

Preface


Thank you for purchasing our power controller PA-4000.

This manual contains instructions for the mounting, functions, operations and notes when operating the PA-4000. To prevent accidents arising from the misuse of this power controller, please ensure the operator receives this manual.

Notes

- This instrument should be used in accordance with the specifications described in the manual. If it is not used according to the specifications, it may malfunction or cause a fire.
- Be sure to follow the warnings, cautions and notices. If they are not observed, serious injury or malfunction may occur.
- The contents of this instruction manual are subject to change without notice.
- Care has been taken to ensure that the contents of this instruction manual are correct, but if there are any doubts, mistakes or questions, please inform our sales department.
- This instrument is designed to be installed in a case or a control panel. If it is not, measures must be taken to ensure that the operator cannot touch power terminals or other high voltage sections.
- Any unauthorized transfer or copying of this document, in part or in whole, is prohibited.
- Shinko Technos CO., LTD. is not liable for any damage or secondary damage(s) incurred as a result of using this product, including any indirect damage.

Safety precautions (Be sure to read these precautions before using our products.)

The safety precautions are classified into categories: "Warning" and "Caution". Depending on circumstances, procedures indicated by  Caution may be linked to serious results, so be sure to follow the directions for usage.



Warning

Procedures which may lead to dangerous conditions and cause death or serious injury, if not carried out properly.



Caution

Procedures which may lead to dangerous conditions and cause superficial to medium injury or physical damage or may degrade or damage the product, if not carried out properly.



Warning

- To prevent an electric shock or fire, only Shinko or other qualified service personnel may handle the inner assembly.
- To prevent an electric shock, fire or damage to the instrument, parts replacement may only be undertaken by Shinko or other qualified service personnel.



Safety precautions

- To ensure safe and correct use, thoroughly read and understand this manual before using this instrument.
- This instrument is intended to be used for industrial machinery, machine tools and measuring equipment. Verify correct usage after consulting the purpose of use with our agency or main office. (Never use this instrument for medical purposes with which human lives are involved.)
- External protection devices such as protection equipment against excessive temperature rise, etc. must be installed, as malfunction of this product could result in serious damage to the system or injury to personnel. Also proper periodic maintenance is required.
- This instrument must be used under the conditions and environment described in this manual. Shinko Technos Co., Ltd. does not accept liability for any injury, loss of life or damage occurring due to the instrument being used under conditions not otherwise stated in this manual.

Caution with respect to Export Trade Control Ordinance

To avoid this instrument from being used as a component in, or as being utilized in the manufacture of weapons of mass destruction (i.e. military applications, military equipment, etc.), please investigate the end users and the final use of this instrument. In the case of resale, ensure that this instrument is not illegally exported.

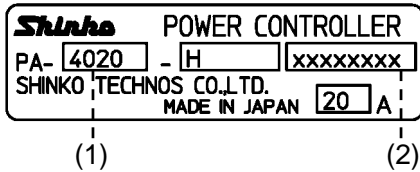
1. Model

1.1 Models

Model	Rated current
PA-4020-H	20A
PA-4030-H	30A
PA-4050-H	50A
PA-4075-H	75A
PA-4100-H	100A

1.2 How to read the model label

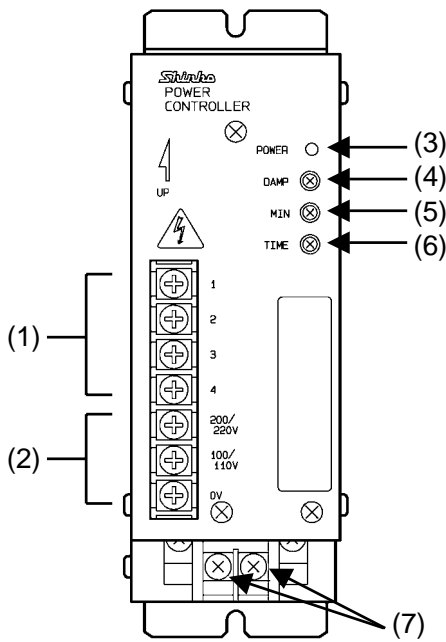
The model label is attached to the front face of the instrument. (Fig. 1.2-1)



- (1) Model: (e.g.) PA-4020-H
 (2) Serial number

(Fig. 1.2-1)

2. Name and functions



(Fig. 2-1)

(1) Control signal terminals:

1: Common terminal

2: 4 to 20mA DC current signal input terminal

Converts to 0.8 to 4V with input impedance 200Ω.

3: Control signal input terminal

Corresponds to output 0 to 98% using 0.8 to 4V DC input.

4: Reference voltage terminal for control

Outputs 5V DC when no load is applied.

Outputs approximately 4.2V DC when connecting 1kΩ of the manual setting unit with internal impedance 220Ω.

(2) Control power terminals: Control power input terminals

Connects in accordance with the supply voltage.

(3) POWER indicator: Supplied voltage indicator

The green LED lights when power is turned on.

(4) DAMP: Gradient adjustment (0 to 100%)

Sets output gradient corresponding to input signal.

(5) MIN : Lower limit adjustment (0 to 100%)

Sets output voltage when input signal is at the lower limit.

(6) TIME : Soft-up time adjustment (0.2 to 8sec)

Sets Soft-up time.

(7) Input/Output terminals: Main circuit I/O current terminals

Connects power to "U", and load to "u".

3. Mounting to the control panel

3.1 Site selection

⚠ Caution

Use within the following temperature and humidity ranges.

Temperature: 0 to 60°C (32 to 140°F), Humidity: 0 to 90%RH (No icing, no condensation)

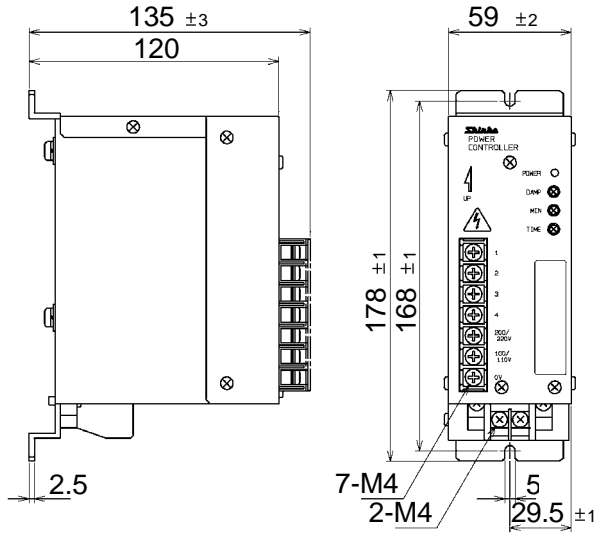
If the PA-4000 is installed within a control panel, the ambient temperature of the PA-4000 must be kept to under 60°C. Otherwise the life of electronic parts (especially electrolytic capacitors) of the PA-4000 will be shortened.

Ensure the mounting location corresponds to the following conditions:

- A minimum of dust, and an absence of corrosive gases
- No flammable, explosive gases
- No mechanical vibrations or shocks
- No exposure to direct sunlight, an ambient temperature of 0 to 60°C (32 to 140°F) that does not change rapidly
- An ambient non-condensing humidity of 0 to 90%RH
- No large capacity electromagnetic switches or cables through which large current flows
- No water, oil or chemicals or where the vapors of these substances can come into direct contact with this unit

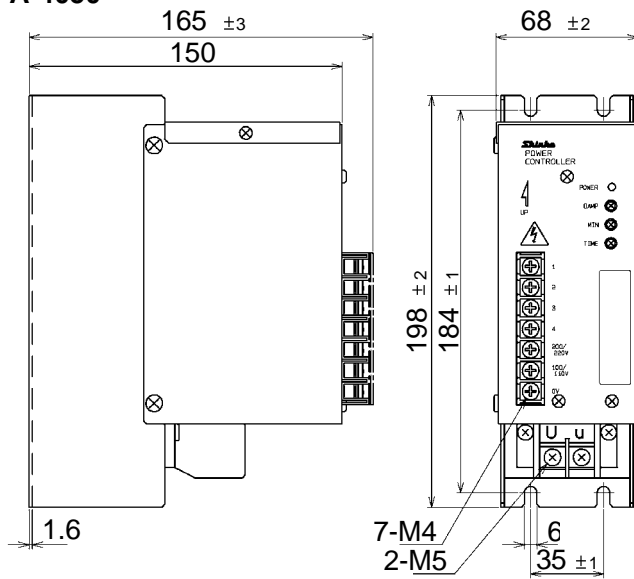
3.2 External dimensions (Scale: mm)

- PA-4020, -4030



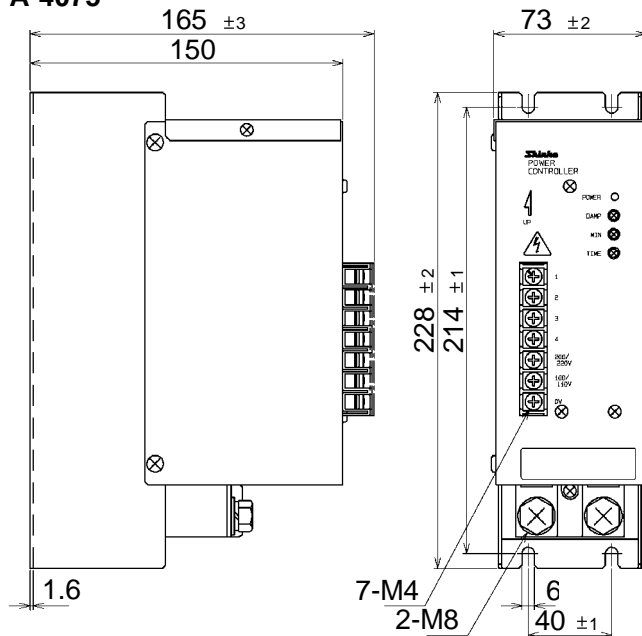
(Fig. 3.2-1)

- PA-4050



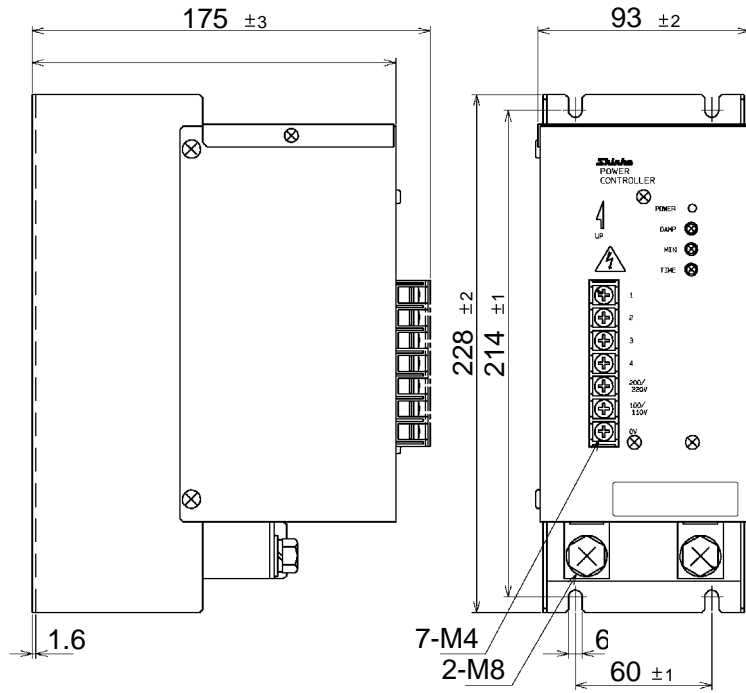
(Fig. 3.2-2)

- PA-4075



(Fig. 3.2-3)

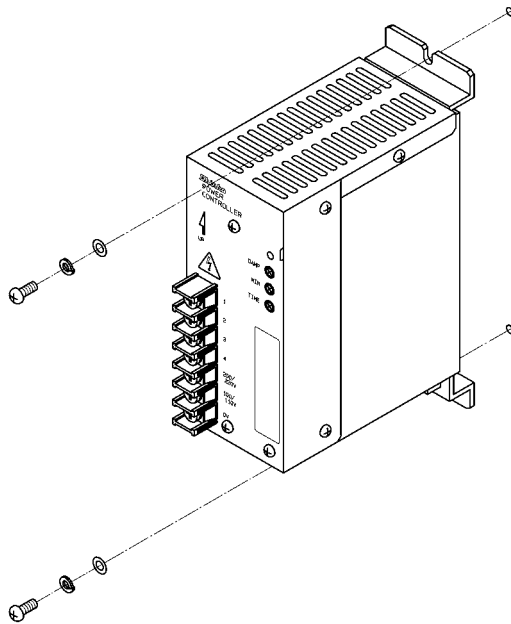
● PA-4100



(Fig. 3.2-4)

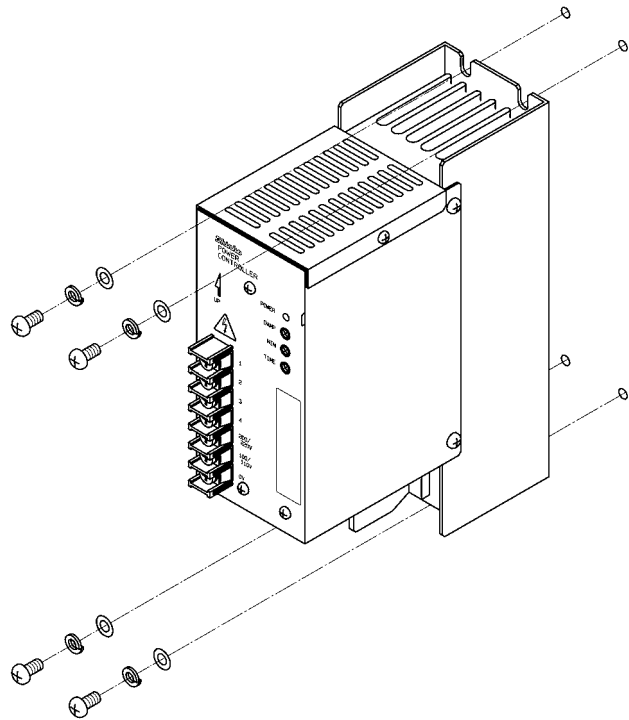
3.3 Mounting

● PA-4020, -4030




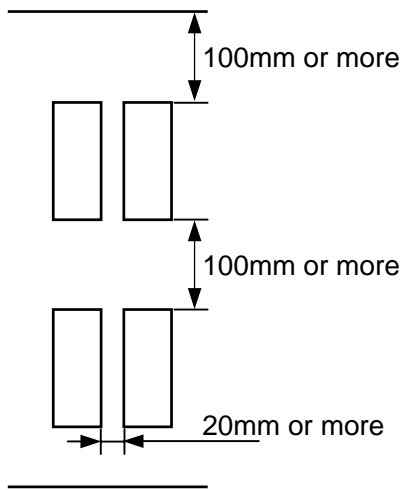
(Fig. 3.3-1)

● PA-4050, -4075, -4100



(Fig. 3.3-2)

- Be sure to install the power controller with the  mark on the front face upward. Refer to Section 3.2.
- Electric shock might be caused because parts, of which electric potential is the same as that of power supply or load voltage, are exposed.
- Be sure to store the power controller in a case or a control panel. Control panel inside must be well-ventilated.
- Be sure to install the power controller vertically.
- When installing plural power controllers, take the space between units into consideration. See (Fig. 3.3-3).
- Be sure to use the terminal cover when using this instrument.



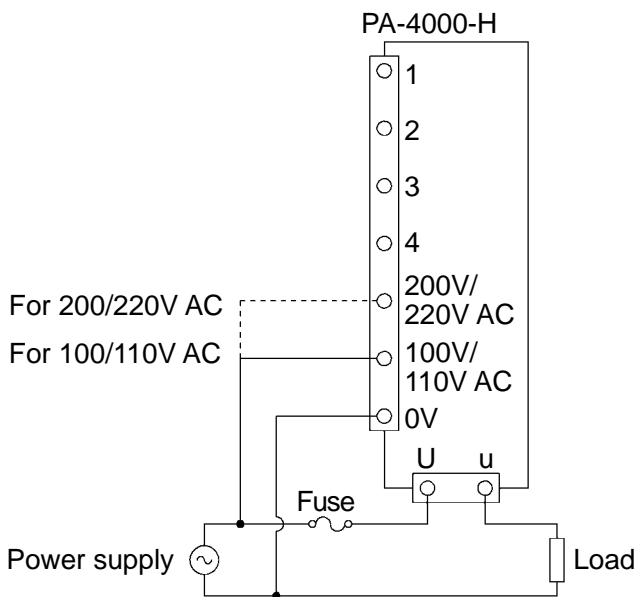
(Fig. 3.3-3)

4. Wiring

4.1 Connecting main circuit

Warning

Turn the power supply to the instrument OFF before wiring or checking.
Working or touching the terminal with the power switched ON may result in severe injury or death due to Electric Shock.



(Fig. 4.1-1)

- Be sure to match the phase of the main circuit with that of power supply.
- For the terminal screw diameter, refer to Section "3.2 External dimensions".
- The rapid fuse and fuse holder (both sold separately) are provided.
- For the main circuit wiring, use the wiring material as thick as or thicker than those listed in (Table 4-1) below.

(Table 4-1)

Current (A)	20A	30A	50A	75A	100A
Cross section (mm ²)	3.5	5.5	8	22	30

4.2 Connecting various setting circuits

Use twisted wires or shielded wires, and avoid parallel wiring to the power line.

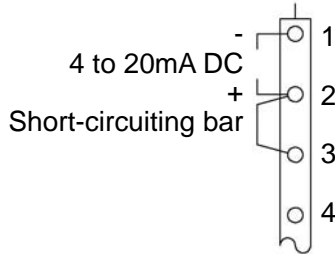
The short-circuiting bar has been used in connecting control signal terminals 2-3. Remove the short-circuiting bar for unnecessary setting circuits.

Current running through the setting circuit is very small amount of 10mA DC. So use contacts which do not cause contact failure.

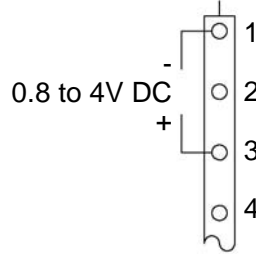
The external setting unit (sold separately, 1kΩ for output setting, 10kΩ for gradient setting) and scale plate (sold separately) are provided.

By combining Shinko indicating controllers via a simple connection, optimal temperature control can be obtained.

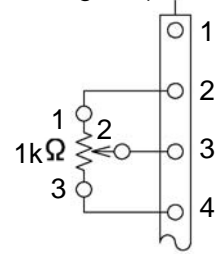
- Current input signal



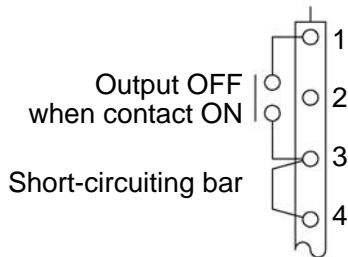
- Voltage input signal



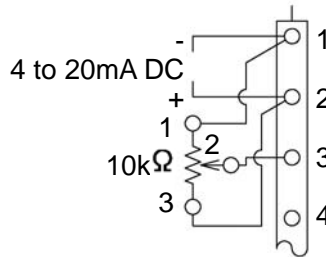
- Manual setting input (with external setting unit)



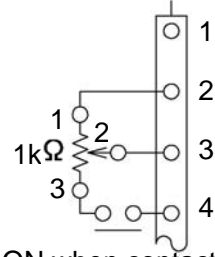
- ON/OFF no-voltage contact input (using internal DAMP)



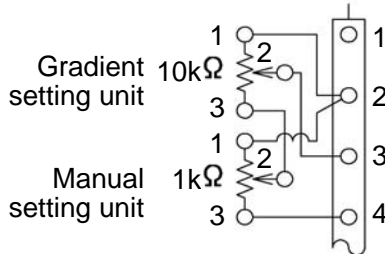
- Current input signal (with external gradient setting unit)



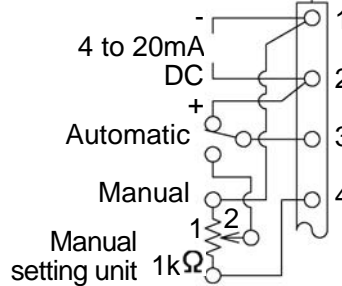
- ON/OFF no-voltage contact input (with external upper limit setting unit)



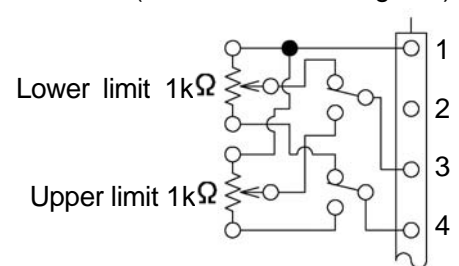
- Manual setting input (with external gradient setting unit)



- Auto(Current input signal) / Manual switching

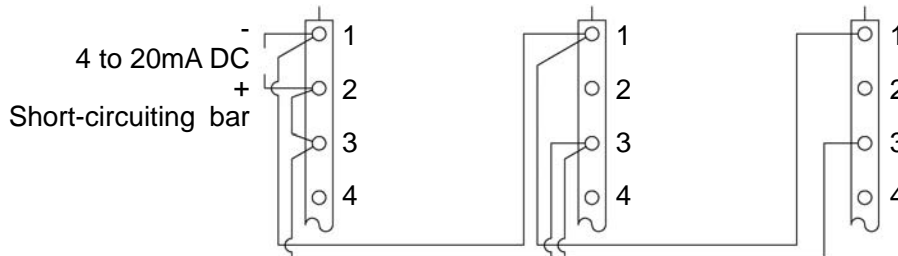


- 2-position control (with external setting unit)



- Plural controls of with current input signal

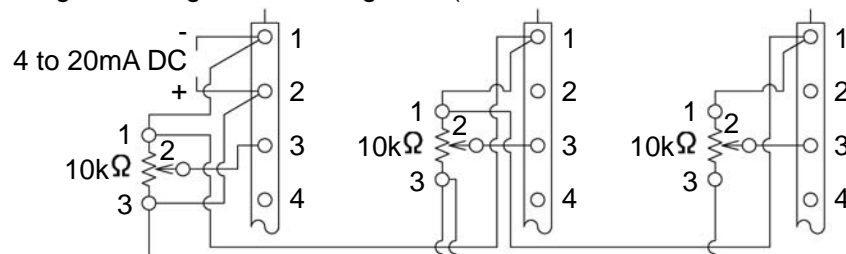
Can be used for control of 3-phase open delta wiring by using three single-phase units.



Each internal gradient setting possible (DAMP)

- Plural controls of current input signal

Using external gradient setting units (if the number of units increases, output upper limit decreases.)



5. Specifications

Number of phases	Single-phase (2-wire type)
Rated current	5 types: 20A, 30A, 50A, 75A, 100A
Input signal	4 to 20mA DC, 0.8 to 4V DC, Manual setting, No-voltage contact
Input resistance	200Ω(4 to 20mA DC), 100kΩ(0.8 to 4V DC), 1kΩ (manual setting)
Rated voltage	100/110V AC, 200/220V AC, Combination voltage Allowable voltage fluctuation: 90 to 110% of the Rated voltage Allowable peak dielectric strength: 400V AC
Rated frequency	50/60Hz (automatic switching) Allowable frequency fluctuation: ±1Hz of the Rated frequency
Output adjustment range	0 to 98% of the Rated voltage
Load current fluctuation	0.1A to Rated current
Gradient adjustment range	0 to 100%
Soft-up	Approx. 0.2 to 8sec, variable

External dimensions

Model	Dimensions (W x H x D)
PA-4020-H, PA-4030-H	59 x 178 x 135mm
PA-4050-H	68 x 198 x 165mm
PA-4075-H	73 x 228 x 165mm
PA-4100-H	93 x 228 x 175mm

Weight

Model	Weight
PA-4020-H, PA-4030-H	Approx. 1.1kg
PA-4050-H	Approx. 2.4kg
PA-4075-H	Approx. 2.9kg
PA-4100-H	Approx. 3.1kg

Mounting

Surface mounting

Cooling method

Self cooling

Insulation resistance

Between Main circuit - Ground : 50MΩ or more, at 500V DC
Between Control circuit - Ground : 50MΩ or more, at 500V DC

Dielectric strength

Between Main circuit - Ground : 1.5kV AC for 1 minute
Between Control circuit - Ground : 1.5kV AC for 1 minute

Temperature rise

Thyristor: 50°C or less
Resistor: 50°C or less

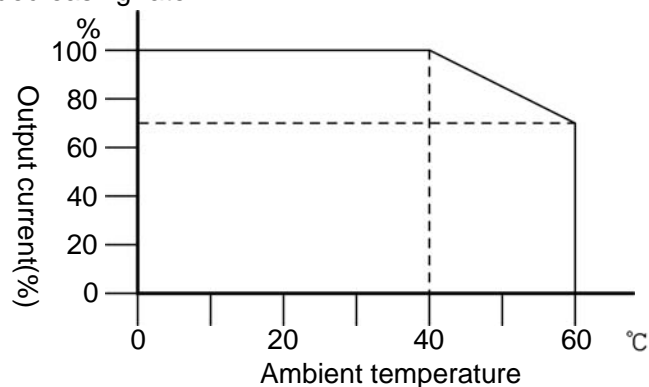
Heating value

Output current	20A	30A	50A	75A	100A
Internal heating value	28W	36W	50W	75W	100W

Ambient temperature

Operating temperature: 0 to 60°C (Allowable current decreases at 40°C or higher)
Storage temperature: -10 to 70°C

Output decreasing rate:



Ambient humidity

0 to 90%RH (Non condensing)

Accessories

Instruction manual: 1 copy

6. Troubleshooting

Refer to the following items after checking the power supply to the instrument.



Warning

Turn the power supply to the instrument OFF before wiring.

Working with the power switched ON may result in severe injury or death due to Electric Shock. Moreover, the instrument must be grounded before the power supply to the instrument is turned on.

● Checking and Maintenance

To sustain safety and performance, periodical checking and maintenance are required.

If any dust particles are attached to parts of the instrument, degrading or malfunction may be caused.

Remove dust using a vacuum cleaner or compressed air, etc.

For characteristic features checking, only Shinko or other qualified service personnel should be used.

Checking	Solution
Installation, appearance, structure	Check if this instrument is securely fixed, and the mounting screws are also fastened securely.
	Check if the terminal cover, parts, etc. are securely mounted, and screws are tightly fastened.
	Check if the instrument is deformed or broken, or parts are burnt out. Please have the instrument repaired.
	Check if bolts or screws of input or control terminals are fastened securely.
Characteristic features	Please consult Shinko or other qualified service personnel.

● Troubleshooting

Problem	Cause	Checking	Solution
Output voltage is not generated.	Power is not supplied.	The POWER lamp is not lit.	Check the power side.
	Blown fuse	Check if the fuse is blown out or not.	Replace the fuse. (Recommended fuse or equivalent)
	Setting signal is not applied	Check connection of the setting circuit and voltage between control signal terminals.	Check the signal source of the indicating controllers, etc.
	Short-circuiting bar of the control signal terminal is not mounted securely.	Check if the short-circuiting bar is mounted when the setting signal is 4 to 20mA DC.	Refer to Section "4.2 Connecting various setting circuits".
Output voltage is generated, however, does not change.	Setting signal maintains the maximum value (approx. 4V DC), and does not change.	Check voltage between control signal terminals 1 and 3.	Check the signal source of the indicating controllers, etc.
	Broken thyristor		Contact our agency or us.

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