Shimaden, Temperature and Humidity Control Specialists

°C
%RH

Series PAC26P

THYRISTOR SINGLE PHASE POWER REGULATOR

FUNCTION

Standard Function

Electronic over current protect function:	Protects thyristor element by shutting off the over current detected by a load current monitoring CT.
Constant voltage characteristics by means of voltage feedback:	Stable output provided by the voltage control function and easy operation achieved by the linear characteristics of control input and output voltage.
Soft start function:	Setting suitable soft start for the load.

Additional Function (option)

Automatic power adjusting function:	The suitable power for the control temperature is continuously controlled by a signal from the programmable controller, computer and adjuster. Applicable for soft control of the low range.
Constant-current control (Current feedback):	Applicable to controlling the pure metallic heater and the Kanthal Super heater.
Constant-power control (Power feedback):	Applicable to controlling the SiC and the carbon heater,and applicable to high stability controlling.
Power linear control (Voltage square feedback):	Applicable to precise controlling for Nichrome heater load with power linear characteristics of the control input / output voltage.
Current limiting function:	Applicable to loads with rush current on starting and continuous usage over current condition such as pure metallic, Tungsten and Molybdenum heaters.
Start up output limiting function:	Applicable to the rush current reduction and load protection on turning on the power supply.
Heater break alarm:	Alarm display and output in case of detecting the low power condition of the broken heater and heater defect.
Rapid fuse:	Perfect protection for the thyristor device and the power line from the over current of the short circuit and the grounding.
Power adjustment function:	Addition of various manual equipment used for adjusting ramp, base (residual output), manual and high / low.

Monitor and Alarm Output on the Trouble Situation

Over-current protection:	[O.C] monitor lights and alarm output on
Fan stop (for models over 150A):	[FAN] monitor lights and alarm output on
Rapid fuse burnt out:	[FUSE] monitor lights and alarm output on
Heater break alarm:	[H / B] monitor lights and warning output on

PANEL INFORMATION AND CONTROL TERMINALS

Terminal No. \ Code		Terminal Code	
		Voltage / Current	Contact
Upper terminal	1	C1	C1
	3	C2	C2
	5	R1	R1
	7	R2	R2
	9	R3	R3
	11	–	L2
	13	M	L3
	15	AL1	AL1
	17	AL2	AL2
Lower terminal	2	S1	
	4	S2	
	6	CL1	
	8	CL2	
	10	CL3	
	12	AP1	
	14	AP2	
	16	HB1	
	18	HB2	

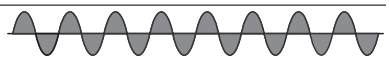
Adjusters
- Power adjuster (standard)
- Soft start time adjuster (standard)
- Heater break alarm setting device (option)
- Automatic power adjuster (option)

Monitor Lamps
- P.L.: Power supply and output indication
- O.C: Over-current
- Fuse: Burning-out of rapid fuse (option)
- H / B: Heater break alarm (option)
- FAN: Stoppage of cooling fan (standard for 150A or above)

Terminal Codes and Functions
- C1–C2: Control input
- R1–R2–R3: External power (option)
- M: Manual / base adjustment (option)
- L2–L3: Low power and adjustment (option)
- AL1–AL2: Alarm output common to over-current, FAN,FUSE
- S1–S2: External sequence signal for limitting start power
- CL1–CL2–CL3: Current limiting adjuster
- AP1–AP2: Automatic Power signal input
- HB1–HB2: Heater break alarm output

CONTROL SYSTEM AND OUTPUT WAVEFORM

PHASE CONTROL SYTEM

OUTPUT	OUTPUT WAVEFORM
0%	
80%	
50%	
20%	

CONTROL SYSTEM AND CHARACTERISTICS

Control system / Output	Phase Control Sytem
Harmonic disturbance	May occur
Flicker occurrence	None
Applicable load	Constant resistance load, inductive load (transformer primary control)
responsiveness	fast
Power factor	bad
Features	Smooth and fine control
Noise generation	Exist
Additional transformer	Can be used
Input voltage fluctuation and output fluctuation	Output fluctuation less than ± 2% when input fluctuation is ± 10% (constant voltage function is standard)

TABLE OF POWER AND GENERATED HEAT

Note that the maximum output of the thyristor on the voltage / power control experiences a 5 to 6% power loss as the efficiency values of the phase control system and the cycle operation system are 94% and 95%, respectively. It has to be considered while designing the power system. The ventilation also has to be considered for temperature rise of the installed area by referring to the following heat generated.

ITEMS / CURRENT CAPACITY	POWER FOR VOLTAGE [KW]					TOTAL HEAT GENERATED ON MAXIMUM OUTPUT [W]		COOLING
	100V	200V	380V	400V	440V	WITH FUSE	WITHOUT FUSE	
20A	2	4	7.6	8	8.8	32	29	Self-cooling system
30A	3	6	11.4	12	13.2	49	45	
45A	4.5	9	17.1	18	19.8	60	54	
60A	6	12	22.8	24	26.4	75	65	
80A	8	16	30.4	32	35.2	94	85	
100A	10	20	38.0	40	44.0	117	105	
150A	15	30	57.0	60	66.0	193	175	Forced air cooling system
250A	25	50	95.0	100	110.0	327	300	
350A	35	70	133.0	140	154.0	420	385	
450A	45	90	171.0	180	198.0	560	520	

***Total heat generated is a summation of the generated heat on the thyristor, fan and fuse.**

SELECTION OF SPECIAL HEATER AND CONTROL SYSTEM AND ADDITIONAL FUNCTION

In case of using the heater listed in the following table, an additional function (single or multiple) should be selected.

ITEMS / SERIES	CONTROL SYSTEM	APPLICABLE HEATER	ADDITIONAL FUNCTION				REQUIREMENT FOR SETTING TO HEATER TERMINAL VOLTAGE BY USING TRANSFORMER
			CONSTANT CURRENT CONTROL	CONSTANT VOLTAGE CONTROL	CURRENT LIMITING	START-UP TIME OUTPUT LIMIT	
PAC26P	Phase control system	Super Kanthal	suitable		applicable		yes
		Platinum	suitable		applicable		yes
		Molybdenum	suitable		suitable	applicable	yes
		Tungsten	suitable		suitable	applicable	yes
		Carbon	applicable	suitable			yes
		Saltbath	suitable				yes
		SiC		suitable	applicable		yes

*** Please contact us if you have any questions.**

SPECIFICATION

COMMON SPECIFICATION

Control input and Ratings

Contact signal:	Non-volatage contact signal	
Current input:	4 to 20mA DC	Receiving impedance: 100Ω
Voltage input:	1 to 5V DC	Input impedance: 200kΩ
	0 to 10V DC	Input impedance: 200kΩ

Power Voltage and Ratings

100V type:	100 to 110V ±10% 50/60Hz
	110 to 120V ±10% 50/60Hz
200V type:	200 to 220V ±10% 50/60Hz
	220 to 240V ±10% 50/60Hz
400V type:	380 to 400V ±10% 50/60Hz
	400 to 440V ±10% 50/60Hz

Power Supply for 400V Type and External Power Ratings

20 to 100A:	200 to 220V 20VA
150 to 450A:	200 to 220V 50VA

Current Capacity and Cooling System

Self-cooling system:	20, 30, 45, 60, 80 & 100A
Forced air cooling system:	150, 250, 350 & 450A

Over-current Protection System

Electronic type (gate breaking system) standard:	about 130% of rated current
Rapid fuse type (optional):	130 to 150% of rated current Reset
Electric type:	Turn power OFF and reapply
Rapid fuse type:	Replace fuse

Power Control Function

Standard:	Power adjustment (internal)	0 to 100%
Option:	External power	0 to 100%
	Manual power	0 to 100%
	Base power	0 to 100%
	High-low power (contact input type)	
	• High power	0 to 100%
	• Low power	High × 0 to 100%
	External power + Manual power	
	External power + Base power	
	Auto power control function	50 to 100%

Alarm Monitors and Rating

Over-current:	[O.C] monitor lights. / AL 1-AL 2 conducted Fan stop for models over
Fan stop (for models over 150A):	[FAN] monitor lights. / Same as above
Fuse burnt out:	[FUSE] monitor lights. / Same as above
Heater break:	[H / B] monitor lights. / HB1-HB2 conducted
Output contact rating:	240V AC 1A / load resistance

Operating Environment

Ambient temperature range:	-10 to 50 ˚C
Ambient humidity:	90% or less without condensation
Stock temperature:	-20 to 65 ˚C

Applicable standard: RoHS directive supported

Insulation Resistance:

Power terminals and chassis:	500V DC 20MΩ	
Dielectric Strength Power supply terminals and chassis:	100 to 240V power supply:	2000V AC 1 minute
	380 to 440V power supply:	2500V AC 1 minute

Material / Finish: Ordinary steel plate / paint coating

External Dimensions and Weight See external dimension diagrams.

INDIVIDUAL SPECIFICATIONS

Phase Control System

Control system:	Phase control system
Soft start time:	Adjustable 1 to 10 sec. (90% rise)
Output voltage control range:	0 to 97% minimum of input voltage
Output stability:	Output fluctuation less than ± 2% when input fluctuation is ± 10%
Output voltage characteristics:	Linear output by voltage feedback
Over-current protection system:	Equipped with electronic protective function
Applicable load:	All types of heaters (added functions to be selected according to heater characteristics)

Additional Functions (options)

Power control function:	See "Common Specification"
Constant-current control (current feedback)	For pure metallic heaters, super Kanthal, etc.
Constant-power control (power feedback)	For SiC and carbon heaters
Voltage square control (voltage feedback)	Nichrome wire heaters
Output limiting function:	
Current limiting	To limit to 50 to 100% of rated current
Start up output limiting	To limit to 0 to 60% output for 1 to 60sec.
Rapid fuse	Equipped with alarm output function
Heater break alarm	Setting at 0 to 100% of rated current
Auto power adjustment	50 to 100%

ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS
SERIES	PAC26P	Phase Angle Control Single Phase Power Regulator

CONTROL INPUT	2	Contact (Select this code if you want to use it only manually)
	3	1 to 5V DC Input Impedance: 200kΩ
	4	4 to 20mA DC Receiving Impedance: 100Ω
	6	0 to 10V DC Input Impedance: 200kΩ
	9	Others (Please consult before ordering.)

POWER SUPPLY	13-	100 to 110V	
	14-	110 to 120V	
	15-	200 to 220V	
	16-	220 to 240V	
	17-	380 to 400V	Note: 200V power supply is separetely required for electric sourse and power for fan. Transformer (model FE42-50) See page 14.
	18-	400 to 440V	

		100 to 240V AC / Current capacity		*380 to 440V AC / Current capacity	
CURRENT CAPACITY		021	20A	022	20A
		031	30A	032	30A
		041	45A	042	45A
		061	60A	062	60A
		081	80A	082	80A
		101	100A	102	100A
		151	150A	152	150A
		251	250A	252	250A
	*	351	350A	352	350A
	*	451	450A	452	450A

FEEDBACK FUNCTION	0	Constant voltage (standard feature)	/ Nichrome
	1	Constant current	/ Platinum, Carbon, Saltbath, Tungsten
	2	Constant power (*1)	/ SiC, Carbon
	3	Voltage Square-root	/ Nichrome

OUTPUT CONTROL FUNCTION	0	None	
	1	Startup time output control limiting (0 to 60%, 1 to 60sec.)	
	2	Current limiting (When saving continuously for 1 minute or more)	When 1 or 2 is selected in the feedback function Can not be selected
	3	Startup time output control + Current limiting	

EXTERNAL POWER ADJUSTER		N	None (Internal installation as standard)	
	CONTACT INPUT	P	External power adjuster	QSV002 × 1 included
		B	Base (low) power adjuster	QSV002 × 1 included
		H	High / Low power adjuster	QSV002 × 2 included
	CURRENT / VOLTAGE INPUT	P	External power adjuster	QSV002 × 1 included
		M	Manual power adjuster	QSV002 × 1 included
		B	Base power adjuster	QSV002 × 1 included
		W	External power + Manual power	QSV002 × 2 included
		Y	External power + Base power	QSV002 × 2 included

See page 9 for a description of each function.

HEATER BREAK ALARM (Constant resistance load)	0	Without
	1	With (0 to 100% setting of rated current)

RAPID FUSE	0	Without
	1	With (See rapid fuse option.)

AUTO POWER ADJUSTMENT FUNCTIONS EXTERNAL GRADIENT INPUT FUNCTIONS	0	Without	
	4	4 to 20mA DC Receiving Impedance: 100Ω	Auto Power adjustment functions
	6	0 to 10V DC Input Impedance: 100kΩ	
	7	4 to 20mA DC Receiving Impedance: 100Ω	External gradient input functions
	8	0 to 10V DC Input Impedance: 100kΩ	

REMARKS	0	Without
	9	With (Please consult before ordering.)

Notes:

* For use beyond the rated voltage, please make an inquiry.

* Variable resistance heating elements such as silicon carbide (SiC) heaters have a high negative temperature coefficient (their resistance greatly affected by temperature). During a temperature rise, their resistance falls far below that within the ordinary temperature range, leading to inadequate power.

  Maintaining output power within an appropriate range at every temperature requires the device's current capacity to be multiplied by a square root of the heating element's resistance ratio.

  To give an example, the approximate resistance ratio of SiC heaters is 1:3, a square root of which is √3, or approx. 1.73. The required current capacity when using those heaters is thus 1.73 times the original capacity.

  However, since heater deterioration may further widen the ratio, a current capacity even higher than the abovementioned must be selected. As for use of SiC heaters, we recommend about double the original capacity.

● 200V series / 350A, 450A and 400V series / 20 to 450A are treated as semi-standard products. Please contact us in advance for the delivery date.

ITEMS SOLD SEPARATELY

Rapid Fuse Option

CONSTANT CURRENT / VOLTAGE		CODE
20A	100–240V	QSF023
	380–440V	QSF024
30A	100–240V	QSF025
	380–440V	QSF026
45A / 100–440V		QSF027
60A / 100–440V		QSF028
80A / 100–440V		QSF029

CONSTANT CURRENT / VOLTAGE	CODE
100A / 100–440V	QSF030
150A / 100–440V	QSF031
250A / 100–440V	QSF032
350A / 100–440V	QSF033
450A / 100–440V	QSF034

External Power Adjuster

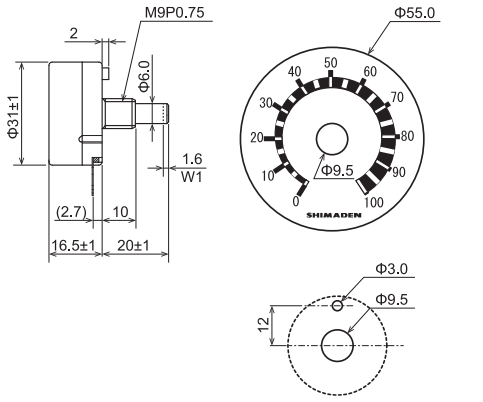
CODE	SPECIFICATIONS
QSV002	with B10kΩ, knob, scale panel, lead wire 1m

Rating

Model : QSV002
Resistance value : B10kΩ
Length of lead wire : 1m
M3.5 crimp terminal

External dimensions and mounting sizes

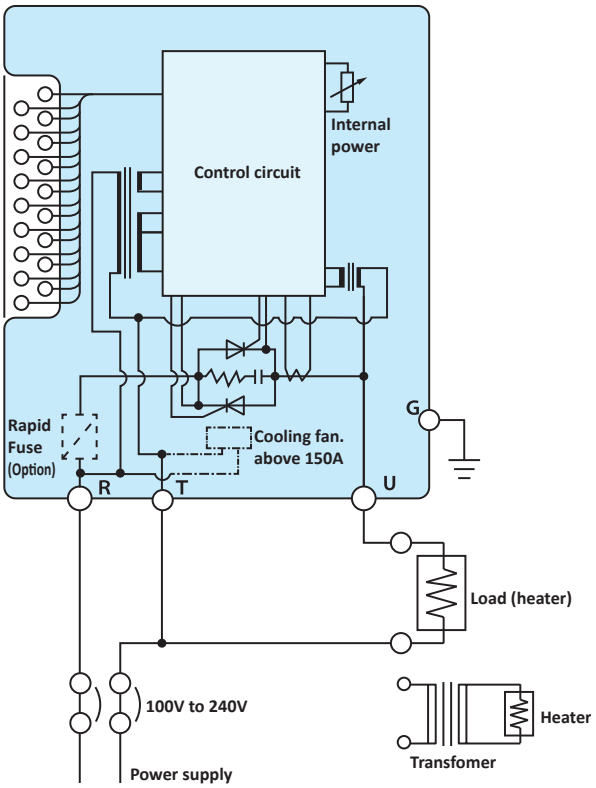
Lead wire : With 1m vinyl lead
Panel / Knob : With 1 each



Unit: mm

CIRCUIT BLOCK AND TERMINAL DIAGRAMS

•100 to 240V Power Supply



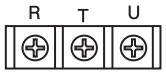
Terminal symbol

□Control terminal

No.1 to 18 (See panel information and control terminals.)

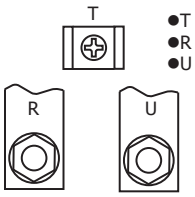
□Power supply / Load circuit

[20A / 30A, 45A / 60A terminal]



●R / Power terminal
●T / Power & feedback terminal
●U / Output terminal

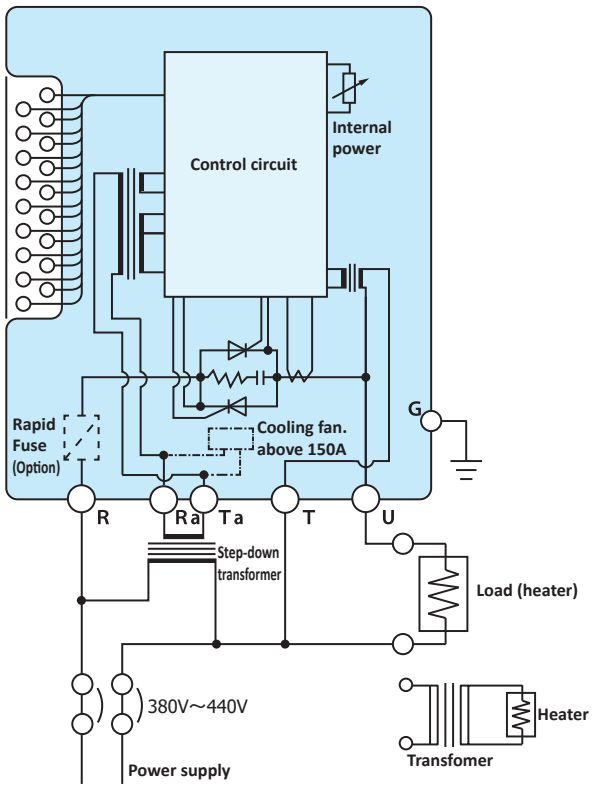
[80A / 100A, 150A / 250A, 350A / 450A terminal]



●T / Power & feedback terminal
●R / Power terminal
●U / Output terminal

bar wiring

●380 to 440V Power Supply



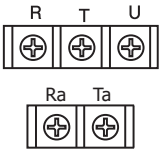
Terminal symbol

□Control terminal

No.1 to 18 (See panel information and control terminals.)

□Power supply / Load circuit

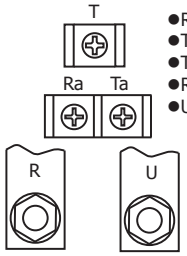
[20A / 30A, 45A / 60A terminal]



●R / Power terminal
●T / Power & feedback terminal
●U / Output terminal

- External power supply -
●Ra / 0V (R phase) terminal
●Ta / 200V (T phase) terminal

[80A / 100A, 150A / 250A, 350A / 450A terminal]



●Ra / 0V (R phase) terminal
●Ta / 200V (T phase) terminal
●T / Power & feedback terminal
●R / Power terminal
●U / Output terminal

bar wiring

* Rapid fuse is an optional items. Fan is a provided instrument of above 150A.

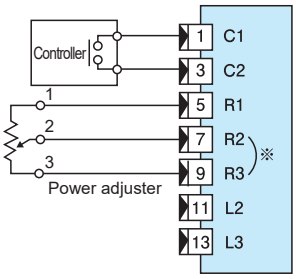
WIRING OF CONTROL TERMINAL

This function is available by connecting adjuster (rating B 10kΩ 1W), after delievered to the user.

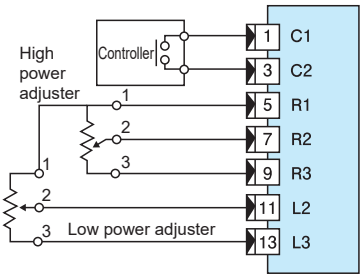
Output Adjusting Function (Upper Terminal)

■ Wiring with contact output type controller

External power High / Low power



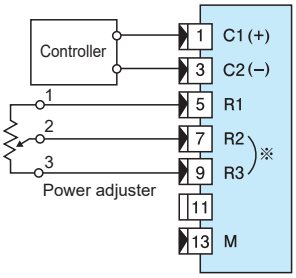
- With internal power standard
- To adjust output in case of conduction between input terminals C1 and C2.
- Short circuit R2 and R3 when power adjuster is not used (adjust by internal power adjuster).
- Conduct between C1 and C2 : 0 to 100%



- To adjust maximum output for conducted (on) input terminals C1-C2 and to maintain non- conduct (off) output.
- High power : Conduct between C1 and C2 0 to 100%
- Low power : No conduct between C1 and C2 High power × Low power

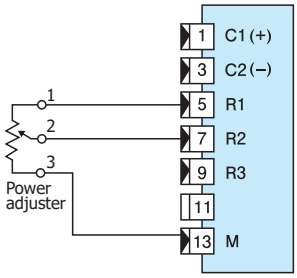
■ Wiring with voltage / current output type controller

External power



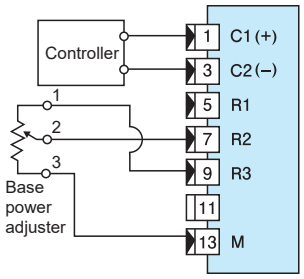
- With internal power standard
- Short circuit R2 and R3 when power adjuster is not used (adjust by internal power).
- Input of 100%: 0 to 100%

Manual power



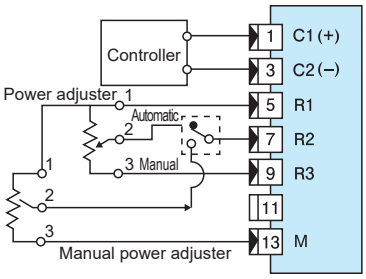
- To adjust power manually.

Base (residual) power



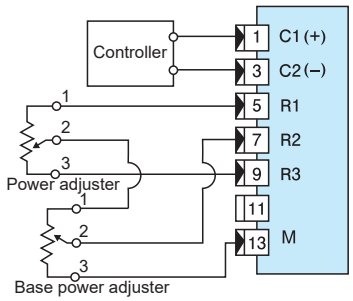
- To keep output steady when the control signal is at 0%.
- The maximum power is adjusted by internal power adjuster.
- Input of 0%: 0 to 100%

External power + Manual power (Automatic / Manual)



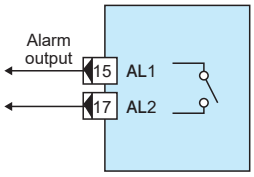
- External contact switches automatic / manual for power adjusting selection of automatic and manual operations.
- Please prepare the automatic / manual switch.

External power + Base (residual) power



- To adjust maximum output and to maintain some parts of output 0% control signal.

Alarm circuit

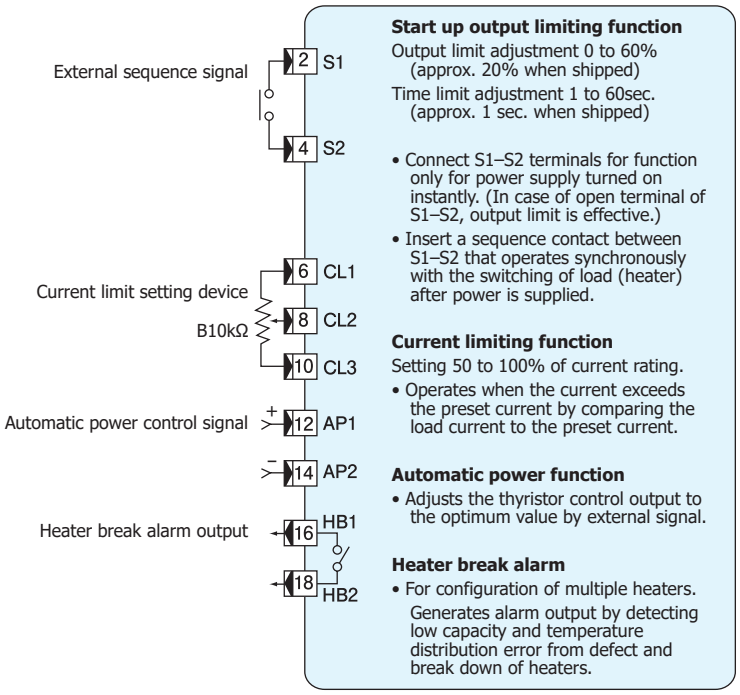


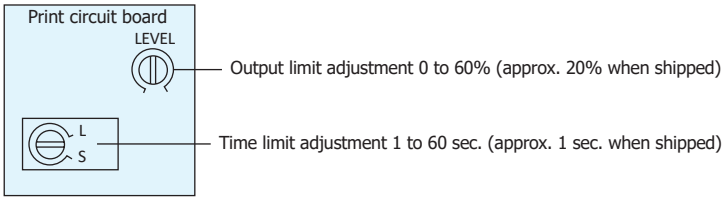
- Alarm on
  Conduct between AL1 and AL2.
- Operation
  Over-current protection circuit in operation.
  Fuse burnt out.
  Cooling fan stopped.

WIRING OF CONTROL TERMINAL

Additional Function (Option) (Lower Terminal)

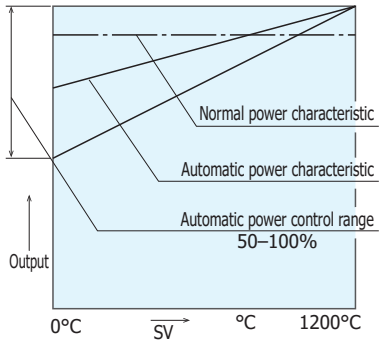
All additional function terminals are optional.
It cannot be added after delivery. Please select when ordering.





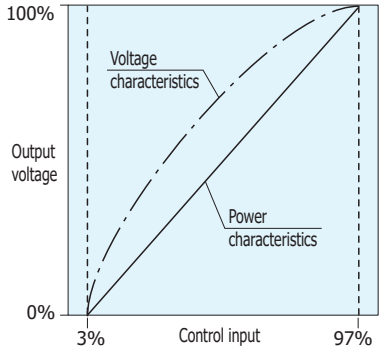
DRAWING OF ADDITIONAL FUNCTION CHARACTERISTIC

● Automatic Power Adjusting Function



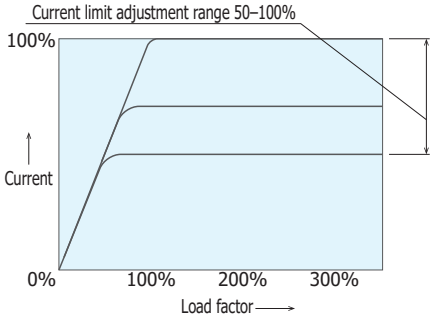
The maximum output (power) suitable for the set (SV) temperature is set steplessly by an external signal (program controller, computer, controller), and controllability over a wide area is improved.

● Power Linear Characteristics (Voltage Feedback)



This function outputs a power proportional to the control input and also has a constant voltage characteristic, so it can be applied to a nichrome heater to improve controllability. It becomes a power regulator proportional to the scale of the regulator for manual adjustment.

● Current Limiting Characteristics

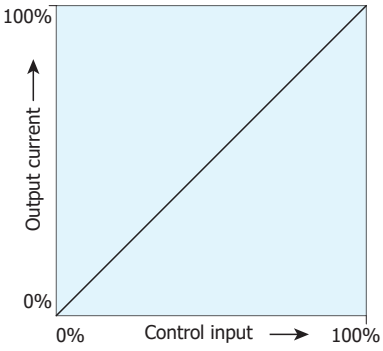


This function is a characteristic that limits the current value to the set value (50 to 100% of the rated value). Select this when controlling the heater such as platinum, molybdenum, tungsten, etc. where an initial inrush current occurs and the SiC heater control.

Note: With this characteristic, the power is reduced as the load is increased beyond the rating. (See table below)

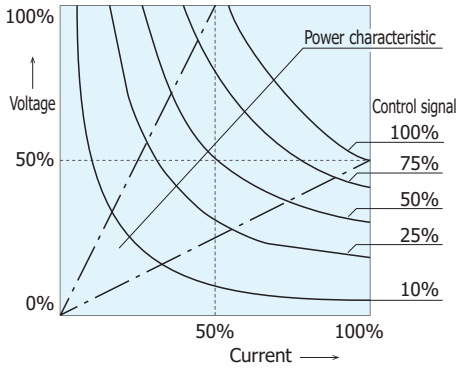
Load factor	100%	200%	300%	500%
Current	97%	100%	100%	100%
Voltage	97%	50%	33%	20%
Power	94%	50%	33%	20%

● Constant Current Characteristics (Current Feedback)



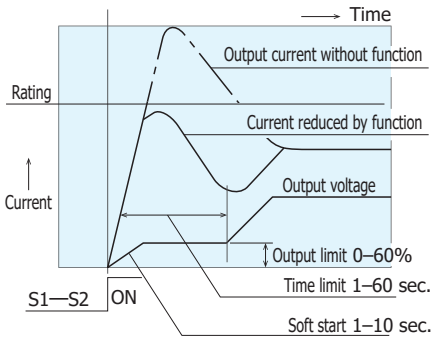
This function calculates and controls the current setting value given by the control signal and the current signal from the current transformer (built-in CT). If the control input is constant, the current is controlled to be constant even if load fluctuations and power supply fluctuations occur, making it suitable for controlling platinum, molybdenum, tungsten, Kanthal super, etc.

● Constant Power Characteristics (Power Feedback)



This function controls the electric power proportional to the control input, and its effect appears in the SiC heater control where the resistance value changes greatly depending on the temperature range. Controlling the electric power controls the amount of heat generated in a stable manner, and the controllability is further improved compared to the case of controlling only the voltage or current. When selecting this characteristic, it is necessary to allow some extra thyristor capacitance. The maximum power characteristics of the thyristor are in the range of rated current 50% × rated voltage 100% to rated current 100% × rated voltage 50% as shown in the figure above. Select the thyristor rating so that the heater load current used is 50% of the thyristor current shown in the above figure.

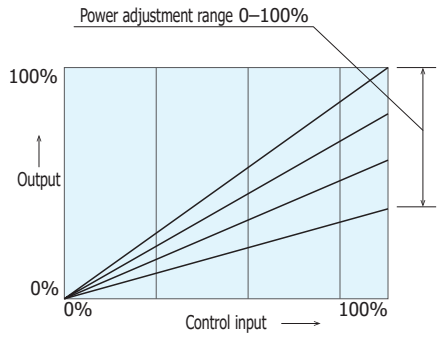
● Start up Output Limiting Characteristics



This characteristic is effective when controlling a load (platinum, molybdenum, tungsten, infrared lamp, etc.) that has an inrush current when the power is turned on or when the load is switched. It can also protect the load.

DRAWING OF ADDITIONAL FUNCTION CHARACTERISTIC

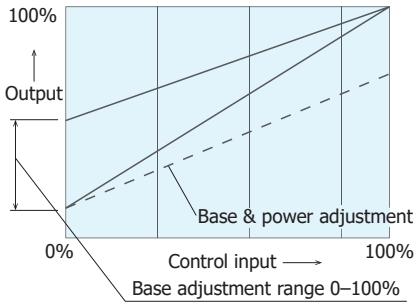
● Output Power



This function selects the external power when you want to operate it away from the main unit. It can be used to adjust the power to suit the set temperature, improve controllability, adjust the rising slope, and manually correct the load characteristics.

* When combined with a voltage/current input type controller, the internal power (with standard) can be used in the same way as above.

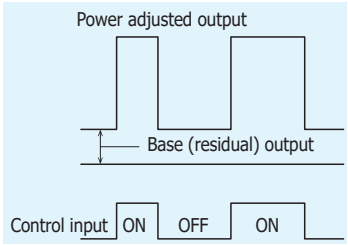
● Base (Residual) Power Characteristics



In general control, the output is set to 0% when the control input is 0%, but when the output limit function at startup is added, the control input continues for 0% of the time, and when the heater temperature falls, the control input is turned on again. When it increases to 100% etc., an appropriate current remains so that an overcurrent does not flow.

*The residual output can be adjusted in the range of 0 to 100%, so be careful to set it to the required value so that it does not become excessive.

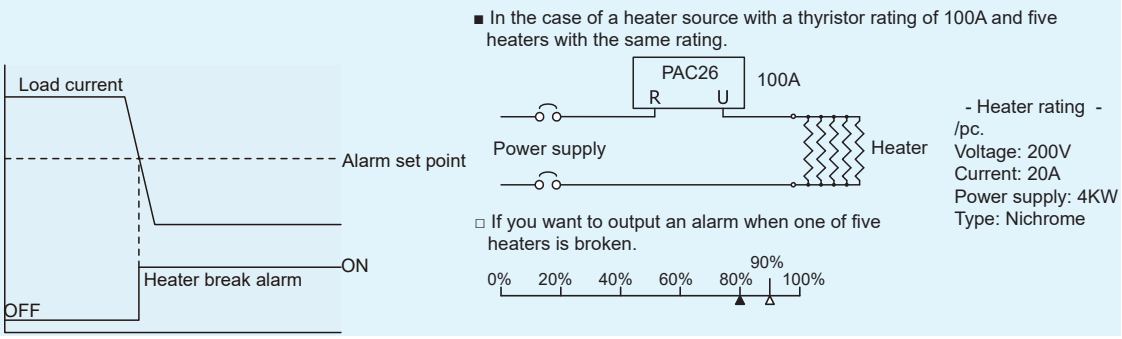
● High / Low Power Characteristics



In the case of contact signal input type, use low power to improve control and prevent inrush current due to load characteristics in combination with two-position controller or PID controller. High power can adjust the power in the range of 0 to 100% when the C1 and C2 terminals are short-circuited. The low power is the output value that is obtained by multiplying the low power adjustment value by the high power adjustment value when C1 and C2 terminals are released.

Example: When the high power value is 80% and the low power is 30%, the residual output is 24%.

● Heater Break Alarm Circuit



Generally, even if one heater is broken in a heat source consisting of multiple heaters, it will be detected promptly and an alarm will be output.

Heater break alarm function calculates by voltage/current detection, and detecting sensitivity is approx. 10%.

*Reset: Power supply OFF

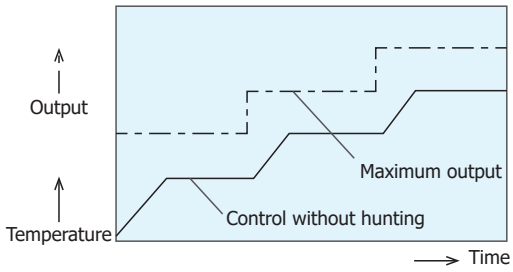
*Control output is output even during alarm operation.

equipment (programmable controller, computer or controller) and improves controlling ability continuously providing suitable power to the SV (Set Value)

EXAMPLE OF THE AUTOMATIC POWER FUNCTION

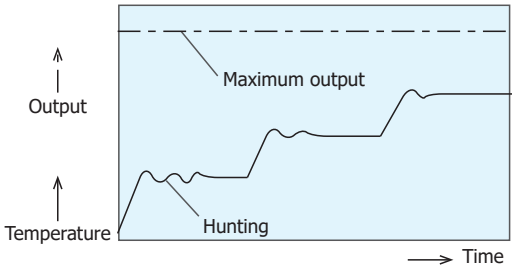
■ Contstant value control

• Output with automatic power control function and result of control



Power changes along with the SV value to prevent overshooting and allow optimum control.

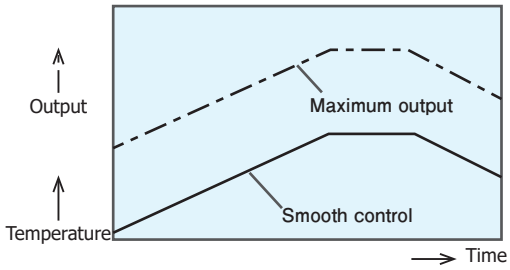
• Output without automatic power control function and result of control



The power gets excessive in low range, resulting in overshooting and hunting.

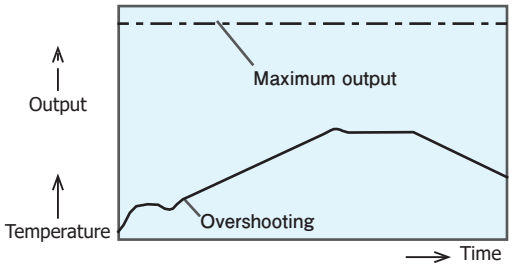
■Program Control

• Output with automatic power control function and result of control



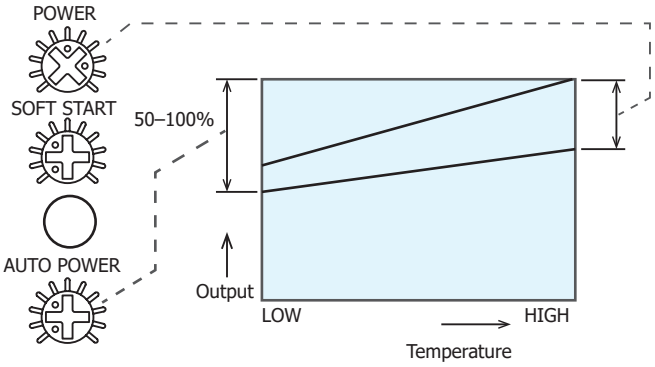
Soft control of the program is possible without transient characteristic (overshooting) at the start time.

• Output with automatic power control function and result of control



Power gets excessive at the start time, resulting in overshooting. In some cases, control characteristics deteriorate in a low range.

■Procedure for Automatic Power Ajusting Function

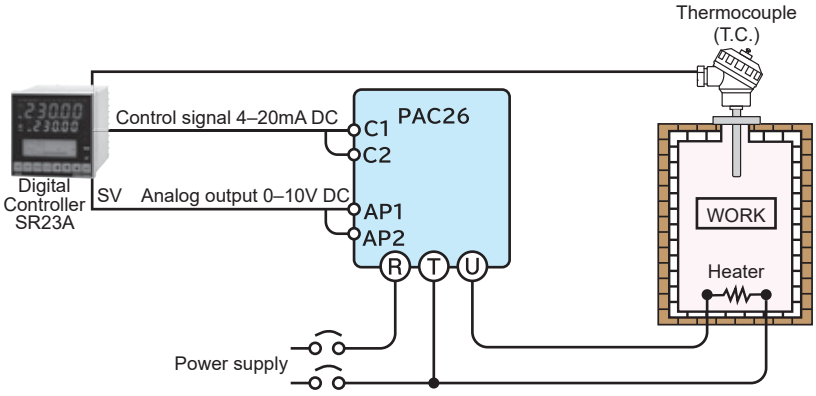


By setting output optimum to the low range set value on the [AUTO-POWER] adjuster, the output characteristic is designated to the line connecting automatic power adjusting value and the output at the maximum temperature. In case of adjusting maximum output, adjusters for internal power and external power are employed.

• Soft Control by Automatic Power Adjusting Function

In case of achieving small temperature stress such as bio industry and fine ceramic manufacturing, the automatic power adjustment is effective for precision control. The temperature control range expands for the same PID value in the PID control condition.

■ Example of combination with Digital controller SR23A

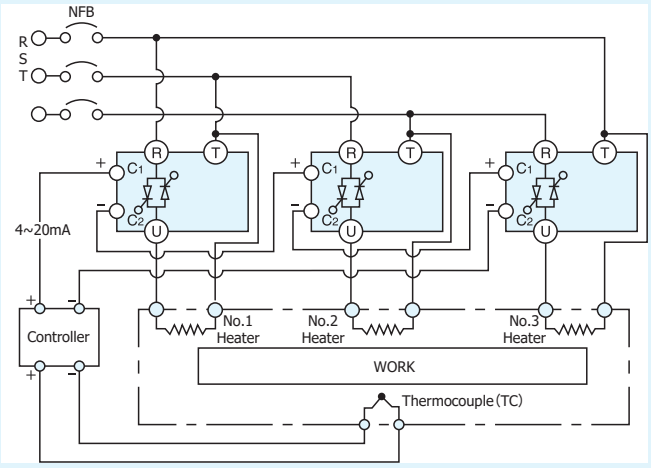


When the SV analog output (4 to 20mA or 0 to 10V) of the SR23A Digital controller is input to the auto power terminals (AP1 and AP2) of the PAC26P, maximum power cramping, is set automatically by controller setting (SV) and the efficiency of control is improved. The combination plays another role; it effectively saves a total load when several thyristors are turned on simultaneously. AP1 to AP2.

APPLICATION EXAMPLES

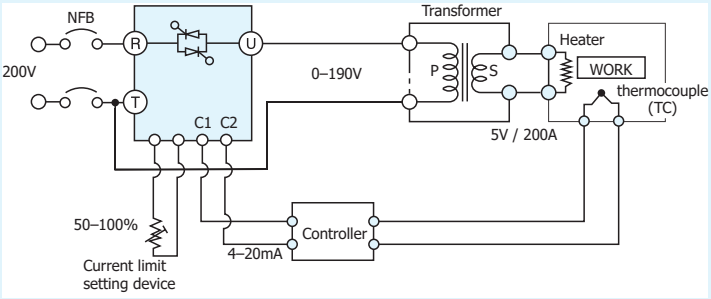
• Application of 1 Controller with 3 PAC26's

(Since receiving impedance is 100Ω, up to 6 PAC26's can be used with one controller.)



No.1 to No.3 are controlled by the same control signal from the controller. In order to broaden the soaking temperature band in the furnace, the respective outputs should be differentiated. In such case, the built-in (or external: option) power adjuster serves to make balancing adjustment.

• Application with Transformer (Phase Angle Control System Only)



-- Transformer is used for: --

1. Matching the heater terminal voltage.
2. Insulating between the primary side and secondary side.

Applicable Heating Unit: Pure metalic heater, SIC heater

400V STEP DOWN TRANSFORMER

In case of using system with power supply of 380 to 440V (high voltage), 200V low voltage power supply is required to provide electronic circuit and fan driving. No 200V power is supplied to the installed area, use the power supply (380 to 440V) after conversion down to 200V.

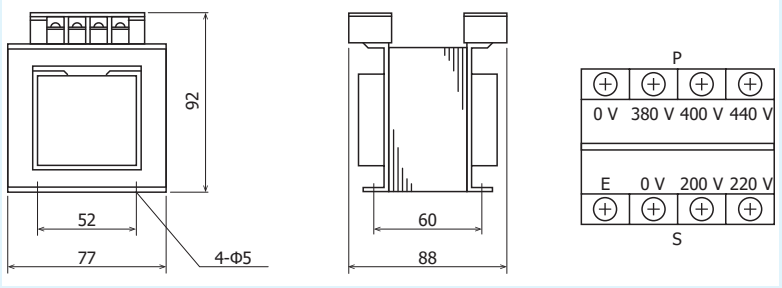
□ Transformer type: FE42-50

Primary (input) voltage: 380V, 400V, 440V, 50/60Hz

Secondary (output) voltage: 200V, 220V (200V terminal for PAC26)

Capacity: 50VA (20A to 100A / 2 sets, 150A to 450A / 1 set of thyristor can be connected.)

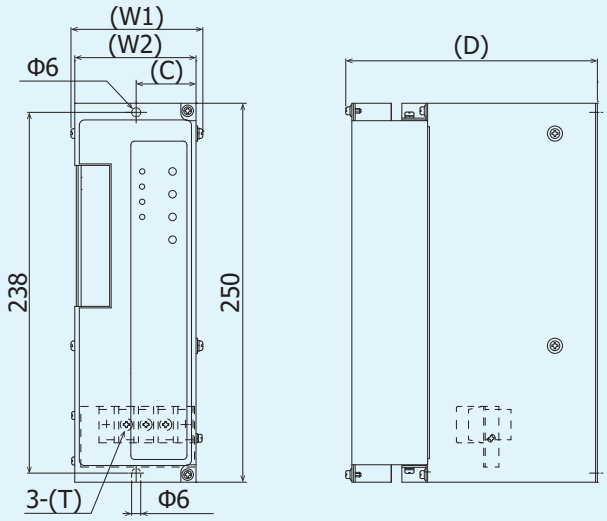
Dielectric strength: Between primary terminal and secondary terminal: 2500V AC 1 minute



Unit: mm

EXTERNAL DIMENSIONS AND WEIGHT

20A, 30A, 45A & 60A (Note: Dimensions of 20A and 30A are those of 45A and 60A, respectively, for 380V to 440V)



Code \ Current	20A , 30A / 100V to 240V	45A , 60A / 100V to 240V 20A , 30A , 45A , 60A / 380V to 440V
W1	87	113
W2	80	105
D	166	176
C	39.5	52.5
T	M4	M6

Unit: mm

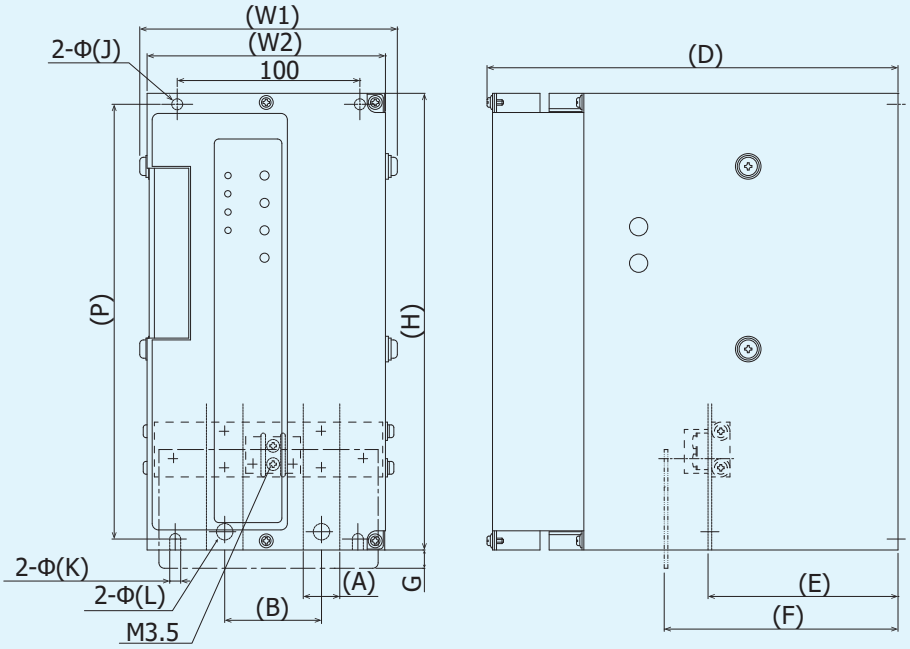
Weight

20A,30A/100V to 240V : Approx. 3kg.

45A,60A/100V to 240V : Approx. 3.8kg.

20A,30A,45A,60A/380V to 440V : Approx. 3.8kg.

80A, 100A, 150A & 250A (100V to 440V)



Code \ Current	80 , 100A	150 , 250A
W1	141	140
W2	130.5	128
H	250	300
D	225	274
P	238	286
A	20	25
B	53	58
J	6	7
K	6	7
L	9	11
E	104	165
F	130	190
G	15	28

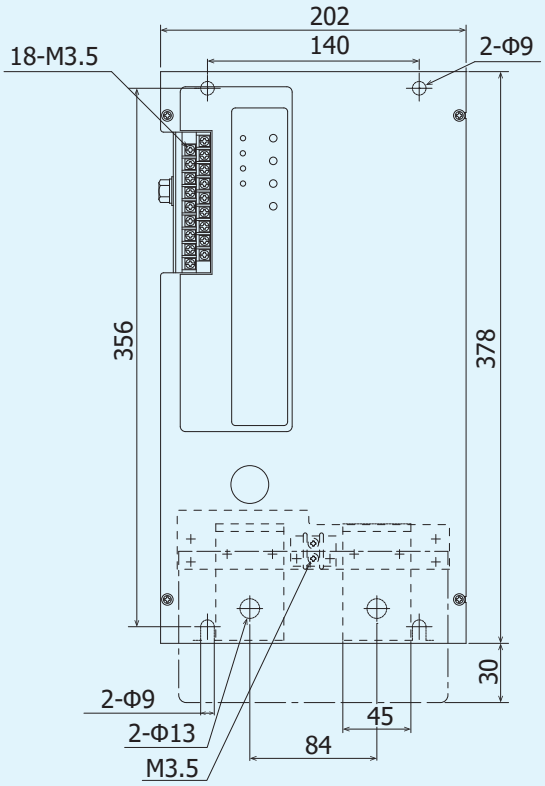
Unit: mm

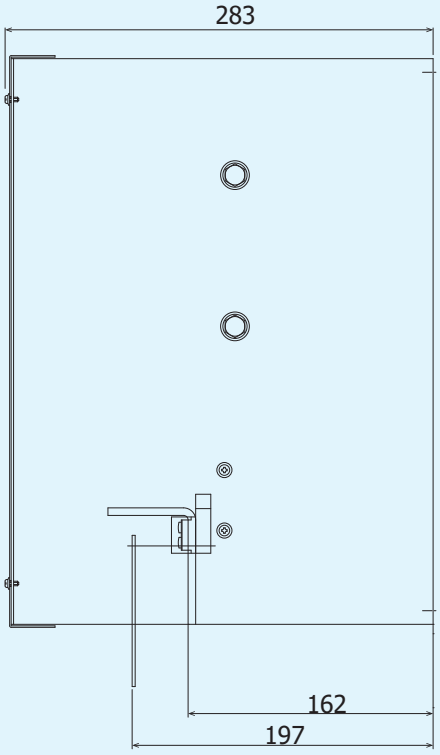
Weight

80A, 100A : Approx. 6.1 kg.

150A, 250A : Approx. 8.7 kg.

350A & 450A (100V to 440V)

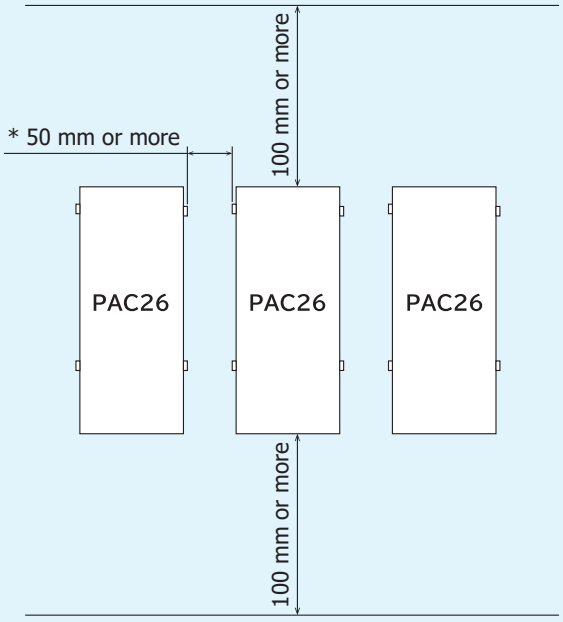




Weight: Approx. 17kg.

Unit: mm

Intervals Required for Mounting



- Wiring should be conducted for ease of maintenance and inspection at the opened door.
  (*Avoid adherent installation in order to open cover for wiring.)

■ **The contents of this material are subject to change without notice.**

WARNING	* Be sure to follow the instruction manual when operating this device. * This device is designed for industrial use to control temperature, humidity and other physical values. Avoid using it for control of devices upon which human life is dependent. * If the possibility of loss or damage to your system or property as a result of failure of any parts of the process exists, proper safety measures must be made before the instrument is put into use so as to prevent the occurrence of trouble.

Head Office & Saitama Factory
ISO 9001/ISO14001 Certification Obtained

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