

PAC35 Series

THREE-PHASE POWER REGULATOR

Instruction Manual

PAC35F-1BE
May, 2024

Thank you for purchasing a Shimaden PAC35 Series Three Phase Power Regulator. Before using this product, make sure that the product specifications are in accordance with your desired requirements by reviewing a code selection table. This instruction manual should be kept in a handy place where the end user can refer to it when necessary.

1. SPECIFICATIONS

| | PAC35P | PAC35Z |
|---|---|---|
| Control System | Phase Control System (with soft-start) | Time Base Zero Voltage Switching Control System |
| Proportional Cycle (Z) | N/A | Approx. 3 sec. (2 to 4 sec., internal variable) |
| Control Circuit Configuration/Element Configuration | 3-Phase Anti-Parallel Configuration/SCR × 3, Diode × 3 | 2-Phase Anti-Parallel Configuration/SCR × 2 × 2-Phase |
| Applicable Load | Resistance Load | Fixed Resistive Load |
| Power Supply Frequency | 50/60 Hz (switched at the terminal, factory setting: 50 Hz) | 50/60 Hz |
| Output Voltage Control Range (P) Power Control Range (Z) | 0 – 95% min. of Input Voltage | 0 to 95% min. of Load Power |
| Power Lamp | Green LED | Green LED lamp lights when the load is applied. |
| Manipulated Variable Output (optional) (Z) | N/A | Output terminal for indicator is attached. (0 to 1 mA DC) |

COMMON SPECIFICATION

| | |
|-----------------------------|--|
| Current Capacity: | 20, 30, 45, 60, 90, 135A |
| Power Supply: | 200 to 240V AC ±10%. 380 to 440V AC ±10% |
| Control Input: | Current: 4 to 20mA DC/Receiving impedance: 100Ω Contact: Non-voltage contact signal |
| Power Adjuster: | Current input type: Internal installation as standard (External installation available as option) Contact input type: External installation as standard |
| Auto/Manual Adjustment | By using manual power adjuster (option), auto/manual switching control is possible. |
| Thyristor Element Cooling: | 20 to 90A (natural air), 135A (fan cooled) |
| Over-Current Protection: | None available (Use fuse for semiconductor.) |
| Minimum Loads: | 10% min. of current capacity (no operation at no load) |
| Temperature Range: | -10 to 50°C |
| Operating Ambient Humidity: | 90% RH max. |
| Storage temperature : | -20 to 65°C |
| Insulation Resistance: | 20MΩ min. at 500V DC between control input terminals and power supply terminals 20MΩ min. at 500V DC between power terminals and ground terminals |
| Dielectric Strength: | 1 min. at 2000V AC between power terminals and ground terminals |
| External Dimensions | Please refer to external dimensions. |

2. ORDERING INFORMATION

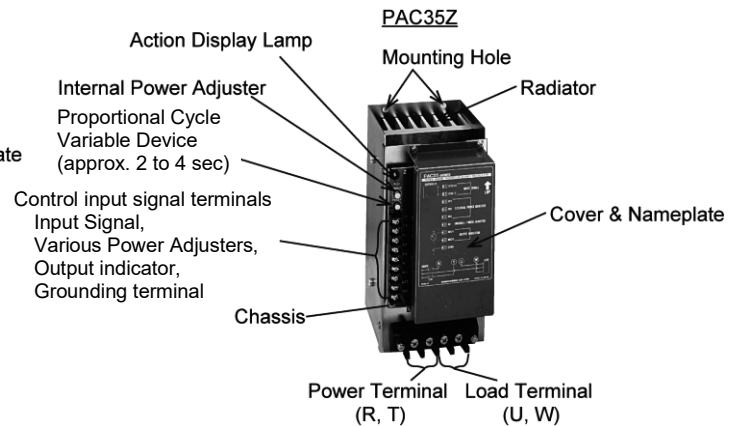
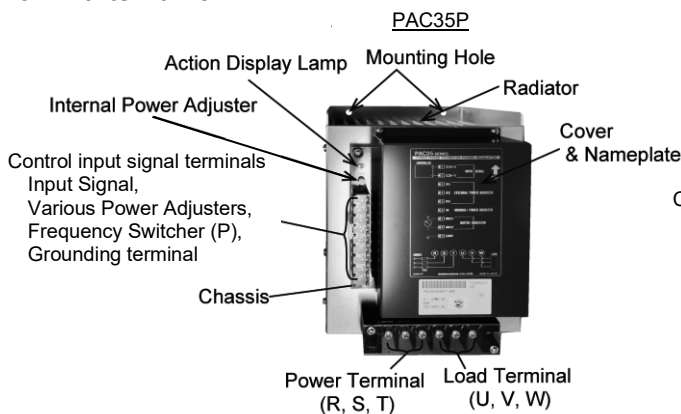
PAC35P

| ITEMS | | CODE | | SPECIFICATIONS | | |
|------------------------|--------|------|-----|---|--|---------------------------------|
| SERIES | PAC35P | | | Phasa Angle 3-phase Power Regulator with Soft-Start | | |
| CONTROL INPUT | | 0 | | | 4 - 20mA DC Receiving impedance: 100Ω | |
| | | 2 | | | Non-voltage contact | |
| | | 9 | | | Others (Please consult before ordering.) | |
| CURRENT CAPACITY | | 020 | | | 20A | |
| | | 030 | | | 30A | |
| | | 045 | | | 45A | |
| | | 060 | | | 60A | |
| | | 090 | | | 90A | |
| | | 135 | | | 135A | |
| POWER SUPPLY | | | 37- | 200 - 240V AC ±10% 50/60Hz | | 50/60Hz switchable by terminals |
| | | | 35- | 380 - 440V AC ±10% 50/60Hz | | |
| | | | 99- | Others (Please consult before ordering) | | |
| EXTRNAL POWER ADJUSTER | | | N | None (internal standard) | | Current input |
| | | | 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 | | |
| | | | X | Others (Please consult before ordering.) | | |
| REMARKS | | | 0 | Without | | |
| | | | 9 | With (Please consult before ordering.) | | |

PAC35Z

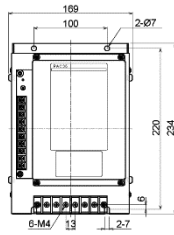
| ITEMS | | CODE | | SPECIFICATIONS | |
|--|--------|------|--|---|---------------------------------|
| SERIES | PAC35Z | | | Time Base Zero Voltage Switching (3-Phase) | |
| CONTROL INPUT | | 0 | | 4 - 20mA DC Receiving impedance: 100Ω | |
| | | 2 | | Non-voltage contact | |
| | | 9 | | Others (Please consult before ordering.) | |
| CURRENT CAPACITY | | 020 | | 20A | |
| | | 030 | | 30A | |
| | | 045 | | 45A | |
| | | 060 | | 60A | |
| | | 090 | | 90A | |
| | | 135 | | 135A | |
| POWER SUPPLY | | 37- | | 200 - 240V AC ±10% 50/60Hz | 50/60Hz switchable by terminals |
| | | 35- | | 380 - 440V AC ±10% 50/60Hz | |
| | | 99- | | Others (Please consult before ordering.) | |
| EXTRNAL POWER ADJUSTER | | N | | None (internal 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 | |
| | | P | | High power adjuster (standard) | |
| | | B | | High power adjuster (standard) + Low power adjuster | |
| | | X | | Others (Please consult before ordering.) | |
| MANIPULATED VARIABLE (POWER) OUTPUT AND / OR INDICATOR | | 0 | | None | |
| | | 1 | | With output signal | |
| | | 2 | | With output signal + QSM001 (Indicator □60mm) | |
| | | 3 | | With output signal + QSM002 (Indicator □80mm) | |
| REMARKS | | 0 | | Without | |
| | | 9 | | With (Please consult before ordering.) | |

3. Parts Name



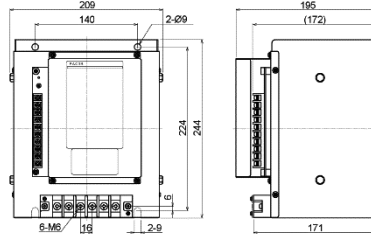
4. EXTERNAL DIMENSIONS & WEIGHT

① PAC35P 20A, 30A



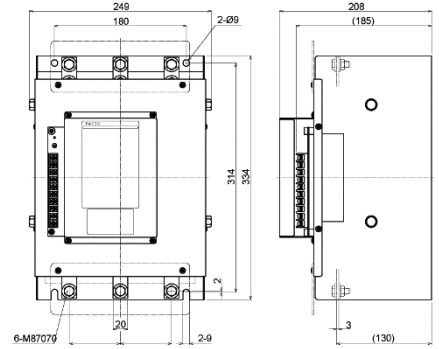
Weight: Approx. 3.0kg / 20A
Approx. 5.2kg / 30A

② PAC35P 45A, 60A



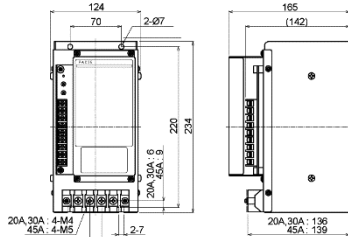
Weight: Approx. 7.6kg

③ PAC35P 90A, 135A



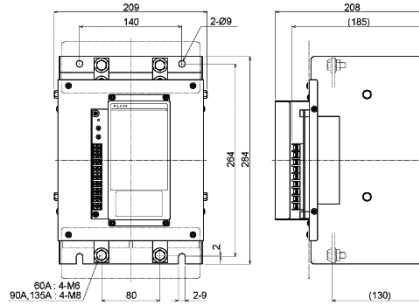
Weight: Approx. 12kg / 90A
Approx. 13kg / 135A

④ PAC35Z 20A, 30A, 45A



Weight: Approx. 2.5kg / 20A
Approx. 3.8kg / 30A, 45A

⑤ PAC35Z 60A, 90A, 135A



Weight: Approx. 8.4kg / 60A, 90A
Approx. 9.4kg / 135A

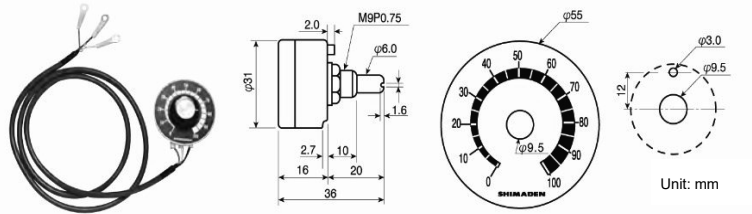
Unit : mm

5. EXTERNAL OPTIONS

5-1. External Power Adjuster

Model: QSV002

- Resistance: B10k Ω 1W
- Lead wire length: 1000 (1m), with M4 crimp terminal
- Scale plate / knob: 1 each provided
- External (High) Power Adjuster (0 to 100%)
- Base (Low) Power Adjuster (0 to 100%)
- Manual Power Adjuster (0 to 100%)



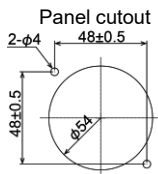
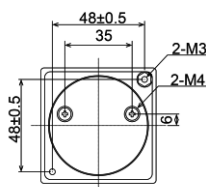
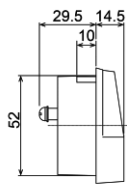
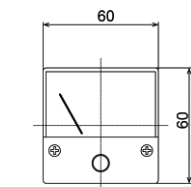
Unit: mm

5-2. Manipulated variable indicator (Zero-Voltage Switching Method)

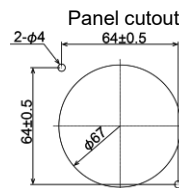
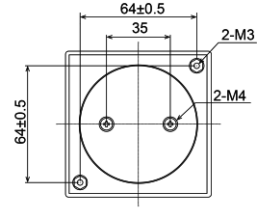
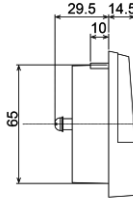
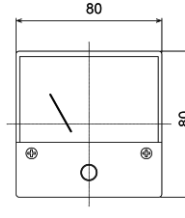
In the case of a fixed-cycle zero-voltage switching type, it is inappropriate to indicate the output voltage and current with a general panel meter due to fluctuations, so this indicator is used to continuously indicate the power consumption in percentage.

EXTERNAL DIMENSIONS

Model: QSM001



Model: QSM002



Unit: mm

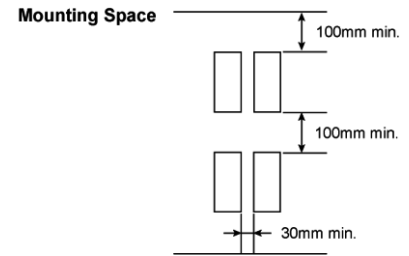
6. Mounting & Operating Environment

| | | | | | | | |
|-------------------|--------|----|-----|-----|-----|-----|-----|
| Capacity (A) | | 20 | 30 | 45 | 60 | 90 | 135 |
| Heating Value (W) | PAC35P | 69 | 105 | 141 | 172 | 270 | 445 |
| | PAC35Z | 45 | 69 | 93 | 125 | 175 | 300 |

* Care must be taken for air ventilation.

* Vertical mounting is recommended. Refer to the mounting space diagram.

When mounting horizontally, use at 60% maximum of the capacity.



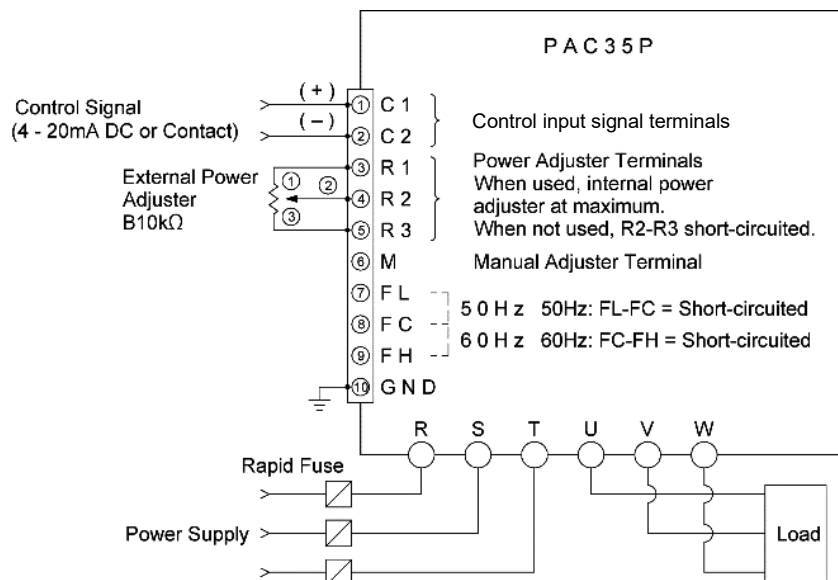
7. Control System and Output Waveform

| Control Mode | Noise | Output Voltmeter Deflection | Output Wave Form | | |
|--------------------------------------|--------|-----------------------------|------------------|------------|------------|
| | | | 10% Output | 50% Output | 90% Output |
| Phase angle control (P) | Little | Continuous | | | |
| Time base zero voltage switching (Z) | None | intermittent | | | |

8. TERMINAL ARRANGEMENT

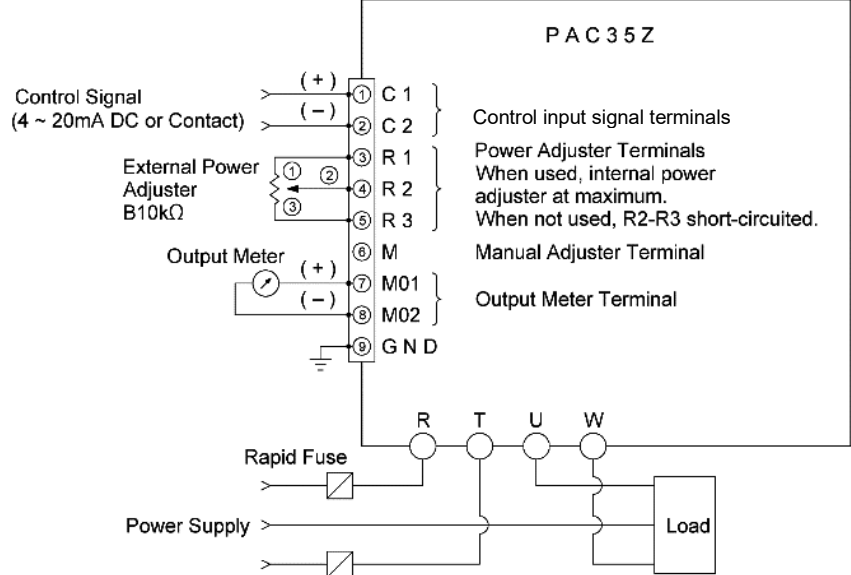
This device does not have a protection function for thyristor elements. Please attach rapid fuses for semiconductors to the primary power supply of the device. (Recommended fuses are listed on appendix.)

8-1 PAC35P (Phase Angle)



| current capacity | Main wiring terminal (RST,UVW) | | | Control input signal terminal | | | Ground terminal (ground wire) | | |
|------------------|--------------------------------|------------|-------------------------------|-------------------------------|------------|-------------------------------|-------------------------------|------------|-------------------------------|
| | Recommended torque value | Screw size | Wire diameter (stranded wire) | Recommended torque value | Screw size | Wire diameter (stranded wire) | Recommended torque value | Screw size | Wire diameter (stranded wire) |
| 20A | 1.2~ | M4 | 3.3mm ² | 1.0~ 1.3 N·m | M3.5 | 0.25~ 1.65 mm ² | 1.0~ 1.3 N·m | M3.5 | 0.25~ 1.65 mm ² |
| 30A | 1.4 N·m | | 5.3mm ² | | | | | | |
| 45A | 2.5~ | M6 | 8.3mm ² | | | | | | |
| 60A | 3.0 N·m | | 13.3mm ² | | | | | | |
| 90A | 10.0~ | M8 | 21.2mm ² | | | | | | |
| 135A | 11.0 N·m | | 30.0mm ² | | | | | | |

8-2. PAC35Z (Time Base Zero Voltage Switching)

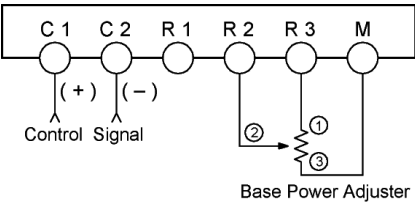


*Terminal Arrangement
3 Phase power terminals (R, S, and T) of PAC35P (90A and 135A) are placed on the upper side of the main unit.
3 Phase power terminals (R and T) of PAC35Z (60A, 90A, and 135A) are placed on the upper side of the main unit. Please refer to external dimensions.
*When using the phase control system (PAC35P), control characteristics vary due to the difference in power supply frequency. Therefore, please confirm the frequency of the power supply to be used before using the product.
When using 50 Hz: FL-FC = Short-circuited
When using 60 Hz: FH-FC = Short-circuited
Factory setting is 50 Hz (FL-FC = Short-circuited).

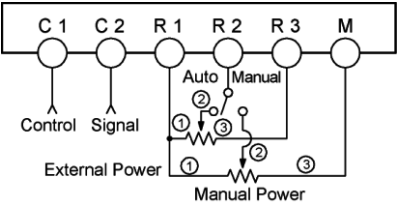
| current capacity | Main wiring terminal (RST,UVW) | | | Control input signal terminal | | | Ground terminal (ground wire) | | |
|------------------|--------------------------------|------------|-------------------------------|-------------------------------|------------|-------------------------------|-------------------------------|------------|-------------------------------|
| | Recommended torque value | Screw size | Wire diameter (stranded wire) | Recommended torque value | Screw size | Wire diameter (stranded wire) | Recommended torque value | Screw size | Wire diameter (stranded wire) |
| 20A | 1.2~1.4 N·m | M4 | 3.3mmφ | 1.0~1.3 N·m | M3.5 | 0.25~1.65 mm ² | 1.0~1.3 N·m | M3.5 | 0.25~1.65 mm ² |
| 30A | | | 5.3mmφ | | | | | | |
| 45A | 1.2~1.4 N·m | M4 | 8.3mmφ | | | | | | |
| 60A | 2.5~3.0 N·m | M6 | 13.3mmφ | | | | | | |
| 90A | 10.0~11.0 N·m | M8 | 21.2mmφ | | | | | | |
| 135A | | | 30.0mmφ | | | | | | |

9. POWER ADJUSTER CONNECTIONS

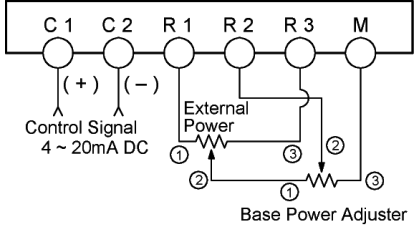
9-1. Base Power Control (Current Input Type)



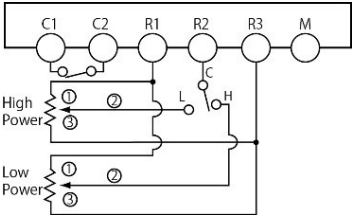
9-3. Auto / Manual Selectable (Current / Contact Type)



9-2. External Power Adjust / Base Power Adjust (Current Input Type)



9-4. High / Low Adjust (Contact Input Type)



*External power adjuster and base power adjuster correspond with each other.
*Internal power adjuster = at maximum

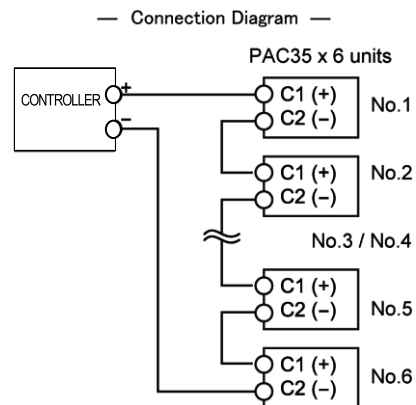
0 - 100% output adjustment is available with high and low power adjusters.

10. Using Multiple Units When Power Input

Input resistance of this device is set at 100Ω (when 4 – 20 mA), therefore, please confirm the load resistance of the controller to be connected before wiring.

Load resistance of Shimaden's Controller is set at 600Ω (when 4 to 20 mA), therefore, 6 units of this device can be connected to one controller.

Please refer to the connection diagram.



The contents of this manual are subject to change without notice.

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