TEXIO
Test and Measurement Solutions

User Manual

Programmable DC Regenerative Power Supply

PBW Series

PBW-502H **PBW-502HB**
PBW-103HP **PBW-103HS**

Warranty

Thank you for purchasing our measuring instrument.
Please read this instruction manual (hereinafter referred to as this instruction manual) carefully to the end so that you can fully demonstrate the performance of this instrument before using it. I would like to express my gratitude. Please keep this manual in a safe place.

Please keep your purchase statement (delivery note, receipt, etc.) in a safe place as it will serve as your warranty card.
If you have any questions regarding after-sales service or products, please contact our service center.

Guarantee

Our measuring instruments will be repaired free of charge for one year from the date of purchase for failures that occur during normal use.
Even within the warranty period, repair will be charged in the following cases.

1. Failure or damage caused by fire, natural disaster, abnormal voltage, etc.
2. Improper repair, adjustment, or modification.
3. Failure or damage caused by improper handling.
4. If the failure is caused by a cause other than this product.
5. If you do not present your purchase details.

This warranty is valid only in Japan.

If a product sold in Japan is brought overseas and breaks down, it will basically be repaired in Japan.
Even during the warranty period, you will be responsible for the transportation costs to our company.

There are items marked with ⚠ in this manual. This mark ⚠ of his is an important note for the safety of the customer who uses the instrument and for protecting the instrument from destruction and damage. Please read it carefully and use it correctly.

■ About a trademark, a registered trademark

TEXIO is our product brand in industrial electronics. In addition, the company name and the brand name mentioned in this instruction manual are the trademark or the registered trademark of each company or group in each country and region.

■ About this instruction manual

In addition, the specifications of the product and the contents of this instruction manual are subject to change without notice for improvement.

■ About export

This instrument is a model for exclusive use in Japan. Before taking this product out of the country or exporting it, please consult with us, each sales office, or our agency (dealer).

■ About hardware and firmware versions.

The contents described in this document correspond to PBW series hardware version 1.0 and firmware version 1.9.1008.2000 or higher.

Table of Contents

USING THE PRODUCT SAFELY

■ Preface

To use the product safely, read this instruction manual to the end.
Before using this product, understand how to correctly use it.

If you read this manual but you do not understand how to use it, please ask us or your local dealer. After you read this manual, save it so that you can read it, anytime as requied.

■ Pictorial indication

This instruction manual and product show the warning and caution items required to safely use the product. The following pictorial indication and warning character indication are provided.

<Pictorial indication>	
	Some part of this product or the instruction manual may shows this pictorial indication. In this case, if the product is incorrectly used in that part, a serious danger may be brought about on the user's body or the product. To use the part with this pictorial indication, be sure to refer to this instruction manual.
	If you use the product, ignoring this indication, you may get killed or seriously injured. This indication shows that the warning item to avoid the danger is provided.
	If you incorrectly use the product, ignoring this indication, you may get slightly injured or the product may be damaged. This indication shows that the caution item to avoid the danger is provided.

Please be informed that we are not responsible for any damages to the user or to the third person, arising from malfunctions or other failures due to wrong use of the product or incorrect operation, except such responsibility for damages as required by law.

USING THE PRODUCT SAFELY

■ Do not remove the product's covers and panels

Never remove the product's covers and panels for any purpose.

Otherwise, the user's electric shock or fire may be incurred.

■ Warning on using the product

Warning items given below are to avoid danger to user's body and life and avoid the damage or deterioration of the product.

Use the product, observing the following warning and caution items.

■ Warning items on power supply

- Power supply voltage

  The rated power supply voltage of the product is 3-phase AC200V.

- Power cord

  (Important) The attached power cord set can be used for this device only.

- Protective fuse

  If an input protective fuse is blown, the product does not operate. For a product with external fuse holder, the fuse may be replaced. As for how to replace the fuse, refer to the corresponding chapter in this instruction manual.

  If no fuse replacement procedures are indicated, the user is not permitted to replace it. In such case, keep the case closed and consult us or your local dealer. If the fuse is incorrectly replaced, a fire may occur.

USING THE PRODUCT SAFELY

■ Warning item on Grounding

If the product has the GND terminal on the front or rear panel surface, be sure to ground the product to safely use it.

■ Warnings on Installation environment

- Operating temperature and humidity

  Use the product within the operating temperature indicated in the “rating” temperature column. If the product is used with the vents of the product blocked or in high ambient temperatures, a fire may occur.

  Use the product within the operating humidity indicated in the “rating” humidity column. Watch out for condensation by a sharp humidity change such as transfer to a room with a different humidity. Also, do not operate the product with wet hands. Otherwise, an electric shock or fire may occur.

- Use in gas

  Use in and around a place where an inflammable or explosive gas or steam is generated or stored may result in an explosion and fire. Do not operate the product in such an environment.

  Also, use in and around a place where a corrosive gas is generated or spreading causes a serious damage to the product. Do not operate the product in such an environment.

- Installation place

  Avoid installing the product on inclined places or on places subject to vibration. Otherwise, the product may slip or fall down to cause damages or injury accidents.

■ Do not let foreign matter in

Do not insert metal and inflammable materials into the product from its vent and spill water on it. Otherwise, electric shock or fire may occur.

■ Warning item on abnormality while in use

In abnormal situations, such as “smoke”, “fire”, “abnormal smell” or “irregular noise” occur from the product while in use, stop using the product, turn off the switch, and remove the power cord plug from the outlet. After confirming that no other devices catch fire, ask us or your local dealer.

USING THE PRODUCT SAFELY

■ Input / Output terminals

Maximum input to terminal is specified to prevent the product from being damaged. Do not supply input, exceeding the specifications that are indicated in the "Rating" column in the instruction manual of the product.

Also, do not supply power to the output terminals from the outside.

Otherwise, a product failure is caused.

■ Calibration

Although the performance and specifications of the product are checked under strict quality control during shipment from the factory, they may be deviated more or less by deterioration of parts due to their aging or others.

It is recommended to periodically calibrate the product so that it is used with its performance and specifications stable.

For consultation about the product calibration, ask us or your local dealer.

■ Daily Maintenance

When you clean off the dirt of the product covers, panels, and knobs, avoid solvents such as thinner and benzene. Otherwise, the paint may peel off or resin surface may be affected.

To wipe off the covers, panels, and knobs, use a soft cloth with neutral detergent in it. During cleaning, be careful that water, detergent, or other foreign matters do not get into the product.

If a liquid or metal gets into the product, an electric shock and fire are caused. During cleaning, remove the power cord plug from the outlet.

Use the product correctly and safely, observing the above warning and caution items. Because the instruction manual indicates caution items even in individual items, observe those caution items to correctly use the product.

If you have any questions or concerns regarding the contents of this manual, please contact our service center.

Chapter 1 Overview

This chapter describes the precautions for safe use of the product, basic operation methods, and main major specifications. Please read this manual carefully before using the product and always keep it on hand.

1-1. Outline of PBW series

1-1-1. Series list

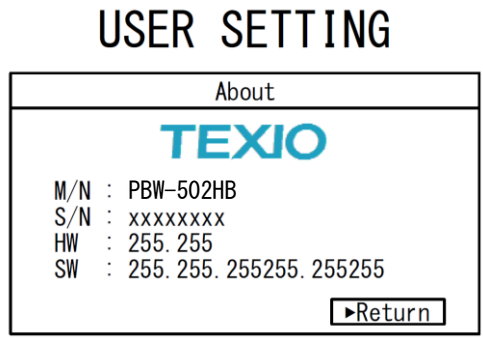
The representative models of the PBW series are listed below. Throughout the user manual, the term “PBW” refers to all models unless otherwise specified.

Model	Rated power	Output current	Output voltage	Remarks
PBW-502H	5kW	±30A	525 V	LAN CAN DIO standard
PBW-502HB	5kW	±30A	525 V	Booster (Slave operation only, independent operation not possible)
PBW-103HP	10kW	±60A	525 V	PBW-502H + PBW-502HB parallel model LAN CAN DIO standard
PBW-103HS	10kW	±30A	1000 V	PBW-502H + PBW-502H-B serial model LAN CAN DIO standard

The PBW series can handle up to 100kW. For details, please contact your dealer or our company.

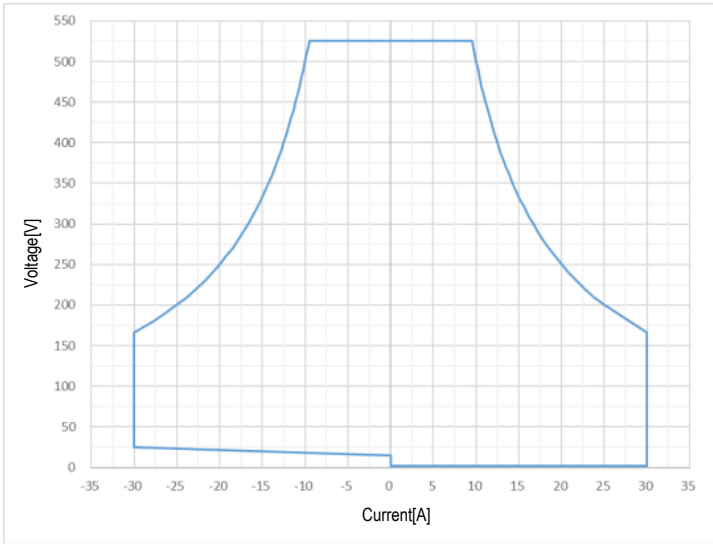
About the PBW-502HB Booster

Overview	Booster is a device that operates as a SLAVE for series-parallel operation.
Functional restriction	• SINGLE setting and operation are not possible • MASTER setting and operation are not possible during series/parallel operation. • Licenses other than serial functions and DIO functions cannot be granted.
Determination of Booster machine	• There is a sticker of Booster under the power switch. • Product Info > On the About screen, the end of M/N is B.

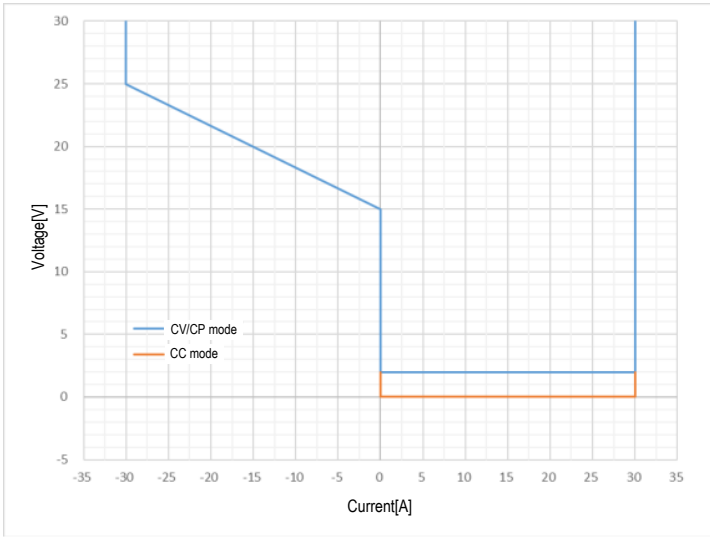


1-1-2. Operating Range

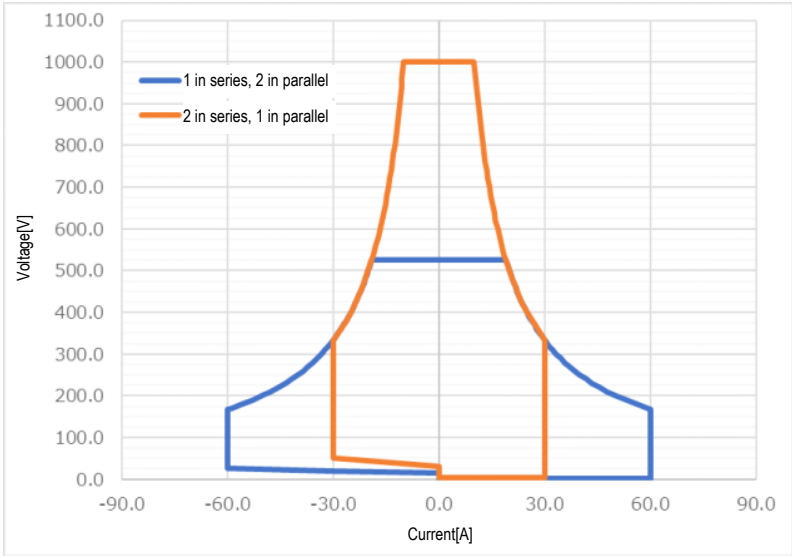
PBW-502H



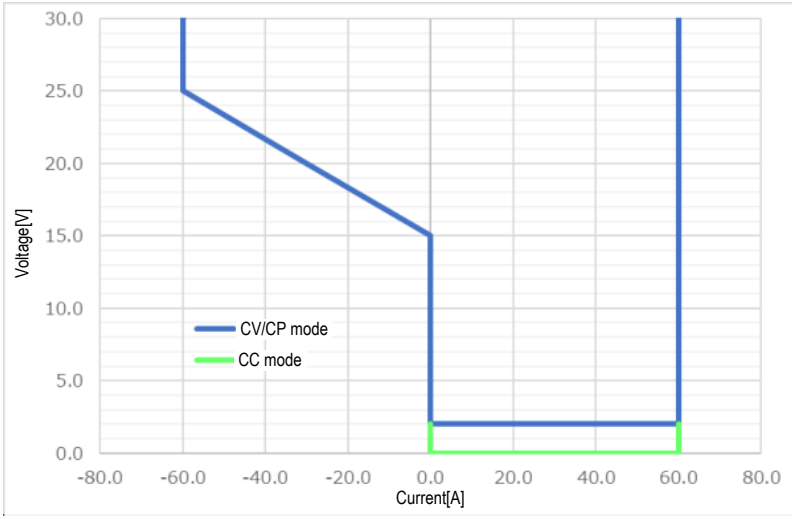
Undervoltage (30 V or less)



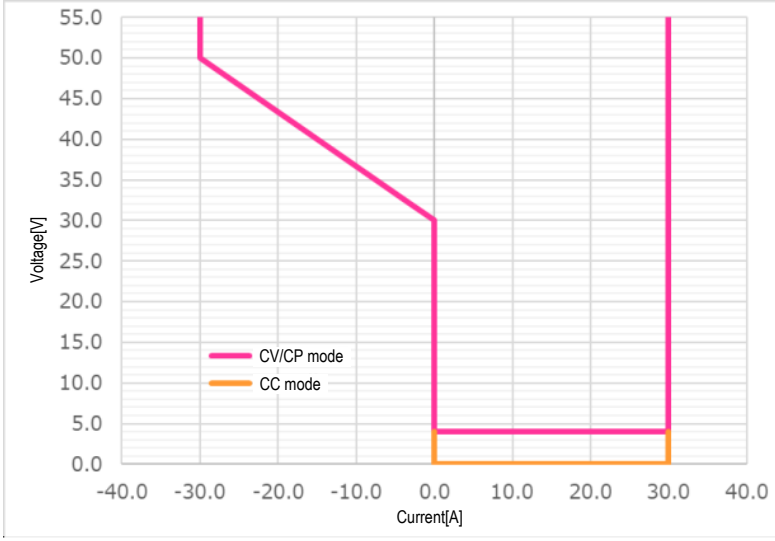
PBW-103HP (1 in series, 2 in parallel), PBW-103HS (2 in series, 1 in parallel)



PBW-103HP Undervoltage (30 V or less)



PBW-103HS Undervoltage (30 V or less)



The current in the AC → DC direction is assumed to be positive. During series-parallel operation, the number of units is multiplied by the same value.

The command value and limit value can be set regardless of the operation range shown in the above figure. However, operation may be impossible with a value set outside the operating range.

- Low-voltage regeneration area (left side of figure above)
  CV mode: Voltage rises because no current flows.
  CC/CP mode: Operation is performed at a value smaller than the command value as no current is allowed to flow.

- Low Voltage Power Driving Area (right side of figure above)
  This may not be stable due to conditions such as the UUT.

1-1-3. Features

Features	• Output voltage: 525 V Output current: ±30 A 5kW • Configurable up to 1000V, ±600A, 100kW with series and parallel capabilities • Capable of operating as a power supply and regenerative electronic load • Compact and lightweight by using SiC for power devices • Equipped with color LCD
Function	• Equipped with CV, CC, and CP control modes • Various protection functions • Adjustable slew rate • Adjustable output resistance • Equipped with serial and parallel master-slave functions
External interface	• Equipped with LAN and CAN as standard • Equipped with external control DIO as standard

1-1-4. Accessories and options

Before using the device, check the contents of the package to ensure that all standard items are included.

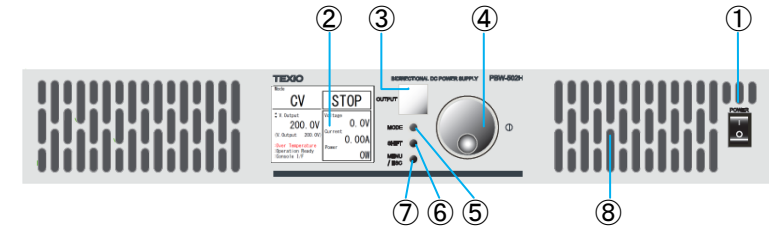
Standard accessories	Details	
LAN cable	1	for sries/parallel communication
terminating resistor	1	for sries/parallel communication
Rack fixing bracket	1 set (2 pieces)	Mounting screws are included on the side of the main unit
Housing fixing bracket	1 set (4 pieces)	Mounting screws are included on the side of the main unit

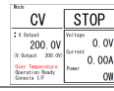
※AC input and output cables are not included.

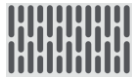
※For PBW-103HP/HS, the housing fixing metal fittings are pre-assembled.

1-2. Part Names and Functions

1-2-1. Front Panel

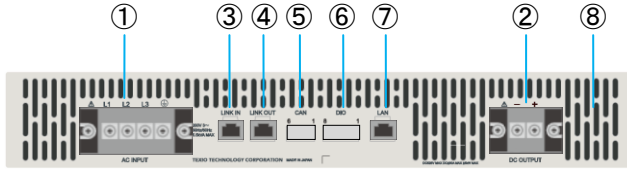


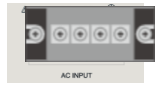
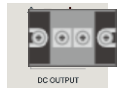
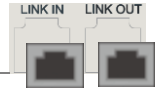
No.	Name		Function
1	Main switch		Press “–” to Turn on the power supply. Press "O" to turn off the power supply.
2	LCD		LCD display screen
3	Start/Stop button		Start and stop operation of the unit.This button illuminates green during operation, red in abnormal condition, and yellow during standby for operation. It remains unlit in other conditions.
4	Control Knob		Rotate to set values and select items.Turn the knob clockwise for increases and counterclockwise for decreases. Value settings or item selections can be made by pressing the knob (hereinafter Entering).

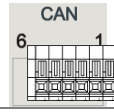
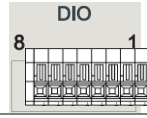
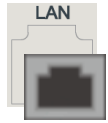
5	Mode button		Switches between CV, CC, CP, and CR modes.
6	Shift button		Switches digits when manipulating values.
7	MENU/ ESC Key		The key is used to switch setting screen. It can also be used to return to the previous screen.
8	Air inlet		This is an air inlet for cooling the fan of the internal unit.

Never block the air intake.

1-2-2. Rear Panel



No.	Name		Function
1	AC input terminal		This terminal block is intended for connection to the three-phase mains and earthing to the ground.
2	DC Output terminal block		DC Output terminal block
3	LINK IN		This connector is used to connect the LAN cable or terminating resistor when performing series-parallel operation.
4	LINK OUT		

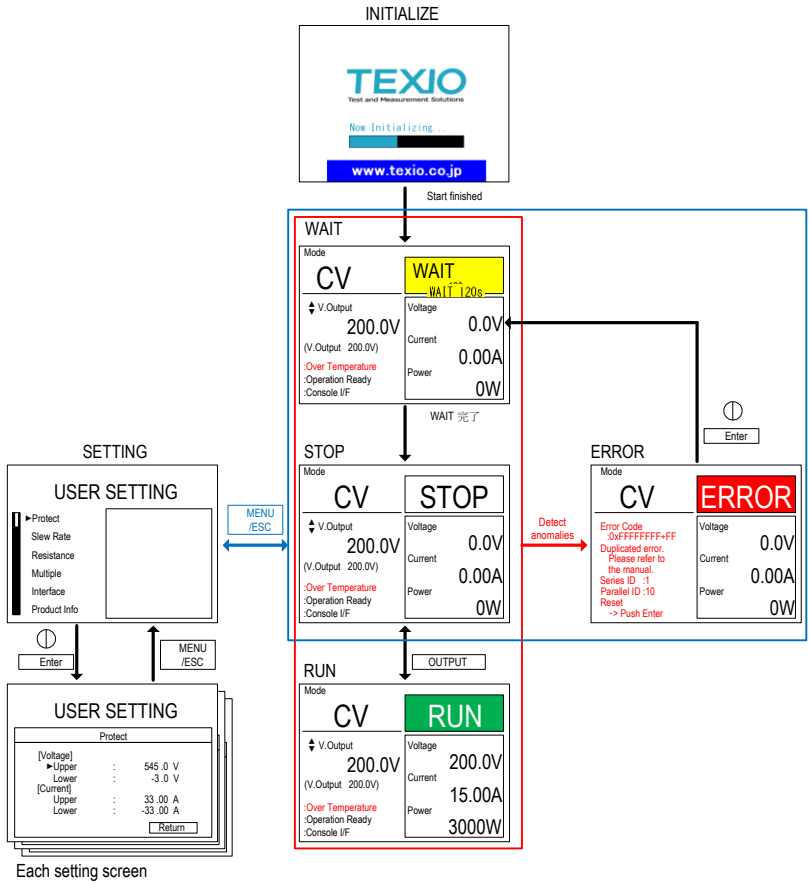
5	CAN communication port		This terminal block port is used to control this device via CAN communication.
6	Contact input/output port		This terminal block is used to control this device using contact input/output.
7	LAN communication port		This connector is used to control this device via LAN communication. Also used for updating and license activation of this device.
8	Air inlet		This is an air inlet for cooling the fan of the internal unit.

Never block the air intake.

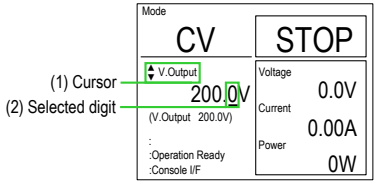
1-3. LCD Display

Describes the display contents and operation methods of each screen displayed on the LCD.

1-3-1. Screen configuration



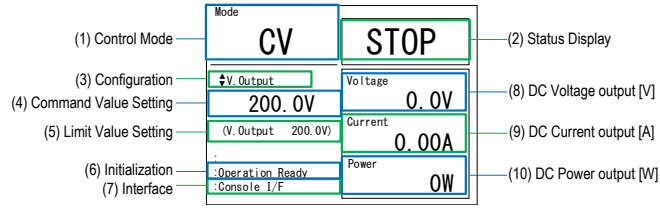
1-3-2. Common operation display contents



Steps

1. Rotate the Knob to move the cursor through the items. Move the cursor to the item that has the value need to be changed and press Enter to change the value.

2. The selected digit is underlined at the bottom of the digit. The number of revolutions of the Knob increases or decreases. Press Shift to change the selected digits.



1. Control mode
Control mode of the DC output side is displayed on the screen. When Mode is pressed during WAIT or STOP, the mode changes in the order of CV → CC → CP → CR → CV → ···.

2. Status display
Displays the status of the device. There are four types: WAIT, STOP, RUN, and ERROR.

Status name	Overview	AC relay	DC relay
WAIT	Cooling wait state of the AC inrush current prevention circuit	OPEN	OPEN
STOP	Ready for operation	CLOSE	OPEN
RUN	DC output status	CLOSE	CLOSE
ERROR	Abnormality is detected and stopped.	OPEN	OPEN

3. Configuration
   The current setting is shown on the display. By turning the Knob, the set command can be selected according to the table below.

Item	CV mode	CC mode	CP mode
Command value	Volt. command value [V]	Current command value [A]	Power command value [w]
Setting item 1 Upper Limit	Current Upper Limit [A]	Voltage Upper Limit [V]	Voltage Upper Limit [V]
Setting item 1 Lower Limit	Current Lower Limit [A]	Voltage Lower Limit [V]	Voltage Lower Limit [V]
Setting item 2 Upper Limit	Power Upper Limit [W]	Power Upper Limit [W]	Current Upper Limit [A]
Setting item 2 Lower Limit	Power Lower Limit [W]	Power Lower Limit [W]	Current Lower Limit [A]

4. Setting value
   Set Value Command Value and Limit Value selected in the setting items are displayed

5. Command Value Setting
   Command values corresponding to each control mode are shown on the display.

6. Initialization
   When communication with other devices has been initiated during Parallelization/ Serialization, "Initializing" is also displayed. "Operation ready" will be shown once it is completed

7. Interface
   Current selected Interface is displayed

Item	Description
Console I/F	Console is selected
LAN I/F	External Interface (LAN) is selected
CAN I/F	External Interface (CAN) is selected

8. Voltage measured value (V)
9. Current measured value (A)
10. Power measured value (W)

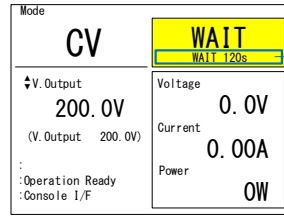
The device displays the DC output readings. Since the voltage of the DC output terminal existed, the voltage is displayed even when it is not RUN.

1-3-3. INITIALIZE Window

Progress is indicated by a green bar.

1-3-4. WAIT Window

The remaining waiting time is displayed. RUN and error-reset actions are disabled during WAIT.

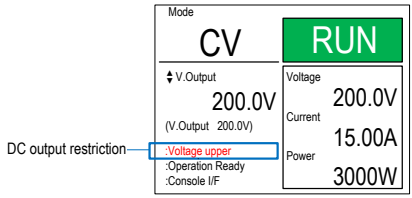


This device has an inrush current prevention circuit on the AC side. Because this circuit requires cooling, it is necessary to leave an interval for a certain period after the last use. Cooling time is up che WAIT status in the following cases.

(1) When the power is turned on again within 2 minutes after the power is turned off
(2) If an error is detected within 2 minutes after the power is turned on
(3) When abnormality is detected again within 2 minutes after error reset

1-3-5. RUN Screen

When it hits the limit value, the operation may differ from the command value. The DC output limit status is displayed when the product hits the limit value.

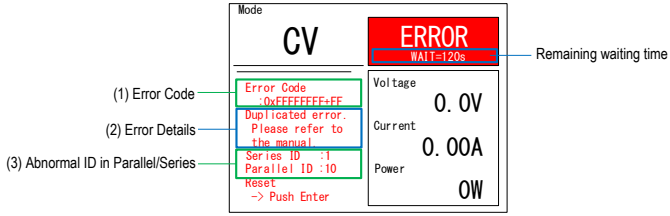


When only one DC output limit status is used, the output limit name in the table below is displayed. When multiple occurrences occur at the same time, they are displayed as hexadecimal numbers in the left-most bit arrangement.

bit	LCD message	Description
0	Voltage upper	When DC output voltage is higher than or equal to the upper limit of voltage limit value.
1	Voltage lower	When DC output voltage is less than or equal to the lower limit of voltage limit value.
2	Current upper	When DC output current is higher than or equal to the upper limit of current limit value.
3	Current lower	When DC output current is less than or equal to the lower limit of current limit value.
4	Power upper	When DC output power is higher than or equal to the upper limit of power limit value.
5	Power lower	When DC output power is less than or equal to the lower limit of power limit value.
6	Low voltage	When DC output voltage is (30* series number) V or less.
7	Over temperature	When the internal temperature rises.

1-3-6. ERROR Window

The error details are displayed. When a WAIT condition occurs at the same time, the remaining waiting time will also be displayed here.



(1) Error code

Displayed in hexadecimal. For details of errors and bit arrangement, refer to 10.2 “Error Display.”

(2) Error Description

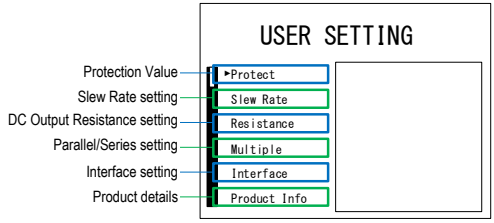
If there is only one error occurrence item, the content of the error is displayed.

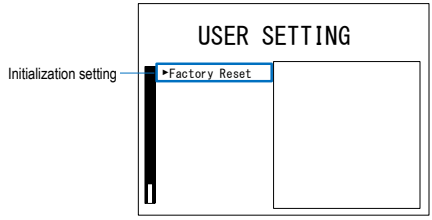
(3) Error occurrence series and parallel ID

Displays the serial-parallel ID of the device that first detected an error during series-parallel operation. Refer to Section 7.1 “Series/Parallel Setting” for the series/parallel ID.

1-3-7. USER SETTING window

Various settings can be made. Refer to 1-3-8 “Settings hierarchy” for details.





1-3-8. Setting hierarchy

Press MENU/ESC key on the WAIT, STOP, ERROR screen to move to the SETTING screen. The SETTING window allows the user to configure various settings for the device. The table below lists the hierarchy of settings.

Setting items	Overview
Protect	Protection value setting
Slew Rate	Slew rate setting
Resistance	DC output resistance setting
Multiple	Series/Parallel Setting
Interface	Interface Setting
Interface Select	Interface Select
Console	Console setting
CAN Config	CAN setting
CAN Communication	CAN Communication setting
LAN Config	LAN Settings
LAN Communication	LAN Communication Settings
DIO	DIO function setting
Product Info	Product Information
About	Device information
License	License Information
Activation	License setting
Update	Firmware update
Factory Reset	Initialize Factory Value

Chatper 2 Wiring

This chapter describes the wiring of input/output lines.

2-1. AC Input/Protective Earth Terminal Block

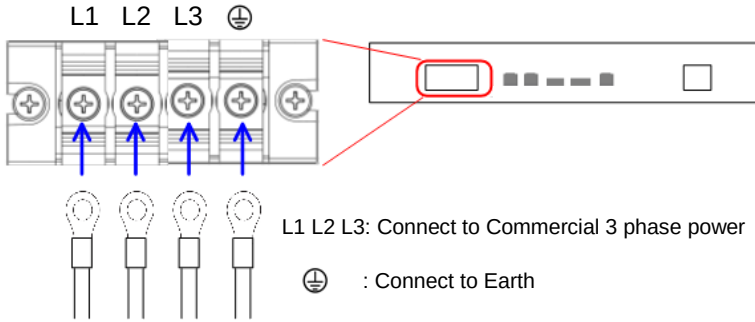
Steps

1. Connect the ground to the commercial three-phase system and ⏚ (protective earth terminal) to the L1, L2, L3 on the AC input/protective earth terminal block on the rear panel of this device.

Note

Connect a commercial three-phase system that conforms to the rating of this device. For the cables used to connect the commercial three-phase system and ground, use cables with current 20 A greater than or equal to the rated voltage of this device.

Use a crimp terminal that is compatible with the screw diameter of the terminal block and the cable and attach it firmly so that the cable will not come off while the device is in use. Use M4 screws for mounting to the terminal block.



Note

Operation without the terminal block safety force bar is extremely dangerous. Be sure to attach the safety force bar before use.

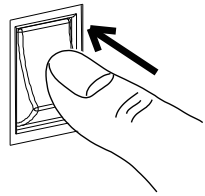
Warning

Do not use the product with voltages other than the rated power supply voltage indicated on the product. There is a risk of fire.

Be sure to connect the protective earth terminal to earth ground. There is a risk of electric shock if the product is used without connection.

Make sure that the circuit breaker of the switchboard is OFF before performing any connection work, and make sure that no voltage is applied to the connection terminals. There is a risk of electric shock.

2. Turn on the power switch. The normal screen is displayed after the startup screen.



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2-2. DC output terminal block

Steps

1. Connect the DUT to the DC output terminals of this device. Pay attention to the polarity when connecting.

   The direction of current and power is assumed to be positive with respect to the DC output terminal (+) → DUT → DC output terminal (-) and the direction of flow.

   It is effective for stable operation by making it as thick and short as possible and tucking it together.

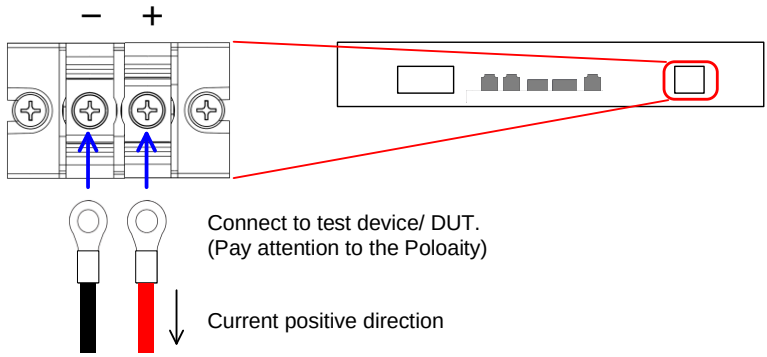
Before making connections, turn off the power switch of this device and check that no voltage is applied to the DC output terminals. There is a risk of electric shock.

Use a crimp terminal that is compatible with the screw diameter of the terminal block and the cable and attach it firmly so that the cable will not come off while the device is in use. Use M4 screws for mounting to the terminal block.

Use a cable with a permissible current of 30A or more per unit and a rated voltage of this device or more. Also, select an appropriate load line considering the voltage drop and heat generation at the load end.

Operation without the terminal block safety cover is extremely dangerous. Be sure to attach the safety force bar before use.

Specifications may not be met if the output (+ or -) is grounded.



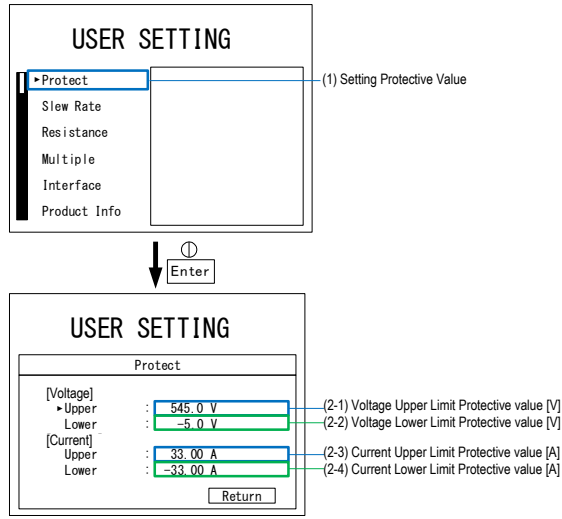
2. Turn on the power. It is ready to supply power.

Chapter 3 Basic Operation

This chapter describes the basic operations required to operate the instrument. Before operating the instrument, refer to Chapter 1, Overview, and Chapter 2, Wiring.

3-1. Protection value setting

Overview	Sets the protection value for the voltage and current of the DC output. If the measured value exceeds the set value, the device turns ERROR and opens the DC and AC terminals.
Steps	1. Press the MENU/ESC key to display the USER SETTING screen. Select **Protect** and press the knob to go to the Protection Value Setting window.



2. Set each protection value. Press the knob to display the cursor. Use the SHIFT key to select the digit, set the protection value, and press the knob to determine it.

Setting item	Setting range
Voltage Upper Limit Protective value	0.0V~545.0V
Voltage Upper Lower Protective value	-5.0V～525.0V
Current Upper Limit Protective value	0.00A～33.00A
Current Upper Lower Protective value	-33.00A～0.00A

3. After completing, press MENU/ESC key or select Return to return to the previous page.

Note

It is not possible to change the settings while device is operating.

The protection values always been verified. Therefore, if the lower limit of the voltage protective value is set to 0 V or more with the DC output open, it becomes an ERROR.

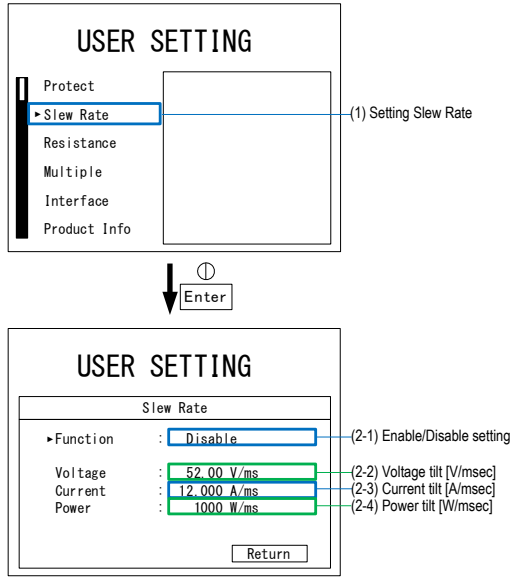
If an ERROR occurs when the device is regenerating power, depending on the test device operation, DC output voltage may rise transiently. Therefore, stopping may not work in the safe direction. Set an appropriate protection value according to the operating conditions.

3-2. Slew rate setting

Overview — Set the conditions for changing to the command value or limit value during operation.

Steps

1. Press the MENU/ESC key to display the USER SETTING screen. Select **Slew Rate** and press the knob to go to the Slew Rate Selection window.



2. Enables or disables the slew rate function.

3. Valid: The selected value starts to change at a slope from (2-2) to (2-4) after Enter also pressed.

4. Disabled: The selected value is immediately reflected when Knob is turned (it operates at the maximum inclination).

Setting item	Setting range
Function	Enable/Disable
Voltage	0.01V/msec～50.00V/msec
Current	0.001A/msec～12.000A/msec
Power	1W/msec ~1000W/msec

5. After completing, press MENU/ESC key or select Return to return to the previous page.

It is not possible to change the settings while device is operating.

When the slew rate is large or depending on conditions, such as the tested unit, operations slower than the set value or linear operation may not be possible. In the DC output limit state, operations may be slower than the setting.

3-3. DC output resistance setting

Overview

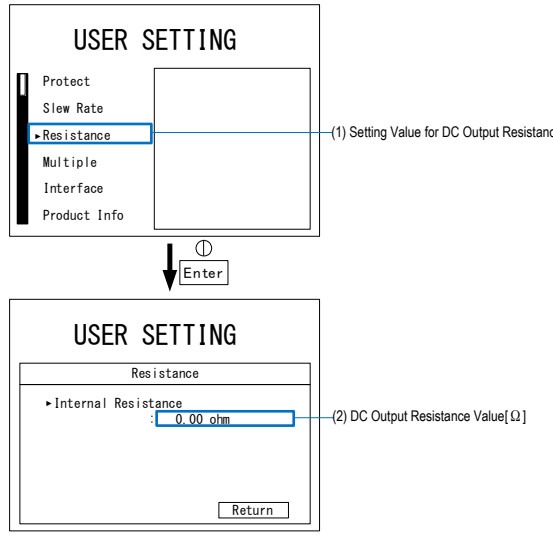
Setting the internal resistance of the device. This function operates only in CV mode and when the voltage command value is (30 x serialized quantity) V or more. In addition, the value (Command Voltage Value - DC Output Current x DC Output Resistance) is limited within the

following voltage range.

1 unit serialization: 30–525 V,
2 units serialization: 60–1000 V

Steps

1. Press the MENU/ESC key to display the USER SETTING screen. Select **Resistance** and press the knob to go to the Run Setup window.



2. Press the knob to display the cursor. Select the digit with the SHIFT key, set the DC output resistance value, and press the knob to determine it.

Setting item	Setting range
DC Output Resistance value	0.00Ω～100.00Ω

3. After completing, press MENU/ESC key or select Return to return to the previous page.

Note

It is not possible to change the settings while device is operating.

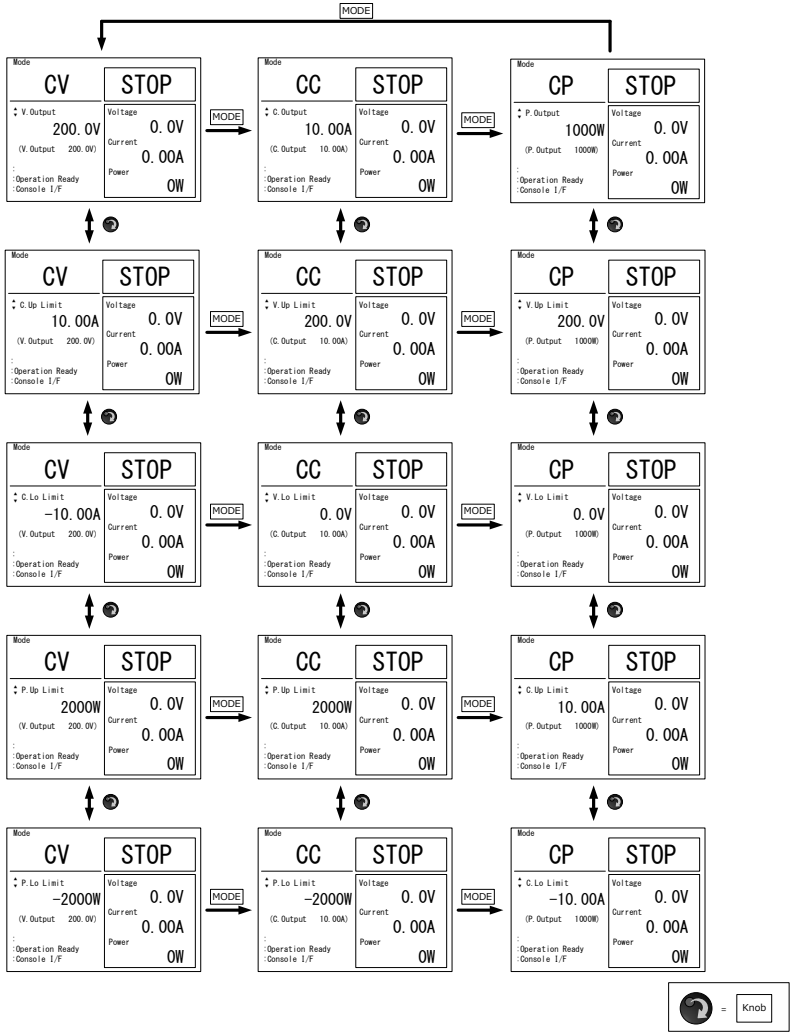
3-4. Setting of the control mode

Overview CV/CC/CP/CR can be changed.

Steps

1. Press the MODE key during WAIT or STOP to change the control mode of CV/CC/CP.

2. Switch between different modes by turning the Knob. Please refer to page for “Setting items”.



3-5. Command value/limit value setting

Overview

Command value and limit value can be set.

It can also be changed during operation. When changing during operation, the behavior

depends on the slew rate function setting. Please refer to 3-2 Slew rate setting for the setting method.

Steps

1. Select the setting item and press the knob to display the cursor on the setting value.

2. Select the digit with the SHIFT key, and press the knob to determine it.

Note

In addition to the following range, it cannot be set outside the protection value range. If the protected value is changed and goes out of range, it will be corrected automatically.

Command Value Setting itme	Setting range
Voltage	Single: 0.0V~525.0V 2 Series: 0.0V~1000.0V
Current	0.00A~±30.00A × Parallel number
Power	0W~±5000W × Series/parallel number
limit value setting item	Setting range
Upper limit of voltage limit value	Single: Lower limit of voltage limit value ~535.0V 2 series: Lower limit of voltage limit value ~1000.0V
Lower limit of voltage limit value	0.0V~ Upper limit of voltage limit value

Upper limit of current limit value	0.80A~32.00A × Parallel number
Lower limit of current limit value	-32.00A ~-0.80A × Parallel number
Uppwer limit of power limit value	200W~5300W × Series/parallel number
Lower limit of power limit value	-5300W~-200W × Series/parallel number

Since the limit value takes precedence over the command value, it may not follow the command value. The operation when the limit value in each control mode is exceeded is shown in the table below. Set the appropriate limit and protection values according to the operating conditions.

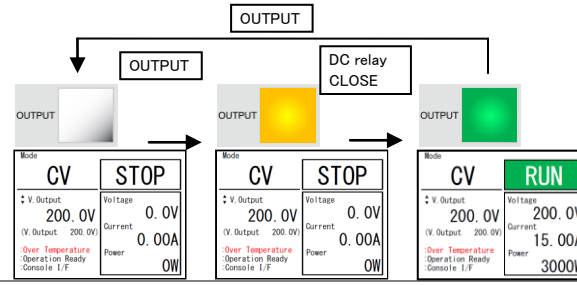
Control mode	Power direction	Voltage limit value	Current limit value	Power limit value
CV	Power running	--	Follow the limit value. DC voltage drops.	
	Regeneration	--	Follow the limit value. DC voltage rises.	
CC	Power running	Follow only upper limit value.	--	Follow the limit value.
	Regeneration	Follow only lower limit value.	--	Follow the limit value.
CP	Power running	Follow only upper limit value.	Follow the limit value.	--
	Regeneration	Follow only lower limit value.	Follow the limit value.	--

3-6. RUN / STOP Switching

Steps

1. When Output key is in STOP status, it lights up in yellow, and the DC relay begins to close. When the DC relay is closed, it illuminates in green to move to the RUN states. Press Start/Stop again to return to STOP mode.

2. Press Output key again to return to STOP mode.



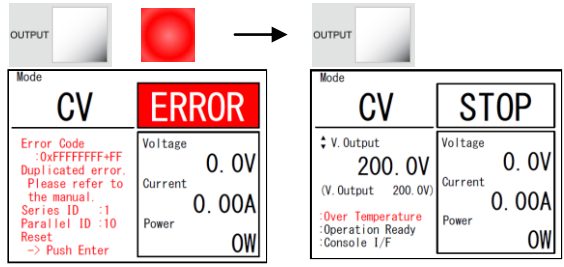
The FAN speed of this device is adjusted according to the operating status and the internal temperature of this device. If the internal temperature of this device is high, the FAN may continue to rotate at a high speed even in STOP conditions. Even when the fan is rotating at high speed, the main power switch is shut off, and there is no problem.

3-7. Error Reset

Steps

1. In ERROR status, Output key lights will be in red. In ERROR mode

2. Remove the cause and press the rotary encoder knob to reset.



Note It cannot be reset in the WAIT state. Reset after WAIT is completed.

Chapter 4 Series-Parallel Operation

This device can construct a system in which voltage range and current capacity are expanded by connecting multiple units in series and parallel.

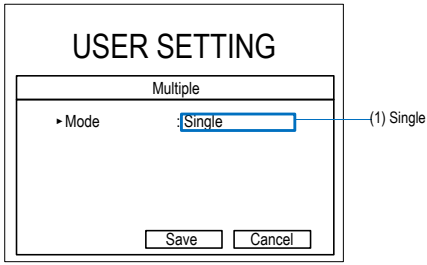
A maximum of 2 series and a maximum of 20 parallel connections are possible. However, in the case of series/parallel, it is limited to 2 series/10 parallel.

4-1. Series/Parallel Setting mode

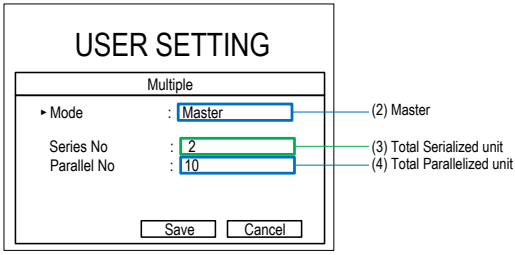
Overview

There are the following three types of series-parallel mode.

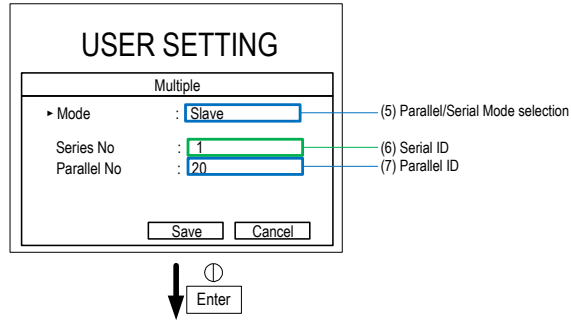
Single Unit It operates independently without communicating with other equipment.



Master Slave is controlled in series and parallel.



Slave	It operates according to the instruction of the master in series and parallel.



Note Refer to Section 4-2 Series/Parallel Preparations to set the series/parallel mode after connecting. If you do it before connecting, an error will occur.

4-2. Series/Parallel Preparations

4-2-1. Series-Parallel Wiring

Overview	Wire the main circuit line and signal line. The connection method is described referring to two series and three parallel connection examples inthe figure below.

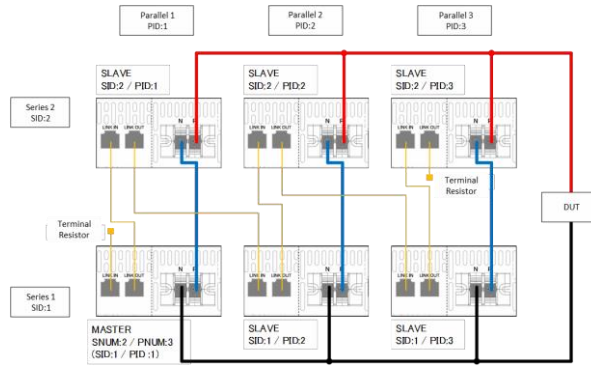
Warning Before making connections, turn off the power switch of this device and check that no voltage is applied to the DC output terminals using a tester, etc. There is a risk of electric shock.

Pay attention to the polarity when connecting. Incorrect polarity may damage the UUT or the tester.

Note

PBW-103HS is already in series configuration. Therefore, two PBW-103HS cannot be used and connected in series.

Two series and three parallel connection example



About the slave device ID
SID: Series connection ID 1st column (lower voltage) = 1
2nd column (upper voltage) = 2
PID: Parallel connection ID 1 to 20 (10: when including series)
For details, please refer to 4-2-2 Series/parallel setting

Steps

1. Connect the positive terminal of the DUT to the P terminal of SID:2 (red line in Fig. above).

2. Connect the negative terminal of the DUT to the N terminal of SID:1 (black wire in Fig. above)

3. Connect terminal N of SID:2 of the same PID to terminal P of SID:2 (blue line in Fig above). Do not connect the midpoint potential to the Test Unit. Do not connect between midpoints of different PIDs.

4. Next, connect the signal lines. Connect LINK IN/OUT between the units in daisy-chain

fashion using the supplied LAN cable (orange wire in Fig. above).

5. Connect the supplied terminating resistors to both ends of the cable.

Note

If the supplied cable (0.25 m) is not long enough, use a straight cable with CAT5e or more. The total length of the daisy-chain connection must not exceed 20 m.

Do not connect to the LAN connector.

4-2-2. Series/Parallel Setting Procedure

Overview

The serial/parallel setting can be set as follows.

Steps

1. Press the MENU/ESC key to display the USER SETTING screen. Select **Multiple** and press the knob to go to the Setting window.

2. Selects the series/parallel mode.

Mode	Description
Single	Single operation
Master	Master machine
Slave	Slave machine

3. Select the desired mode and press the knob to confirm.

4. For the master, set the Sereis No. (Total number of serial units) and Parallel No. (Total number of parallel units).

   For slaves, set their Sereis ID and Parallel ID.

For master	Sereis No.	1~2
	Parallel No.	1~20（10：Including series）
For slave	Sereis ID	1st column in series（Lower voltage）＝1 2nd column in series（Upper voltage）＝2
	Parallel ID	1~20（10：Including series）

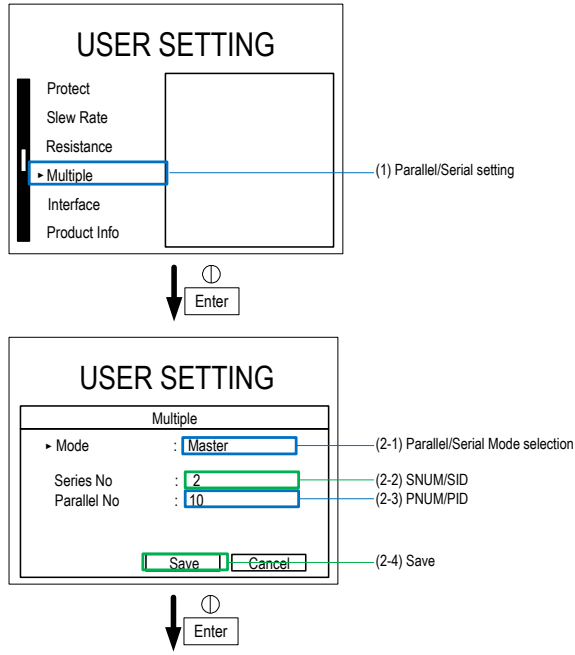
5. Press the knob to confirm the value.

6. Select Save and press the knob to save. A message will appear, so turn the knob again.

   To cancel, select Cancel and press the knob or press the MENU/ESC key.

Example)

Setting screen



Note

To detect any disconnection or disconnection of communication line, initialization of series-parallel communication will time out in 60 seconds, and a series-parallel setting error will occur.

Counting starts after entering at step (2-4) is pressed. If an error occurs, the resetting of Slave is disabled. Therefore, complete the series-parallel setting by returning all the devices to Single mode and performing the series-parallel setting again or restarting all the devices is required.

7. The master is appended with "-M" at the end of the control mode.

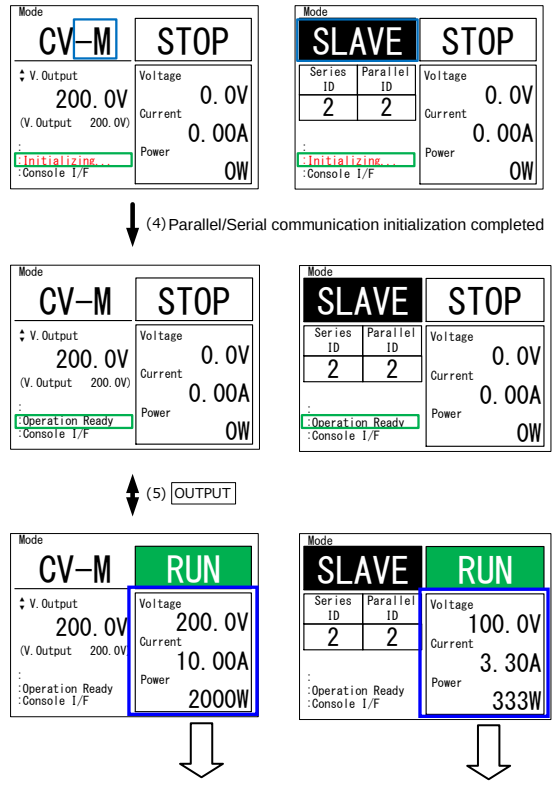
   The slave displays "SLAVE" in the control mode. The serial-to-parallel ID of its own unit is displayed in the field of the command value or limit value.

8. Operation cannot be started when the initialization status is "Initializing." When completed, "operation ready" is displayed.

9. Output key and resetting can only be operated with Master. Operation in Slave is disabled.

Example)

Series/Parallel Setting Procedure



MASTER displays the total value of 2-series and 3-parallel connections.

1/2 voltage, 1/3 current and 1/6 power (own machine's share) is displayed in each Slave.

During series and parallel operation, the whole operation can be operated at once with Master. Master setting is equally divided and set to Slave.

The measured value of Master displays the DC output value in series and parallel. The measured value of Slave displays the DC output value of the device.

Example: The above figure shows the DC output status when Master is set to CV200 V in the 2 series and 3 parallel, and 20 Ω is connected to the load. The measured value of Master is displayed as the whole DC output. Since SLAVE is 2 series, DC voltage of half of Master is displayed, DC current of 1/3 is displayed because it is 3 parallel, and DC power of 1/6 is displayed because it is 2 series and 3 parallel.

Changing the series/parallel setting changes the master's protective value, slew rate, command value, and limit value. It retains the value when the range is widened, but it is automatically corrected when the range is narrowed. Be sure to check before RUN.

The PBW-103HP or HS booster machine (SLAVE) cannot be used as the master machine due to its exclusive settings.

Chapter 5 Various Settings

This chapter describes interface selection and various settings.

5-1. Interface Selection

Overview — Select the interface to use to operate this device.

Steps

1. Press the MENU/ESC key to display the USER SETTING screen. Select **Interface** and press the knob to go to the Setting window.

2. Select Interface Select and press the knob. Press the knob again to select the interface.

Interface	Description
Console	Control from panel
LAN	Control by LAN communication (panel is also effective)
CAN	Control by CAN communication (panel is also effective)

3. After selecting, press the knob to confirm. Select return or press the MENU/ESC key to return to the previous screen.

5-2. Console Setting

The device can be operated or displayed through the front panel.

5-2-1. LCD backlight adjustment

Overview	LCD brightness can be adjusted.
Steps	1. Press the MENU/ESC key to display the USER SETTING screen. Select **Interface** and press the knob to go to the Setting window.
	2. Select Console and press the knob to go to the settings screen.
	3. Press the knob to select Backlight.
	4. Adjust the brightness of the backlight and then press the knob to confirm. Select return or press the MENU/ESC key to return to the previous screen.

5-2-2. Panel display direction

Overview	LCD display rotation can be adjusted.

Steps

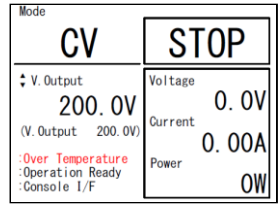
1. Press the MENU/ESC key to display the USER SETTING screen. Select **Interface** and press the knob to go to the Setting window.

2. Select Console and press the knob to go to the settings screen.
3. Press the knob to select Rotation.

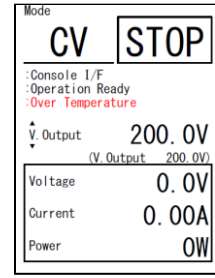
Rotation	Description
Horizontal	Use the device horizontally
Vertical	Use the device vertically.

4. Select a direction and then press the knob to confirm. Select return or press the MENU/ESC key to return to the previous screen.

Example)



Horizonta



Vertical

Note

When under the Vertical display, the buttons and Knob are oriented below the LCD.

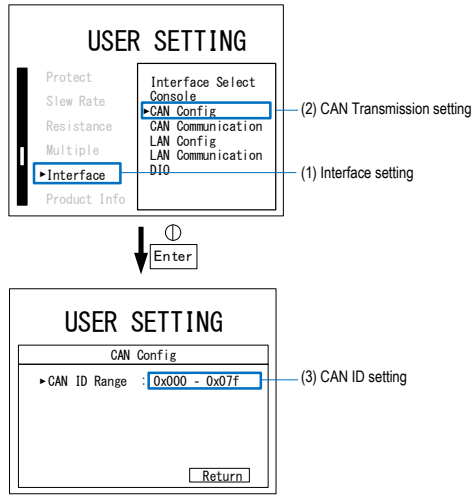
5-3. CAN setting

CAN setting is possible. See the programming manual for details.
The programming manual can be downloaded from our website.

https://www.texio.co.jp

5-3-1. CAN Config

Overview Set CAN IDs.



Steps

1. Press the MENU/ESC key to display the USER SETTING screen. Select **Interface** and press the knob to go to the Setting window.

2. Select CAN Config and press the knob to go to the configuration screen.

3. Press the knob to select CAN ID Range.

4. Set the CAN ID and press the knob to confirm.

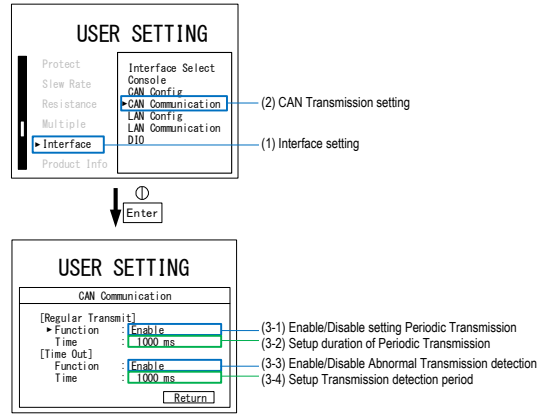
5. Select return or press the MENU/ESC key to return to the previous screen.

5-3-2. CAN Communication

Overview

CAN Transmission setting is possible.

［Regular Transmit］
Function：Enable/disable periodic sending.
Time：Set the periodic transmission cycle.
［Time Out］
Function：Enable/disable communication error detection.
Time：Set the communication error detection time.



Steps

1. Press the MENU/ESC key to display the USER SETTING screen. Select **Interface** and press the knob to go to the Setting window.

2. Select CAN Communication and press the knob to go to the configuration screen.

3. Press the knob to select［Regular Transmit］Function

4. Set enable/disable of periodic transmission and press the knob to confirm.

Funcion	Description
Ebable	Periodic transmission is enabled.
Disable	Periodic transmission is disabled.

5. Press the knob to select［Regular Transmit］Time.

6. Use the rotary encoder and SHIFT key to set the periodic transmission period and press the knob to confirm.

Time	Range
Transmission period	10~10,000ms

7. Press the knob to select［Time Out］Function.

8. Set enable/disable of communication error detection, and press the knob to confirm.

Funcion	Description
Ebable	Communication error detection is enabled
Disable	Communication error detection is disabled

9. Press the knob to select［Time Out］Time.

10. Use the rotary encoder and SHIFT key to set the communication error detection time, and press the knob to confirm.

Time	Range
Transmission period	1,000~10,000ms

11. Select return or press the MENU/ESC key to return to the previous screen.

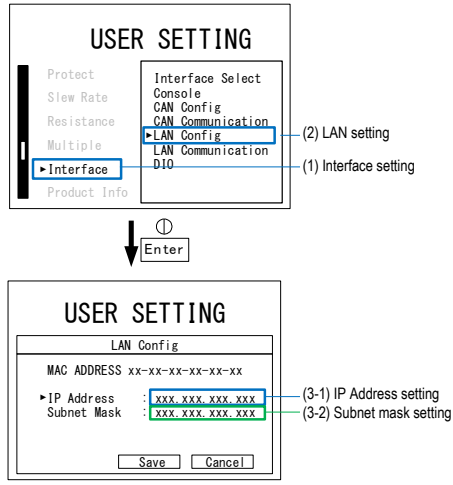
5-4. LAN Setting

LAN setting is possible. See the programming manual for details. The programming manual can be downloaded from our website.

https://www.texio.co.jp

5-4-1. LAN Config

Overview Set the LAN IP Address and Subnet mask.



Steps

1. Press the MENU/ESC key to display the USER SETTING screen. Select **Interface** and press the knob to go to the Setting window.

2. Select LAN Config and press the knob to go to the configuration screen.

3. Press the knob to select IP address.

4. Use the rotary encoder and SHIFT key to set the IP address, and press the knob to confirm.

5. Press the knob to select Subnet mask.

6. Use the rotary encoder and SHIFT key to set the Subnet mask, and press the knob to confirm.

7. Select Save to apply the settings.

   If not applicable, select Cancel or press MENU/ESC key.

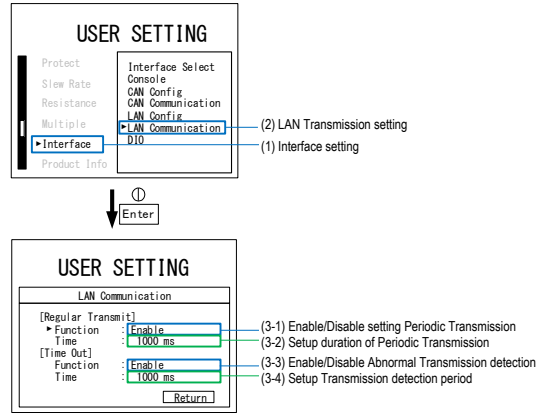
   For Save, restart the device.

5-4-2. LAN Communication

Overview

Configure LAN communication settings.

［Regular Transmit］
Function：Enable/disable periodic sending.
Time：Set the periodic transmission period.
［Time Out］
Function：Enable/disable communication error detection.
Time：Set the communication error detection time.



Steps

1. Press the MENU/ESC key to display the USER SETTING screen. Select **Interface** and press the knob to go to the Setting window.

2. Select LAN Communication and press the knob to go to the configuration screen.

3. Press the knob to select［Regular Transmit］Function.

4. Set enable/disable of periodic transmission and press the knob to confirm.

Funcion	Description
Ebable	Periodic transmission is enabled.
Disable	Periodic transmission is disabled.

5. Press the knob to select［Regular Transmit］Time.

6. Use the rotary encoder and SHIFT key to set the periodic transmission period and press the knob to confirm.

Time	Range
Transmission period	10~10,000ms

7. Press the knob to select［Time Out］Function.

8. Set enable/disable of communication error detection, and press the knob to confirm.

Funcion	Description
Ebable	Communication error detection is enabled
Disable	Communication error detection is disabled

9. Press the knob to select［Time Out］Time.

10. Use the rotary encoder and SHIFT key to set the communication error detection time, and press the knob to confirm.

Time	Range
Transmission period	1,000~10,000ms

11. Select return or press the MENU/ESC key to return to the previous screen.

5-5. DIO

Emergency stop input and error detection signal output can be performed by contact.

5-5-1. DIO terminal

Overview

By using this function, it is possible to input an external emergency stop using DIO and output a signal when an error is detected.

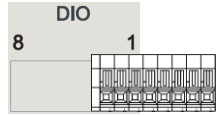
This function must be enabled when using the DIO pin. For details, please refer to section 5-5-2. DIO settings.

Be sure to cut off the power supply to this device before wiring. Risk of electric shock.

When changing the DIO contacts, do not touch other terminals on the back of this device. There is a risk of electric shock or equipment damage.

Specification: One-touch type 8-pin — Osada OS-63-8P

Device rear panel



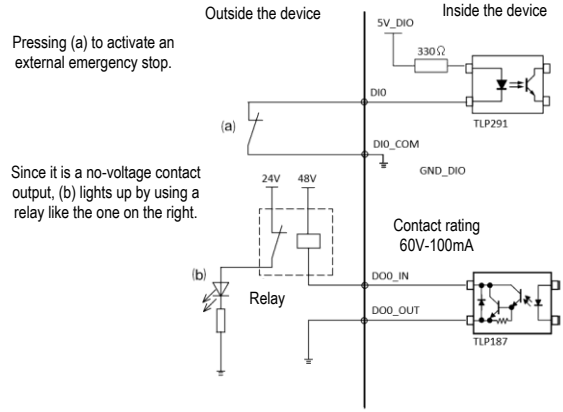
※Recommendation

Wire diameter：AWG22～28

Strip length：8～9mm

Pin	Name	Function description
1	DIO	Emergency stop input, open when stopped
2	DIO_COM	GND 4 pin of DI0 and continuity
3	DI1	Reserved
4	DI1_COM	Reserved, continuity with GND 2 pin of DI1

5	DO0_IN	Error detection signal output, non-voltage contact, open when detected
6	DO0_OUT	
7	DO1_IN	Reserved
8	DO1_OUT	



Note

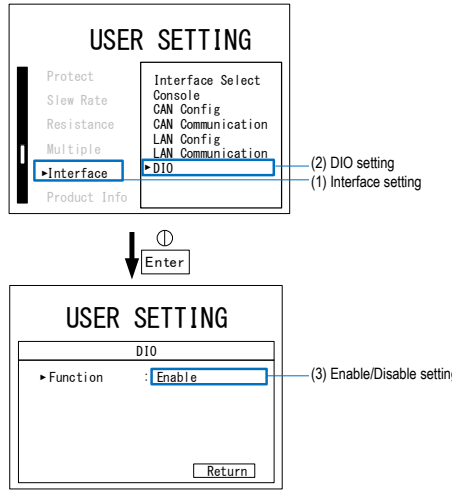
The DI input section has a circuit configuration that assumes direct connection to external no-voltage contacts (switches, relays, etc.). Do not apply an external power supply directly to the DI input, as this may cause a malfunction.

An error detection signal is output when an error other than an emergency stop input occurs. No error detection signal is output during emergency stop input.

5-5-2. DIO Function Setting

Overview

Enables or disables the emergency stop input at contact input.



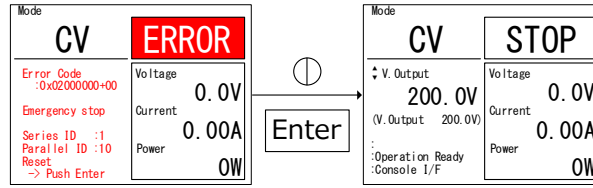
Steps

1. Press the MENU/ESC key to display the USER SETTING screen. Select **Interface** and press the knob to go to the Setting window.
2. Select **DIO** and press the knob to go to the Setting window.
3. Press the knob to select Function.
4. Set enable/disable and press the knob to confirm.

Fuction	Description
Enable	DIO is enabled
Disable	DIO is disabled

5. Select return or press the MENU/ESC key to return to the previous screen.

Reset Steps



6. After the emergency stop, the screen is remained to the ERROR window.

7. Press the knob to reset the abnormal state. In the case of WAIT, please reset after the time on the upper right side of the screen has passed.

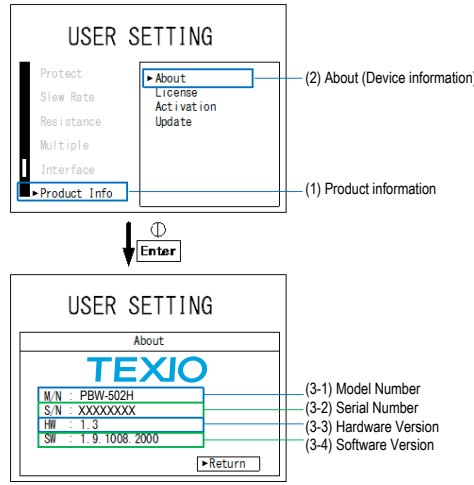
8. The abnormal state is canceled and returns to STOP.

Chapter 6 Product Information

This chapter describes how to check and update the model number of this unit, version information, initialization, etc.

6-1. Device information

Overview	Model and Version of the device can be identified.



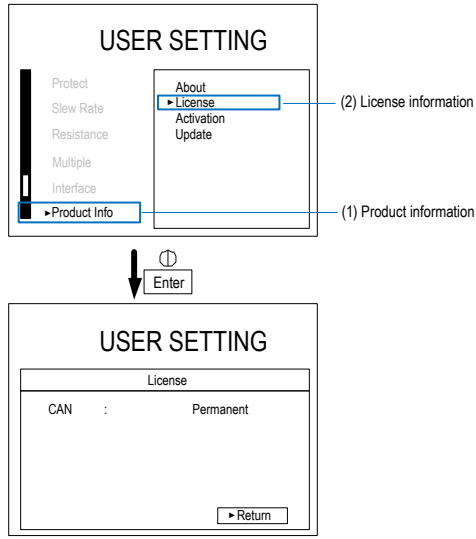
Steps

1. Press the MENU/ESC key to display the USER SETTING screen. Select **Product info** and press the knob to go to the Setting window.
2. Select **About** and press the knob to go to the Setting window.
3. Select Return or press the MENU/ESC key to return to the previous screen.

6-2. License Information

Overview

The license can be checked.



Steps

1. Press the MENU/ESC key to display the USER SETTING screen. Select **Product info** and press the knob to go to the Setting window.

2. Select **License** and press the knob to go to the License info window.

3. Select Return or press the MENU/ESC key to return to the previous screen.

Note

Activation is a function to add licenses. This unit supports function expansion by license. Please contact us for the functions that can be expanded.

6-3. Firmware Update

Overview

Using a dedicated application, you can update the firmware of this device by connecting it to a PC via LAN.

For the latest firmware information, please contact your dealer or our sales office.

The dedicated application can be downloaded from our website.

https://www.texio.co.jp

Note

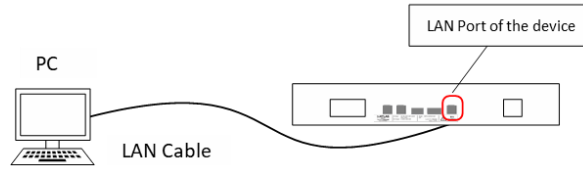
Series-parallel operation is not possible between devices equipped with different firmware versions.

Steps

1. Connect the PC and the device with a LAN cable.

   Boost the dedicated application PBW UpdateTool.exe.

Connection



Note

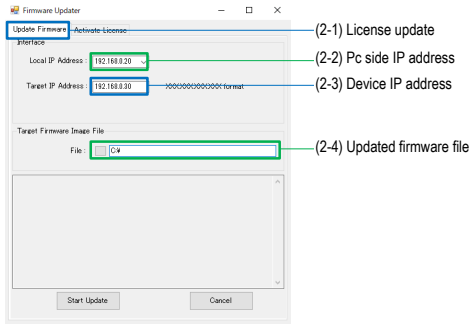
Use a LAN cable with a standard of Category 5 or higher.

2. (2-1) Select the Update Firmware tab on top.

   (2-2) Select the IP address of the PC connected to the LAN

   (2-3) Enter the IP address of this device.

   (2-4) Please set the path of the update firmware file (.hfi).

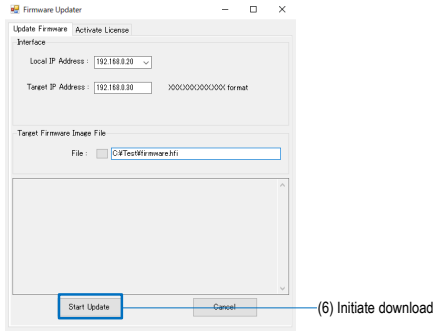


3. Press the MENU/ESC key to display the USER SETTING screen. Select **Product info** and press the knob to go to the Setting window.。

4. Select Update to navigate to the Firmware update window

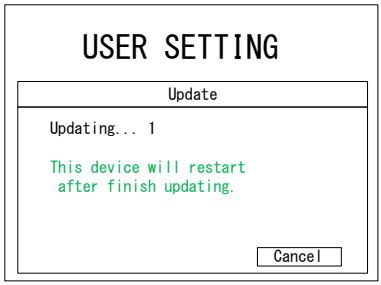
5. Waiting to receive updated firmware from the PC. You can abort the update by pressing the MENU/ESC key.

6. Press Start Update in the dedicated application to start downloading.



7. Receiving update firmware from PC. Never turn off the power of this equipment during reception.

8. Check the firmware version after rebooting. Please refer to 6-1 Device information for how to check the version.



Note

If the update fails, close PBWUpdateTool once and operate the PC again. .

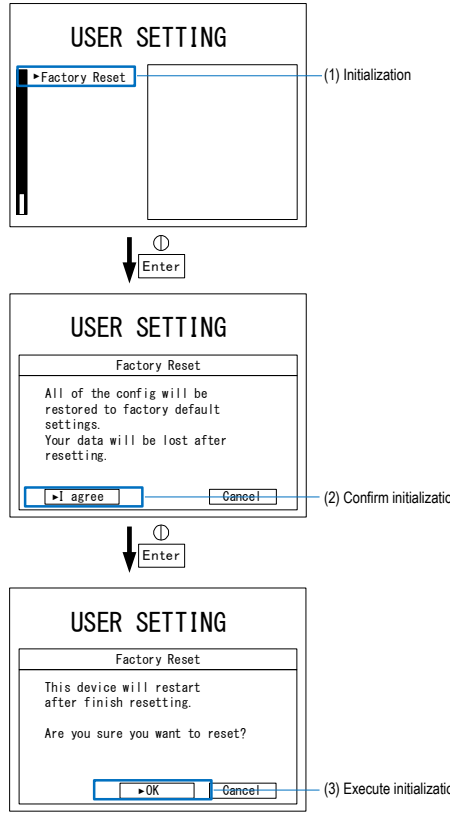
6-4. Initialization Setting

Overview

Command Value, Protective Value, Parallel/Serialization setting, LAN, and CAN initial value setting.

License details are retained, and a system reboot is needed.

Rebooting is required.



Steps

1. Press the MENU/ESC key to display the USER SETTING screen. Select **Factory Reset** and press the knob to go to the Setting window.

2. Select **I agree** and press the knob. If you do not want to initialize, select Cancel or press the MENU/ESC key.

3. Select OK and press the knob to initialize. If you do not want to initialize, select Cancel or press the MENU/ESC key.

4. Rebooting is required.

Chapter 7 Others

This chapter describes how to check failures and what to do when errors occur.

7-1. Troubleshooting

Overview

If any trouble or problem is suspected during use of this device, check the product referring to the following items.

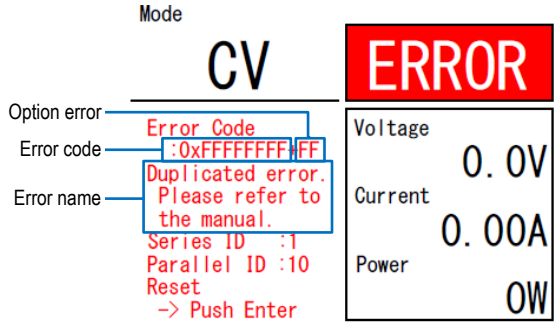
If there is no item applicable to the symptom or if the problem is not resolved by taking countermeasures, contact your supplier or our contact point.

Symptoms	Cause	Countermeasures
Nothing is displayed on the LCD when the main power switch is turned on.	The product is not connected to the commercial three-phase system or the cable is broken.	Check that the cable is connected properly.
	The AC input voltage is not correct.	Check that the AC input voltage is appropriate.
The LCD does not turn off when the main power switch is turned off. "Critical Error" is displayed on the LCDs.	There is a problem inside the device. 	Do not use this device. Disconnect this device from the three-phase power source, and immediately contact your dealer or our contact point.
The command value cannot be set.	You are attempting to set a value outside the protection range.	Check the protection value setting.

DC output is not output.	The command value and limit value are set to 0.	Set an appropriate value to the command value and limit value.
Stable with DC voltage/current/ power different from the commanded value	Limited by either the set value of DC voltage/current/power limit value upper or lower limit.	Check the DC output limit status. Please refer to 1-3-5 RUN.
The DC output voltage/current/ power oscillates.	Vibration due to wiring inductance.	Reduce the wiring inductance. (Reduce the wiring length. Twist the wiring.)
	The UUT generates a steep fluctuation that exceeds the limit of this device.	Consider adding an electrolytic capacitor to the DC output of this device.

7-2. Error indication

An error code is displayed at ERROR. The details of each bit are described in the table below. An optional error display is displayed to the right of the +. Please remove the cause of the error by referring to the countermeasure column. If the problem persists or occurs frequently, please contact the store where you purchased the product or our company.



Error indications

BIT	LCD message	Details of error detection	Countermeasures
0	0x00000001 Hardware error 1	HW error 1：Sensor error detection Gate driver DESAT detection	Countermeasure C
1	0x00000002 Hardware error 2	HW error 2：Control voltage drop detection Gate driver DESAT detection	Countermeasure C
2	0x00000004 Internal COM error	Inter-Communication Error：Abnormal internal communication of this device	Countermeasure D

3	0x00000008 EEPROM error	EEPROM error: EEPROM read/write error	Countermeasure D
4	0x00000010 Software error 1	SW error 1	Countermeasure D
5	0x00000020 Hardware error 3	Internal voltage error 3: Abnormal voltage of the internal bus of the system	Countermeasure D
6	0x00000040 Error	Reserved	-
7	0x00000080 OVP DC	DC overvoltage: Overvoltage of the DC output	Countermeasure B
8	0x00000100 OCP DC	Over cell stack current: Overcurrent of DC output	Countermeasure B
9	0x00000200 OCP Internal Bus	Internal overcurrent: Overcurrent inside the device	Countermeasure C
10	0x00000400 UVP DC	DC undervoltage:Under voltage of DC output	Countermeasure B
11	0x00000800 OVP Internal Bus 1	Internal overvoltage 1: Overvoltage on the internal bus of the device	Countermeasure C
12	0x00001000 UVP Internal Bus 1	Internal undervoltage 1: Undervoltage of the internal bus of the device	Countermeasure C
13	0x00002000 OVP Internal Bus 2	Internal overvoltage 2: Overvoltage on the internal bus of the device	Countermeasure C
14	0x00004000 UVP Internal Bus 2	Internal undervoltage 2: Undervoltage of the internal bus of the device	Countermeasure C

15	0x00008000 OVR AC (Peak value)	AC overcurrent instantaneous value: Instantaneous overvoltage of AC input	Countermeasure A
16	0x00010000 OVR AC (RMS value)	AC overvoltage rms value: Rms value overvoltage of AC input	Countermeasure A
17	0x00020000 OCR AC (Peak value)	AC overcurrent instantaneous value: Instantaneous overcurrent of AC input	Countermeasure A
18	0x00040000 OCR AC (RMS value)	AC overcurrent rms value: Effective value overcurrent of AC input	Countermeasure A
19	0x00080000 UVR AC (RMS value)	AC undervoltage rms value: Effective value undervoltage of AC input	Countermeasure A
20	0x00100000 Power overload	Overpower error: Input/output overload	Countermeasure C
21	0x00200000 OFR AC	AC voltage frequency rise: Frequency rise of the AC input	Countermeasure A
22	0x00400000 UFR AC	AC voltage frequency drop: Frequency drop of AC input	Countermeasure A
23	0x00800000 Over temperature	Overtemperature: Overtemperature inside the device	Please check the air intake/exhaust port.
24	0x01000000 FAN error	FAN error: FAN lock detection	Countermeasure D
25	0x02000000 Emergency stop	External emergency stop: Emergency stop by contact input	Check the contact input.

26	0x04000000 Error	Reserved	-
27	0x08000000 Error	Reserved	-
28	0x10000000 Multiple setting problem	Series-parallel error: Anomaly in series-parallel settings	Countermeasure E
29	0x20000000 Software error 2	SW error 2	Countermeasure D
30	0x40000000 Software error 3	SW error 3	Countermeasure D
31	0x80000000 Other machine error	Series/Parallel Other Device Error: Abnormality detected by another device in series/parallel	Check the error indications of other units.

Option error indications (Displayed on the + right side of the error code.)

bit	LCD message	Details of error detection	Countermeasures
0	+01	External communication timeout: External communication via CAN/LAN timed out.	Check the timeout settings and the communication state.
1	+02	Serial license invalidity: The connected slave lacks a valid serial license.	Purchase the license
2	+04	Booster anomaly: Inconsistent settings in the booster	Set the slave in 4-1 series/parallel mode.
3	+08	Reserved	-
4	+10	Reserved	-

5	+20	Reserved	-
6	+40	Reserved	-
7	+80	Reserved	-

Corrective action	Error handling method
A	This may occur because of the value of AC input voltage or frequency. Check the input wiring. Refer to 8-3 Electrical specifications for input specifications, and 2-1 AC input/protective ground wiring for connection methods.
B	This may occur depending on the setting of the protection value. Or it may occur when the command value or limit value is close to the protection value. Please refer to 3-1 Protection value setting for the protection value threshold. If there is no improvement, please consider action C.
C	This may have occurred because of the transient changes in the UUT or the control performance of this device. (1) Before the error occurs, check if the output limit display on the 1-3-5 RUN screen, 3-5 command value/limit value setting has occurred. If the DC output is limited, increase the limit value by referring to 3-5 Command value/limit value setting. (2) Set the speed of change of voltage/ current/ power of the device under test within the response range of this device. (3) Please consider adding an electrolytic capacitor to the DC output of this device. (4) If there is no improvement, please consider adding a noise filter to the input/output, as

	there is a possibility of false detection of an abnormal state due to noise in the operating environment.
D	This may have occurred because of the transient changes in the UUT or the control performance of this device.
E	Consider taking the following actions according to the timing of occurrence. (1) Consider the following actions based on the timing of the occurrence. Check that the communication line and terminating resistor are correctly connected. Refer to 4-2-1 Series-parallel wiring. Check the series-parallel ID. Refer to 4-1 Series/parallel mode. (2) When the initialization status occurs in “operation ready” and STOP status Check that the version of this machine matches. Check the series-parallel ID. Refer to 4-1 Series/parallel mode. (3) When it occurs immediately after RUN Check the main circuit wiring. Refer to 4-2-1 Series-parallel wiring. (4) When it occurs during RUN Check the main circuit wiring. Refer to 4-2-1 Series-parallel wiring. The voltage/current/power change speed of the UUT should be within the response range of the UUT. Consider adding an electrolytic capacitor to the DC output of this device.

Chapter 8 Specifications

This chapter describes each specification.

8-1. General Specifications

Item	Specifications	Remarks
Operating temperature range	0～40℃	
Accuracy guaranteed temperature range	25±5℃	
Humidity range	20～80%RH	No condensation
Size	PBW-502H W430×D670×H66 mm PBW-103HP/HS W430×D670×H132 mm	Excluding protrusions
Weight	PBW-502H 18kg PBW-103HP/HS 38kg	
Dielectric strength test	Primary - Secondary Primary - Chassis AC1500V 1 minute	
Insulation resistance test	Primary-Secondary Primary - Chassis DC1000V above 10MΩ Secondary - Primary Secondary - Chassis DC1000V 10MΩ above	

8-2. Terminal Specifications

Item		Form	Remarks
AC Input	R S T	Terminal block	Rated 600 V to 50 A M4 screw fixing/4P, 13 mm-pitch
Grounding	⏚		
DC output	N P	Terminal block	Rated 600 V to 50 A M4 screw fixing/4P, 13 mm-pitch※
Series-parallel communication	LINK IN LINK OUT	RJ45 RJ45	Dedicated signal
LAN	LAN	RJ45	Left LED Yellow LINK Right LED green TX/RX
CAN	CAN	Terminal block	Electrical characteristics: compliant with ISO11898 Snap-on type/6P, 2.54 mm-pitch
Contact input/output	DIO	Terminal block	Contact rating: 60 V to 100 mA Snap-on type/8P, 2.54 mm-pitch

※PBW-103HP direct current output: busbar, M10 bolt

8-3. Electrical Specifications

Item		Specifications	Remarks
AC Input	Rated voltage	AC200V	Three-phase three-wire system
	Voltage range	180～220Vrms	
	Maximum current	19.2Arms	
	Rated frequency	50 / 60Hz	
	Frequency range	45～66Hz	
	Power factor	0.95 above	At rated power

	Maximum efficiency	92%		
DC output	Series	1 series	2 series	For details, please refer to 1-1-2 Operating Range.
	Voltage range	0.0～525.0V	0.0～1000.0V	
	Current range	±30.0A x Number of Parallels		
	Power range	±5.0kW x Series/Parallel Number		
	Voltage Accuracy	0.4%F.S.		※1, ※2
	Current Accuracy	0.8%F.S.		
	Power Accuracy	1.2%F.S.		
	Voltage ripple	0.4%rms F.S.		※2, ※3
	Current ripple	0.8%rms F.S.		
	Power ripple	1.2%rms F.S.		
	Voltage command value response	9msec	14msec	※2, ※4
	Current command value response	5msec	6msec	※2, ※5
	Power command value response	9msec	14msec	※2, ※5
	Voltage load response	Response time: 15 msec Voltage peak: 10% F.S.		※2, ※6
		Response time: 15 msec Voltage peak: 7% F.S.		※2, ※7

※1 Accuracy guaranteed temperature

※2 DC output voltage (30 x series number) V or more

※3 Resistive load

※4 Time when DC output voltage changes by 10 → 90% with respect to a change in command value of the resistive load, 30 → 525 V or 525 →, 30 V

※5 Time when DC output changes by 10 →90% with respect to a change in command value of the voltage source, ±100% F.S.

※6 (6 x number of parallels) A/msec, for current change of ±100%F.S., until the voltage command value error becomes 2.5% F.S. or less

※7 (30 x number of parallel) A/msec, for current change of +50←→+100% F.S. or-50 ←→-100% F.S., until the voltage command value error becomes 2% F.S. or less

8-4. Set value specification

This section describes the initial values and setting ranges of each setting.

When it becomes out of range due to the resetting of the series and parallel, it is automatically corrected to within range. Be sure to reconfirm it when resetting series and parallel.

8-4-1. Control mode setting specifications

Item	Initial value	Value
Control mode	CV	CV: Constant voltage, CC: Constant current, CP: Constant power, CR: constant resistance

8-4-2. Protective Value Setting Specifications

Item	Initial value	Minimum value	Maximum value
Voltage protection value upper limit	545.0V	Voltage protection value lower limit	1 series: 545.0V 2 series: 1040.0V

Voltage protection value lower limit -5.0V	-5.0V × Series number	1 series: 525V 2 series: 1000V or voltage protection value upper limit
Current protection value upper limit 33.00A	1.10A × Number of Parallels	33.00A × Number of Parallels
Current protection value lower limit -33.00A	-33.00A × Number of Parallels	-1.10A × Number of Parallels

8-4-3. Command value setting specifications

Item	Initial value	Minimum value	Maximum value
Voltage instruction values	0.0V	0.0V	1 series: 525.0V 2 series: 1000.0V
Current command value	0.00A	-30.00A × Number of Parallels	30.00A × Number of Parallels
Power command value	0W	-5000W × Series/Parallel Number	5000W × Series/Parallel Number

In addition to the above range, the value cannot be set outside the protection value range. If the protection value is outside the range, it is automatically corrected.

8-4-4. Limit value setting specification

Item	Initial value	Minimum value	Maximum value
Voltage limit upper limit	535.0V	Voltage limit lower limit	1 series: 535.0V 2 series: 1020.0V
Voltage limit lower limit	0.0V	0.0V	Voltage limit upper limit
Current limit value upper limit	32.00A	0.80A × Number of Parallels	32.00A × Number of Parallels

Current limit value lower limit	-32.00A	-32.00A ×Number of Parallels	-0.80A × Number of Parallels
Power limit upper limit	5300W	200W × Series/Parallel Number	5300W × Series/Parallel Number
Power limit lower limit	-5300W	-5300W × Series/Parallel Number	-200W × Series/Parallel Number
Accuracy	Voltage Current Power	0.4%F.S. 0.8%F.S. 1.2%F.S.	※1, ※2

In addition to the above range, the value cannot be set outside the protection value range. If the protection value is outside the range, it is automatically corrected.

※1 Accuracy guaranteed temperature range

※2 DC output voltage (30 x number of series) V or more

8-4-5. Slew Rate Setting Specifications

Item	Initial value	Minimum value	Maximum value
Enabled/Disabled	Disabled	Enable/Disable	
Voltage change speed	50.00V/msec	0.01V/msec	50.00V/msec x Number of series
Current change rate	12.000A/msec	0.001A/msec	12.000A/msec x Number of Parallels
Rate of power change	1000W/msec	1W/msec	1000W/msec x Series/Parallel Number

8-4-6. DC Output Resistance Setting Specifications

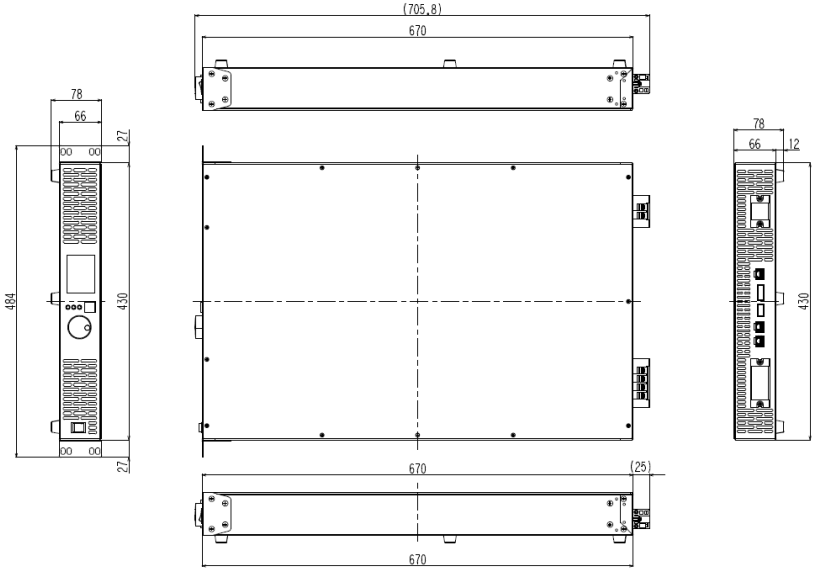
Item	Initial value	Minimum value	Maximum value
DC output resistance	0.00Ω	0.00Ω	100.00Ω

8-4-7. Series/Parallel Setting Specifications

Item	Initial value	Minimum value	Maximum value
Series-parallel mode	SINGLE	SINGLE / MASTER / SLAVE	
SNUM / SID	1	1	2
PNUM / PID	1	1	1 series: 20 2 series: 10

8-5. Dimensions

PBW-502H



scale:mm

Booster is also the same size.

For PBW-103Hx, except for the legs, it will be stacked in two layers. It also has a cover on the back.

TEXIO TECHNOLOGY CORPORATION

7F Towa Fudosan Shin Yokohama Bldg., 2-18-13, Shin Yokohama, Kohoku-ku, Yokohama, Kanagawa, 222-0033, Japan.

https://www.texio.co.jp/

For after-sales service, please visit the service center below.

service center 〒222-0033 8F Towa Fudosan Shin Yokohama Bldg., 2-18-13, Shin Yokohama, Kohoku-ku, Yokohama TEL.045-620-2786