THREE PHASE THYRISTOR POWER REGULATOR

Model TPR-3

THE PHASE CONTROL TYPE A.C POWER REGULATOR TO FULFILL ACCURATE TEMPERATURE CONTROL

INSTRUCTION MANUAL

This manual primarily describes precautions required in installing and wiring the T.P.R. When using the temperature controller, please refer to the pertinent catalog for detailed information.

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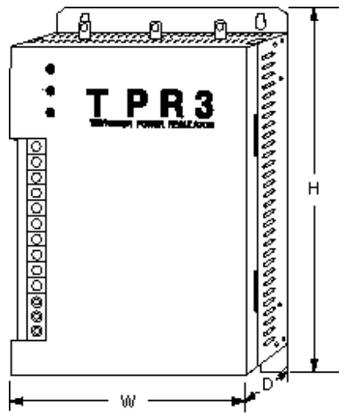
■MAIN PRODUCTS

□DIGITAL: Temperature controller,
Counter/timer,
Tachometer/Panel Meter
□SENSOR: Proximity Switch/Photo Electric Sensor,
Rotary Encoder/Optical Fider Sensor,
□ANALOG: Timer/Temperature Controller

FEATURE

- Long life, rapid response.
- Perfect automation for temperature control due to ON-OFF successive control.
- Compact design, remote function and local operation.
- Easy operation, high confidence.

DIMENSION



Current / Size	100A	150-250A
H	360	440
W	235	255
D	180	200

(Unit:mm)

SPECIFICATION

FORM	THREE-PHASE (TPR-3)
Input voltage	220 VAC, 380 VAC, 440VAC
Frequency	50 or 60 Hz
Rated current	100 A, 150 A, 200 A, 250 A
Ambient temperature	0-50 °C (Ambient humidity :Max 90 % RH)
Load	Resistance load
Control input	Current input :DC 4-20Ma, Voltage input :1-5V, Contact input : ON-OFF
Output voltage	Min 97 % against input voltage
Protection	Fuse, short detection, over current protection
Moving method	Soft start, Soft down
Cooling	Air cooling (Less than 100A:auto cooling, More than 100A:forced cooling by the FAN)
Alarm	Short alarm (Fuse), Over current (Relay contact, 1a 250V 1A)
Insulation resistance	Min 20 mΩ (500 V)
Option	

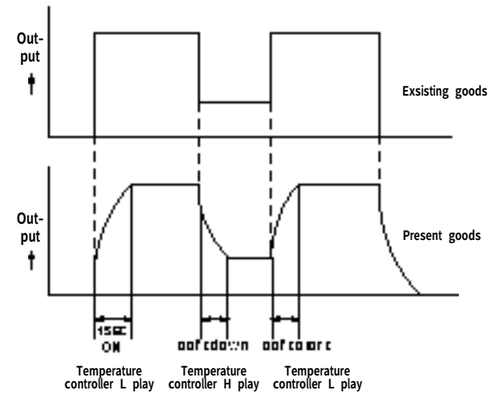
MODEL AND SUFFIX CODE

MODEL	SUFFIX CODE							DISCRIPTION
TPR								Thyristor power regulator
Phase	3							Three phase
Control Method		P						Phase control
		S						Zero switching
Power voltage(AC 60Hz)			220					220 V
			380					380 V
			440					440 V
Rated Current				100				100 A
				150				150 A
				200				200 A
				250				250 A
Input					M			4-20 mA
					D			Others
Load						R		Resistance load
						*L		Induction load
Option							R	Current limit function

EXPLAIN TO FUNCTION

1. Soft Start.Soft Down

In case of control primary part in transformer, it is limited rushing-current and ON-OFF control from great-capacity load. So, it prevent flicker of power part.
In the current input signal control, the SOFT START and SOFT DOWN are operating when the control power input or cut. And in the ON-OFF contact(H-L) control, the SOFT START and SOFT DOWN are operating when ON operation and OFF operation point.



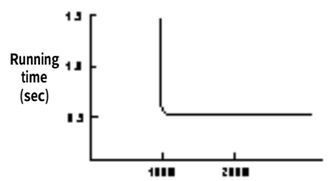
※**SOFT DOWN FUNCTION IS OPTIONAL.**

2. Short Alarm Function

When opened operation power, input power, fuse and short, it is checked and alarmed. At that time,“ LE ” and“ OC ” lamp are lighted on and cut the output circuit.
When the alarm circuit is operating, you could re-operate T.P.R with reset button after checking TPR and load side.

3. Overcurrent Detection Function

TPR adopt the electronic overcurrent detection circuit.
If float overcurrent in load side, the overcurrent circuit operation and thyristor is turned off with stopping the gate signal of thyristor.
At that time,“ OC ” lamp is light on. You could use the alarm function.



THE METHOD OF CONTROL

1. ON-OFF Control

When a temperature is higher or lower than set value, the output voltage is operated.
The structure is simple and economic.

2. Constant Control

It is basic of the proportional control. By comparing between the temperature in furnace and set value, supply the power to heater according to amount of deviation signal. Using P.I.D controller with TPR, it is the best way to control a tamperature.

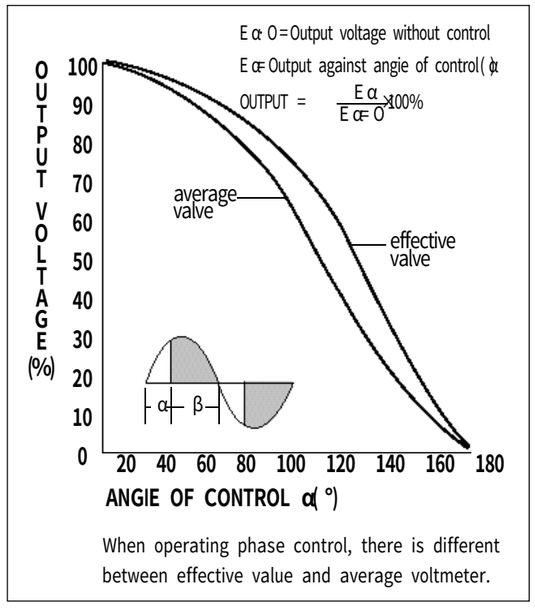
3. Constant Voltage (current) Control

This method is used to control a tamperature which is difficult to detect. This method ignore some disturbance of a controller and be regular the average of voltage or the effective value for the furnace.

4. Constant Power Control

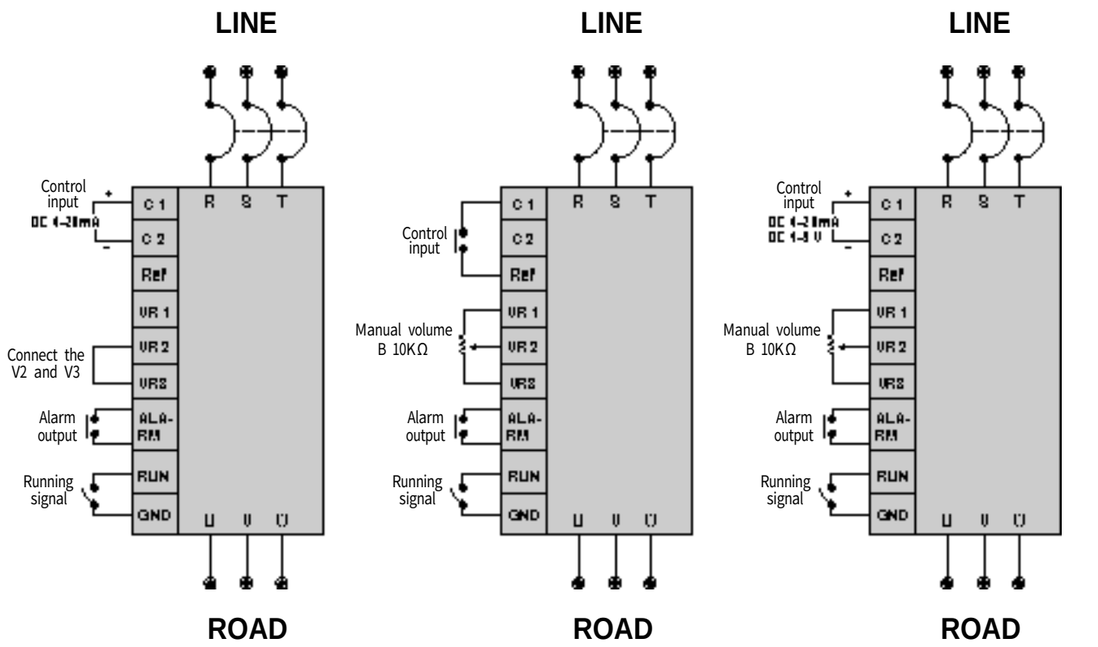
This method is used when we use a silicon carbide or molybdeum heater because both heaters will be changed the resistance value tremendously. It affect a life of heaters. Character of this method is that the power detector is set in front of gate control side and the rest is the same as general type.

◆POWER CHARACTERISTIC CURVE



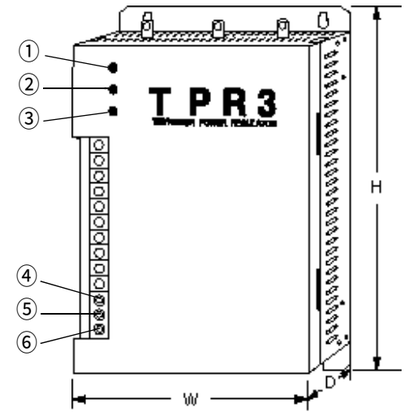
When operating phase control, there is different between effective value and average voltmeter.

EXTERNAL DIAGRAM



WITHOUT EXTERNAL VOLUME | ON-OFF INPUT | DC 4~20mA/DC 1~5V INPUT

NAME OF EACH PART



① POWER LED
② LINE ERROR LED
③ OVER CURRENT LED
④ OVER CURRENT VR
⑤ CURRENT LIMIT VR
⑥ RESET BUTTON

1. Overcurrent Detection

It is adopted electronic type overcurrent detection circuit. When occured overcurrent in load side, the overcurrent detection circuit will operate and turn off the T.P.R.. At that time, overcurrent LED is lighted.

2. Current Limit Function

With setting the maximum using current by parallel operation of electronic overcurrent circuit, it could limit current when the load side has malfunction.

USAGE

●Check point before use

1. Check the TPR you ordered
2. Check any damage in transport

●Setting place

Avoid below places

1. Humidity
2. Difficult place to ventilate
3. Dust, impurities
4. Vibration, High ambient temperature

●Note in setting

Please set TPR in vertical.

1. Set the air fan on the panel.
2. Tighten volt of input · output wiring.
3. Divide load in equal.
4. Set the TPR at the clean and good place to repair.

●Operation

1. Check line-up of wire.
2. Check load capacity, insulation resistance and resistance between the wire.
3. Set external V/R to minimum position.
4. In DC 4-20mA input : Connect C1(+) and C2(–) contact.
   In contact input : Connect C1 (+) and ref contact.
5. Set O.C. V/R to maximum position.
6. Set C.L. V/R to maximum position.
7. Apply power (switch-on)
8. Press reset button and check light-on of O.C. lamp.
9. Check light-off of L.E. lamp.
10. Apply run signal (a contact) to run GND and contact, otherwise connect run and GND contact each other.
11. Check variation of output voltage by external volume control.