

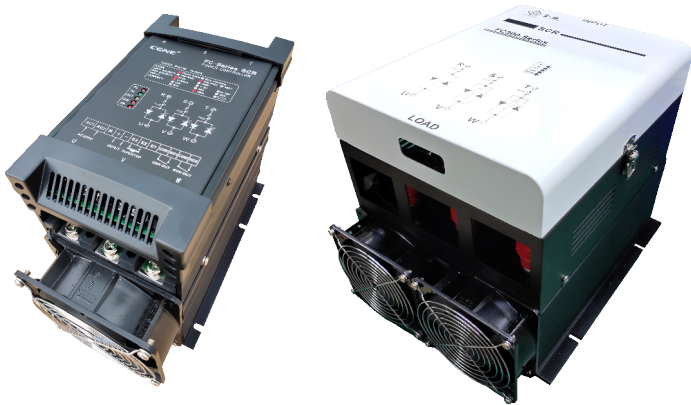
# SCR Power Controller

## Instruction Manual V3.2

Thank you for purchasing FC Series SCR Power controller. This manual mainly describes some necessary precautions during install and wiring. Before operation, please carefully reading this manual and fully understand all the operation procedure of this product, please bring the manual for reference at any time.

### — Appearance and features

#### ■ Appearance



#### ■ Features

- (1) New design, private mould, nice and generous, the whole machine adopts anodized aluminum alloy, small size, good heat-dissipation, long lifetime, easy install and wiring.
- (2) All series were equipped with high-speed fuses to prevent short-circuit current (di/dt) was damaged SCR.
- (3) There are multiple LED indicators on the panel to show the power regulator's working status and cause of failure to facilitate timely maintenance when there have any failures
- (4) Linear output characteristics, high accuracy temperature control, high quality, strong interference ability.
- (5) The best buffer time of 5 seconds slow start and 5 seconds slow shutdown to protect SCR module and load
- (6) Built-in a variety of protections, when abnormal conditions occur, can immediately stop the output to protect user equipment from abnormal heating

### 二 Use safety, warnings and precautions

#### ! Safety

1. Before using, please reading the safety precautions carefully. This precautions are important contents related to safety, please make sure implement them.
2. If this product will be used on the equipment that causes personal injury and heavy property loss, it must be equipped with double protection or triple protection device before used.
3. When the SCR power regulator didn't output, couldn't completely isolated, we suggest must installed branch switch (NFB)
4. When repaired equipment, it is necessary to isolate the main power supply. If only operate the SCR power regulator to turn off there are doesn't enough. Because of the output terminal still with power, there will be a risk of electric shock.

#### ! Warnings

1. To maintain the longtime using of this product, please use the standard input voltage correctly
2. Please don't disassemble, process, modify or repair this product at will, there will be dangers of electric shock, fire, etc.

#### ! Notice Items

1. Please confirm that the product didn't damaged during transportation.
2. The environment using has a great influence on the performance and lifetime of the product, so please avoid the following environment: the high temperature and difficult air circulation, corrosive gas, harmful gas and other places (such places need to be effectively isolated by control box or control room).
3. When installed in the control box, punch holes in the box and install the exhaust fan.
4. Ambient humidity: below 90% RH (no frosting)
5. Operating cycle temperature: - 10°C ~ 50°C, Max 80°C (when the cycle temperature is between 50°C ~ 80°C, the rated current must be attenuated by 1.2% for every 1°C increase).
6. The screw connection of input and output terminals must be tight. SCR belong to a high current product. If the terminal is not tightened, it will cause arc welding phenomenon, and the current will increase several times, resulting in parts burning.
7. When the radiator temperature is high, do not touch the body.
8. The input and output terminals are in danger of electric shock. Please avoid directly contact with the conductor.
9. Load common line can not be connected to zero line or ground, otherwise SCR couldn't be closed and lose control.
10. Follow the gas thermal principle during installation, please install it vertically upwards
11. If the load didn't connected or the current less than 0.6A, the SCR maintaining current (IH) is insufficient, and the SCR power regulator cannot be tested normally, please connect the load above 0.6A when testing.

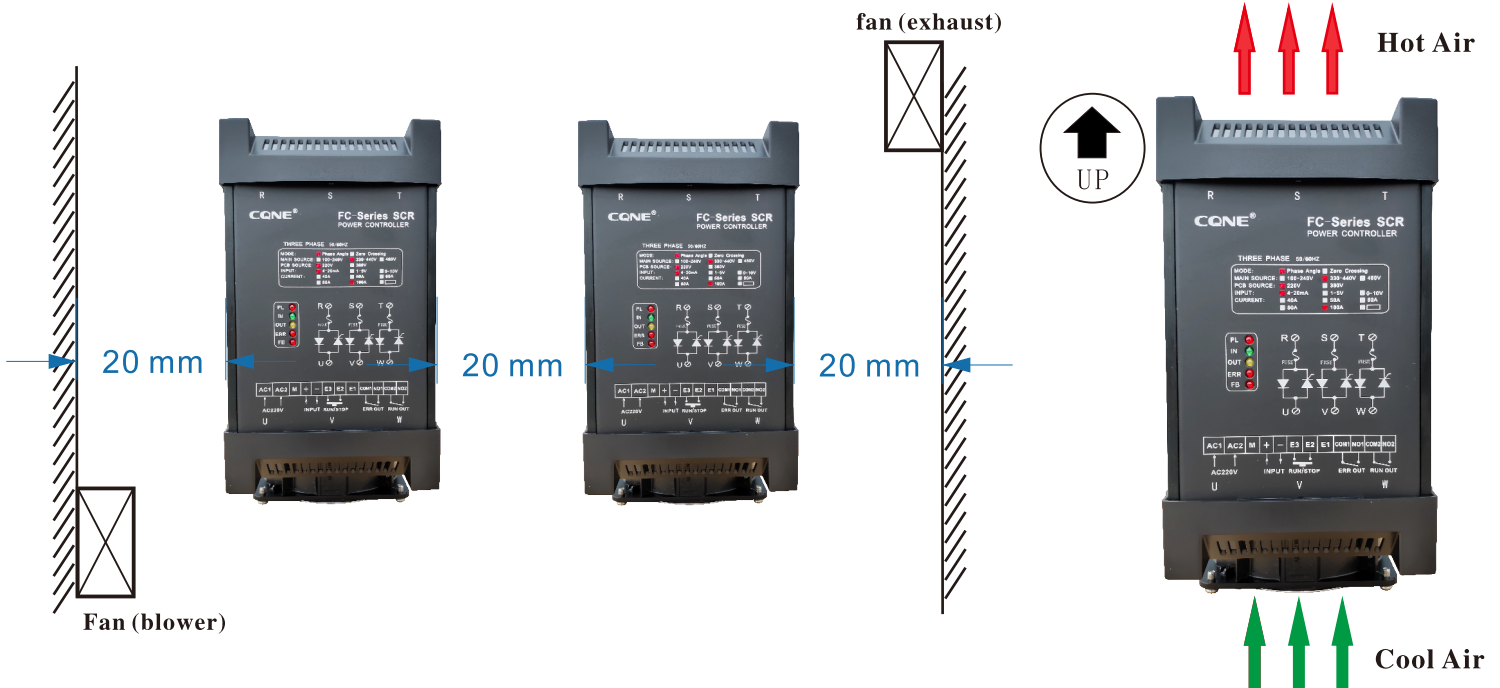
## Technical specifications and panel description

- 3. 1, Control input signal  
 Current input: 4-20mA DC Impedance input: 250Ω  
 Voltage input: 1-5V 0-10V  
 Manually input: 10KΩ potentiometer  
 Switch contact input  
 PLC signal input
- 3. 2, Load Rated voltage range  
 110V:110V AC±3V 50/60Hz  
 220V:220V AC±3V 50/60Hz  
 380V:380V AC±3V 50/60Hz  
 440V:440V AC±3V 50/60Hz
- 3. 3, Effective value current and refrigeration system  
 40A Natural cooling  
 50A-800A Forced air cooling system  
 1000A-1200A Special water cooling system
- 3. 4, Control mode - phase controlled voltage regulator  
 Load: suitable for resistance wire, IR lamp,  
 silicon carbide rod, pure group heater (nickel alloy, Kanthal)  
 Output voltage control range: Input voltage of 0-98%  
 Output stability: When the input voltage fluctuation is ± 10%,  
 the output voltage fluctuation is less than ± 3%
- 3. 5, Alarm protection system
  1. Over temperature alarm: When the radiator temperature exceeds 75 ° C, over temperature alarm system was activated, the ERR over temperature indicator will be lighting on the panel, the trigger board inside output was cutted off, and the relay will be output, this action time less than 20ms.
  2. Over current alarm: When the load was short circuited or the current exceeds 130- 150% of the rated current, the fast fuse will fuse, over- current alarm system was activated, the phase failure of FB indicator on the panel will be light on, the trigger board inside output will be cut off, and the relay will output, all the action time is less than 20ms.
- 3. 6, Operating environment  
 Ambient temperature range: -10°C-50°C  
 Ambient humidity range: ≤90%R
- 3. 7, Insulation impedance  
 Minimum 20MΩ 500V DC
- 3. 8, Insulator strength  
 2000V AC 1 minute (AC220V)  
 2500V AC 1 minute (AC380V)

## Schematic diagram of the minimum clearance for the installation of multiple SCR power regulators and the best position for the fan installation in the control cabinet

### Mounting Clearance and Optimum Location of Control Cabinet Fans

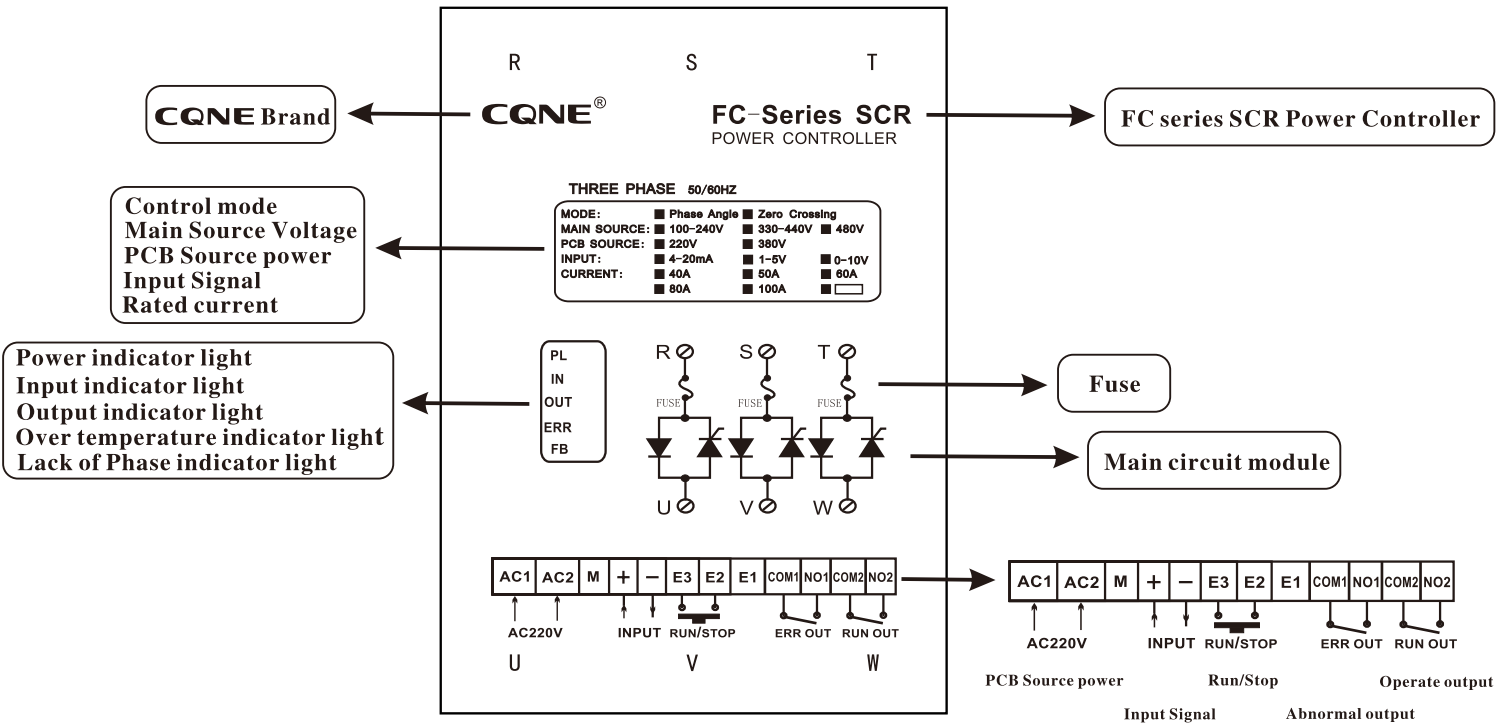
### Air flow



(1) SCR power Controller will generate heat inside. When install, please according to the installation direction (as shown above), that is the correct direction of the words on the SCR power regulator shell is upward. The minimum distance between the power Controller and the power regulator is 20MM. Do not install them in high temperature or poor ventilation place, and make sure a good ventilation system of the control cabinet.

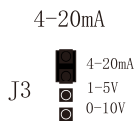
(2) The control cabinet need to install ventilation fan. Please install the fan according to the principle of hot air from bottom to top. The best location for the fan installation is as shown in the figure. Installed on the side of the lower end of the control cabinet, and the fan (exhaust air) is installed on the side of the upper end of the control cabinet. If there is no place to install on the left side, can be installed on the right side at the same time.

## 五 Panel Description

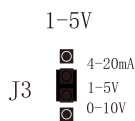


## 六 Input signal selection

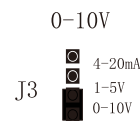
J3 signal input selection port, you can select different input signal types by changing the position of the short-circuit block



Short circuit block to 4-20mA;  
Input signal 4-20mA;



Short circuit block to 1-5V;  
Input signal 1-5V;



Short circuit block to 0-10V;  
Input signal 0-10V;

## 七 output adjustment

There are two potentiometers on the PCB trigger board to adjust the maximum and minimum output values. They have been adjusted before leaving the factory. Please do not adjust them at will.

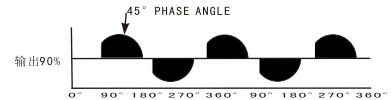
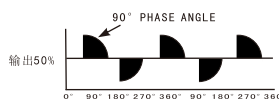
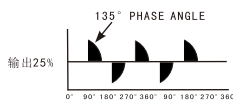


BIAS: Adjust the minimum output value, and the clockwise output becomes larger.

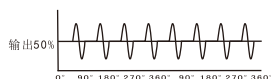
MAX: Adjust the maximum output value, and the clockwise output becomes larger.

## 八 Output control mode and output waveform

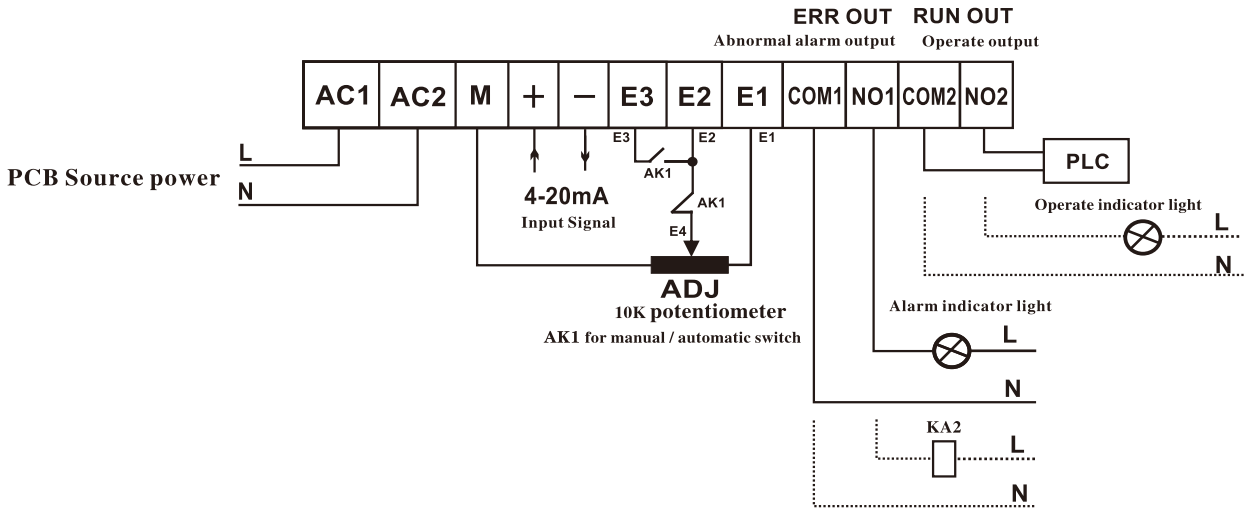
Output mode:  
phase control



Output mode:  
zero position control (cycle)

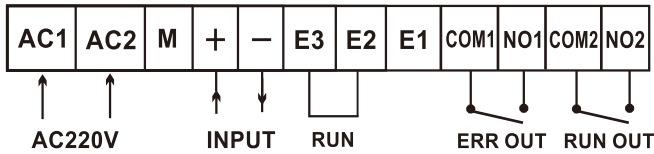


**九 Main board terminal wiring diagram**

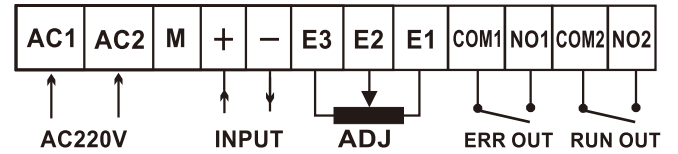


**+ Motherboard signal wiring diagram**

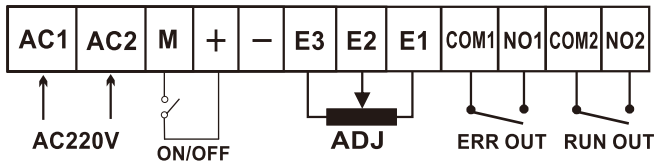
(1) 4-20mA/1-5V/0-10V signal input(Factory default connection)



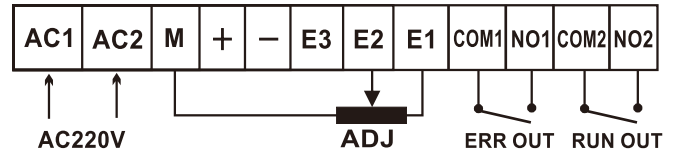
(2) 4-20mA/1-5V/0-10V signal input,potentiometer limits output power



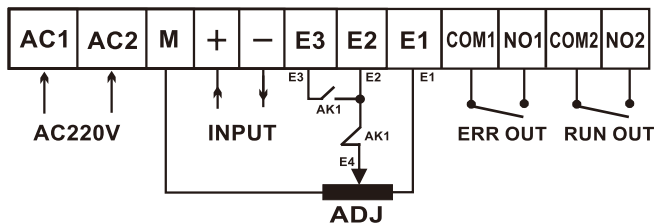
(3) Contact control signal input, potentiometer limits output power.



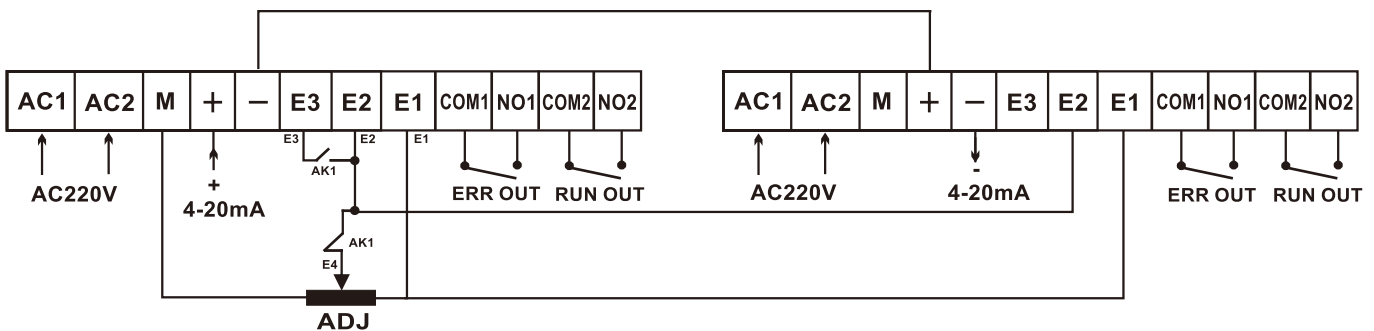
(4) The potentiometer is manually input, and the output size can be adjusted by rotating the potentiometer.



(5) Automatic/manual switch control, intermediate relay AK1 normally closed action, manual control, AK1 normally open action, automatic control connection.

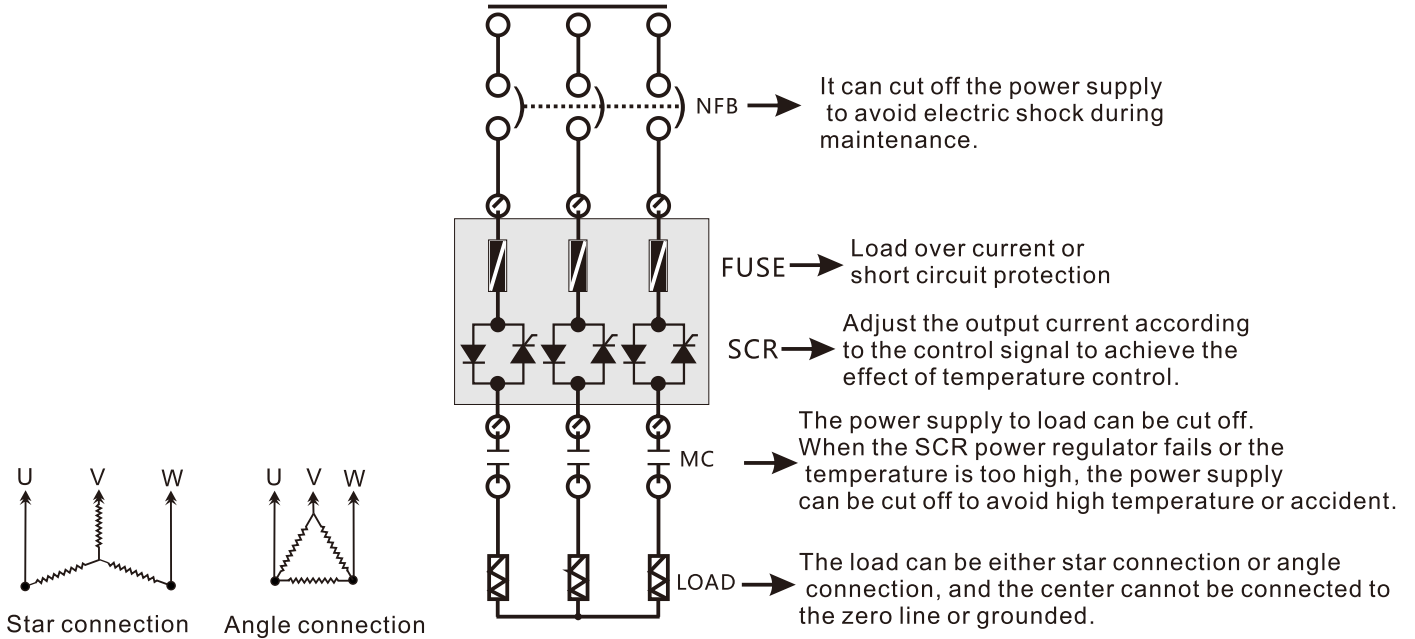


(6) One control two, automatic/manual switch control, intermediate relay AK1 normally closed action, manual control, AK1 normally open action, automatic control connection.



**+- Main circuit wiring diagram**

**Three-phase three-wire power supply**



**+二 Selection index table**

Please confirm before selection model no., the load whether within the capacity of SCR

Model no.: **FC** **3** **P** - **3V** **080** - **210** - **R**  
A B C D E F G

**A-Model**

FC:FC Series

Single phase:

$$\text{SCR Power Controller amperage (A)} = 1.3 * \frac{\text{Loading (KW)} * 1000}{\text{Voltage (V)}}$$

**B-Phase**

1: single-phase      3: three phase

Three phase:

$$\text{SCR Power Controller amperage (A)} = 1.3 * \frac{\text{Loading (KW)} * 1000}{\text{Line Voltage (V)} * \sqrt{3}}$$

**C-Control mode**

P:Phase control      D:Zero control

**D-Main circuit voltage**

1V:110V    2V:220V    3V:380V    4V:440V

**E-Type of current**

40A(040)    50A(050)    60A(060)    80A(080)    100A(100)  
 125A(125)    150A(150)    175A(175)    200A(200)    225A(225)  
 250A(250)    300A(300)    350A(350)    400A(400)    500A(500)

**F-Specifications**

210: Control panel AC220V supply power Over-current protection Over-temperature protection

**G-Function**

Blank: No running output function

R: It has the function of running output

### 十三 Panel indicator shows the status and troubleshooting

There are five LED indicators on the housing panel, which show different conditions. The SCR power regulator can be seen through them. At a glance, very convenient, which represents the situation, please see the following table:

Name	Color	Display status	Cause of abnormal failure	Handling method
PL	Red	The power indicator does not light on (Light on means normal)	1. Trigger board does not power 2. PCB main board failure 3. SCR over temperature	1. Check the auxiliary power circuit 2. Replace the PCB main board or send back for repair 3. Check the SCR over temperature
IN	Green	Output indicator does not light on (Light on means normal)	1. The input signal of the power regulator do not output 2. Power regulator input signal polarity was reversed 3. Internal MAX or external VR reset	1. Check the input signal of the power regulator 2. Check the input signal wiring of the power regulator 3. Check internal MAX and external VR
OUT	Yellow	Output indicator does not light on (Light on means normal)	1.No 4-20mA signal or reversed connection 2.The trigger board was broken	1. Check the IN indicator, if the indicator do not light on that means the thermostat has no output signal or was connected reversely 2. PCB main board failure, replace or send back for repair 3. Check the main power supply or fuse
ERR	Red	SCR over temperature indicator light on (Light on means abnormal)	1. The SCR cooling fan faulty or stuck 2. The ambient temperature too high or the ventilation too poor	1. Replace the fan or remove dirty stuff or objects 2. Improve ventilation conditions
FB	Red	Phase failure alarm indicator light on (Light on means abnormal)	1. Fuse blown 2. The main power supply does not powered or lacks phase	1. Replace the fuse, check whether the load was short-circuited or grounded 2. Check the main power

### 十四 Specification & Dimension

	Current	Dimension (L*W*H)	Installed size (L*W)	Screw	Cooling system	Size photos
Three phase	40A	210*140*185mm	164(120)*132mm	M6	Natural cooling	PicsA
	50A-100A	250*140*185mm	164(120)*132mm	M6	Fan cooling	PicsB
	125A-175A	330*140*185mm	230(170)*132mm	M8	Fan cooling	PicsC
	200A	340*180*251mm	230(170)*170mm	M8	Fan cooling	PicsD
	250A-350A	330*265*270mm	210(170)*257mm	M10	Fan cooling	PicsE
	400A-500A	390*330*270mm	360*230mm	M10	Fan cooling	PicsF
	600A	420*330*270mm	390*230mm	M12	Fan cooling	PicsG

