

Thyristor Power Regulator

**TPR3N(35 A, 50 A, 60 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.

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**Safety information**

Before operating, please read through the safety information carefully for the proper usage.

This safety information contains very important information regarding the safety issues so please follow these instructions at all times. This safety information is composed of Danger, Warning and Caution.

**! Danger**

In order to prevent the electric shock from occurring during operation, please earth the product to the main body fixing volt and please do not touch it because the heat sink becomes very hot. Electric shock may occur in the input/output terminal so please never let your body and/or conductive substance to be contacted by the input/output terminal.

**! Warning**

- When applying this product to the machines that can cause potential casualties or damage the important assets, please install the double/triple safety devices and use it.
- Please supply in the rated power supply voltage in order to prevent this product from breaking down or damaged.
- Do not disassemble, manufacture, upgrade and repair the product by yourself. Doing so can result in malfunction, electric shock and fire.
- Please turn OFF the product and then disassemble the product. Not doing so will break down the product, generate the electric shock and cause malfunction to occur.

**! 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 mm

**Suffix code**

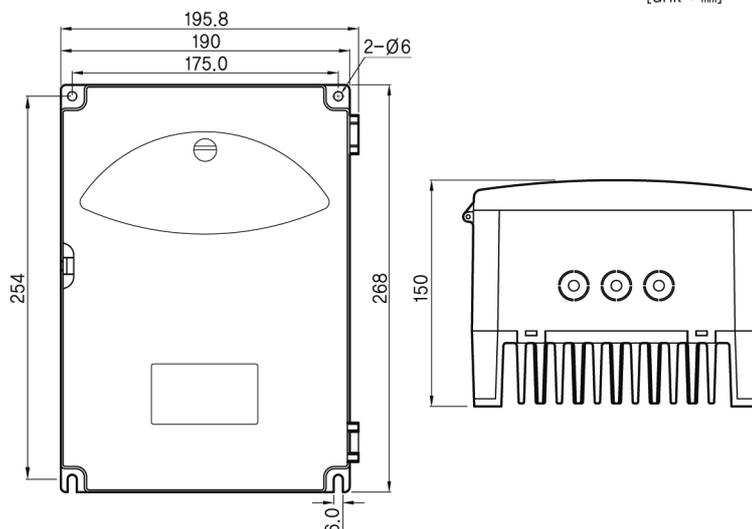
Model	Code	Information
TPR-	3N □ □	3-phases thyristor controller
Power supply voltage	220	220 V a.c
	380	380 V a.c
	440	440 V a.c
Rated current	35	35 A
	50	50 A
	60	60 A

**Specification**

Model	TPR-3N □ 35	TPR-3N □ 50	TPR-3N □ 60
Power supply voltage	220 V a.c, 380 V a.c, 440 V a.c		
Applying frequency	50/60 Hz (Dual usage)		
Rated current	35 A	50 A	60 A
Protective circuit	Protected by the internal fuse		
Applying load	Resistive load/Inductance load		
Control input	Current Input	4 - 20 mA d.c	
	Voltage Input	0 - 5 V d.c, 1 - 5 V d.c, 0 - 10 V d.c,	
	Contact Input	ON/OFF	
	External V,R	External volume (10 K $\Omega$ )	
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	Natural cooling (35 A), Forced cooling (50, 60 A)		
Display method	Output displayed by the LED		
Insulation resistance	minimum 100 M $\Omega$ (500V dc mega standard)		
Output adjustable range	0 ~ 100 %		
Dielectric strength	For 1 minute at 2000 V a.c 50/60 Hz		
Line noise	Noise (2 kV) by the noise simulator		
Ambient temperature	0 ~ 40 °C (but no icing allowed)		
Ambient humidity	35 ~ 85 % R.H.		
Storage temperature	-25 ~ 70 °C		
Weight	approx. 5 kg		

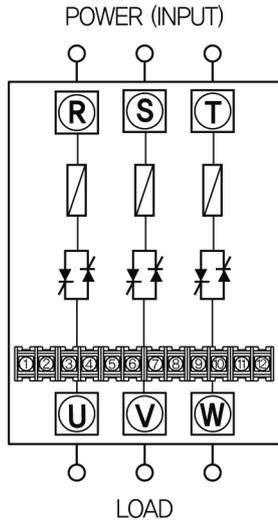
**Dimension and installation panel cutout**

[unit : mm]



# Connection diagram

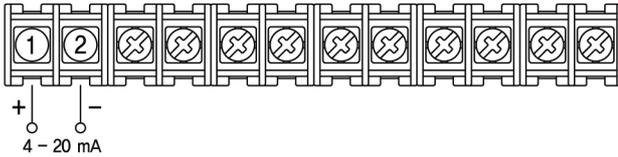
## Terminal arrangement diagram



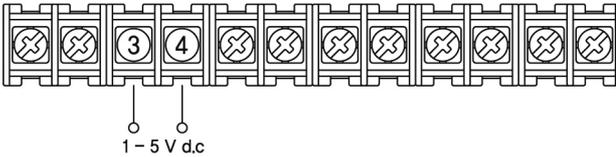
## How to wire the input signal terminal

– Press the left side handle and open the cover

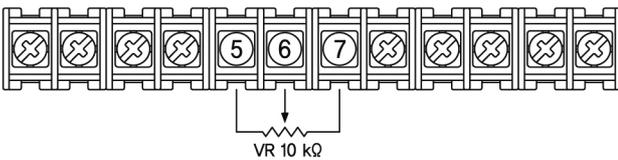
● when using 4 – 20 mA d.c



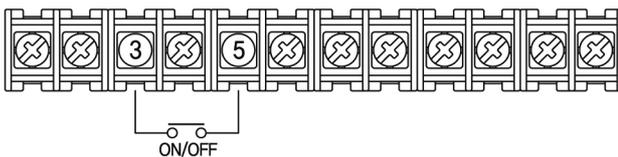
● when using 1 – 5 V, 0 – 5 V, 0 – 10 V d.c



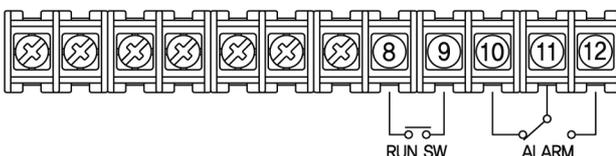
● when using external manual volume



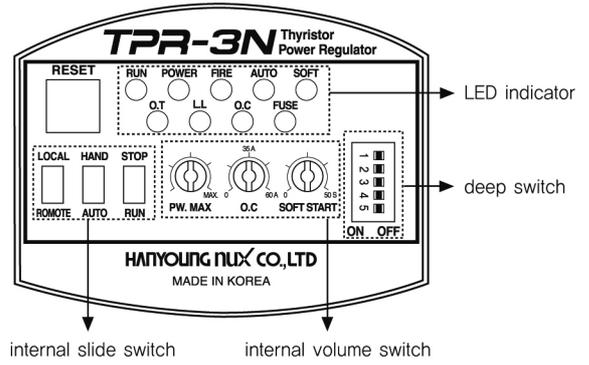
● when using ON/OFF



● when using RUN S/W, ALARM RELAY



# Function explanation



## 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

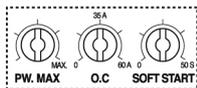
## internal slide switch (SLIDE S/W)

- 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 –

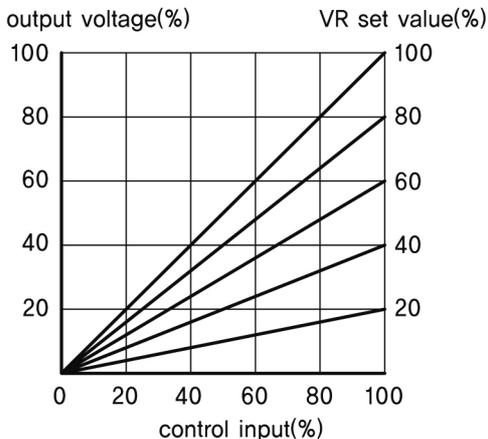
<p>LOCAL HAND STOP</p> <p>REMOTE AUTO RUN</p>	<ul style="list-style-type: none"> <li>– external manual volume operation</li> <li>– ignore the internal PW,MAX VR operation</li> <li>– use the control input</li> </ul>
<p>LOCAL HAND STOP</p> <p>REMOTE AUTO RUN</p>	<ul style="list-style-type: none"> <li>– external manual volume operation</li> <li>– ignore the internal PW,MAX VR operation</li> <li>– ignore the control input</li> </ul>
<p>LOCAL HAND STOP</p> <p>REMOTE AUTO RUN</p>	<ul style="list-style-type: none"> <li>– ignore the external manual volume operation</li> <li>– internal PW,MAX VR operation</li> <li>– use the control input</li> </ul>
<p>LOCAL HAND STOP</p> <p>REMOTE AUTO RUN</p>	<ul style="list-style-type: none"> <li>– ignore the external manual volume operation</li> <li>– internal PW,MAX VR operation</li> <li>– ignore the control input</li> </ul>

■ internal volume (VR)



- Output voltage limitation (PW.MAX)

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)

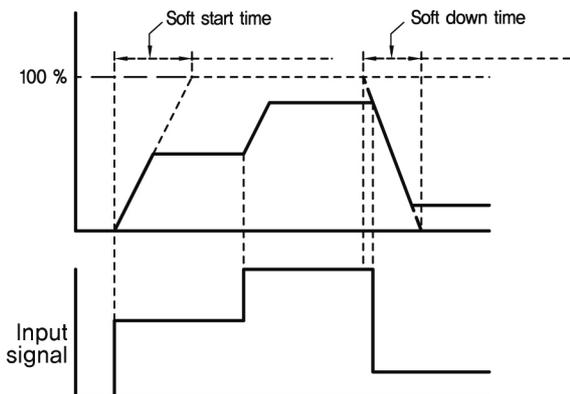
If the current more than the VR set value is supplied in then OC LED will become ON immediately and if it is maintained for more than 0,5 then alarm will be generated.

- Set range : 0 ~ max applying current value
- Initial value : Maximum load current value of the product (35 A, 50 A, 60 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.

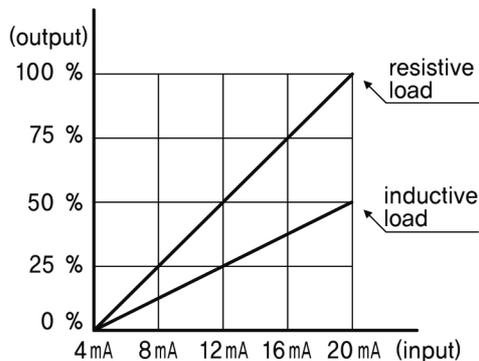
- Set time : 0 ~ 50 sec
- Set the soft start volume as minimum then soft start function will not be operated.
- Using the soft start function in the ON/OFF control is meaningless



■ Deep switch (DIP S/W)

SW number	Function			
SW 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SW 2	<input type="checkbox"/>	4 - 20 mA	0 - 10 V	0 - 5 V
SW 3	<input type="checkbox"/>	resistive load		inductive load
SW 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SW 5	<input type="checkbox"/>	NON	30 %	40 %
				50 %

Inductance input (operation mode: Inductive load, S/W number 3 right side)  
This is the mode that is used when load has much of inductance element just like coil. Max output value is limit to 50 %.

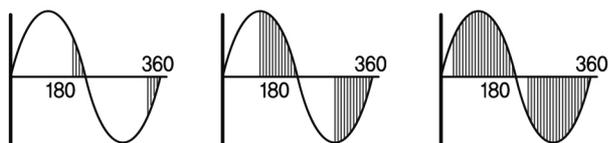


■ RESET

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

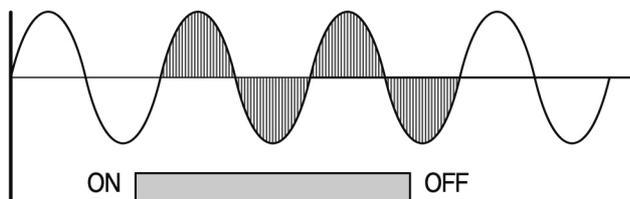
■ PHASE CONTROL

AC power has 50/60Hz frequency and 60Hz 1/2CYCLE displays numerical value 180degree for approx 8.33ms. 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



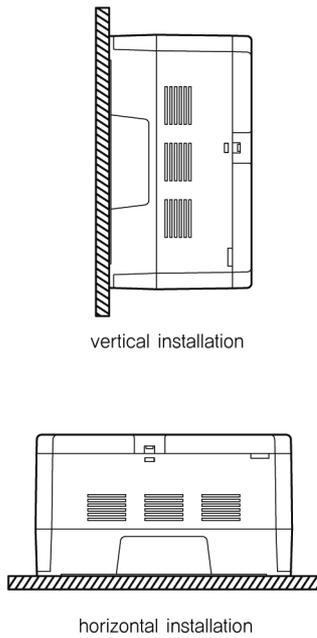
■ ON/OFF control (ZERO CROSS)

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



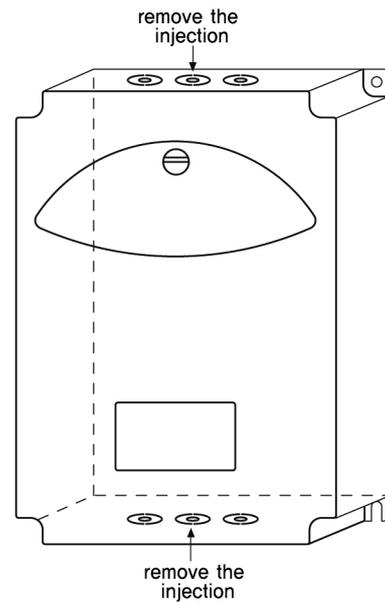
## ■ installation method

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



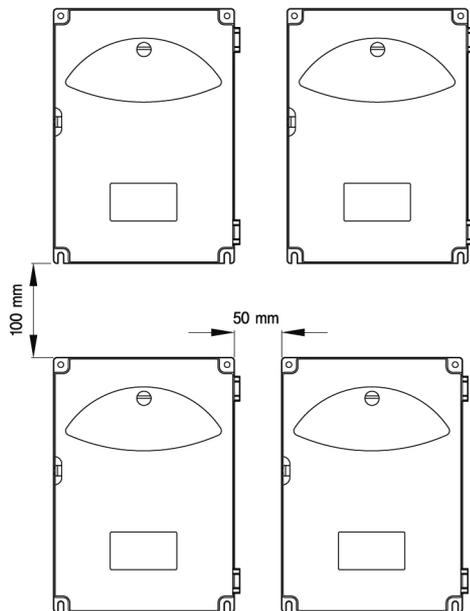
## ■ Wiring method

Remove the R, S, T, U, V, W terminal of injection which located at the up and down of the product (indicated with arrow in the given picture) by pressing them and then open the cover and perform the wiring



## ■ 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.



When performing wiring, must turn OFF the power and do the wiring. When operating, too much heat may be generated in the input/output power wire so please separate it from the control input signal wire.

## ■ 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 °C)
- 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.

