

PAC35 Series THREE-PHASE POWER REGULATOR

Instruction Manual

PAC35F-1AE
June, 2015

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	PAC35C	PAC35Z
Control System	Phase Control System (with soft-start)	Cycle Base Zero Voltage Switching Control System	Time Base Zero Voltage Switching Control System
Proportional Cycle (Z)	N/A	N/A	Approx. 3 sec. (2 – 4 sec., internal variable)
Control Circuit Configuration/Element Configuration	3-Phase Anti-Parallel Configuration/SCR × 3, Diode × 3	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	Fixed Resistive Load
Power Supply Frequency	50/60 Hz (switched at the terminal, factory setting: 50 Hz)	50/60 Hz	50/60 Hz
Output Voltage Control Range (P) Power Control Range (C/Z)	0 – 95% min. of Input Voltage	0 – 95% min. of Load Power	0 – 95% min. of Load Power
Power Lamp	Green LED	Green LED lamp lights when the load is applied.	Green LED lamp lights when the load is applied.
Manipulated Variable Output (optional) (C/Z)	N/A	Output terminal for indicator is attached. (0 – 1 mA DC)	Output terminal for indicator is attached. (0 – 1 mA DC)

COMMON SPECIFICATION

Current Capacity:	20, 30, 45, 60, 90, 135A	
Power Supply:	200 – 240V AC ±10%. 380 – 440V AC ±10%	
Control Input:	Current:	4~20mA DC/Receiving Resistance: 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 - 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 - +50°C	
Operating Ambient Humidity:	90% RH max.	
Insulation Resistance:	20MΩ min. at 500V DC between control input and power supply terminals 20MΩ min. at 500V DC between power supply terminals and chassis	
Dielectric Strength:	1 min. at 1000V AC between control input and power supply terminals 1 min. at 2000V AC between power supply terminals and chassis	
External Dimensions	Please refer to external dimensions.	

2. ORDERING INFORMATION

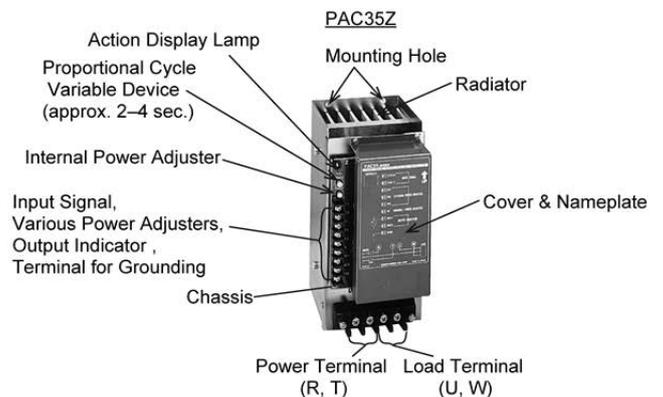
PAC35P

ITEMS	CODE		SPECIFICATIONS
SERIES	PAC35P		Phase Angle 3-phase Power Regulator With Soft-Start
CONTROL INPUT	0		4~20mA DC Receiving Resistance: 100 Ω
	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
	35-		380~440V AC ± 10% 50/60Hz
	99-		Others (Please consult before ordering.)
EXTERNAL 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
	X		Others (Please consult before ordering.)
REMARKS	0		Without
	9		With (Please consult before ordering.)

PAC35C/PAC35Z

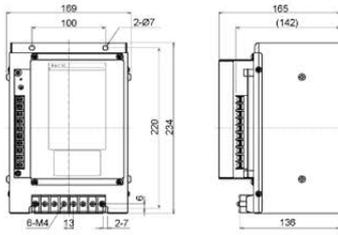
ITEMS	CODE		SPECIFICATIONS
SERIES	PAC35C		Cycle Base Zero Voltage Switching (3-Phase)
	PAC35Z		Time Base Zero Voltage Switching (3-Phase)
CONTROL INPUT	0		4~20mA DC Receiving Resistance: 100Ω
	2		Non-voltage contact
	9		Others (Please consult before ordering.)
CURRENT CAPACITY	020		20A
	030		30A
	045		45A
	060		60A
	090		90A
	135		135A
POWER SUPPLY	37-		200~240V AC ± 10% 50/60Hz
	35-		380~440V AC ± 10% 50/60Hz
	99-		Others (Please consult before ordering.)
EXTERNAL 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
	X		Others (Please consult before ordering.)
MANIPULATED VARIABLE (POWER) OUTPUT AND/OR INDICATOR	0		None
	1		Manipulated variable output
	2		Manipulated variable + indicator
REMARKS	0		Without
	9		With (Please consult before ordering.)

3. Parts Name



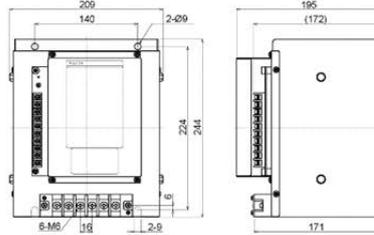
4. EXTERNAL DIMENSIONS & WEIGHT

① PAC35P / PAC35C 20A, 30A



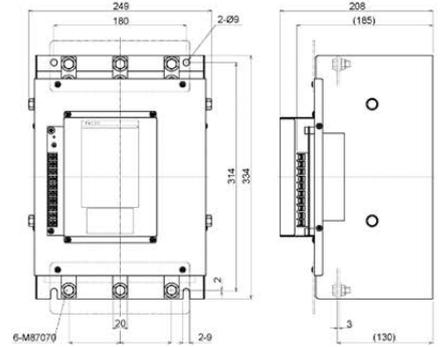
Weight: Approx. 3.0kg / 20A
Approx. 5.2kg / 30A

② PAC35P / PAC35C 45A, 60A



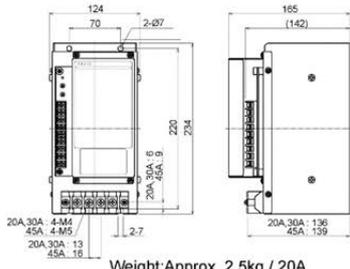
Weight: Approx. 7.6kg

③ PAC35P / PAC35C 90A, 135A



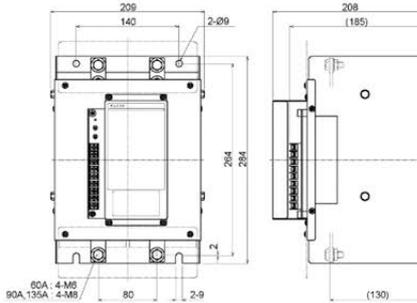
Weight: Approx. 12kg / 90A
Approx. 13kg / 135A

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

Model : QSV002

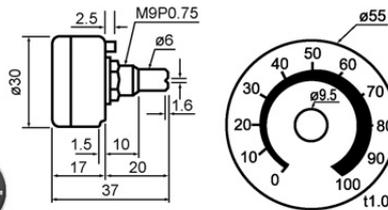
- External (High) Power Adjuster (0~100%)
- Base (Low) Power Adjuster (0~100%)
- Manual Power Adjuster (0~100%)

External Power adjuster

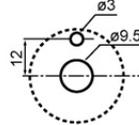


- Resistance: B10kΩ 1W
- Lead wire length: 1m

Power Adjuster Dimensions



Panel cutout



Output Indicator

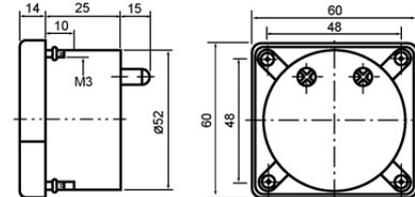


Manipulated Variable Output Indicator
(Zero Voltage Switching Models Only)

Model : QSM001

- Range: 0~100%
- Sensitivity: 1mA FS

Indicator Dimensions



Unit : mm

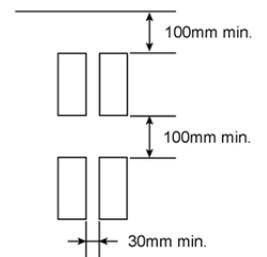
6. Mounting & Operating Environment

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

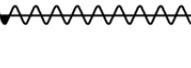
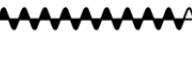
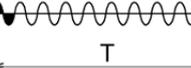
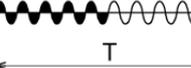
* Care must be taken for air ventilation.

* Vertical mounting is recommended. Refer to the mounting space diagram.
When mounting horizontally, use at 60% maximum of the capacity.

Mounting Space



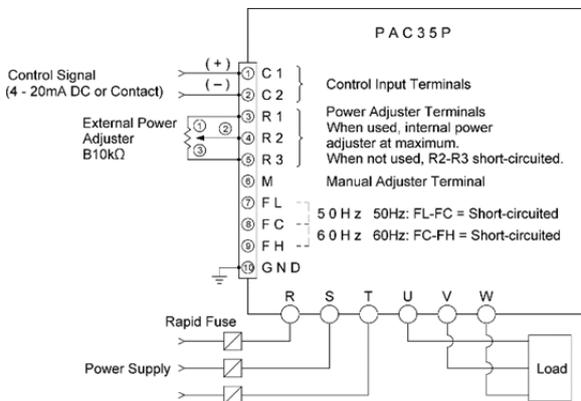
7. Control System and Output Waveform

Control Mode	Noise	Output Voltmeter Deflection	Output Wave Form		
			10% Output	50% Output	90% Output
Phase angle control (P)	Little	Continuous			
Cycle base zero voltage switching (C)	None	Large deflection (with low output) Almost continuous (with mid & high output)	 1 cycle ON and 9 cycles OFF	 1 cycle ON and 1 cycle OFF	 9 cycles ON and 1 cycle OFF
Time base zero voltage switching (Z)	None	intermittent	 T	 T T=3 sec.	 T T=Proportional Cycle

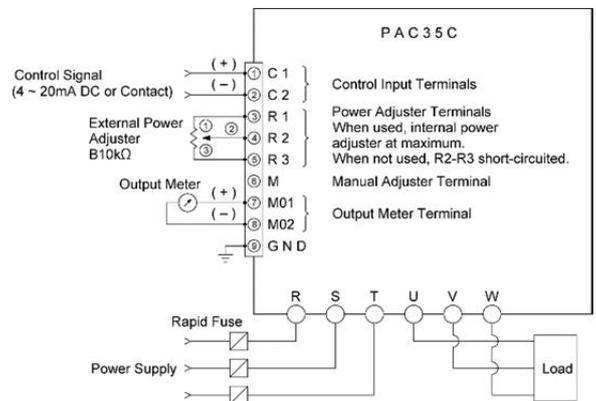
8. TERMINAL ARRANGEMENT

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.)

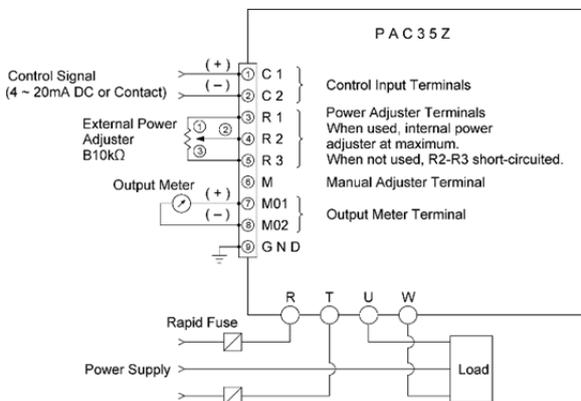
8-1 PAC35P (Phase Angle)



8-2. PAC35C (Cycle Base Zero Voltage Switching)



8-3. PAC35Z (Time Base Zero Voltage Switching)



*Terminal Arrangement

3 Phase power terminals (R, S, and T) of PAC35P/PAC35C (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.

Current Capacity	Attaching Fuse Capacity	Type
20A	40A	CS5F-40
45A	75A	CS5F-75
60A	100A	CS5F-100
90A	150A	CS5F-150
135A	200A	CS5F-200

CS5F Type:
FUJI ELECTRIC
CO., LTD.

*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.

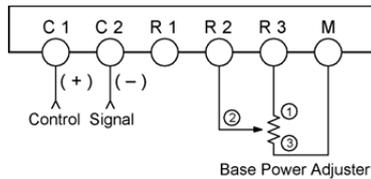
When using 50 Hz: FL-FC = Short-circuited

When using 60 Hz: FH-FC = Short-circuited

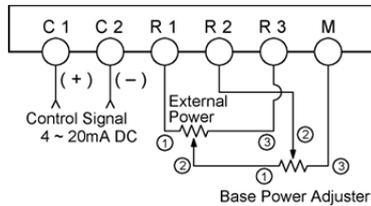
Factory setting is 50 Hz (FL-FC = Short-circuited).

9. POWER ADJUSTER CONNECTIONS

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



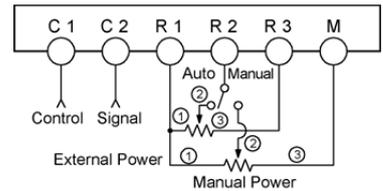
9-2. External Power Adjust / Base Power Adjust (Current Input Type)



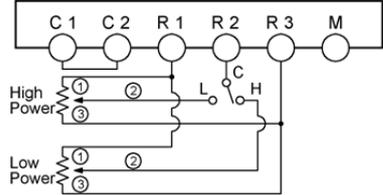
*External power adjuster and base power adjuster correspond with each other.

*Internal power adjuster = at maximum

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



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



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

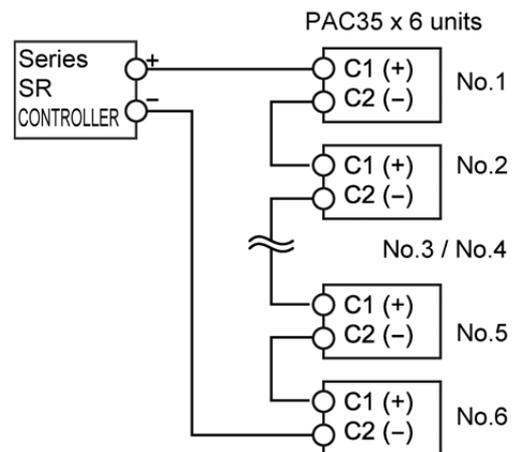
10. Using Multiple Units When Power Input

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 SR Series Controller is set at 600Ω (when 4 – 20 mA), therefore, 6 units of this device can be connected to one controller.

Please refer to the connection diagram.

— Connection Diagram —



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

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