

## Power REGULATOR

## TPR-3N/TPRF-3N (70 A/100 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

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HANYOUNG NUX



## 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

<b>DANGER</b>	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury
<b>WARNING</b>	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
<b>CAUTION</b>	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.

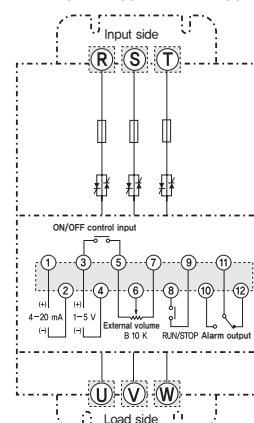
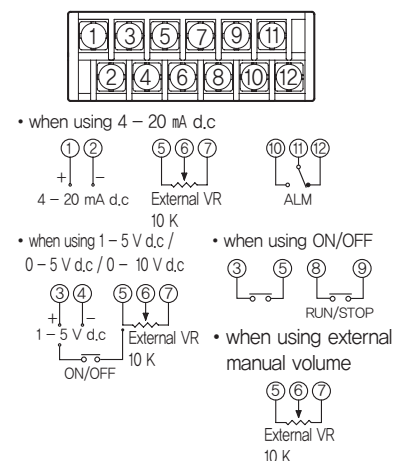
**Warning**

- 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.
- To prevent deflection 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

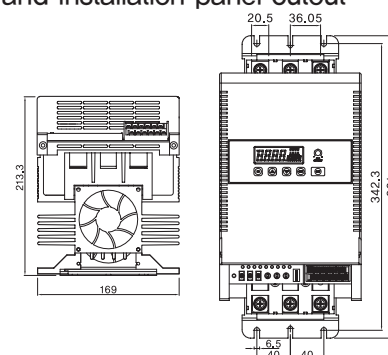
**Caution**

- The place of operating this product affect to the its functions and life cycle so that avoid to use it in the following circumstance.
  - A place of having high humidity and not circulating air
  - A place of piling dust or impurity or having high ambient temperature or high vibration
- The contents of this manual may be changed without prior notification.
- Make sure that there is no damage or abnormality of the product during delivery.
- After turning OFF power sources of all instruments, please wire them.
- The Thyristor Power Regulator shall be installed perpendicularly.
- Install exhausting fan in internal and upside of the panel.
- Tighten BOLT of the input and output wire enough.
- Do not use this product at any place with corrosive (especially noxious gas or ammonia) or flammable gas.
- Do not use this product at any place with direct vibration or impact.
- Do not use this product at any place with liquid, oil, medical substances, dust, salt or iron contents. (Use at Pollution level 1 or 2)
- Do not polish this product with substances such as alcohol or benzene.
- Do not use this product at any place with a large inductive difficulty or occurring static electricity or magnetic noise.
- Do not use this product at any place with possible thermal accumulation due to direct sunlight or heat radiation.
- Install this product at place under 2,000 m in altitude.
- When the product gets wet, the inspection is essential because there is danger of an electric leakage or fire.
- Do not connect anything to the unused terminals.
- After checking the polarity of terminal, connect wires at the correct position.
- The warranty period for this product including parts is one year if this product is properly used
- When installing more than 1 devices close to each other, must have gap at least 100 mm

## Connection diagram

■ Terminal arrangement  
(Regular type / FND type)■ Input signal terminal connection diagram  
(Regular type / FND type)

## Dimension and installation panel cutout



[Unit : mm]

## Suffix code

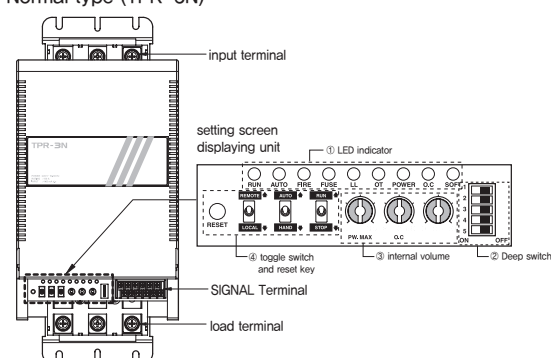
Model	Code	Description
TPR-3N		3 phase power regulator (no indication function)
TPRF-3N		3 phase digital Power Regulator (digital displaying type)
Power supply voltage	220	220 V a.c
	380	380 V a.c
	440	440 V a.c
Rated Current	70	70 A
	100	100 A

## Specification

Power supply voltage		220 V a.c., 380 V a.c., 440 V a.c
Operating Frequency		50 / 60 Hz(Dual usage)
Rated Current		70 A / 100 A
Protective circuit		Protected by the internal fuse
Applying load	Normal type	Resistance load / inductive load (Select by conversion switch)
	FND type	Resistance load / inductive load (Select by internal parameter)
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.Ω)
Control method	Normal type	Phase control, ON/OFF control (Switch selection)
	FND type	Phase control, ON/OFF control (Parameter selection)
Starting method		SOFT START / SOFT UP / DOWN
Output adjusting range		Above 95 % of input voltage (when applying max current input)
Cooling method		Forced cooling
Indicating method	Normal type	Indicate the output by LED
	FND type	Indicate the voltage and state by 7 segments
Insulation Resistance		Min, 100 MΩ (500 V d.c Mega standard)
Output adjusting range		0 ~ 100 % (Adjust the V.R or parameter value.)
Dielectric Strength		For 1 minute at 2000 V a.c 50/60 Hz
Line noise		Noise (2 kW) by the noise simulator
Ambient temperature		0 ~ 50 °C (but no icing allowed),
Ambient humidity		35 ~ 85 % R.H,
Storage temperature		-25 ~ 70 °C
Weight		Approx. 5 kg

## Name of each parts

## ■ Normal type (TPR-3N)



## • LED display

Number	LED name	Information
①	SOFT	L,ON when operates the soft start
②	O.C	L,ON when value exceeds the over current set value
③	POWER	Always L,ON when power is supplied in
④	O.T	L,ON when heat sink temperature is above 85 °C
⑤	L.L	Generating the output more than the load break set value is generating and if load current is less than 1A then light becomes ON
⑥	FUSE	L,ON with internal fuse break
⑦	FIRE	L,ON when output becomes ON and L,ON proportional to an output amount
⑧	AUTO	L,ON when performing auto-operation
⑨	RUN	Always L,ON when operating (RUN) (L,OFF when selecting STOP)

## • Deep switch

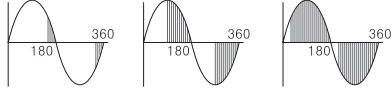
Input signal selection				Operation mode selection		Load break selection	
Set information	SW1	SW2	Set information	SW3	Set information	SW1	SW2
4 - 20 mA	ON	ON	Resistive load	ON	NON	ON	ON
0 - 5 V	ON	OFF	Inductive load	OFF	30 %	OFF	ON
0 - 10 V	OFF	ON	-	-	40 %	ON	OFF
1 - 5 V	OFF	OFF	-	-	50 %	OFF	OFF

• Selecting the operation mode as inductive load will limit the max output to 50 %.

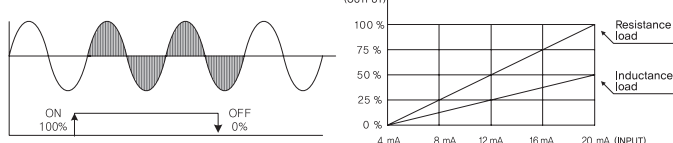
• Switch conversion is not recognized during operation so please supply in the power after checking the switch

## ■ Phase control

AC power source has 50/60 Hz frequency and 1/2 cycle of 60 Hz frequency appears a value of 0 ~180 degree in about 8.33 ms. Phase Control is a method that after inputting 1/2 cycle into AC power source, it proportionally generates power between 0 ~180 degree in 8.33 ms according to the control signal. Also, this method can be fully adjusted according to the wave form of AC so that AC motors and other variety of electronic devices are controlled easily.



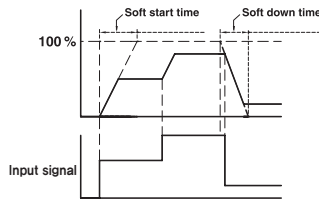
## ■ Inductance input (DIP S/W 3 : OFF)



This is a mode that is used when load contains a lot of inductance components such as coil. Max output value is limited to 50 %.

### • Front volume

Volume / Reset key	Information
Output limitation setting (PW,MAX)	<p>Function which limits an output amount. Output 0% when volume is positioned at min and output 100% when it is positioned at max.            • Default setting : 100% (max.)            • No correspondence when performing ON/OFF control</p>
Over current alarm setting (O.C)	<p>The current LED becomes ON immediately when input value is more than the set value and if that value is maintained for more than 0.5 sec then alarm output will become ON.            • Default set value : 100 A            • Set range : 0~rated current (max value)</p>
Soft start setting	<p>ON the switch for the first time when using the inductive or capacitive load, max value power will be supplied into the load which may damage the load or destroy the power device. This setting increases the load voltage gradually.            • Default setting: 0 (Set range: 0~50 sec)            • It is not operated with "0" setting            • No correspondence when performing ON/OFF control</p>



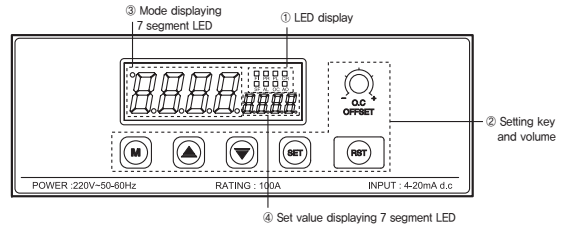
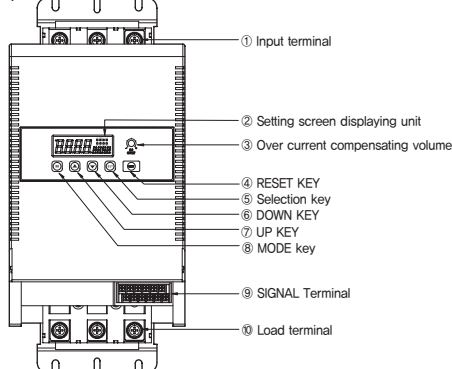
### • Front Toggle Switch and reset key

Switch	Information
 REMOTE LOCAL	<p>Select whether users will use the external manual controlling volume which connected to the terminal or the internal output limitation (PW,MAX)</p> <ul style="list-style-type: none"> <li>• REMOTE : Selected when using the external volume connected to the terminal</li> <li>• LOCAL : Selected when using the output limitation (PW,MAX) setting internal volume</li> </ul>
 AUTO HAND	<p>Select whether users will use the control output (4~20 mA) of controller as input signal or not (use volume)</p> <ul style="list-style-type: none"> <li>• AUTO : Selected when using the control output (4~20 mA) of controller as input signal</li> <li>• HAND : Not using the input signal (4~20mA) (select the setting by volume)</li> </ul>
 RUN STOP	<p>Select the control action as RUN state or STOP state</p> <ul style="list-style-type: none"> <li>• RUN : Selected when it is in the general control state</li> <li>• STOP : Selected when stopping the control action temporarily (output OFF)</li> </ul> <p>When using the RUN/STOP which operates by the external contact input (D.I), please select the internal RUN/STOP toggle switch as STOP side</p>
 RESET	<p>Control state becomes the hold state temporarily when alarm output is ON. Pressing the Reset key after solving the problem will restore the setting.</p>

### • Example of toggle switch selection

Switch selection	Information
REMOTE – LOCAL	Use external volume, ignore internal volume, use input signal
REMOTE – HAND	Use external volume, ignore internal volume, ignore input signal (output variation by the external volume)
LOCAL – AUTO	Ignore external volume, use internal volume, use input signal
LOCAL – HAND	Ignore external volume, use internal volume, ignore input signal (output variation by the external volume)

## ■ FND type (TPRF-3N)



### • LED display

Number	LED name	Explanation
①	FI	L,ON when output becomes ON and becomes L,ON proportional to an output amount
②	PR	L,ON when selecting resistive load
③	PL	L,ON when selecting inductive load
④	S,F	L,ON when operating the soft start
⑤	A,L	L,ON with over current, heat sink temperature alarm operation
⑥	O,C	L,ON when value exceeds the over current set value
⑦	A,O	L,ON when performing the auto-operation

### • Setting key and volume

Name of each button	Explanation
	Mode button Enter into the manual mode and save the data
	Incremental button Increase the set value
	Decrement button Decrease the set value
	Selecting button Manual operation/auto operation selectable by pressing it for 2 sec When performing manual operation, it varies an output amount by pressing increment/decrement key disregarding the input signal Press it for 2 sec again then it will save the setting and return to the auto operation mode
	Reset button System temporarily stops when alarm occurs. Pressing this button will restore the setting
	Over current compensating volume Compensate the current indicated value displayed in the displaying unit (default setting: positioned in the middle) *Applied only when performing phase control

• Mode displaying 7 segment LED : Mode of each list will be displayed when setting the parameter

• Set value displaying 7 segment LED : Display the set value when setting the parameter Also, it displays the measured value which selected in the displaying mode during operation.

## Parameter composition

Actuating key	Name	Default value	Information
	LOC	OFF	OFF : Lock cancel LOC 1 : Lock all LOC2 : Auto mode lock
	ISEL	4-20	4 ~ 20 (mA), 1 ~ 5 (V), 0 ~ 10 (V) VOL : Set by the manual volume (10 KΩ) ON/OFF : ON/OFF control by the external contact input * Input specification with dot in present, the output limitation by the external volume setting is applied.
	OPrt	PA-r	PA-r : resistive load (phase control) Mot : inductive load (phase control) * output amount limited to 50 %
	GrdF	100	Set the output limitation value (set range : 0 ~ 100 %)
	ELEF	0	Input signal compensation about output amount (set range : -100 ~ 100)
	SSt	30	Set the reaching time from when supplying in the power or starting operation to the time when reaching the output amount corresponding to the input signal (set range : 1 ~ 250 sec)
	Sud	5	During controlling, it sets the time to reach the output amount corresponding to the critical variation of input signal (set range : 0 ~ 50 sec)
	oC	0	Over current protective alarm value setting (set range : 0 ~ 100 A)
	oE	0	Over temperature alarm value of heat sink setting (set range : 0 ~ 100 °C)
	LL	0	When the load current is above the set value, alarm output will become ON if the load current is less than 1 A. (Set range : 0 ~ 100 A)
	LI nE	oLI n	oLI n : Slope setting function selection LI nE : Output limitation setting function selection
	di SP	1 nP	INP selection : input signal percentage display OUT selection : output voltage percentage display CUR selection : load current display(A) HST selection : heat sink temperature display(°C)
	Id	0	Set the communication address (set range : 0 ~ 255)
	baud	96	Set the communication speed (set range : 24 ~ 1 Mbps)

Cautious) selecting the operation mode as phase control inductive load will limit the output amount to 50 %.