjust the positions of the lock plates for the load input terminal cover ([p.12](#)).
- 4 Close the load input terminal cover ([p.11](#)).

Warranty

Warranty Period

Before delivery, our products have undergone strict testing and inspections and have been found to comply with the specifications. We offer different warranty periods for different product models. If the product should become defective within the specific warranty period applied to the product model after the date of purchase, we will repair the product or replace it with a new one for free. In a case in which the customer concluded a separate agreement with us regarding the warranty period, the conditions of the warranty period are applied based on such agreement.

Scope of Warranty

If the product should become defective within the warranty period, we will repair the product or replace it with a new one. However, the warranty does not cover:

- Failure or damage caused by use that is not in accordance with the Operation Manual, misuse, or neglect.
- Failure or damage during transportation after delivery.
- Failure or damage caused by improper modification, adjustment, or repair.
- Failure or damage caused by an Act of God, fire, or other events beyond our control.
- Failure or damage caused by use in a corrosive atmosphere, a dusty environment, or an environment where salt damage occurs or contamination by liquid or foreign matters is likely to occur.
- Failure or damage due to causes that are not attributable to us.

Disclaimer

Regardless of the warranty period, in no event shall we be liable for loss of opportunity or profit caused by the failure of our product, or initial or secondary damages, accident compensation, damages to products other than our products, or compensation for other operations caused by unavoidable circumstances that we may or may not have foreseen.

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The specifications of this product and the contents of this manual are subject to change without prior notice.

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Disposal

Dispose of the product in accordance with your local regulations.