

THYRISTOR-TYPE SINGLE-PHASE POWER REGULATOR

TRV1-M/V Series



We Create from Sensor to System.

TOHO ELECTRONICS INC.

THYRISTOR POWER REGULATOR TRV1—W/V Series Thyristor-type Single-phase Power Regulator

It is a thyristor-type single-phase power regulator that displays input and output values and parameters using a 7-segment LED and allows various function settings through a front-key operation.

■Features

- Selection of Control Mode
 - Phase Control and Zero Cross Switching Cycle Arithmetic Control
- Multiple Input
 - Current, Voltage, Contact Point, and Voltage Pulse (SSR Driving Voltage)
- It allows the user to select phase control/zero cross switching cycle arithmetic control even with contact proportional input and voltage pulse input(SSR driving voltage)
- Display of input value/output value and parameters
- Soft start/slow up/slowdown of output are equipped as a standard function (0.0 to 25.0s)
- Free power source (100 to 240V AC)
- Automatic frequency detection function with a range between 45 and 65Hz

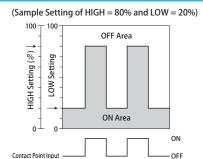
■Specifications

Display	Display Method	Digital Display Red-colored 7-segment LED 1+3 digits (Character Height: 10mm) Display values through front-key operation					
	Display Type	Output value, control input value, maximum limit (pitch) external setting value, and minimum limit external setting value					
Settings	Setting Method	By front key and external variable resistor					
	Setting Paramete	Selection of Control Mode Phase Control Angle/Phase Control Voltage Square/Zero Cross Switching Cycle Arithmeti Control					
		Maximum Limit (Pitch) Setting • 0 to 100%					
		Minimum Limit Setting • 0 to 100%					
		Soft Start Timer Setting 0 to 25.0s					
		Slow Up Timer Setting 0 to 25.0s					
		Slowdown Timer Setting 0 to 25.0s					
		Selection of Input Type Voltage/Current/Contact/Voltage Pulse					
		Setting of Input Sampling Cycle 0 and 1 to 120s (Contact point and voltage pulse input type correspond to two-position action with 0s setting and to proportional action with 1s or higher. Value must be set to a multiple of the proportional cycle time of the regulator.)					
Power	Rated Voltage	90 to 264V AC (Free Power)					
	Rated Frequency	45 to 65Hz					
Control Input	Input Type (Multi-input)※	I1 Current 1 4 to 20mA DC Receiving Resistance Approx. 100Ω					
		12 Current 2 0 to 20mA DC Receiving Resistance Approx. 100Ω					
		V1 Voltage 1 1 to 5V DC Input Resistance Approx. 500kΩ					
		V2 Voltage 2 0 to 5V DC Input Resistance Approx. 500kΩ					
		C1 Contact Point Nonvoltage contact or open collector sink load 5V DC 3mA					
		S1 Voltage Pulse (SSR Drive) 12V DC 3mA					
	Input Type (Other Inputs)	V3 Voltage 3 0 to 10V DC Input Resistance Approx. 370kΩ					
	Sampling Cycle	Contact and Voltage Pulse Input: 2ms when in two-position action 1 to 120s when in proportional action					
	Current and Voltage Input: 2/Control Power Supply Frequency						
Output	Current Capacity	Six Types: 20A, 30A, 50A, 70A, 100A					
	Output Range	0 to 98% or higher of input voltage					
	Control System	Three Types: Phase Control Angle/Phase Control Voltage Square/Zero Cross Switching Cycle Arithmetic Control					
	Minimum Load Current	0.5A (Output 98%)					
	Applicable Load	Phase Control: Resistance Load Zero Cross Switching Cycle Arithmetic Control: Fixed Resistance Load					
Accessory	External Variable Resistor	Maximum Limit (Pitch): 0 to 100% (B 10k Ω) Minimum Limit : 0 to 100% (B 10k Ω)					
	Quick-blow Fuse	External Installation					
Common	Data Retention	EEPROM (Nonvolatile Memory)					
Specification	Usage Environmental Condition	Temperature: 0 to 55°C (Operation Warranty Range) 0 to 40°C (Performance Warranty Range)					
		Humidity: 90%Rh or lower (without condensation)					
		Height: Elevation of 2000m or lower					
		Category: II					
		Contamination Level: 2					
	Input Noise Removal Ratio	Normal: 50dB or higher Common: 100dB or higher					
	Insulation Resistance	Between Input and Power Supply: $20M\Omega$ or higher 500V DC 1 minute Between Input and Chassis: $20M\Omega$ or higher 500V DC 1 minute					
	Voltage Endurance	Between Input and Output : 2300V AC 1 minute Between Input and Chassis: 1500V AC 1 minute					
	Storage Temperature	-20 to 65℃					
	Dimensions	See Dimensional Outline Drawing					
	Mass	20A Approx. 0.6kg, 30A Approx. 0.7kg, 50A Approx. 1.2kg, 70A Approx. 1.8kg, 100A Approx. 2.3kg					
	IVIdSS	20A Approx. 0.0kg, 50A Approx. 0.7kg, 50A Approx. 1.2kg, 70A Approx. 1.0kg, 100A Approx. 2.5kg					

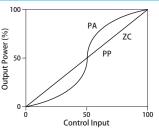


■ Function Characteristic Diagram

HIGH (Maximum)/LOW (Minimum) Output characteristic of setting and contact point input

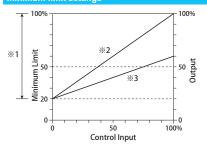


Output Characteristic per Control Mode



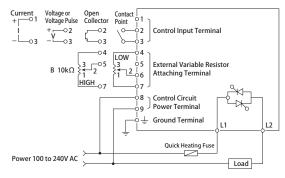
- Zero Cross Switching Cycle Arithmetic: Straight Line Phase Control Voltage Square: Almost Straight Line Phase Control Angle: S Curve Provided that the load is a fixed-resistance load

Characteristic of maximum limit (pitch) and minimum limit settings



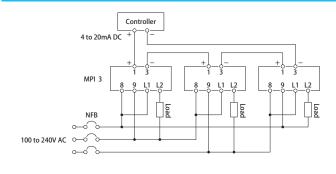
- %1 Setting range of HIGH SET (pitch) at the minimum limit setting of 20%
- ※2 Output characteristic at HIGH SET (pitch) setting of 100%
- **3 Output characteristic at HIGH SET (pitch) setting of 50%

Example of standard wiring



Maximum (HIGH) and minimum (LOW) settings can be made through key operation even if the variable resistor is not externally attached.

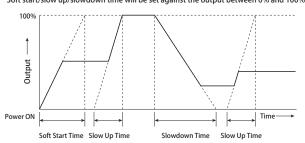
Example in which three TRV1s are interlocked with one controller



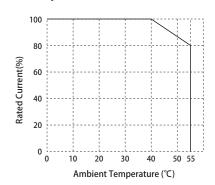
Soft Start/Slow Up/Slowdown Function

This is a function that limits the sudden change of output against the load and changes the output gradually upon sudden change of control input and setting.

Soft start/slow up/slowdown time will be set against the output between 0% and 100%.



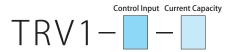
■ Ambient Temperature Characteristic Diagram



The approximate internal heat value of TRV1 is shown below. Please check and be careful with spacing and environment conditions upon installation. Please consider heat dissipation and ventilation as well.

Current Capacity	20A	30A	50A	70A	100A
Heat Value	24W	40W	56W	79W	109W

■List of Models for Selection



Control Input	М	Multi	4 to 20mA DC Input Resistance Approx. 100Ω 0 to 20mA DC Input Resistance Approx. 100Ω 1 to 5V DC Input Resistance Approx. $500k\Omega$ 0 to 5V DC Input Resistance Approx. $500k\Omega$ Nonvoltage Contact Point or Open Collector 5V DC 3mA Voltage Pulse (SSR Driving Voltage) 12V DC 3mA				
	٧	Voltage	e 0 to 10V DC Input Resistance Approx. 370kΩ				
Current Capacity		020	20A				
		030	30A				
		050	50A				
		070	70A				
		100	100A				

■List of Part Codes

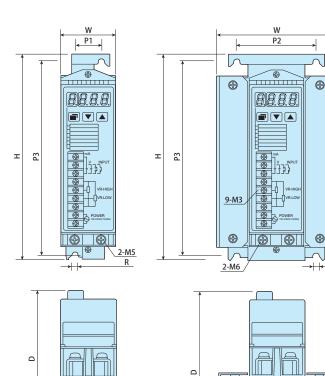
Item	Code	Specifications		
Fuse Holder	HT4017	Corresponds to 20 to 70A		
	HT5723	Corresponds to 100A		
Quick-blow Fuse	250GH-32	Corresponds to main unit 20A (32A)		
	250GH-40	Corresponds to main unit 30A (40A)		
	250GH-63	Corresponds to main unit 50A (63A)		
	250GH-100	Corresponds to main unit 70A (100A)		
	350GH-125	Corresponds to main unit 100A (125A)		
Set of External Variable Resistor (Variable Resistor + Scale Plate + Knob)	021	For maximum limit (pitch) or minimum limit setting per set		

■Dimensional Outline Drawing

Main Unit

Dimensional Drawing

_	<u> </u>								
	Appear	Н	W	D	P1	P2	Р3	R	
20A			50±0.5	128±1	24±0.5				
30A	Fig. 1	192.5±1	50±0.5	128±1	24±0.5		181±1	5.5±0.2	
50A			60±0.5	154±1	28±0.5				
70A	Fig. 2		110±0.5	154±1		75±0.3			
100A		rig. 2	155±0.5	154±1		75±0.3			

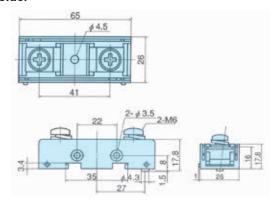


Parts

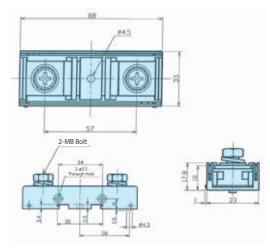
Unit: mm

Fuse Holder

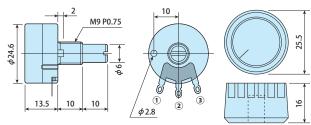
HT4017



HT5723

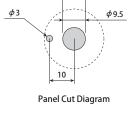


External Variable Resistor



External Variable Resistor (Resistance: $10k\Omega$ Characteristic: B)

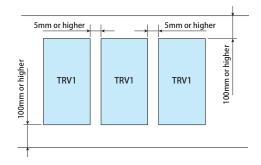
 ϕ 55 Scale Plate

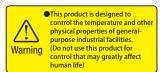


Unit:mm

Installation Spacing Diagram

Fig.1





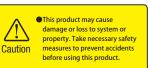


Fig.2



OHO ELECTRONICS INC.

Head Office: 2-4-3 Nishihashimoto, Midori-Ku, Sagamihara, Kanagawa 252-0131Japan Phone: +81-42-700-2100 FAX: +81-42-700-2112 E-Mail: overseas@toho-inc.co.jp

Web site: https://www.toho-inc.com/english/index.html