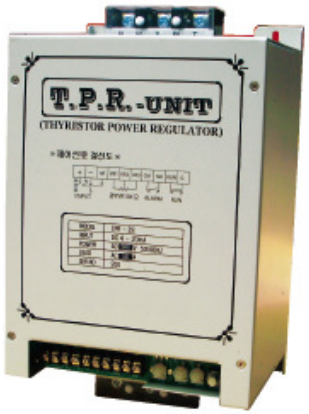
3-Phase SCR UNIT (Thyristor Power Regulator)

TPR-3S/M/L



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Safety Cautions

Safety cautions should be observed at all times to ensure safe and correct use of the product and to prevent accident and risks.

⚠ Danger

In order to prevent electric shock during operation please ground the fixing bolt on the main body. Input/output terminals can give an electric shock, and temperature of the heat plates is very high; these should not come into contract with the human body.

⚠ Warning

- Double or triple safety device should be installed if the product is used for devices (such as nuclear power control, medical devices, vehicles, and railroad) which are vulnerable to significant personal and physical damages. (It may cause fire, personal and physical damages.)
- Use a panel for attachment works to avoid electric shock; do not apply power until all wiring works are complete.
- Do not connect wires, or maintain/repair while power is applied.
- Do not try to dismantle, improve or repair the product when it becomes defective. (This may cause fire.)
- Use of the product other than as specified by the manufacturer may cause personal or physical injuries/damages/losses.

⚠ Caution

- Check if the product conforms to your order specification.
- Check if the product is damaged or defective during transportation.
- Suitable Place for Installation (Avoid the following areas.)
  - Humid and blocked air flow
  - Dusty, excessive foreign materials, high atmospheric temperature, severe vibration
- Turn off all power before wiring.
- Install the product in an upright, vertical position.
- Install a ventilation fan in the upper part of the panel.
- Use the product away from corrosive combustible gas.
- Avoid the area of high inductive disturbance, electromagnetic, frequency or electromagnetic noise.
- This product is covered under the Company's warranty for one year for normal use.

Operation & Installation

1. Check if all wires are correctly connected.
2. Check the status of load and insulation before applying load.
3. For use of internal and external volumes, set the volume to a minimum and increase gradually.
4. For DC 4-20mA input, connect the (+) and the (-) terminals; for contact point input, connect the (+) and the ref terminals.
5. Set the over current alarm VR (O.C) and the current limit (C.L) VR to a maximum then decrease gradually. If these are not in use, set the volume to a maximum. (Optional)
6. Apply the main power, press the reset button and check if the over current lamp (O.C) illuminates.
7. Check if the open-phase lamp (LE) is put out. (If it is lit on, it indicates an open-phase or defective fast-blow fuse.)
8. Connect the A (the RUN signal) contact point to the RUN and GND terminals. (Have it connected directly when not in use.)
9. Convert the TIC output 4-20mA and see if output current (voltage) changes. (Install an external volume if necessary.)

Features

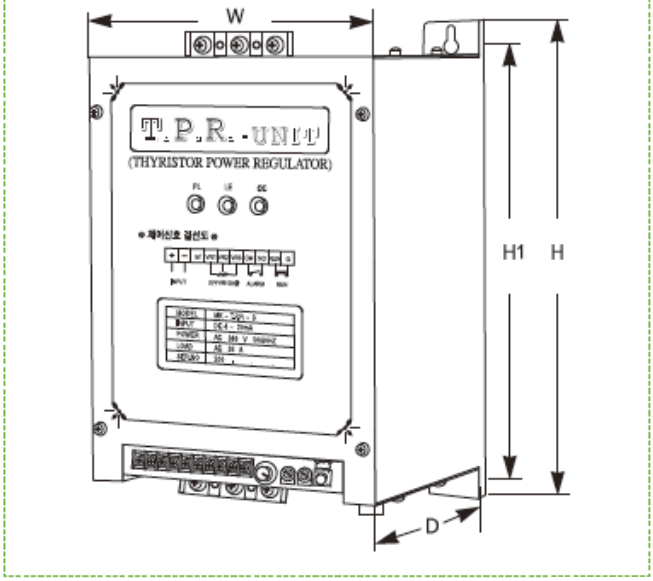
- Use of SCR ensures a fast response speed and long life.
- ON-OFF and the continuous proportional control are enabled.
- Despite of its heavy load, remote and local operations are enabled.
- It is easy to handle; reliable to operate; and easy to maintain/repair.
- All products are fitted with fast blow fuses and cooling fans (DC12V).
- Power can be controlled to accommodate various inductive (transformer) load types. (Please inform the company at the time of placing an order.)

Checkpoints for Abnormal TPR-UNIT

Turn off the main and operation powers. Place the analog tester range onto RX1, and connect the black lead to (R), the red lead to (U), the black lead to (S), the red lead to (V), the black lead to (T) and the red lead to (W). If the resistance value is between 10Ω~30Ω (it varies depending on the SCR capacities) then it is normal (i.e. it is not short).
Connect the red and the black leads in opposite ways. If the resistance value is infinite then it is normal; if it is 0Ω (short) then it indicates an internal SCR error.
If the resistance values for both directions are infinite, then it indicates an internal fuse error (blown).

Shape and Dimension

Specification	Model	W	H	D	W1	H1
35A, 50A	U	180	280	150	135	264
35A, 50A	D	180	300	150	135	284
70A, 100A		180	350	180	135	334
150A, 200A		240	400	210	200	378
250A		280	400	250	Optional	
400A		400	600	300		



- The above specification may be subject to change by the manufacturer. -

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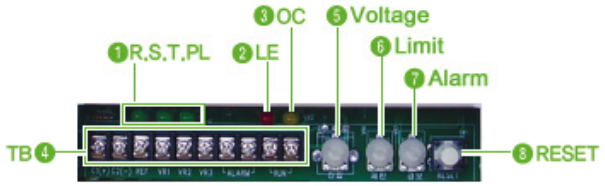
Name of Terminal Blocks

+	−	REF	VR1	VR2	VR3	CM	NO	RUN	GNG
DC 4−20mA DC 1−5V			to be installed if 10KΩ external volume is required.			Alarm contact point 1a output		RUN signal (to be connected when not in use.)	

Name and Function of Components



❶ **POWER LAMP**
A power lamp on R.S.T, which is lit on during power supply.
The corresponding LED lamp is put out if there is open phase, blown fuse or error in power transformer, and the LE and OC lamps are lit on activating the alarm relay.

❷ **LE**
A line error lamp. This is put out during power supply, but is lit on when there is open phase on R.S.T, blown fuse or error in power transformer.

❸ **OC**
An Over Current LED lamp which is put out during power supply, but is lit on when there is an over current, open phase, blown fuse or error in power transformer activating the alarm relay.

❹ **TB**
A Control Input Terminal Block (see the wiring diagram for input terminal block)

❺ **Voltage**
The Out Adjust Volume for output voltage which is adjustable internally and externally. (Factory setting: maximum volume)

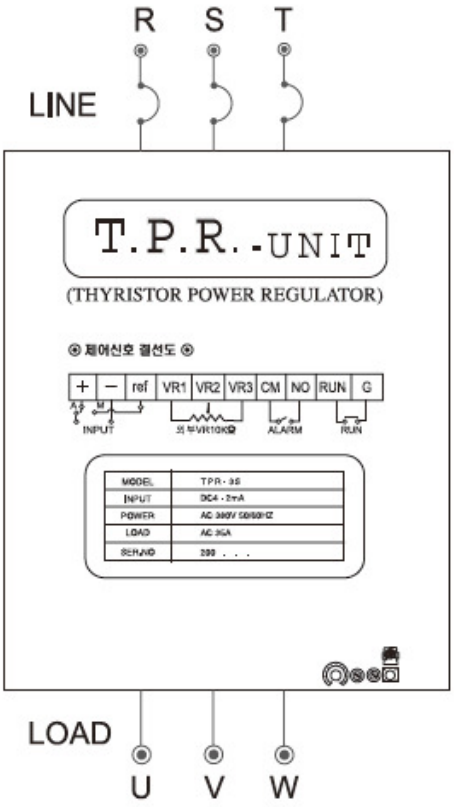
❻ **Limit**
The Current Limit Volume which is used to set limits for over current. If it is set to the maximum operational current, the load current can be limited. (Optional. The max volume is the factory setting.)

❼ **Alarm**
The Over Current Volume for giving alarms. When there is over current than the set value, the current detection circuit is activated turning on the OC lamp and activating the alarm relay. (Optional. The max volume is the factory setting.)

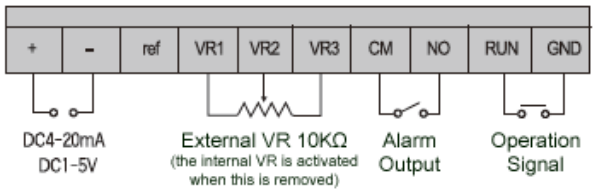
❽ **RESET**
A Reset Push Button Switch. Upon completion of maintenance works following open phase, blown fuse or over current alarm, press the Reset button to reset the system.

※ **SOFT START** : At the initial current signal input, the system is in Slow Start Time for about 3 seconds by the internal circuit.
From the next time onward the system is in regular proportional control.

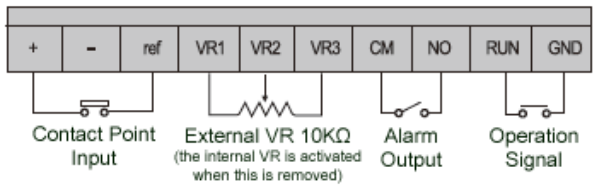
Internal Configuration and Wiring Diagram



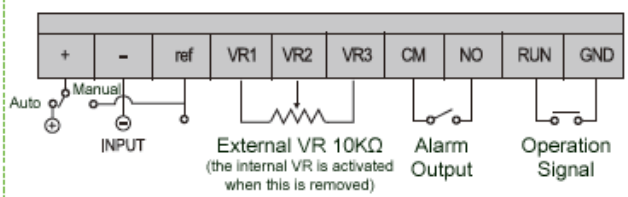
For Current (Voltage) Input Signal



For Contact Point Input (ON-OFF)



For Auto & Manual Control



Electric Power

Curr./ Vol.	220V	380V	440V	계산공식
25A	9.5KW	16.4KW	19.0KW	Power(W)÷Voltage(V)×1.732 = Current(A) eg.) 9500W÷220V×1.732 = 25A Voltage(V)×1.732×Current(A) = Power(W) eg.) 220V×1.732×25A=9526W 220×1.732=381 380×1.732=658 440×1.732=762
50A	19.0KW	32.9KW	38.1KW	
70A	26.7KW	46KW	53.3KW	
100A	38.1KW	65.8KW	76.2KW	
120A	45.7KW	79KW	91.4KW	
150A	57.2KW	98.7KW	114.3KW	
200A	76.2KW	131.6KW	152.4KW	
250A	95.3KW	165KW		

※ Utilize up to 80% of its original capacity to prolong life of TPR unit and to protect SCR elements and fuses.

Specification

Type	Specification
Input Voltage	AC110V, AC220V, AC380V, AC440V, 50Hz/60Hz
Rated Current	35A, 50A, 70A, 100A, 120A, 150A, 200A, 250A
Controlled Input	DC 4-20mA DC 1-5V Contact Point Input ON-OFF
Applicable Load	Resistance load (heater), inductive load (the 1st transformer control), optional
Output Voltage	97% of input voltage
Control Method	Phase control
Cooling Method	automatic fan operation on/off (DC12V) at temperature over 50°C
Protective Circuit	fast blow fuse, open phase protection, over current protection (optional)
Starting Mode	SOFT START, SOFT DOWN
Alarm Output	fast blow fuse, open phase over current detection, alarm relay 1a contact point
Atmospheric Condition	better than -50°C 90% RH
Insulation Resistance	over 500V 20MΩ

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