

Intelligent Power Control Device



IP1 SERIES



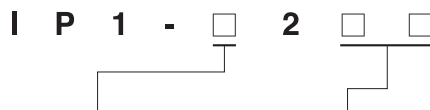
Overview

IP1 series is the power regulator for single-phase. Element failure detection function and ramp up and down functions, etc., equipped with fine functions, it is ideal for precise control.

Features

- Slim shape of 21.5mm wide (external dimensions of 15A / 25A type is common)
- An output protection element was built-in to minimize the operation failure or error due to external surge
- Optimum control scheme can be selected among On / Off Control (IP-S type), Cycle Control (IP1-C), Phase Control (IP1-PW).
- Failure on the output side can be informed by a LED together with possible initialization of output buzzer and lamp operation.
- UL, C-UL standard approved

Type Information



Control scheme

PW : Phase control

C : Cycle control

S : Zero-cross control

Max. load current

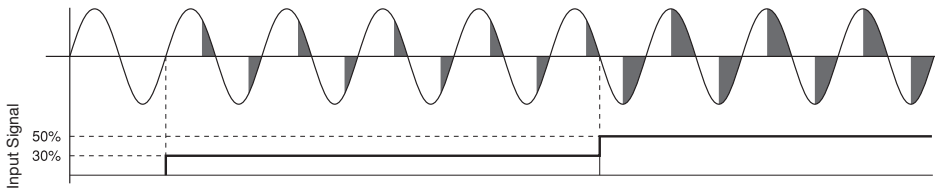
15 : 15A

25 : 25A

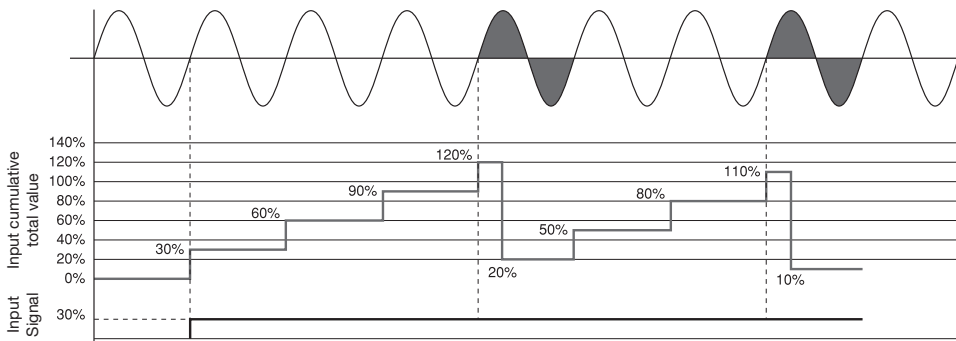
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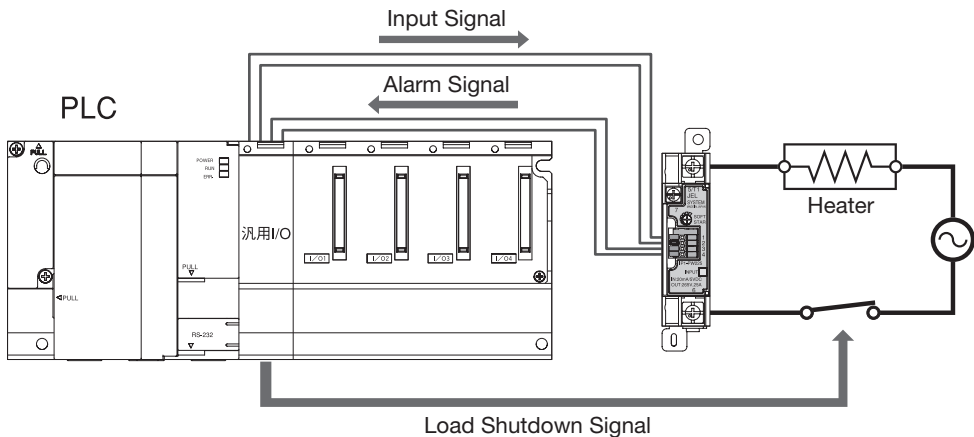
IP1-PW Type (Phase control)



IP1-C Type (Cycle control)



IP1-S Type (Zero-cross control)



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IP1-C/PW Type

● Ratings

Item	IP1-C215	IP1-C225	IP1-PW215	IP1-PW225
Control Scheme	Cycle control		Phase control	
Maximum Input Current	DC 24mA			
Maximum Load Voltage	AC 264Vrms			
Maximum Load Current	AC 15Arms	AC 25Arms	AC 15Arms	AC 25Arms
1 Cycle Surge Current	146A (50Hz)	250A (50Hz)	146A (50Hz)	250A (50Hz)
Isolation Resistance	100MΩ以上 (500VDC) *1			
Dielectric Strength	AC 2500Vrms/1min. *1			
Operating Temperature Range	- 20 ~ + 60 °C			
Storage Temperature Range	- 30 ~ + 70 °C			

※1 : Between Input(1②), Volume(3④), -Output(5⑥7)-case

● Electrical Characteristics

(Ta = 25 °C)

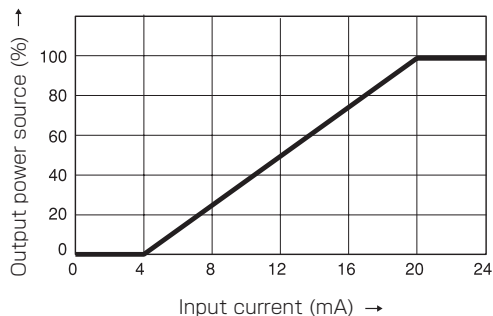
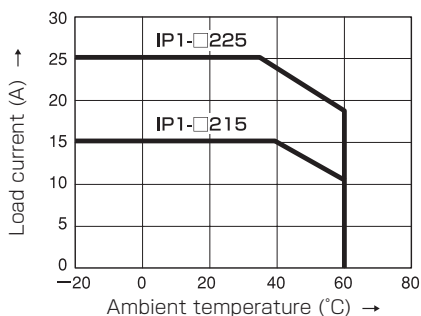
Item	IP1-C215	IP1-C225	IP1-PW215	IP1-PW225
Input Impedance	250Ω ± 20%			
Input Current Range	DC 4 ~ 20mA			
Load Voltage Range	AC 85~264Vrms (Sine wave)			
Load Current Range	100mA AC rms to max. load current *2			
On State Voltage Drop	AC 1.5Vrms and below (at max. output power)		AC 3.0Vrms and below (at max. output power)	
Off State Leakage Current	AC 9mArms and below (load voltage 200Vrms 60Hz)			
Power Adjustment Range	0 ~ 100%		0 ~ 95%	
Responding Time	—		1 cycle and below without soft start*3	
Load Voltage Frequency Range	50Hz/60Hz (Auto-change) 47 ~ 53Hz/57 ~ 63Hz			
Current Consumption				
(6-7) Analog Input	5.1mArms (100Vrms 50Hz)			
Ext. volume	7.0mArms (100Vrms 50Hz)			
Ramp-up/Ramp-down Time	Approx 0.5 sec to 40 sec		Approx 0.5 sec to 13 sec	
Weight	Approx 260 g			

※2 : Conduction angle tend to be narrower when the load with minute current applied. Please allow your time to pre-check the function.

※3 : The front volume adjuster reach MAX when turned clockwise and reach ZERO when turned counter-clockwise.

● Characteristics

● Input current vs. Output power (IP1-C/PW Type)



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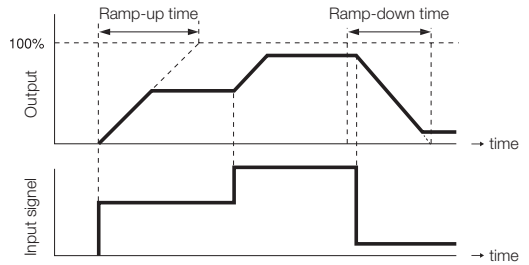
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● The Ramp-up/Ramp-down (Soft start) function

The Ramp-up/Ramp-down (Soft start) function can be used to suppress rapid change in output voltage by changing the output slowly in case of a rapid change in the output due to input signal changes.

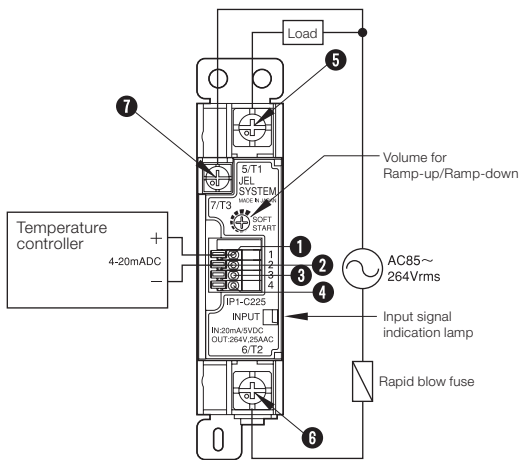


■ Ramp-up time and Ramp-down time (Soft start)

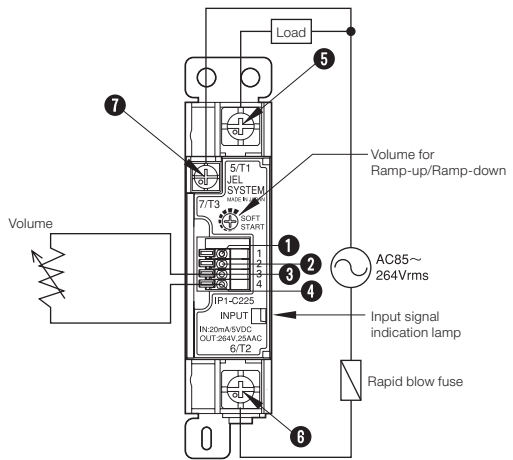


* The length Ramp-up and Ramp-down time is the same.

■ Example of connection with temperature controller



■ Example connection adopting external volume (Manual setting)



- ①: Input terminal (+)
- ②: Input terminal (-)
- ③: Volume terminal (1)
- ④: Volume terminal (2)
- ⑤: Output terminal (T1)
- ⑥: Output terminal (T2)
- ⑦: Power terminal (T3)

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IP1-S Type

● Ratings

Item	IP1-S215	IP1-S225
Control Scheme	Zero-cross control	
Maximum Input Voltage	DC 30V	
Maximum Alarm Output Voltage	DC 30V (open collector)	
Maximum Alarm Output Current	DC 0.1V (open collector)	
Maximum Load Voltage	AC 264Vrms	
Maximum Load Current	AC 15Arms	AC 25Arms
1 Cycle Surge Current	146A (50Hz)	250A (50Hz)
Isolation Resistance	100MΩ以上 (500VDC) *1	
Dielectric Strength	AC 2500Vrms/1min.*1	
Operating Temperature Range	-20~+60°C	
Storage Temperature Range	-30~+70°C	

*1 : Between Input(1・2), Volume(3・4), -Output(5・6・7)-case

*2 : Conduction angle tend to be narrower when the load with minute current applied. Please allow your time to pre-check the function.

● Electrical Characteristics

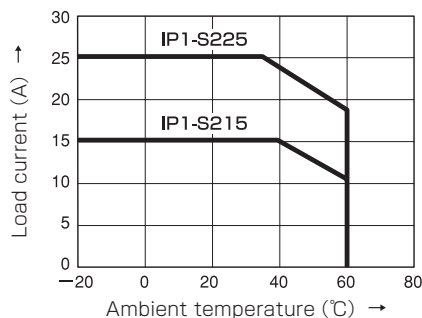
(Ta = 25 °C)

Item	IP1-S215	IP1-S225
Input Voltage Range	DC 9.6~30V	
Release Voltage	DC 1V and above	
Input Current	DC 7mA and below (Input Voltage 30VDC)	
Load Voltage Range	AC 85~264Vrms (Sine wave)	
Load Current Range	100mA AC rms to max. load current *2	
On State Voltage Drop	AC 1.5Vrms and below (at max. output power)	
Off State Leakage Current	AC 9mArms and below (Load Voltage 200Vrms 60Hz)	
Alarm On State Voltage Drop	DC 1.5V and below	
Alarm Off State Leakage Current	DC 0.1mA and below	
Operate Time	1/2 Cycle + 1ms and below	
Release Time	1/2 Cycle + 1ms and below	
Alarm Responding Time	0.5sec and below	
Load Voltage Frequency Range	47~63Hz	
Current Consumption (6・7)	15mArms and below (200Vrms 50Hz)	
Zero Cross Turn On	Built in	
Weight	Approx 250g	

● Failure Detection Function

Failure mode	Input Voltage	Alarm Display	Alarm Output	
SSR	ON	Green	High	
	OFF	Green	High	
SSR Failure	Short-circuit	ON	Green	High
		OFF	Red	Low
	Half-wave short circuit	ON	Green	High
		OFF	Red	Low
	Open circuit	ON	Red	Low
		OFF	Green	High
Half-wave open circuit	ON	Red	Low	
	OFF	Green	High	
Load open	ON	Green	High	
	OFF	Red	Low	

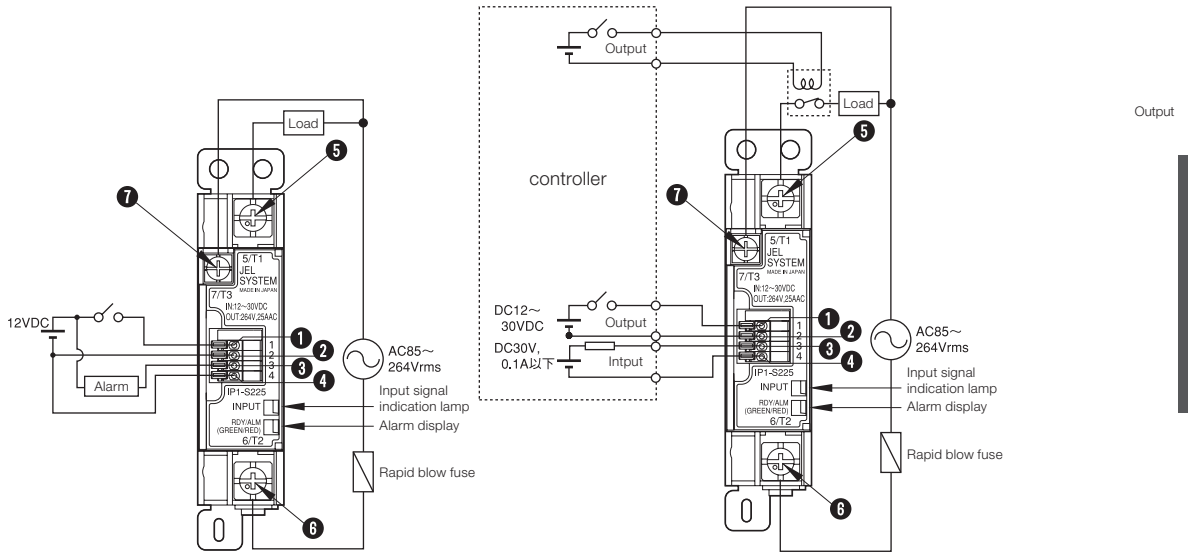
● Characteristics



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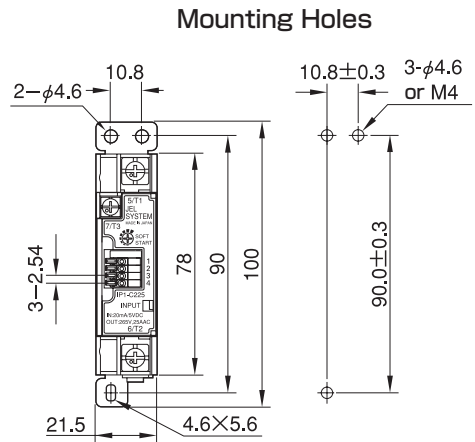
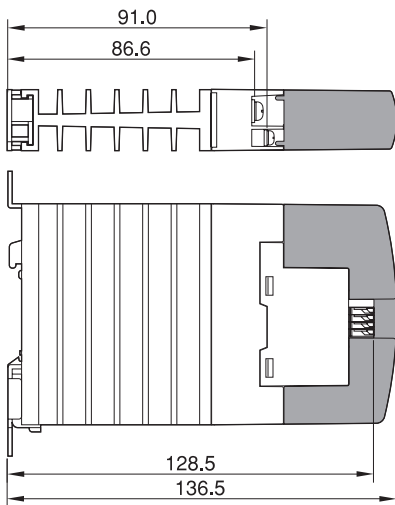
■ Connection Example



- ①: Input terminal (+)
- ②: Input terminal (-)
- ③: Alarm output terminal (collector)
- ④: Alarm output terminal (emitter)

- ⑤: Output terminal (T1)
- ⑥: Output terminal (T2)
- ⑦: Power terminal (T3)

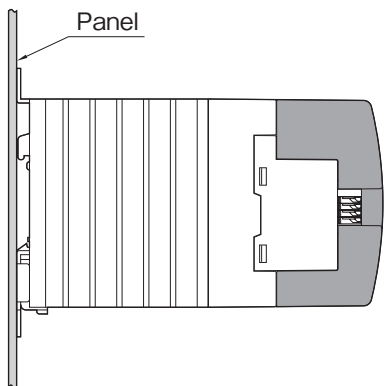
■ IP1 Dimensions



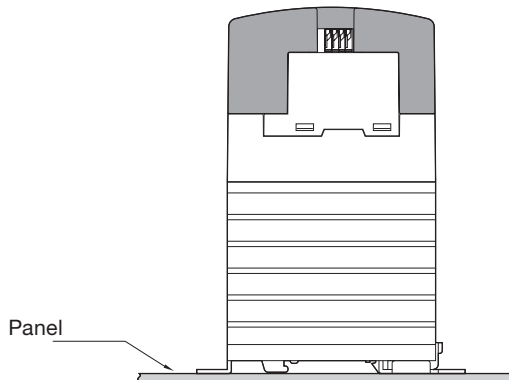
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■ Installation

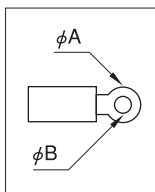
Vertical Installation



Horizontal Installation



● Reduce the rating of load current more than 30% when IP1-series are installed horizontally.



Ring terminals	Terminal No.	Item	φA	φB
	5 6	Output terminal (T1/T2)	Below 9.5mm	Above 4.3mm
7	Power terminal (T3)	Below 6.5mm	Above 3.7mm	

Screw torque	Terminal No.	Item	Max. rate	Recommendation
	5 6	Output terminal (T1/T2)	1.47N·m	1.18 to 1.37N·m
7	Power terminal (T3)	0.78N·m	0.64 to 0.74N·m	

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