

|          |
|----------|
| °C       |
| %RH      |
| SHIMADEN |

## Series PAC11P

### SINGLE PHASE POWER REGULATOR



[20, 30A]

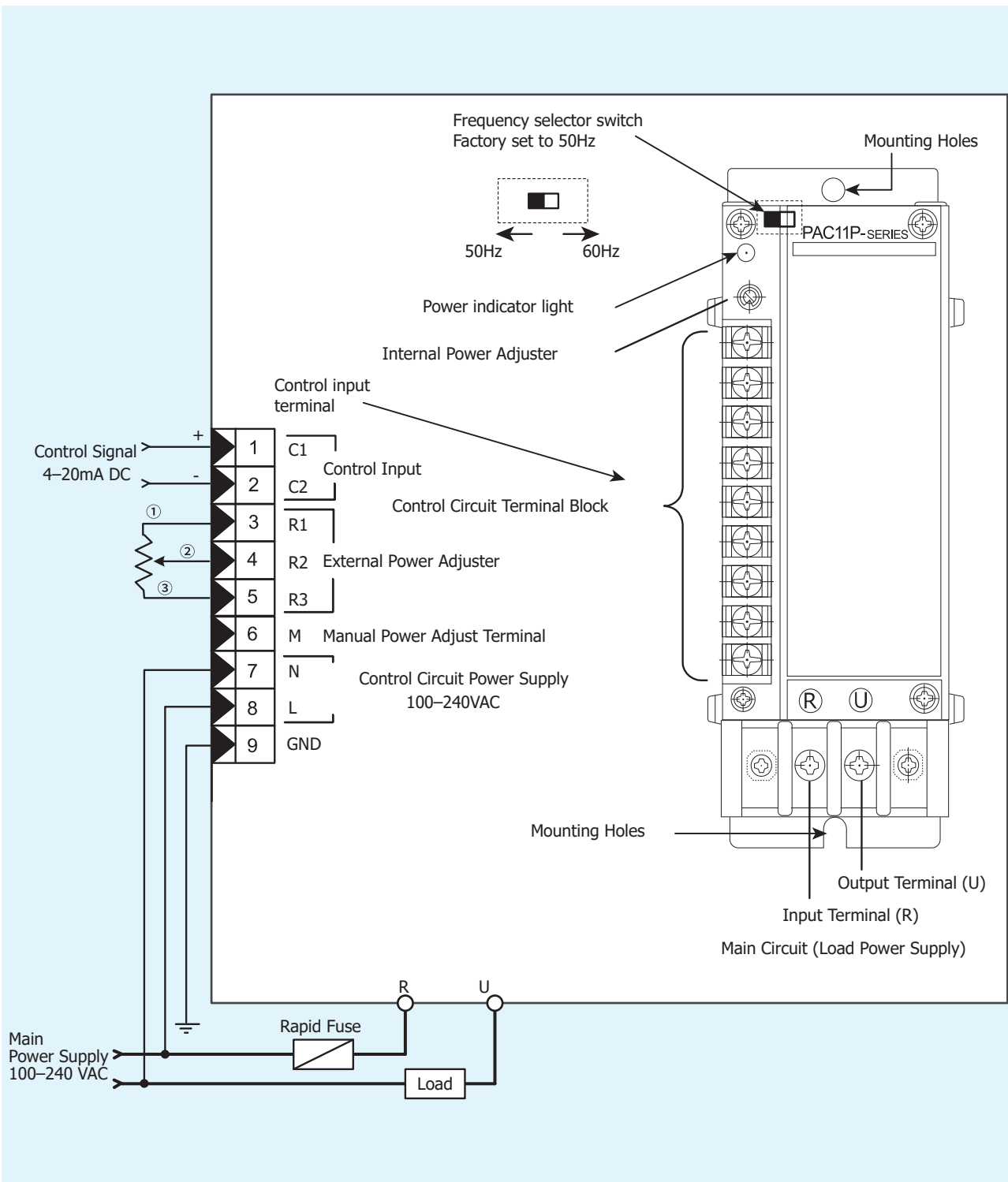


[45, 60A]

#### PRODUCT FEATURE

- *Achieves a slim width with a compact integrated structure, and can increase the panel mounting density.*
- *With frequency switching*
- *Current Capacity: 20 to 60 Amperes*
- *The power adjustment function can be used.*  
*[Current input type: internal (standard equipment), contact input type: external]*
- *RoHS directive supported*

## PANEL INFORMATION AND CONTROL TERMINALS



## SPECIFICATIONS

### ■ PAC11P

- Control Mode : Phase angle (with soft start)
- Possible Loads : All resistance loads
- Current Capacity : 20, 30, 45, 60 Amps.
- Power Supply : 100 to 240V AC $\pm$ 10%
- Power Supply Cycle : 50/60Hz (Switched by the internal switch: factory set: 50Hz)
- Power Lamp : Green LED lamp
- Control Input : Current = 4 to 20mA DC (Receiving impedance: 100 ohms)  
Contact = Zero voltage contact
- Output Voltage Control Range : 0 to 95% min. 50/60Hz. of inut voltage
- Power Adjuster
  - Current input : Internal installation as standard (External installation as option)
  - Contact input : External installation as standard
- Auto/Manual Power Adjuster : Only current input type is available - optional
- Thyristor Element Cooling : Natural air
- Over-Current Protection : None available (Use a fuse for semiconductor)
- Minimum Load : 10% min. of current capacity (no operation at no load)
- Operating Ambient
  - Temperature : -10 to 50°C
  - Humidity : 90% RH (No dew condensation)
  - Elevation : 2000 m above sea level or lower
  - Pollution class : 2 (IEC 60664)
- Storage temperature : -20 to 65 °C
- Applicable standards : RoHS compliance
- Insulation Resistance : 500V DC 20M ohms between power supply terminals and chassis  
500V DC 20M ohms between power supply terminals and input terminals
- Dielectric Strength : 1 min. at 2000V AC between power supply terminals and chassis
- Dimensions and Weight : See page 8.

## INTERNAL HEAT VALUE

Internal heat value for the PAC11P series with the rated current is as follows.

Voltage is produced between terminals by current flowing to the thyristor. Voltage between terminals multiplied by current (W) turns into Joule heat, resulting in rise in temperature of the thyristor element. Take heat dissipation and ventilation into account.

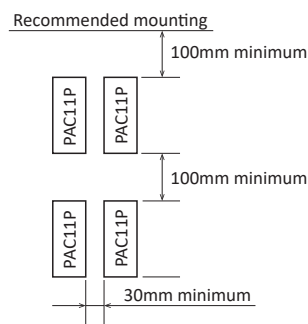
(Heat value conversion formula: 860 kcal = 1000 W)

| Rated current (A) | 20 | 30 | 45 | 60 |
|-------------------|----|----|----|----|
| Heat value (W)    | 24 | 36 | 48 | 60 |

\*Care must be taken for air-ventilation.

\*Vertical mounting is recommended.

When mounting horizontally, use at 70% of the current capacity.



**ORDERING INFORMATION**

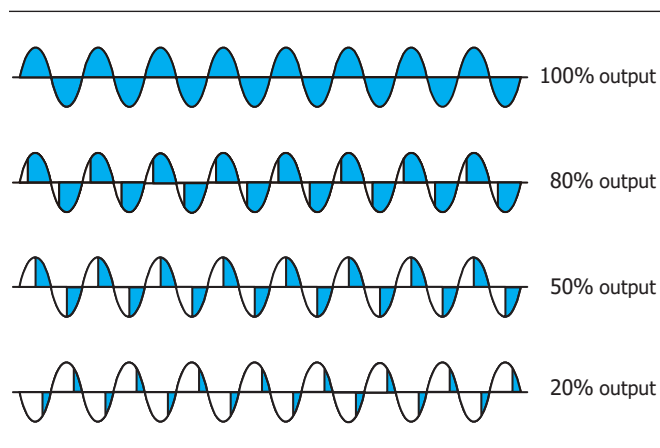
| ITEMS                   | CODE   | SPECIFICATIONS                                             |                                         |                                                     |
|-------------------------|--------|------------------------------------------------------------|-----------------------------------------|-----------------------------------------------------|
| SERIES                  | PAC11P | Phase Angle Single Phase Power Regulator (with soft start) |                                         |                                                     |
| CONTROL INPUT           |        | 0                                                          | 4 to 20mA DC, Receiving impedance: 100Ω |                                                     |
|                         |        | 2                                                          | Non-voltage contact                     |                                                     |
| CURRENT CAPACITY        |        | 020                                                        | 20A                                     |                                                     |
|                         |        | 030                                                        | 30A                                     |                                                     |
|                         |        | 045                                                        | 45A                                     |                                                     |
|                         |        | 060                                                        | 60A                                     |                                                     |
| POWER SUPPLY            |        |                                                            | 90-                                     | 100 to 240V AC ±10%, 50/60Hz                        |
| EXTERNAL POWER ADJUSTER |        | Current Input                                              | N                                       | None (Internal installation as standard)            |
|                         |        |                                                            | P                                       | External power adjuster                             |
|                         |        |                                                            | M                                       | Manual power adjuster                               |
|                         |        |                                                            | B                                       | Base power adjuster                                 |
|                         |        |                                                            | W                                       | External power adjuster + manual power adjuster     |
|                         |        |                                                            | Y                                       | External power adjuster + base power adjuster       |
|                         |        | Contact Input                                              | P                                       | High power adjuster (standard)                      |
|                         |        |                                                            | B                                       | High power adjuster (standard) + Low power adjuster |
| REMARKS                 |        |                                                            | 0                                       | Without                                             |
|                         |        |                                                            | 9                                       | With (Please consult before ordering.)              |

All external power adjusters are equipped with a B10kΩ (1W) scale plate, knob, and lead wire of 1m.

**CONTROL MODES & WAVE FORM**

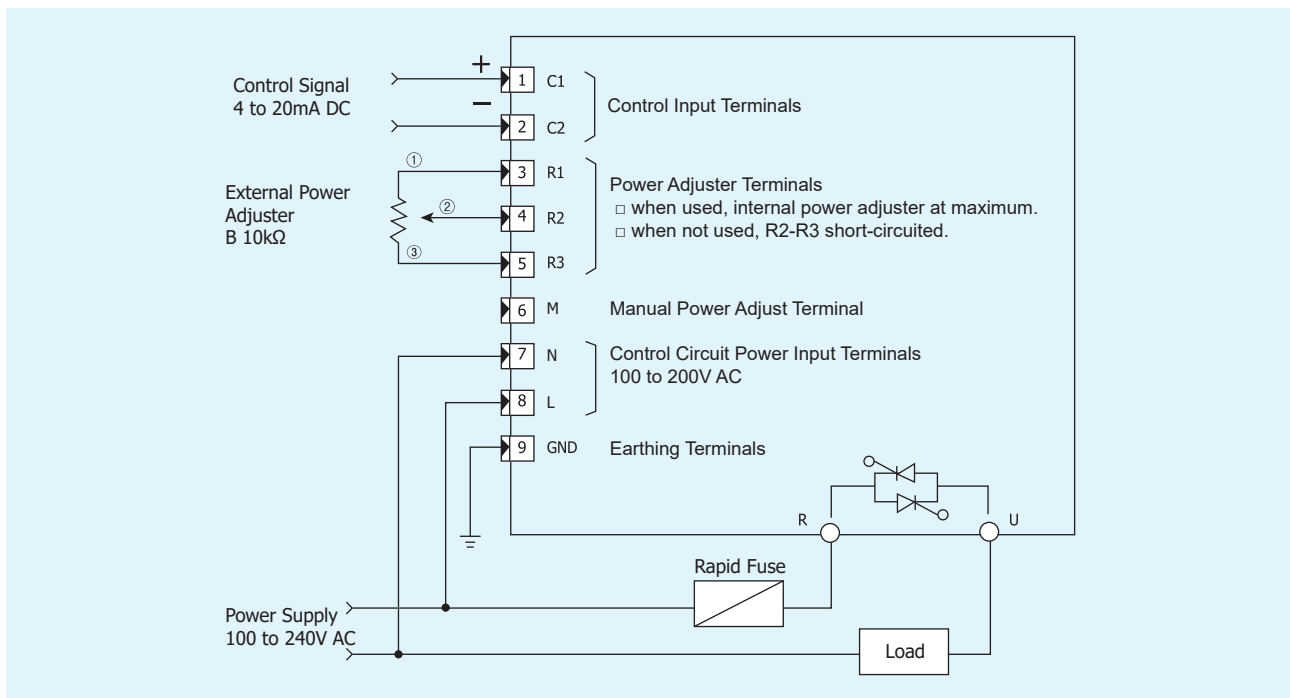
The PAC11P series is available in two types, a phase control method and a cycle calculation zero voltage switching control method, which can be selected at the time of purchase.

Phase control system



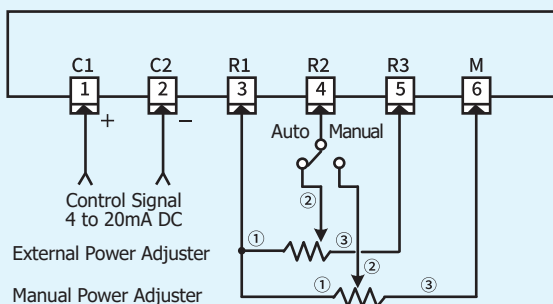
| Control system              | Phase control system                 |
|-----------------------------|--------------------------------------|
| Output                      |                                      |
| Applicable load             | Resistive load, inductive load, etc. |
| Transformer primary control | Available                            |
| Feedback control            | Available                            |
| High harmonic disturbance   | Possibility of occurrence            |
| Flickering occurrence       | None                                 |
| Response time               | Fast                                 |
| Power factor                | Low                                  |

## TERMINALS & WIRING (CURRENT INPUT TYPE)



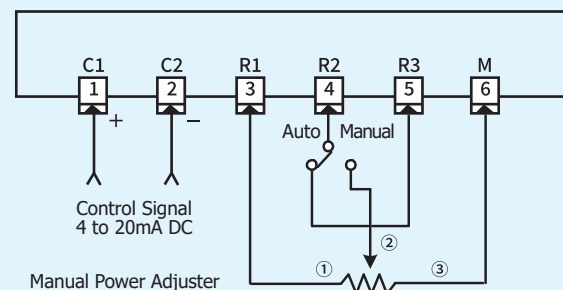
### ■ Connection of various power regulators

#### (1) Using external power/manual switching

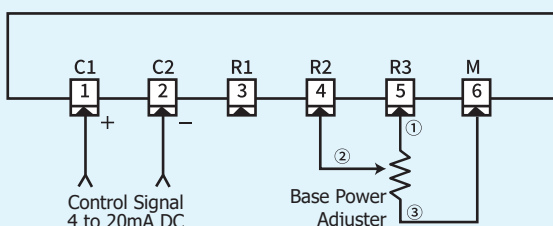


- Set the internal power regulator to maximum.
- If the external power regulator is not used, automatic operation will start when R2-R3 is shorted, and the output at this time will be performed by the internal power regulator.

#### (2) Using automatic/manual switching

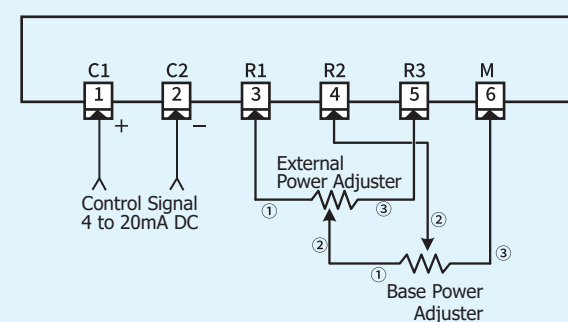


#### (3) Adjusting base power



- In this case, power adjustment is performed using the internal power regulator.

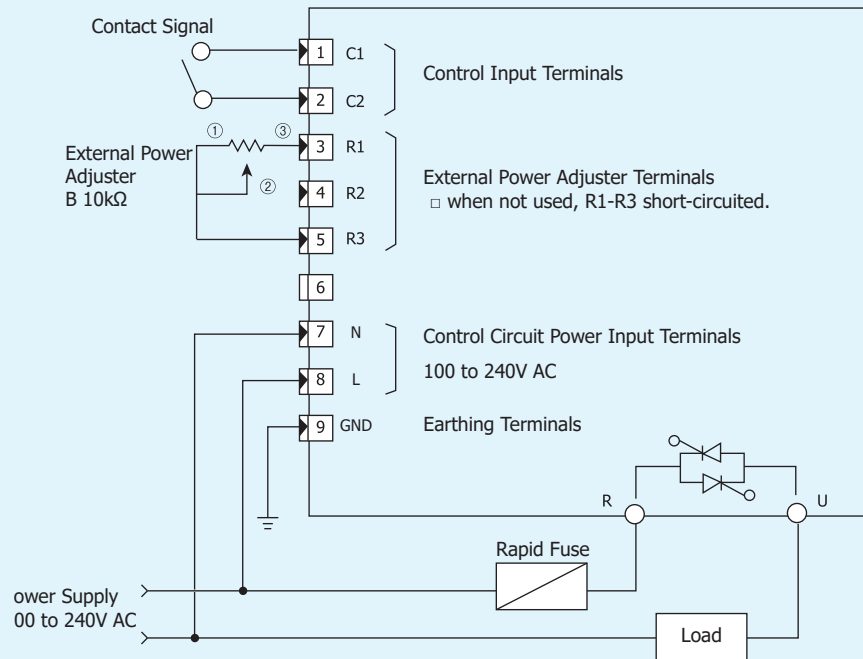
#### (4) When using external power adjustment and base power adjustment simultaneously



- In this case, the external power regulator and base power regulator will interfere with each other.
- Set the internal power regulator to maximum.

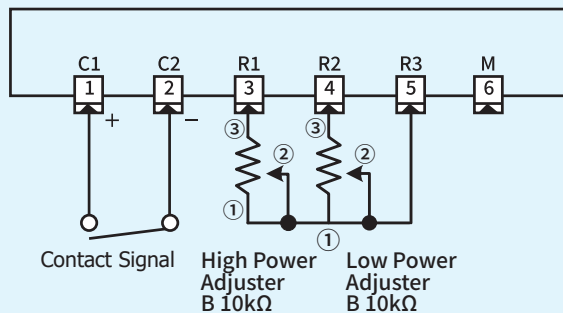
## TERMINALS & WIRING (CONTACT INPUT TYPE)

### ■ Normal Control



## TERMINALS & WIRING (CONTACT INPUT TYPE)

### ■ High/Low Control



Note: When the contacts (C1-C2) are conductive, the output can be adjusted from 0 to 100% using a high power regulator.

When the contact is released, the remaining output can be adjusted from 0 to 100% using the low power adjustment based on the adjusted value of the high power regulator.

$$\text{Low output} = \text{High adjustment value} + \text{Low adjustment value} - 100(\%)$$

In the above calculation, the Low output will be zero if it's negative..

**POWER SUPPLY & LOAD WIRING**■ **Wiring**

Please refer to "Terminal Description and Wiring Example" before wiring. If you insert a rapid fuse, use it at the entrance of power terminal R.

To wire, remove the terminal block cover of PAC11P, loosen the fixing screw attached to the main body, and wire to the terminal block.

**Control terminal**

|                                                   |                             |
|---------------------------------------------------|-----------------------------|
| $\Phi$ (mm <sup>2</sup> )                         | 3.5 or more                 |
| D (mm <sup>2</sup> )                              | 8.0 or more                 |
| Screws                                            | M3.5                        |
| Tightening torque N • m                           | 0.8–1.2                     |
| Recommended wire thickness (cross-sectional area) | 2.0 mm <sup>2</sup> or less |

■ **Wiring of Power Supply and Load**

This device has 2 terminal wiring, and the required screws are M4 for R and U terminals of 20A/30A, and M5 for 45A/60A.

Please use compatible terminals and tighten the screws firmly.

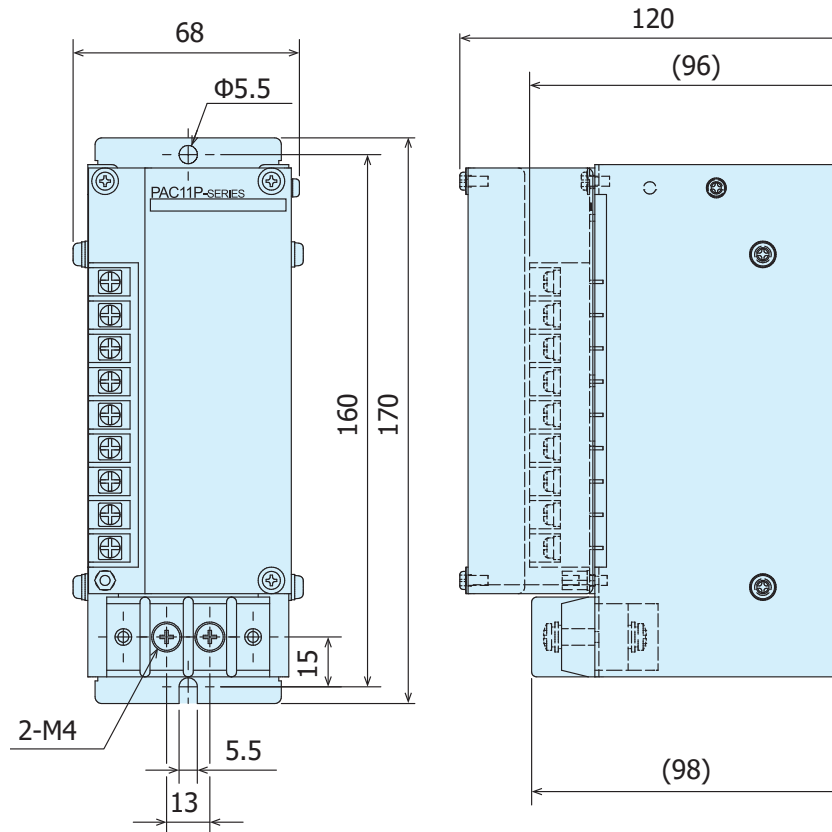
For wiring the R and U terminals, use wire materials that match the current capacity.

|                                                            | Current Capacity           |                            |                      |
|------------------------------------------------------------|----------------------------|----------------------------|----------------------|
|                                                            | 20A/30A                    | 45A                        | 60A                  |
| $\Phi$ (mm <sup>2</sup> )                                  | 4 mm <sup>2</sup> or more  | 5 mm <sup>2</sup> or more  |                      |
| D (mm <sup>2</sup> )                                       | 10 mm <sup>2</sup> or less | 13 mm <sup>2</sup> or less |                      |
| Screws                                                     | M4                         | M5                         |                      |
| Tightening torque N • m                                    | 1.2–1.4                    | 2.0–2.4                    |                      |
| Recommended wire thickness (cross-sectional area)          | 3.5 mm <sup>2</sup>        | 8.4 mm <sup>2</sup>        | 13.3 mm <sup>2</sup> |
| Thickness (cross-sectional area) of the wire for grounding | 2 mm <sup>2</sup> or more  |                            |                      |

**EXTERNAL DIMENSIONS**

## ■ 20A &amp; 30A Types

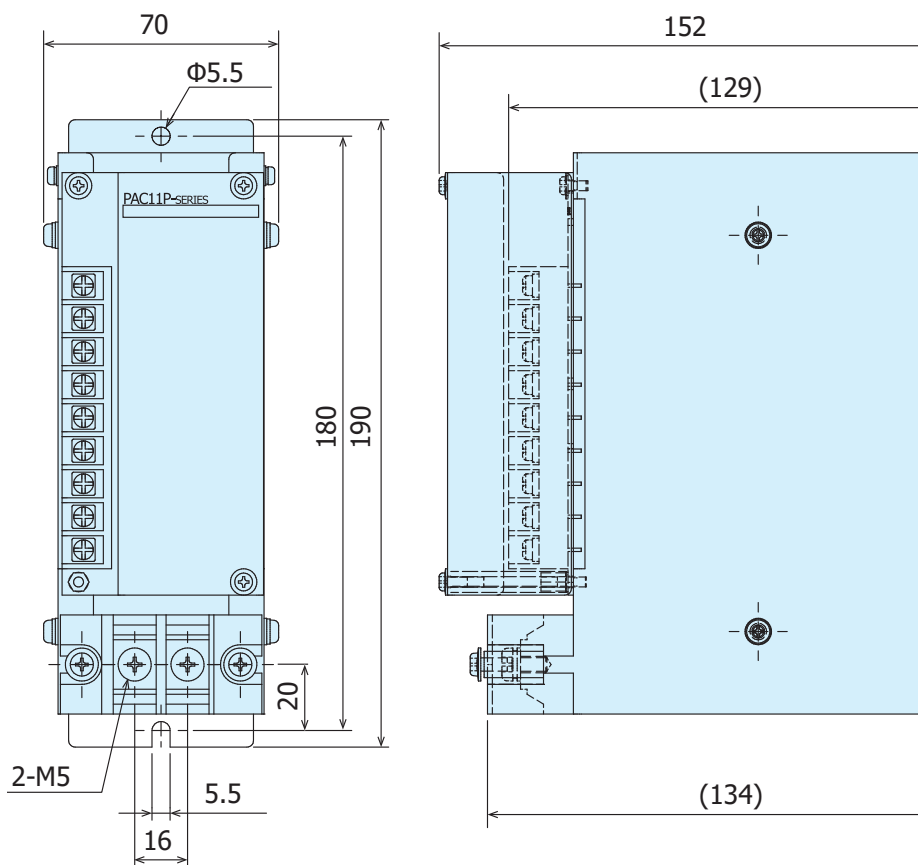
Weight: Approx. 1.1 kg



Unit: mm

## ■ 45A &amp; 60A Types

Weight: Approx. 1.9 kg

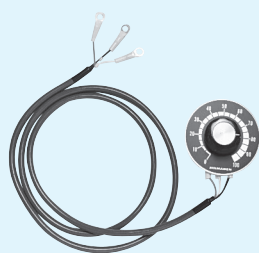


Unit: mm



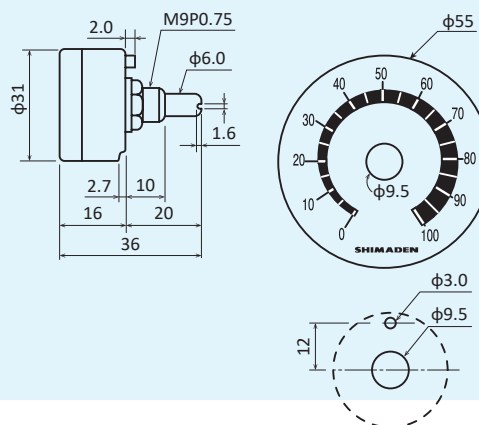
**EXTERNAL ADJUSTER (SOLD SEPARATELY)**

| System<br>Input | Phase control | Lead wire | Spec.                                                                                                                                          |
|-----------------|---------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Current input   | QSV002        | 3 wires   | <input type="checkbox"/> Resistance value: B10k $\Omega$<br><input type="checkbox"/> Lead wire length: 1m,<br>With crimping terminal<br>for M4 |
| Contact input   | QSV001        | 2 wires   |                                                                                                                                                |



☐ 2 wires type when high/low power adjuster is selected

Note: The external power regulator is convenient to operate in a place away from the instrument, but when wiring, do not bundle it with the high-voltage circuit, but wire it apart. If it is unavoidable to wire together, use a shielded wire and ground at one point.



Unit: mm

■ 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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