Thyristor Power Regulator

# TPR-3

(70 A/100 A/150 A/200 A/250 A/320 A/500 A)

INSTRUCTION MANUAL

Thank you for purchasing HANYOUNG product.
Please check whether the product is the exactly same as you ordered.
Before using the product, please read this instruction manual carefully.
Please keep this manual where you can view at any time

HANYOUNG NUX

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## Safety information

Before using the product, please read the safety information thoroughly and use it properly.Alerts declared in the manual are classified to Danger, Warning and Caution by their criticality

| | |
|---|---|
| ⚠ DANGER | DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury |
| ⚠ WARNING | WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury |
| ⚠ CAUTION | CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury |

### ⚠ DANGER

To prevent electric shock while it is running, put to earth with the fixed screw of the unit and do not touch the radiator panel since it is very hot. Do not touch or contact the input/output terminals because they cause electric shock.

### ⚠ WARNING

- If this product is used with the machinery which may be caused human injury or serious property damage then use it after surely installing the protection equipment for two or three times.
- If the user use the product with methods other than specified by the manufacturer, there may be bodily injuries or property damages.
- To prevent defection or malfunction of this product, supply proper power voltage in accordance with the rating.
- To prevent electric shock or malfunction of product, do not supply the power until the wiring is completed.
- Do not decompose, modify, revise or repair this product. This may be a cause of malfunction, electric shock or fire.
- Reassemble this product while the power is OFF. Otherwise, it may be a cause of malfunction or electric shock

### ⚠ CAUTION

Installing location affects the function and life expectancy of this product greatly so please avoid the places given in the below.

- Please avoid the places with the high humidity and bad ventilation system.
- Please avoid the places with the presence of much dust/foreign matters, high ambient temperature and strong shock.
- The contents in this manual may changed without prior notice.
- Please turn OFF the product and perform the wiring.
- Thyristor controller must be installed vertically.
- Please install it in the internal side of panel and install the exhaust fan on the upper part of panel.
- Please avoid the places where corrosive gas (especially noxious gas, ammonia and etc) and inflammable gas exist
- Please avoid the places where vibration and impaction carry into the product directly.
- Please avoid the places where liquid, oil, medical substances, dust, salt or iron contents exist (avoid place of pollution level 1 or 2)
- Do not clean the product with the organic solvent such as alcohols, benzene and etc. (Use neutral detergents)
- Please avoid the places where huge inductive interference exists and places where static electricity/self noise are generated.
- Please avoid the places where heat accumulates due to the direct sunlight, radiation and etc
- Please use it at altitude below the 2000 m.
- If the device is touched or contacted by water then short-circuit and fire may occur so please inspect the device carefully.
- Do not wire anything to the un-using terminal
- Please check the polarity of terminal before wiring.
- The warranty period is one year including the parts only under the condition where the product is used properly
- When installing more than 1 devices close to each other, must have gap at least 100 ㎜

## Suffix code

| Model | Code | | Description |
|---|---|---|---|
| TPR-3P | □ | □ | 3-phase thyristor regulator |
| Power supply voltage | 220 | | 220 V AC |
| | 380/440 | | 380 V AC / 440 V AC |
| Rated current | | 70 | 70 A |
| | | 100 | 100 A |
| | | 150 | 150 A |
| | | 200 | 200 A |
| | | 250 | 250 A |
| | | 320 | 320 A |
| | | 500 | 500 A |

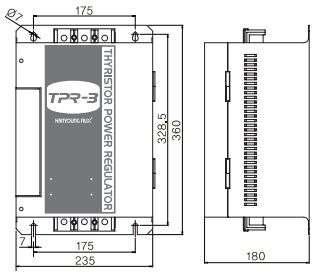
## Specification

| Model | | TPR-3 |
|---|---|---|
| Power supply voltage | | 220 V AC, 380 V AC, 440 V AC |
| Applying frequency | | 50 Hz/60 Hz (Dual usage) |
| Rated current | | 70 A, 100 A, 150 A, 200 A, 250 A, 320 A, 500 A |
| Protective circuit | | Short detection by fuse, Overcurrent detection alarm, Heatsink overheat alarm |
| Applying load | | Resistive load/Inductance load |
| Control input | Current Input | 4 – 20 ㎃ DC |
| | Voltage Input | 0 – 5 V DC, 1 – 5 V DC, 0 – 10 V DC, |
| | Contact Input | ON/OFF |
| | External V.R | External volume (10 KΩ) |
| Control type | | Phase control, ON/OFF control |
| Start type | | SOFT START / DOWN |
| Output voltage | | More than 95 % of the input voltage (with the max current input) |
| Cooling type | | Forced cooling(150 A ~ 500 A), Natural cooling(70 A, 100 A) |
| Display method | | Output displayed by the LED |
| Insulation resistance | | minimum 100 ㏁ (500 V DC mega standard) |
| Output adjustable range | | 0 ~ 100 % |
| Dielectric strength | | For 1 minute at 2000 V AC 50/60 Hz |
| Line noise | | Noise (2 ㎸) by the noise simulator |
| Ambient temperature | | 0 ~ 40 ℃ (but no icing allowed) |
| Ambient humidity | | 35 ~ 85 % R.H |
| Storage temperature | | -25 ~ 70 ℃ |
| Weight | | 70/100 A : approx. 11 ㎏, 150/200/250 A : approx. 15 ㎏, 320 A : approx. 22 ㎏, 500 A : approx. 24 ㎏ |

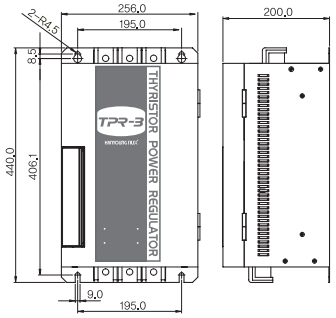
## Dimension and installation panel cutout

(Unit : ㎜)

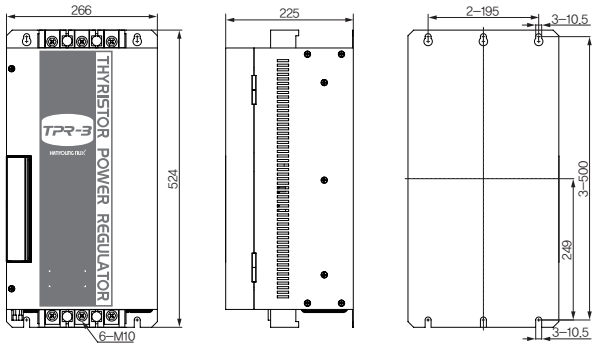
■ 70 A, 100 A



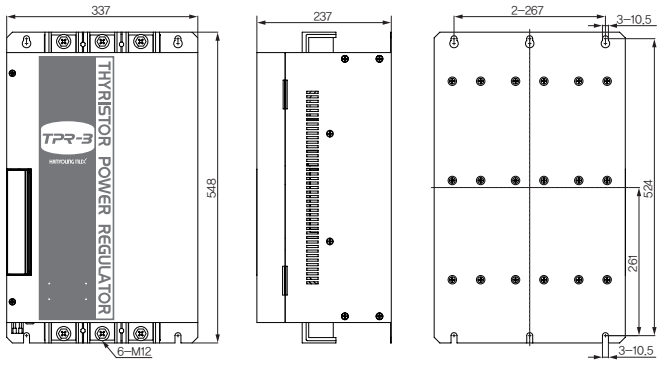

■ 150 A, 200 A, 250 A



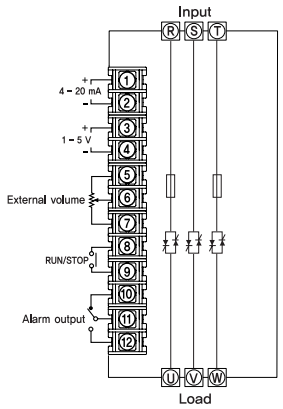

■ 320 A




■ 500 A

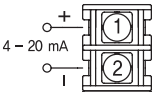



## Connection diagram

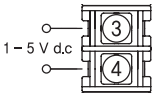



■ How to wire the input signal terminal

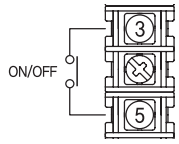
- When using 4 – 20 ㎃ DC



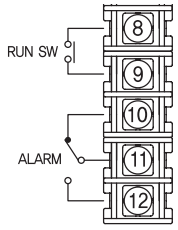

- When using 1 – 5 V, 0 – 5 V, 0 – 10 V DC



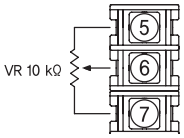
● When using ON/OFF



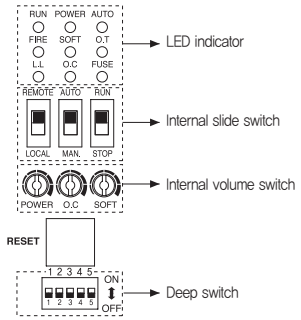

● When using RUN S/W, ALARM RELAY




● When using external manual volume




# Parts Name



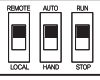
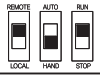
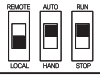
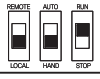

## ■ LED indication

- RUN : Always ON when operating (OFF when selecting STOP)
- POWER : ON when AC power is supplied in
- FIRE : ON when output is generated and becomes ON proportional to an amount of output (Continuously ON with 100 % output)
- AUTO : ON when selecting the AUTO MODE
- SOFT : ON when using the SOFT START function
- OT : ON when heat-sink is over heated, alarm output, operation stops
- LL : ON when value less than the load break set value is generated and ON when load current is less than 1 A.
- OC : ON when value more than O.C set value is generated, alarm output, operation stops
- FUSE : ON when internal FUSE breaks, alarm output, operation stops

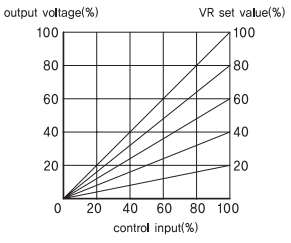
## ■ Internal slide switch (SLIDE S/W)

- REMOTE : Use external volume (VR)
- AUTO : Use control input
- RUN : Always set at RUN when operating
- STOP : All function stop when selecting stop during operation
- LOCAL : Use internal volume (VR)
- HAND : Ignores the control input

– Example of usage –

| | |
|---|---|
|  | – External manual volume operation<br>– Ignore the internal PW.MAX VR operation<br>– Use the control input |
|  | – External manual volume operation<br>– Ignore the internal PW.MAX VR operation<br>– Ignore the control input |
|  | – Ignore the external manual volume operation<br>– Internal PW.MAX VR operation<br>– Use the control input |
|  | – Ignore the external manual volume operation<br>– Internal PW.MAX VR operation<br>– Ignore the control input |

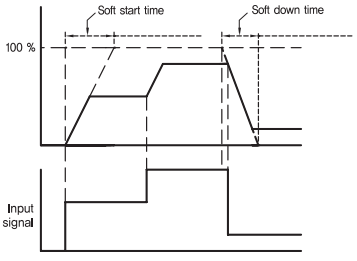
## ■ Internal volume (VR)


• Output voltage limitation (Power)
This is the function that limits the output voltage. Turning the VR to all the way left will make an output amount to 0 % and turning the VR to all the way right will make an output amount to 100 %.

• Over current protection (O.C)
If the current more than the VR set value is supplied in then OC LED will become ON immediately and if it is maintained for more than 0.5 then alarm will be generated.
– Set range
70 A, 100 A : Default value : 100 A
150 A, 200 A, 250 A : Default value : 250 A
320 A, 500 A : Default value : 500 A

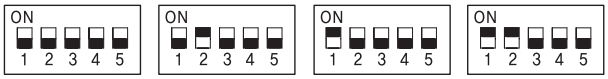
• SOFT START
When using it with the capacitive load such as inductive load and etc, turning ON the power switch for the first time will supply in the max value power and doing so may damage the load and power devices. Therefore this function let load voltage to increase gradually.
– Set time : 0 ~ 50 sec
– Set the soft start volume as minimum then soft start function will not be operated.
– Using the soft start function in the ON/OFF control is meaningless




## ■ Deep switch(DIP S/W)

| Input set | SW1 | SW2 | Operation | SW3 | Load broken wire | SW4 | SW5 |
|---|---|---|---|---|---|---|---|
| 4 – 20 mA | OFF | OFF | Resistive load | OFF | NON | OFF | OFF |
| 0 – 5 V | OFF | ON | Inductive load | ON | 30% | ON | OFF |
| 0 – 10 V | ON | OFF | | | 40% | OFF | ON |
| 1 – 5 V | ON | ON | | | 50% | ON | ON |

– Example of usage –

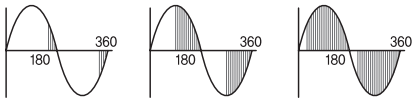



## ■ RESET

All function becomes stop temporarily (HOLD) when ERROR occurs or alarm operates. RESET function is used when restoring.

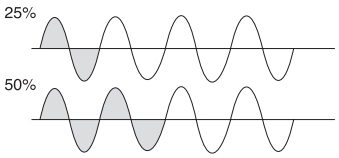
## ■ Phase Control

AC power has 50/60 Hz frequency and 60Hz 1/2CYCLE displays numerical value 180 degree for approx 8.33 ms. Phase control type inputs 1/2 CYCLE to the AC power and depending on the control signal, it generates the power proportionally in between 180 degree for approx 8.33 ms. Also, method is minutely adjusted depending on AC wave shape so it can easily control the electrical device such as AC motor and etc



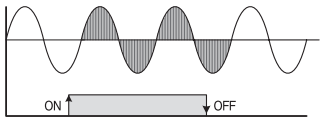

## ■ Fixed cycle control

As setting the constant cycle of the output, (1 sec), fixed cycle control is to control the AC power supply repeatedly with a constant rate of ON/OFF according to the control input.

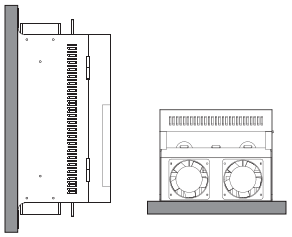



## ■ ON/OFF control (ZERO CROSS)

It generates 100 % output depending on the control input signal and always ON/OFF at the ZERO point or around the ZERO point.

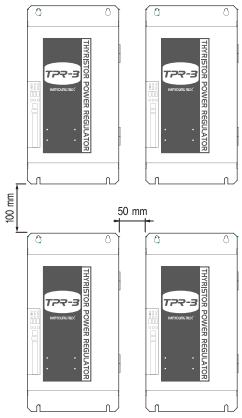



## ■ Installation method




Product installing direction should be vertical direction. If you need to install this product as the horizontal direction due to the space problem or etc, please only use 50 % of the load current

## ■ Installation gap




When installing more than 1 devices close to each other, please have the gap at least 50 mm horizontally and 100 mm vertically.

## ■ Control board installation type

– Be cautious of the air stream.
– As the internal temperature decreases, the durability and reliability of product increase.
– Please minimize the elements that disturb the air stream above the product.
– Be cautious for the ventilation system (Panel internal temperature should be less than 40 ℃)
– When OT LED becomes ON, please check for the panel internal temperature and check if the cooling fan located under the TPR heat sink is working properly.
– Check for the proper wiring of the R, S, T phase.