



# SCR VOLTAGE REGULATOR HGW6 SERIES

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## 1.Appearance and product characteristics

### Product characteristics:

MCU 32-bit dual-core control, built-in PID closed-loop control, 100% linear output;

Double Row digital display, input, output, voltage, current, power five parameters show custom;

Two-channel signal input design, current and voltage signal input can be;

Multiple control modes: constant voltage, constant current, constant power, open loop, cycle control;

Multi-protection function: lack of phase, over-current, over-temperature, break-line protection; module breakdown alarm;

After debugging the parameter saving function, a key to restore the factory setting function;

Modbus RTU communication, the PC can directly control the output size.

### Appearance:



## 2.Use safety, warnings and precautions

### Safe

1. Please read the safety precautions carefully before using and after using. This is an important aspect of security to be sure to follow.
2. If this product is used on the equipment which can injure people and cause heavy property loss, it must be equipped with double protection or triple protection device.
3. SCR is not completely isolated when it is not output, and it is recommended that a shunt switch (NFB) must be installed.
4. In the maintenance of equipment, to isolate the main power supply, such as the operation only SCR off is not enough, because its output is still charged, there will be a risk of electric shock.
5. It is recommended to use the alarm output function of the power regulator, when there is any abnormal, you can first alarm output.

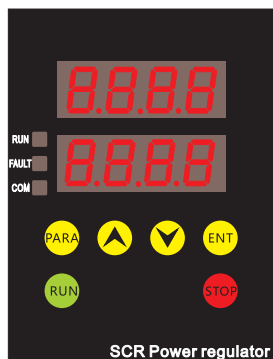
### Warning

1. In order to maintain the long-term use of this product, please use the correct standard input voltage.
2. Please do not decompose, process, modify, repair this product at will, there will be electric shock, fire and other hazards.

### Attention

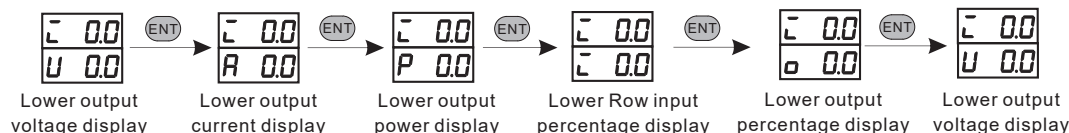
1. Please make sure that the product is not damaged during transportation.
2. Environmental settings on the performance and life of this product has a great impact, so please avoid the following environment: high temperature air circulation is not easy to environment. Please avoid corrosive gas, harmful gas and other places (such occasions need to use control box or control room effective isolation) .
3. When installed in the control box, punch holes in the upper part of the box and install the exhaust fan.
4. Use ambient humidity: below 90% Rh (no frosting) .
5. The operating cycle temperature is 0 ° C ~ + 40 ° C Max 60 ° C (when the cycle temperature is between + 40 ° C ~ + 60 ° C, the rated current must decrease by 1.2% with each 1 ° C increase) .
6. Input and output on-line wiring must be tight. SCR is a high current products, such as terminals not tight will cause arc welding phenomenon, current several times increase, causing parts burned.
7. The radiator temperature is high and contact with the body is prohibited.
8. Input and output terminals have the risk of electric shock please avoid direct contact with the conductor.
9. Unused terminals are not allowed online.
10. Install according to the principle of gas heat, please press the vertical direction.
11. The product is guaranteed to last 1 year in normal use, including components.
12. If the load is not connected or the current is less than 0.6 A, SCR can not do the normal test (please load more than 0.6 a) .

## 3.Description of panel function



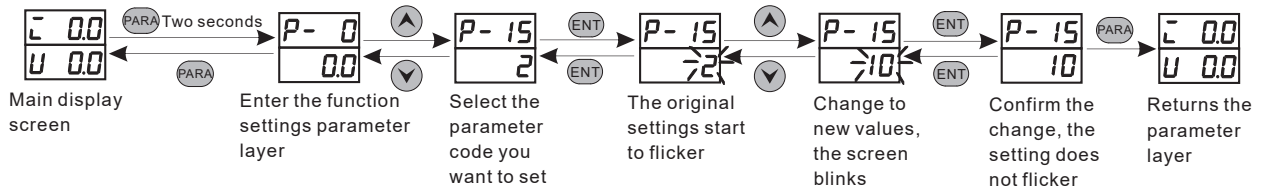
Name	Functional description
Top Row Digital Tube	Current input percentage display/parameter name display
Lower Row digital tube	Current input, output, voltage, current, power display/parameter value display
Run Indicator	Green, this light is on when the power regulator is working
Fault Indicator	Red, when the power regulator occurs abnormal alarm, this light on
COM indicator	Yellow, this light flashes when communication is online

Display parameters layer, ENT button can switch the next row display input, output, voltage, current, power cycle display.



## Function settings parameter layer

Parameter modification instructions (for example, change the p-15 slow start time parameter from 2 seconds to 10 seconds, other parameter modification steps are similar)



04

## 4. Control terminal function description

P+	AI1	AI2	GND	SW1	SW2	GND	A	B	NO	COM	NC	L	N
1	2	3	4	5	6	7	8	9	10	11	12	13	14

Serial number	Symbols	Functional description
1	P+	Reference Power Supply+5V: A given reference for an external potentiometer
2	AI1	Current analog input port 1: DC0 ~ 20MADC4 ~ 20mA (input impedance 125Ω) , with 4-terminal GND form the input circuit
3	AI2	Voltage analog input port 2:0 ~ 5V input potentiometer input (middle tap) DC0 ~ 10V, and the GND form an input loop
4	GND	Signal common: analog signal negative, switch signal common terminal
5	SW1	External startingstopping control: SW1 and 7 terminal GND constitute startingstopping, when both terminals are closed, the regulator works and vice versa
6	SW2	Analog input port selection: SW2 and 7 terminal GND , closed select analog input port 2, open select input port 1
7	GND	Signal common: analog signal negative, switch signal common terminal
8	A	Rs485 Communication port, RS485+
9	B	Rs485 Communication port, RS485-
10	NO	Output Relay: according to the P-49 function menu can be selected as the operation output signal, or alarm output signal, load capacity AC240V/5A, DC24V/5a, NO: normally open; NC: normally closed
11	COM	
12	NC	
13	L	Control Board power supply: AC160 ~ 240V
14	N	

Basic application wiring: 4 ~ 20mA control signal input positive connection 2 terminal AI1, negative connection 4 terminal GND. Control power supply 220V connected to 13,14 terminals, zero line of fire. Starting terminals 5 and 7 factory has been connected, the default boot on the start, if you need to install a start switch in the control cabinet, you can do 5 and 7 switch.

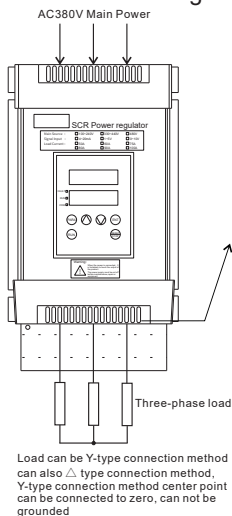
Safety Alert: it is recommended to use the alarm output function of the power regulator when designing the electric circuit. The power regulator has perfect alarm function for the load and power supply, can Be the first time alarm output.

## 5.A quick guide to using it

### 1. main power supply, control board wiring

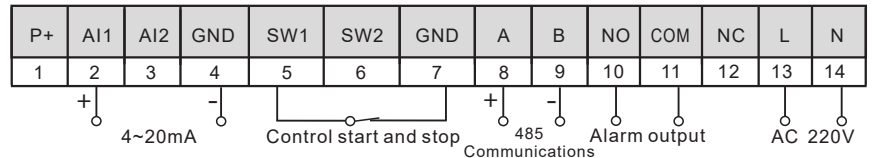
After the regulator is unpacked, first take off the protective cover and the baffle, then you can see the Green Control Board. The wiring of the Control Board can be divided into three wiring modes according to the different input signals, no matter which input signals, the main circuit wiring is the same:

#### Main circuit wiring:

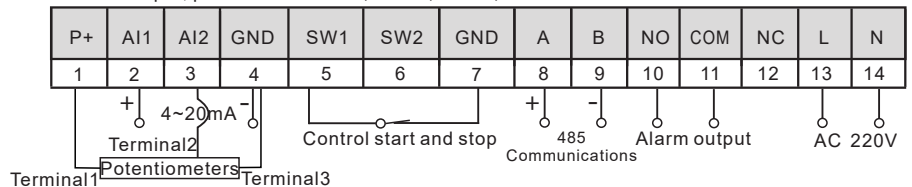


#### Control panel wiring:

1,4 ~ 20 ma input, p7 = 1, p8 = 0, P13 = 1:

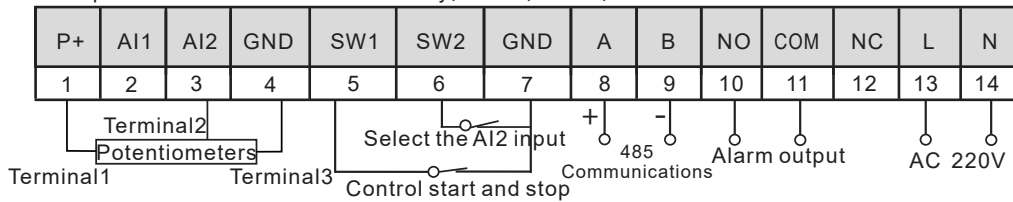


2. 4~20mA Input, potentiometer limit, P7=1, P8=1, P13=1:

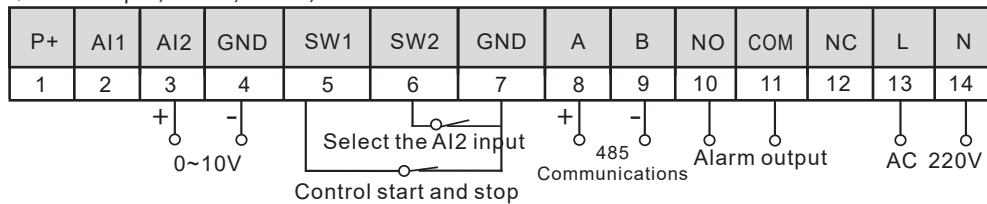




3. The potentiometer is entered manually, P7=1, P8=0, P14=0:



4. 0~10V Input, P7=1, P8=0, P14=1:



## 2. Control signal input mode selection

The input signal of the regulator supports both analog and digital inputs.

This product default analog input, analog input mode 4 ~ 20mA, 0 ~ 10V, potentiometer manual input, 4 ~ 20mA input potentiometer limit, the input mode wiring please see the above control board wiring.

If debugging without analog signal, you can also use digital input signal. Digital signal is divided into panel given percentage and communication given percentage, operation as follows:

1. panel given signal

First modify the parameters, p7 = 0, P9 = 0, return to the main interface and then press the panel button to increase the key, the key is to reduce the value of the given input, the regulator can output.

2. Communication given input percentage.

Parameters p7 = 0, P9 = 1 for communication given percentage need to be adjusted. Write values to decimal address 11, 0 ~ 1000 corresponds to 0% ~ 100.0%.

## 3. Control output mode selection

The mode of output control of the regulator is divided into phase and zero.

Phase can be divided into phase-shift open loop and phase-shift closed loop, and phase-shift closed loop can be divided into constant voltage, constant current and constant power. The common control methods are constant voltage and constant current.

Constant Voltage Control (P24 = 0) is the default control mode, by PID regulation, output voltage = input signal \* rated voltage, load is resistance wire, heater, infrared heating tube and other resistive load can be used constant voltage control.

Constant Current Control (P24 = 1), regulated by PID, output current = input signal \* rated current, so rated current (P-42) set to load the actual output of the maximum current, constant current control mode is often used in transformers, silicon molybdenum bars, silicon carbon bars, graphite and other resistance changes in the load.

Constant Power Control (p24 = 2), by PID regulation, output power = input signal \* rated current \* rated voltage, rated current set to the maximum load output current, according to the load's power, calculate the rated voltage, set it to the P-41 parameter. Typically used for PTC loads.

Phase-shifted open-loop (P24 = 3), not PID control, affected by the power grid is relatively large, the output voltage is not proportional to change, no slow start, slow off.

Cycle zero-crossing (P24 = 4) is a zero-crossing control mode that the cycle is automatically adjusted to the minimum proportion cycle with the input percentage.

The Constant Cycle zero-crossing (p24 = 5) is to control the average value of the load power by the ratio of the number of conduction cycles and the number of turn-off cycles in the period of 2 seconds.

## 4. Slow startup and slow shutdown

Control resistance changes large load, usually increase slow start time (p -15), so that the output current, voltage slowly rise.

Increased P -16 slow shutdown time, extended shutdown time.

Unit: seconds.

## 5. Limit the output signal

The upper limit of P17 output is the limit of the input signal, and then limit the output percentage, play the role of limiting the output voltage, current. %, and the default value of 100% means unrestricted output. If the output upper limit is set at 80%, the analog input is 0 ~ 100%, corresponding to 0 ~ 80% of the regulator input percentage. Under constant voltage control, the output voltage varies between 0 ~ 380V \* 80%.

## 6. Control the start and stop mode of the regulator

There are three ways to start and stop the controller: Terminal Start and stop, communication control start and stop, panel button control start and stop. This product default terminal SW1, GND control regulator start and stop (parameter P12 = 0), pull-in start, break and stop. Other ways can be seen as follows:

Communication control start and stop: parameter P12 = 1, the decimal address 50 write 1 adjuster start, write 0 adjuster stop.

Panel button control start and STOP: parameter P12 = 2, the main screen press RUN regulator start, STOP regulator STOP.

## 7. Three-phase output voltage imbalance alarm

If the output voltage difference between the three phases of the regulator is required to reach a numerical value when the alarm, it is necessary to use the three-phase voltage imbalance alarm.

First turn on the alarm enable: P51 = 1. For example, three-phase output voltage difference reaches 20V alarm, then P52 = 20 can.

Three-phase current imbalance alarm setting method is the same.

## 8. Load break alarm

To use the load disconnect protection feature, p38 = 1.

The alarm uses the current input percentage corresponding to the output current and the threshold current to make a comparison, if the current output current below the threshold current will trigger the load break alarm. Formula: Input Percentage (P-01-RRB- \* rated current \* break protection threshold (P-39) = threshold current.

Example: Model HW6-4-4-100-P machine, pure resistive load at full power output current is 80A, 50% output current should be 40A, minus theoretical and actual current error, an alarm is triggered if the current is less than 30A when 50% of the output is required. Input Percentage = 50% = 0.5, rated current = 100A, threshold current = 30A

$$\text{Cut-off protection threshold ratio} = \frac{30A}{0.5 * 100} = 60\%$$

Set the P-39 parameter to 60.

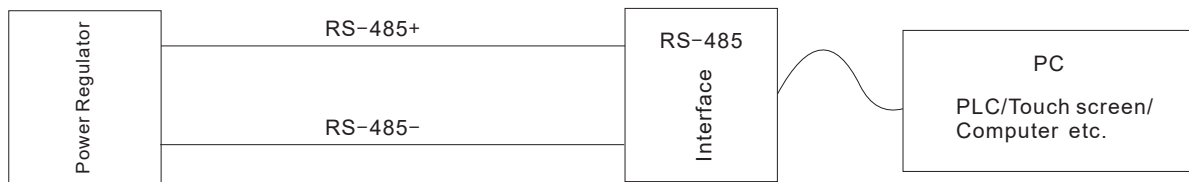
According to the formula, we can see that the smaller the threshold current, the smaller the threshold proportion of breaking protection, the less easy to alarm. The larger the threshold ratio setting, the easier it is to trigger the alarm, the threshold ratio (p -39) default value of 70, the maximum can be set to 70% .

## 6. Detailed description of the communication

### 1. Modify communication parameters

Device address P-43, default value 2. Baud rate P-44, default 1:9600. Data format P-45, default 0: no checksum, 1 stop bit, 8 data bits. The parameter is modified to be the same as the host computer, and the communication can be done after power-off and restart.

### 2. Wiring



### 3. Protocol

#### 1, Modbus communication configuration

HW6 series three-phase power regulator standard configuration for Modbus communication, with the upper computer, touch screen, PLC communication functions. The regulator standard configuration RS485 communication interface, using Modbus Communication Protocol RTU mode, support 3,4,6,16 standard functions.

#### 2, Communication data read and write

When the function menu property of the adjuster is read-write, it can be modified by communication function. When the function menu property of the adjuster is read-only, it can only be read.

#### 3, Modbus communication protocol

When communication is set to RTU mode over the Modbus network, each 8-bit byte in the data contains two 4-bit hexadecimal characters.

##### 1) Code system: 8-bit binary

##### 2) Bits per byte: 1 start bit, 8 data bits, minimum significant bit sent first, 1 parity bit, 1 stop bit (2 stop bits without parity)

##### 3) Error Detection Domain: CRC (cyclic redundancy detection)

Keyword explanation:

Frame: a set of commands that perform an operation on a possible function, consisting of a number of bytes for a particular operation.

Device Address: the communication address defined by a device when it is operated on.

Register address: the corresponding address of a register on a device when an operation is performed on that register. The address is split into high and low bytes in the frame.

Command word: operation function code defined by Modbus. Each command code represents a particular operation.

Function Code 3: Multiple hold registers are read, i. e. multiple successive registers can be read in bulk.

Function Code 4: read multiple input registers, that is, multiple registers can be a continuous batch read.

Function Code 6: write a single hold register.

Function code 16: write multiple hold registers, that is, multiple successive registers can be written to batch.

#### • RTU message frame format

Device address	Function code	Data	CRC check
1 byte	1 byte	N bytes	2 bytes

Data transmission in 8-bit format and data organization in 16-bit format.

#### • Read hold register

Read command frame format

0	1	2	3	4	5	6	7
Device address	03H	Parameter address H	Parameter address L	Length H	Length L	CRC H	CRC L

Parameter address: refers to the continuous reading parameter unit of the starting address.  
Length: refers to the number of consecutive reading parameter units.  
The format of the command frame returned

0	1	2	3	4		13	14
Device address	03H	Number of bytes	Data 1H	Data 1L	...	CRC H	CRC L

Bytes: the total number of bytes that return data.  
The format of the command frame that returns the error message

0	1	2	3	4
Device address	83H	Error code	CRC H	CRC L

#### • Read input register

Read command frame format

0	1	2	3	4	5	6	7
Device address	04H	Parameter address H	Parameter address L	Length H	Length L	CRC H	CRC L

Parameter address: refers to the continuous reading parameter unit of the starting address.  
Length: refers to the number of consecutive reading parameter units.  
The format of the command frame returned

0	1	2	3	4	5	6	7
Device address	04H	Parameter address H	Parameter address L	Length H	Length L	CRC H	CRC L

Bytes: the total number of bytes that return data.  
The format of the command frame that returns the error message

0	1	2	3	4
Device address	84H	Error code	CRC H	CRC L

#### • The write-hold register

Command frame format

0	1	2	3	4	5	6	7
Device address	06H	Parameter address H	Parameter address L	Data H	Data L	CRC H	CRC L

The format of the command frame returned

0	1	2	3	4	5	6	7
Device address	06H	Parameter address H	Parameter address L	Data H	Data L	CRC H	CRC L

The format of the command frame that returns the error message

0	1	2	3	4
Device address	86H	Error code	CRC H	CRC L

#### • Write multi-hold register

Command frame format

0	1	2	3	4	5	6	7	8		17	18
Device address	10H	Parameter address H	Parameter address L	Length H	Length L	Number of bytes	Data 1H	Data 1L	...	CRC H	CRC L

Parameter address: refers to the continuous writing parameter unit of the starting address.  
Length: refers to the number of consecutive write parameter units.  
The format of the command frame returned

0	1	2	3	4	5	6	7
Device address	10H	Parameter address H	Parameter address L	Length H	Length L	CRC H	CRC L

The format of the command frame that returns the error message

0	1	2	3	4
Device address	90H	Error code	CRC H	CRC L

#### 4. Description of correspondence address

The parameter code for the adjuster is the address:

For example, load rated voltage P-41, then the address is decimal 41, if read with PLC, some PLC address 40042.

#### 5. Communication examples

1, Read current output voltage value display (P-02)

Adjuster communication address set to 1, 10 # 02 = 16 # 02, send command frame:

Device address	Function codes	Read register start address	Number of registers	CRC check
01	03	0002	0001	

2, Write slow start rise time (5 seconds for P-15)

Adjuster communication address set to 1, 10 # 15 = 16 # 0F, 10 # 5 = 16 # 05 send command frame:

Device address	Function codes	Read register start address	Data	CRC check
01	06	000F	0005	

#### 7. Parameter description

The serial number of the following parameter is the decimal address

P-0 to P-6 are read-only parameters that display basic information when the regulator is working properly.

P-0	Display of valid input percentage	Scope	0.0~100.0%, one decimal place	Ex-factory value	—	Property	Read
P-1	The percentage of valid output is displayed	Scope	0.0~100.0%, one decimal place	Ex-factory value	—	Property	Read
P-2	Current output voltage value displayed	Scope	The actual detected voltage	Ex-factory value	—	Property	Read
P-3	Current output current value displayed	Scope	The actual measured current size	Ex-factory value	—	Property	Read
P-4	Current output power display	Scope	The power of the actual detection	Ex-factory value	—	Property	Read
P-5	Current grid frequency display	Scope	The actual detected power grid frequency size	Ex-factory value	—	Property	Read
P-6	The current state of the tuner is displayed	Scope	0: stop; 1: run	Ex-factory value	—	Property	Read

P-7 to P-14 for the input signal and start and stop mode set parameters, can change the functional parameters, so that the regulator to achieve the required function.

P-7	Input signal selection	Scope	0: Digital, 1: Analog	Ex-factory value	1	Property	Read/Write
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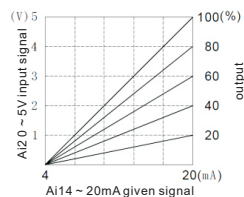
By selecting the parameters of the input signal, the input signal can be divided into two categories:

0: Digital Quantity, including the panel key input mode or communication input mode, which mode to choose specifically, the following P-9 parameters to set.

1: Analog Quantity, including the current analog quantity of AI1 port and the voltage analog quantity of AI2 port input two kinds, the specific choice of which way, see SW2 switch state, open state select the current analog quantity of AI1 port input; In the closed state, the voltage analog input of AI2 port is selected.

P-8	The second analog input limit	Scope	0: off, 1: on	Ex-factory value	0	Property	Read/Write
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When P-7 = 1, the SW2 switch is on. If p-8 = 1 is set, the second analog input is used as the limiting input, usually connected to a potentiometer, used as a maximum limit for the first analog input.



P-9	Digital input signal type selection	Scope	0: Panel Button 1: communication given	Ex-factory value	1	Property	Read/Write
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0: panel keys, in the main interface, directly by the increase or decrease key to set the input percentage. Set the value, power off after the restart is still valid.

1: communication given, set the input percentage by setting the parameter P-11, i. e. the communication parameter address 11, 0.0-100.0.

P-10	Panel setting percentage	Scope	0.0~100.0%	Ex-factory value	0.0	Property	Read
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This parameter only shows the panel set the input percentage size, when using the panel set the input percentage, power off again, set the value is not lost, saved in this parameter.

P-11	Percentage of communication settings	Scope	0.0~100.0%	Ex-factory value	0.0	Property	Read/Write
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The host computer writes data to the address (11) when the communication is set to a given input percentage, from 0.0 to 100.0, corresponding to 0.0 to 100.0% of the input signal.

P-12	Start and stop mode selection	Scope	0: External Switch, 1: Communication 2: Keyboard	Ex-factory value	0	Property	Read/Write
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0: External Switch, SW1 switch closed, the regulator began to operate, SW1 switch opened, the regulator stopped working;

1: Communication Start, the PC to P-50, that is, address 50 to write data, write 1 for start, write 0 to STOP;

2: keyboard starts, press RUN on the regulator panel, regulator starts, press STOP, regulator stops.

P-13	Current input analog type	Scope	0:0~20mA, 1:4~20mA	Ex-factory value	1	Property	Read/Write
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When P-7 = 1, SW2 switch is on, then AI1 input current analog signal through this parameter to select the type.

0:0 ~ 20mA input, 1:4 ~ 20mA input.

P-14	Voltage input analog type	Scope	0:0~5V, 1:0~10V	Ex-factory value	0	Property	Read/Write
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When P-7 = 1, the SW2 switch is closed, then AI2 input voltage analog signal through this parameter to select the type. 0:0 ~ 5V input, 1:0 ~ 10V input.

P-15 to p-26 for limiting parameters and output function set parameters, can change the function parameters, so that the regulator to achieve the required function.

P-15	Slow start time setting	Scope	0-300seconds	Ex-factory value	2	Property	Read/Write
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P-16	Slow off time setting	Scope	0-300seconds	Ex-factory value	2	Property	Read/Write
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The slow start time is the time it takes for the regulator output to go from 0% to 100% (figure T 1 below) ; the slow turn-off time is the time it takes for the regulator output to go from 100% to 0% (figure T 2 below) .



P-17	Output limit setting	Scope	0~100%	Ex-factory value	100	Property	Read/Write
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P-18	Output lower limit setting	Scope	0~100%	Ex-factory value	0	Property	Read/Write
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Output upper limit (maximum) set, output lower limit (minimum) set.

P-19	Maximum voltage limit	Scope	0~500V	Ex-factory value	380	Property	Read/Write
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Maximum voltage limit and rated voltage, will not be greater than the rated voltage, factory value for rated voltage, used to limit the maximum output voltage. When the rated voltage changes, please remember to modify this parameter, such as the rated voltage from 220V to 380V, this parameter must be changed to 380V, otherwise the maximum output can not be 380V, because the maximum limit of 220V.

P-20	Maximum current limit	Scope	0~1000A	Ex-factory value	100	Property	Read/Write
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Maximum current limit is related to rated current, can not be greater than rated current, factory value is rated current, used to limit the maximum output current. Modify as above.



P-21	Proportional coefficient	Scope	0~9999	Ex-factory value	500	Property	Read/Write
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The proportional gain of the PID regulator is corrected by multiplying the proportional gain with the error. Increasing this parameter will increase the damping of the system and speed up the dynamic response of the system. For a certain load, if the parameter is too large, the system will become unstable, the optimal setting value is the maximum possible value when the system begins to be unstable.

P-22	The integral coefficient	Scope	0~9999	Ex-factory value	200	Property	Read/Write
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The integral gain of the PID regulator is corrected by multiplying the integral gain with the error. If the parameter is too large, the system will tend to oscillate rather than recover quickly, and then the recovery rate will increase.

P-23	Differential coefficient	Scope	0~9999	Ex-factory value	10	Property	Read/Write
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The differential gain of PID regulator, which is modified by multiplying the differential gain with the error, has damping effect. The optimal performance is obtained by the optimal combination of three PID parameters.

P-24	Control mode	Scope	0: constant pressure; 1: constant current; 2: constant work; 3: Open Loop; 4: cycle zero-crossing; 5: Fixed Cycle zero-crossing; 6: Fixed Cycle zero-crossing period adjustable	Ex-factory value	0	Property	Read/Write
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See page 3 of the control mode function notes for detailed control mode descriptions.

P-25	Upper Row digital tube display content selection	Scope	0~4	Ex-factory value	0	Property	Read
P-26	The next row of digital display content selection	Scope	0~4	Ex-factory value	0	Property	Read

After the power regulator is powered up, the upper and lower rows of digital tubes will display different parameters according to the control mode content: constant voltage mode input percentage of upper row, output voltage of lower row; constant current mode input percentage of Upper Row, output current of lower row; output voltage of upper row in constant power mode, output current of lower row; input percentage of upper row in open-loop mode, output percentage of lower row; input percentage of Upper Row in cycle mode, the lower row shows the percentage of output. Upper and lower rows can also be user-defined display content: 0, input percentage; 1, output percentage; 2, output current; 3, output voltage; 4, output power.

P-27 to P-33 calibration parameters for input signal and output current and voltage values.

P-27	Input voltage signal (AI2) calibration	Scope	0.500~1.500	Ex-factory value	1.000	Property	Read/Write
P-28	Fixed period zero adjustable period settings	Scope	2-60seconds	Ex-factory value	2	Property	Read/Write
P-29	Input current signal (AI1) calibration	Scope	0.500~1.500	Ex-factory value	1.000	Property	Read/Write

It can calibrate the voltage signal of AI2 and the current signal of AI1. It can calibrate the voltage signal of AI2 and the current signal of AI1.

P-31	Calibration of output voltage	Scope	0.500~1.500	Ex-factory value	1.000	Property	Read/Write
P-33	Calibration of output current	Scope	0.500~1.500	Ex-factory value	1.000	Property	Read/Write

The output voltage value and current value can be calibrated.

P-34 to P-40 for the protection function parameters, change the various function settings parameters, can change the settings of each protection function of the regulator to meet the expected requirements.

P-34	The current failure code	Scope	0~6	Ex-factory value	—	Property	Read
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Display the current state of power regulator operation; 0: fault-free; 1: overcurrent; 2: power lack of phase; 3: Load Disconnect; 4: Radiator overtemperature; 5: Load Short Circuit; 6: Thyristor breakdown; 7: output voltage imbalance; 8: output current imbalance.

P-35	Power supply phase-out protection allowed	Scope	0: off, 1: on	Ex-factory value	1	Property	Read/Write
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When the load power supply is out of phase, the power regulator will alarm. When the load power supply is connected, the fault will be eliminated automatically.

P-36	Overload protection allowed	Scope	0: off, 1: on	Ex-factory value	1	Property	Read/Write
P-37	Load overcurrent protection percentage setting	Scope	50~200%	Ex-factory value	150	Property	Read/Write

When overcurrent protection is enabled, the P-37 can set the overcurrent range from 50% to 200% of the rated current.

P- 38	Load break protection allowed	Scope	0:off, 1:on	Ex-factory value	0	Property	Read/Write
P- 39	Load break protection threshold	Scope	1~70%	Ex-factory value	70	Property	Read/Write

If you want to use the load break protection, please set the maximum current value to rated current P-42 when the load is full, in order to effectively use the break protection function, then change the P-38 to 1 to turn on the protection and set the P-39 protection threshold as a percentage of the rated current. Note: calculation formula of threshold current of load disconnect protection: input percentage (P -01) \* rated current \* threshold percentage of disconnect protection (P -39) = Threshold Current.

P- 40	Radiator overheat protection allowed	Scope	0:off, 1:on	Ex-factory value	1	Property	Read/Write
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When the radiator overheat protection allows, when the radiator temperature exceeds 80 ° C, the power regulator automatically stop output, cooling automatically start output.

The P-41 to P-45 are the regulator rated parameter settings and communication settings.

P- 41	Load rated voltage	Scope	50~500V	Ex-factory value	—	Property	Read/Write
P- 42	Load rated current	Scope	5~1000A	Ex-factory value	—	Property	Read/Write

Rated voltage and rated current set to the nominal value of the regulator, according to the model set factory.

P- 43	Address	Scope	1~247	Ex-factory value	2	Property	Can't R or W
P- 44	Baud rate	Scope	0, 1, 2, 3	Ex-factory value	1	Property	Can't R or W

For communication baud rate selection, 0:4800, 1:9600, 2:19200, 3:38400.

P- 45	Data format	Scope	0:8N1; 1:8E1; 2:8O1	Ex-factory value	0	Property	Can't R or W
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Data format: 0:8 bits, 1 stop bit, no parity; 1:8 bits, 1 stop bit, even parity; 2:8 bits, 1 stop bit, odd parity.

The power regulator supports Modbus protocol and supports 4 functions: 3, 4, 6, 16. Parameter values are 16-bit unsigned registers, do not support decimal points, such as to write 56.7 need to first adjust to the integer 567 before writing. Parameter address is the parameter number, such as write slow start time, as long as the parameter address 15 to write data.

P-46 to P-63 for other higher-order functions of the regulator.

P- 46	Proportion of internal current transformer	Scope	100~ 1000	Ex-factory value	200	Property	Read/Write
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Current transformer ratio, factory settings do not change.

P- 47	Wiring mode of internal current transformer	Scope	0~1	Ex-factory value	1	Property	Read/Write
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Wiring mode, factory settings do not change.

P- 49	Output relay function selection	Scope	0~ 5	Ex-factory value	0	Property	Read/Write
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Functional selection of relay output ports of terminals 10 and 11. 0: normal open output without alarm 1: normal closed output without alarm 2: closed when running 3: closed when stopped 4: normal closed, only connected to the 220V control power supply, the relay is normal closed, with no alarm and output status; 5: Power normally on, as long as the connection of 220V control power supply, relays often on, with the alarm and output status independent.

P- 50	Communication control starts and stops input	Scope	0, 1	Ex-factory value	0	Property	Read/Write
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By means of communication to write 1 P-50 start power regulator, write 0 stop.

P- 51	Three-phase voltage imbalance alarm enable	Scope	0:off, 1:on	Ex-factory value	0	Property	Read/Write
P- 52	Three-phase voltage imbalance alarm bias	Scope	1~500V	Ex-factory value	20	Property	Read/Write

Set P-51 whether to enable three-phase voltage imbalance alarm, set P-52 three-phase deviation of the voltage value, when the set deviation value, alarm output.

P- 53	Three-phase current imbalance alarm enable	Scope	0:off,1:on	Ex-factory value	0	Property	Read/Write
P- 54	Three-phase current imbalance alarm bias	Scope	1~500A	Ex-factory value	20	Property	Read/Write

Set P-53 whether to enable three-phase current imbalance alarm, set P-54 three-phase deviation of the current value, when the set deviation value, alarm output.

P- 55	AB phase output voltage value	Scope	0~500V	Ex-factory value	—	Property	Read
P- 56	BC phase output voltage value	Scope	0~500V	Ex-factory value	—	Property	Read
P- 57	CA phase output voltage value	Scope	0~500V	Ex-factory value	—	Property	Read

Displays the actual output voltage between the three phases.

P- 58	A phase output current value	Scope	0~ 500A	Ex-factory value	—	Property	Read
P- 59	B phase output current value	Scope	0~ 500A	Ex-factory value	—	Property	Read
P- 60	C phase output current value	Scope	0~ 500A	Ex-factory value	—	Property	Read

Display three-phase actual output current value.

P- 61	Restore factory value	Scope	—	Ex-factory value	0	Property	Can't R or W
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When the adjuster parameters have been adjusted chaos can not be used normally, you can choose to restore the factory value, in the main operating interface, press **ENT** + **↓** + **STOP** three keys 2 seconds, when the digital display LoAd, parameter to the factory value.

P- 62	Keyboard modify parameter permission	Scope	0:modifiable,1:non-modifiable	Ex-factory value	0	Property	Can't R or W
P- 63	Factory settings are saved	Scope	—	Ex-factory value	0	Property	Read/Write

Before the factory according to the corresponding model and function to set the parameters, after the P-63 changed to 16, and then press ENT to confirm the digital tube after the SAVE to complete the SAVE of the parameter settings. After you restore the factory value, the parameter is the setting you just saved.

If the user in the use of the process, set a different parameter, and then you can write 16 to save the parameter settings, and then restore the factory value, parameter settings is the user's own saved parameter settings, the factory initial settings can not be restored.

## 8. Fault code description

The power regulator has many fault protection functions. When a failure occurs, the regulator automatically protects itself and displays the corresponding failure code in the display window. The user can determine the fault range according to the displayed fault code and make the corresponding fault treatment countermeasures.

Failure phenomenon	The fault name	Failure cause and treatment plan
No display	No power supply for the control panel	1, check the control power; 2, check the control board and display board connection.
Output out of control	The output is out of control	1, check that the parameter settings are correct.
Unstable output	The output is unstable	1, check the PID parameter settings.
E--1	Load over-current	Check the load for problems.
E--2 (E-A2) (E-B2) (E-C2)	The load power supply is out of phase	1, check whether the load power supply power supply; 2, check whether there is a contactor or fuse is broken. When one-phase power supply is out of phase, display code E-A2, E-B2, E-C2, can represent A or B or C phase power supply is out of phase, when display code E-2 represents at least two-phase power supply is out of phase. 3, the fault elimination, alarm automatically lifted.
E--3	Load disconnect fault	Load cut-off, cut-off current = given percentage * rated current * load threshold, the difference between the current value and the actual detection value is greater than the cut-off current, alarm is activated, may be: 1, load cut-off; 2, load current is too small, rated current set too large; 3, load threshold (P-39) set too small

E - - 4	The radiator overheated	The power regulator overheats and detects that the temperature of the radiator is over 80 ° C, the alarm is activated. When the temperature is under 80 ° C, the alarm is automatically eliminated. The causes of overtemperature may be as follows: 1, the ambient temperature is over 45 ° C; 2, cooling fan damage; 3, dust duct
E - - 5	Load short circuit alarm	1, check whether the load is short-circuited.
E - - 6	Thyristor module breakdown	1, measure whether there is resistance in each phase of incoming and outgoing lines.
E - - 7	Output voltage imbalance	1, check whether the load balance, whether there is a break.
E - - 8	Output current imbalance	1, check whether the load balance, whether there is a break.

## 9. List of specifications and models

HGW6

Specifications	Code	Main power supply	Code	Current	Code	Current	Code	Current	Code	Control mode setting	Code	Additional configuration of the machine	Code	
Three phases	4	110~220V	2	30A	030	75A	075	125A	125	Phase constant voltage current limiting	P	Explosion-proof cabinet custom made	EX	
		330~440V	4	40A	040	80A	080	150A	150	Phase constant current	C	30/40A with additional fan	F	
				50A	050	90A	090	175A	175	Phase constant work	CV	Three-phase current full test	3	
				60A	060	100A	100	200A	200	Cycle zero-crossing power adjustment	Z			
											Set the cycle to zero	ZV		

Current calculation formula

### Current calculation formula

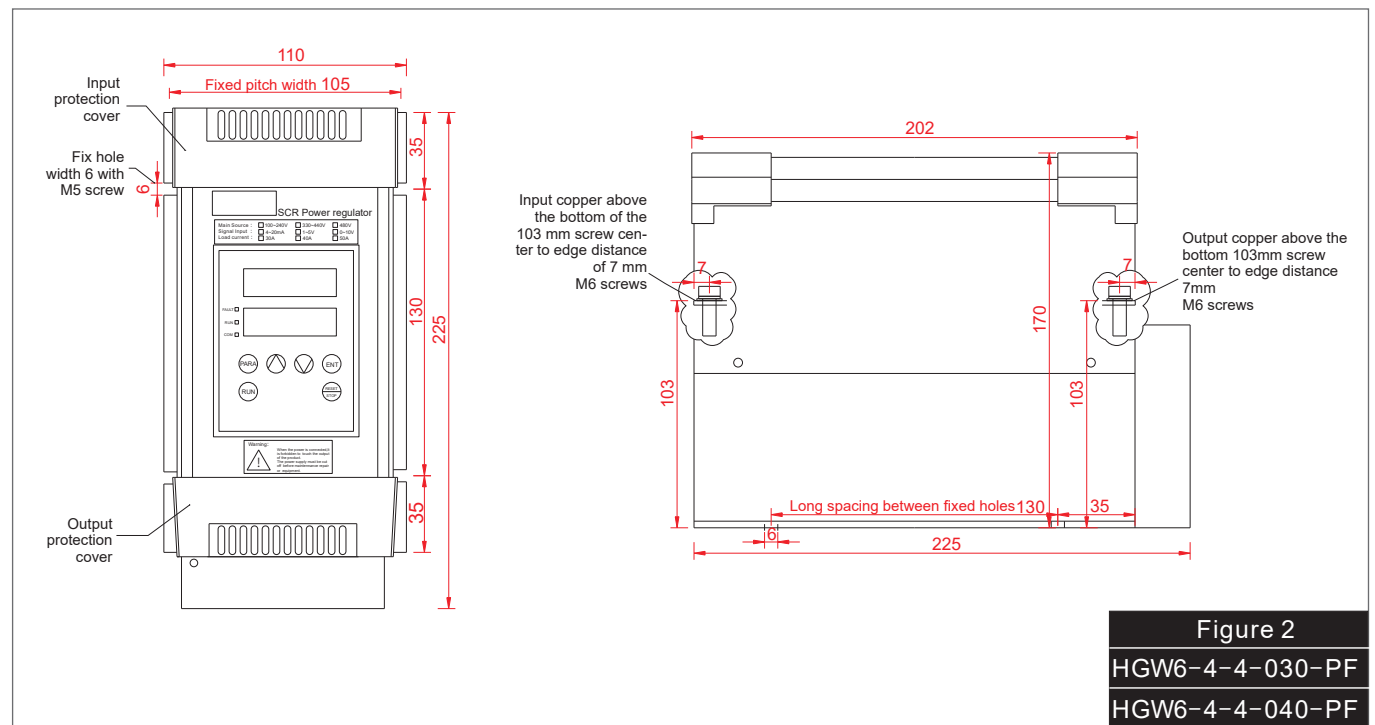
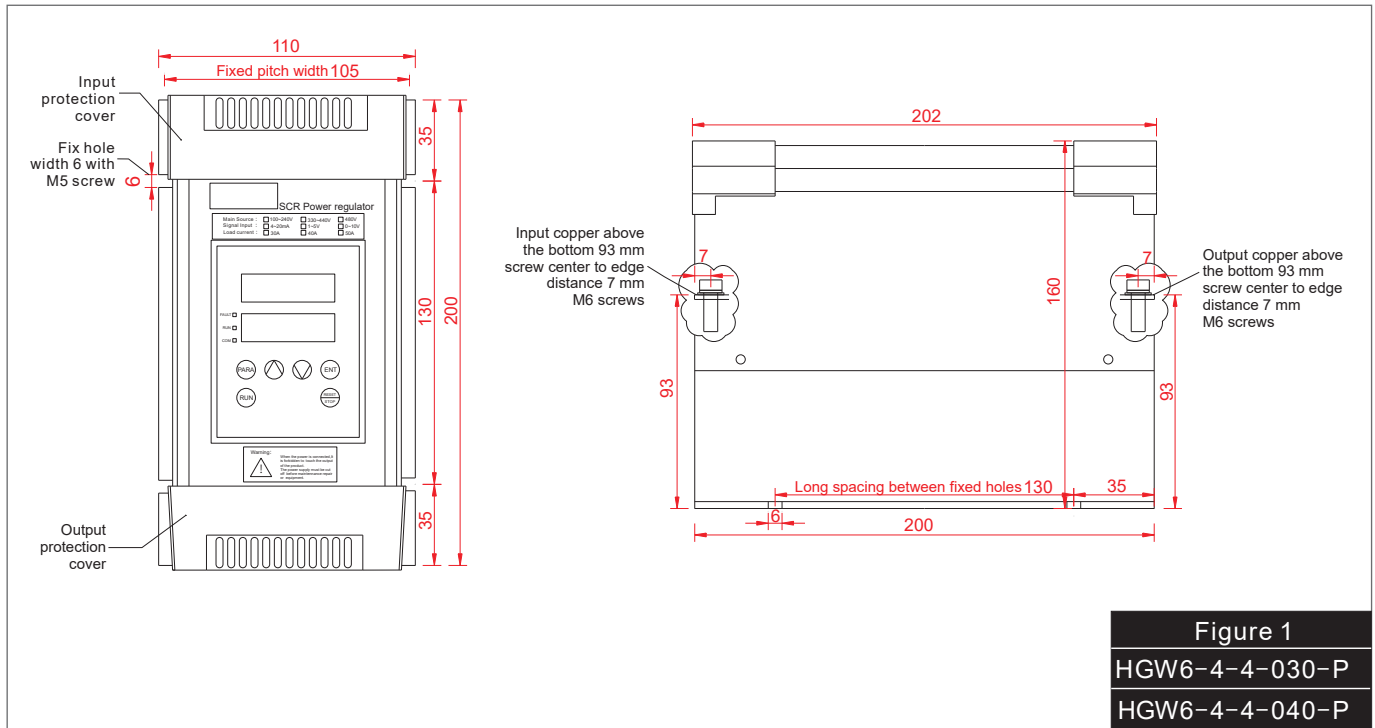
$$\text{Three phase: SCR Ampere number} = 1.2 * \frac{\text{Load (KW)} * 1000}{\text{Line voltage (V)} * \sqrt{3}}$$

### List of specifications and models

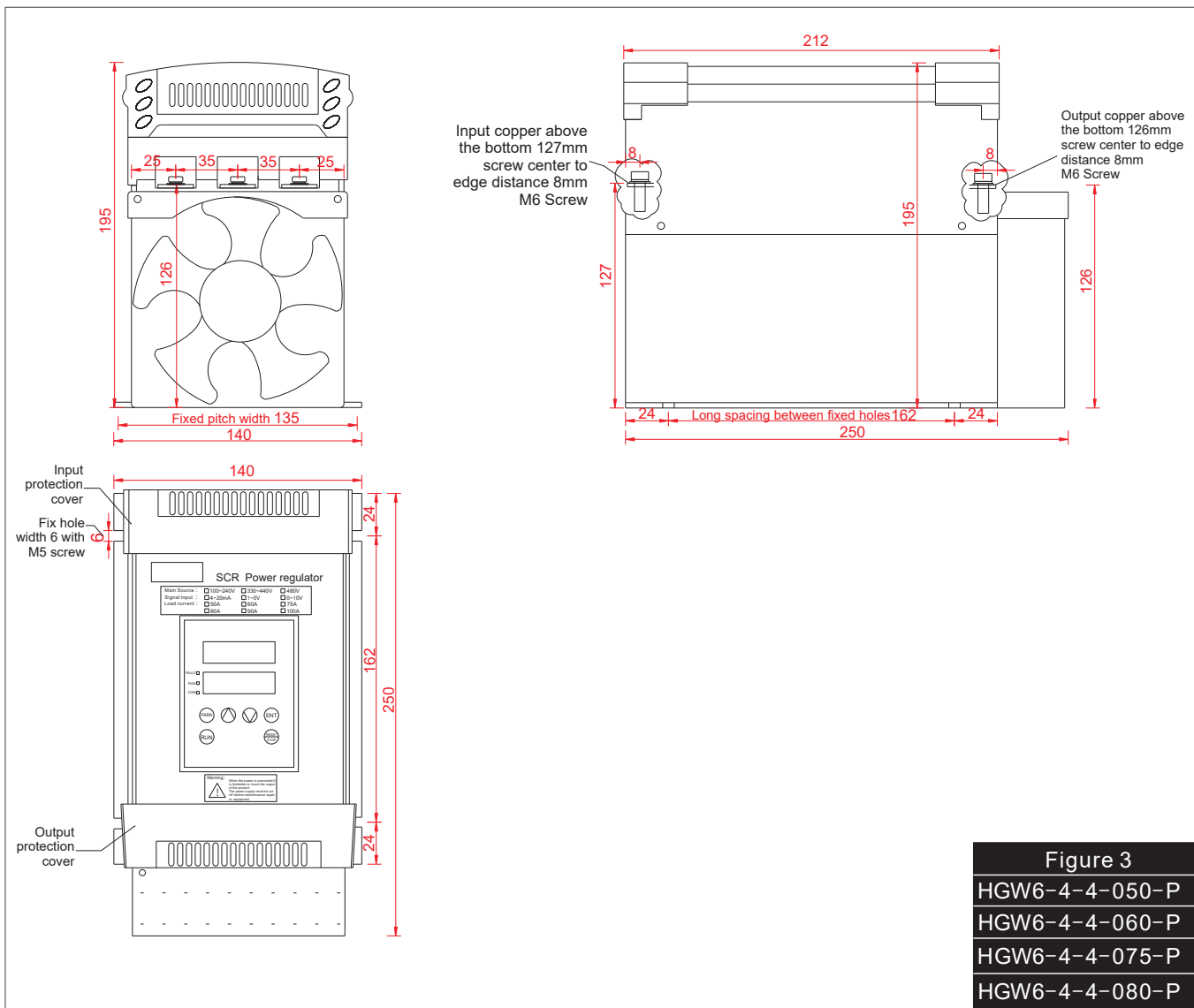
Specifications and models	Current	Load Power (KW)		Appearance size (mm)			Fixed size (mm)		Weight Kg	Screw and lock torque		Cooling mode	Illustration
		220V	380V	Length	width	height	Length	width					
HGW6-4-4-030-P	30A	9.5	16.5	200	110	160	130	105	2.2	M6	40kgfcm	natural	Figure 1
HGW6-4-4-040-P	40A	12.5	20	200	110	160	130	105	2.5	M6	40kgfcm	natural	
HGW6-4-4-030-PF	30A	9.5	16.5	225	110	170	130	105	2.2	M6	40kgfcm	Forced air	Figure 2
HGW6-4-4-040-PF	40A	12.5	20	225	110	170	130	105	2.5	M6	40kgfcm	Forced air	
HGW6-4-4-050-P	50A	15.5	27	250	140	195	162	135	3.5	M6	50kgfcm	Forced air	Figure 3
HGW6-4-4-060-P	60A	19	33	250	140	195	162	135	3.5	M6	50kgfcm	Forced air	
HGW6-4-4-075-P	75A	23.5	41	250	140	195	162	135	3.5	M6	70kgfcm	Forced air	
HGW6-4-4-080-P	80A	25.5	44	250	140	195	162	135	3.5	M6	75kgfcm	Forced air	
HGW6-4-4-090-P	90A	28.5	49	250	140	205	162	135	3.5	M6	85kgfcm	Forced air	Figure 4
HGW6-4-4-100-P	100A	32	55	250	140	205	162	135	3.5	M6	85kgfcm	Forced air	
HGW6-4-4-125-P	125A	40	68.5	290	140	205	202	135	4.4	M8	95kgfcm	Forced air	Figure 5
HGW6-4-4-150-P	150A	45	75	340	140	205	252	135	5.5	M8	170kgfcm	Forced air	Figure 6
HGW6-4-4-175-P	175A	53	88	390	140	205	302	135	6	M8	200kgfcm	Forced air	Figure 7
HGW6-4-4-200-P	200A	60	100	379	185	225	272	170	13	M8	220kgfcm	Forced air	Figure 8

### Product Three Views

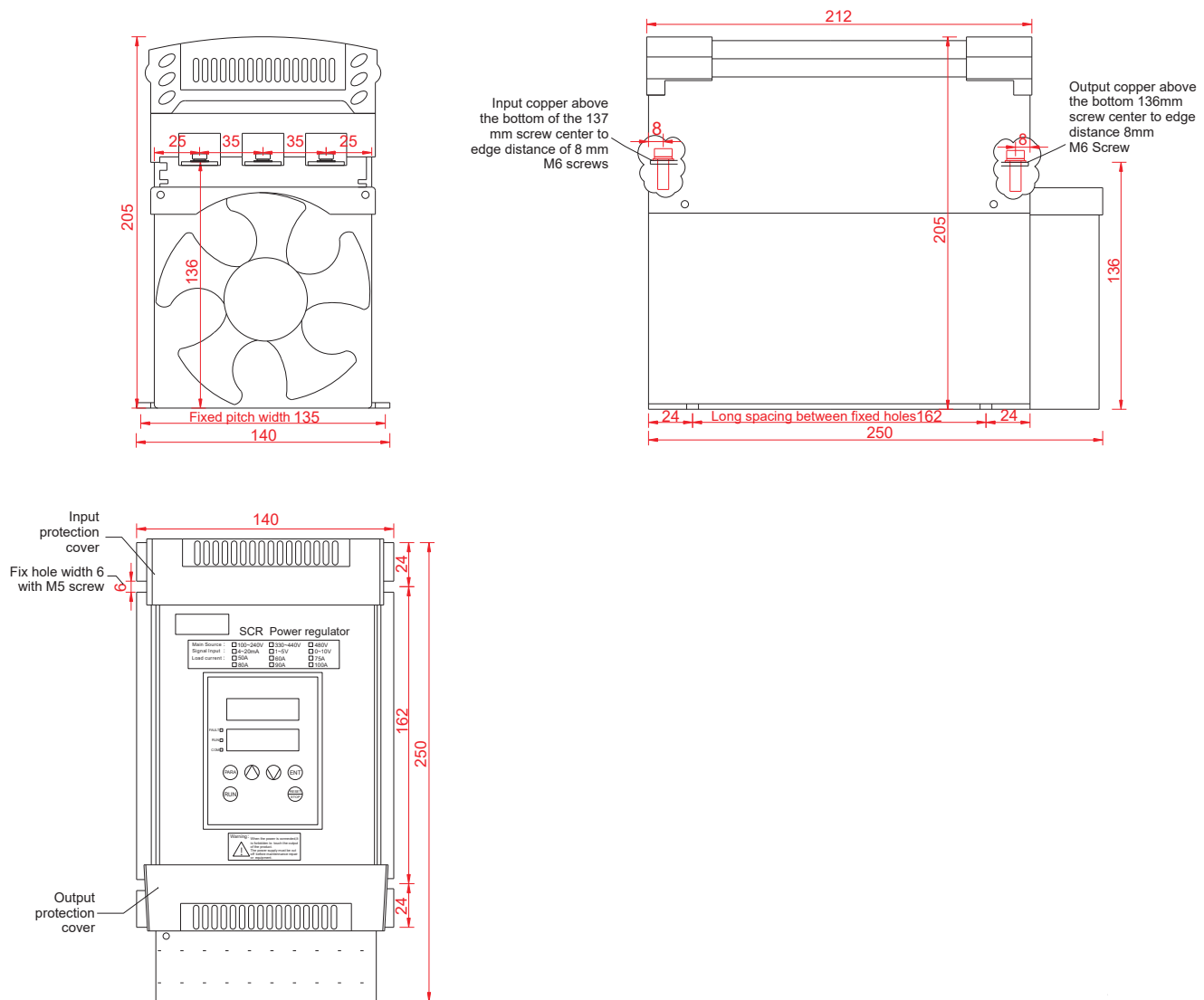
Please refer to the following sizes when drilling and side-by-side distribution of the internal fixed power adjusters in the control cabinet, measuring error ± 2mm.



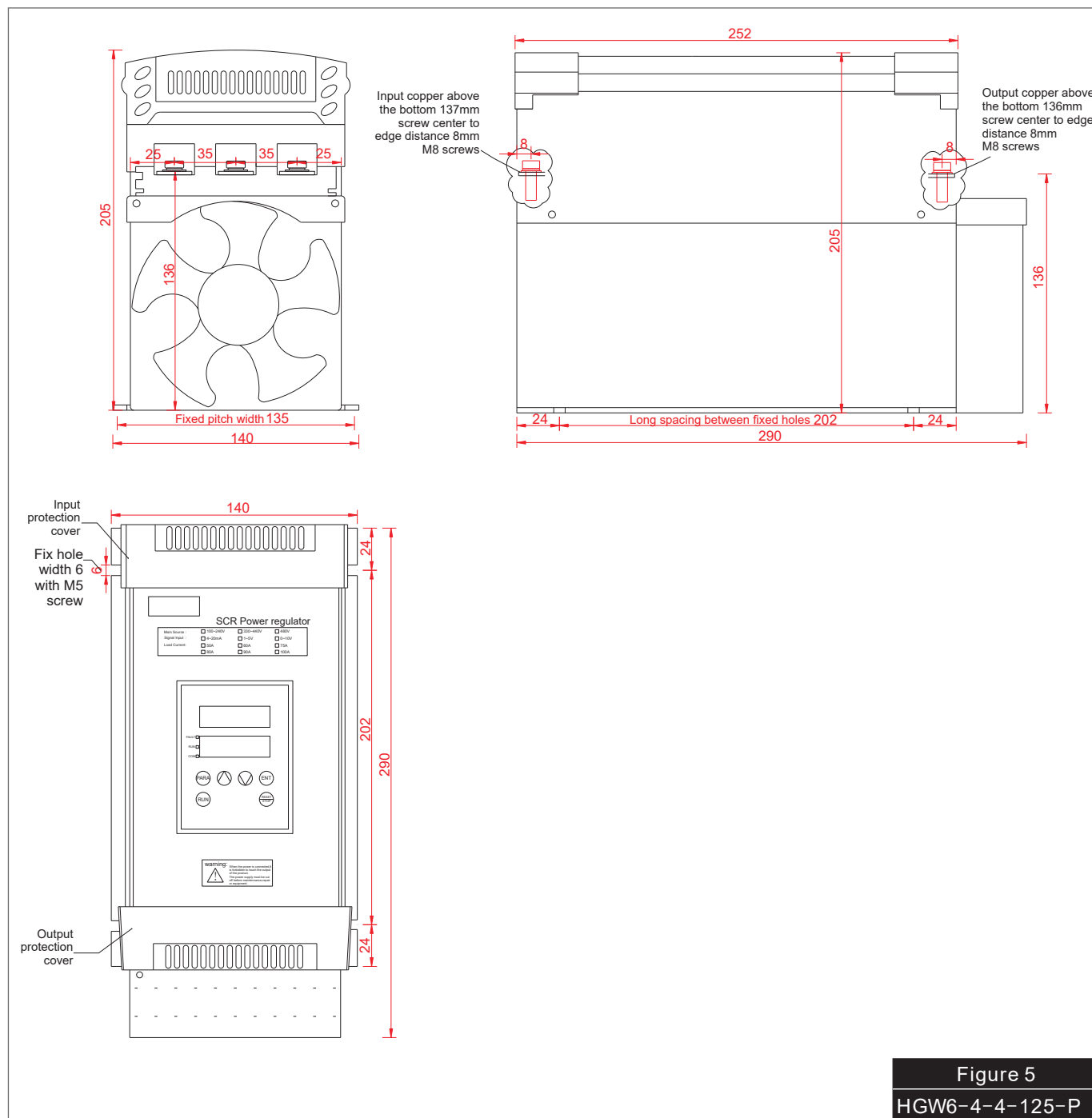




**Figure 3**  
HGW6-4-4-050-P  
HGW6-4-4-060-P  
HGW6-4-4-075-P  
HGW6-4-4-080-P



**Figure 4**  
HGW6-4-4-090-P  
HGW6-4-4-100-P



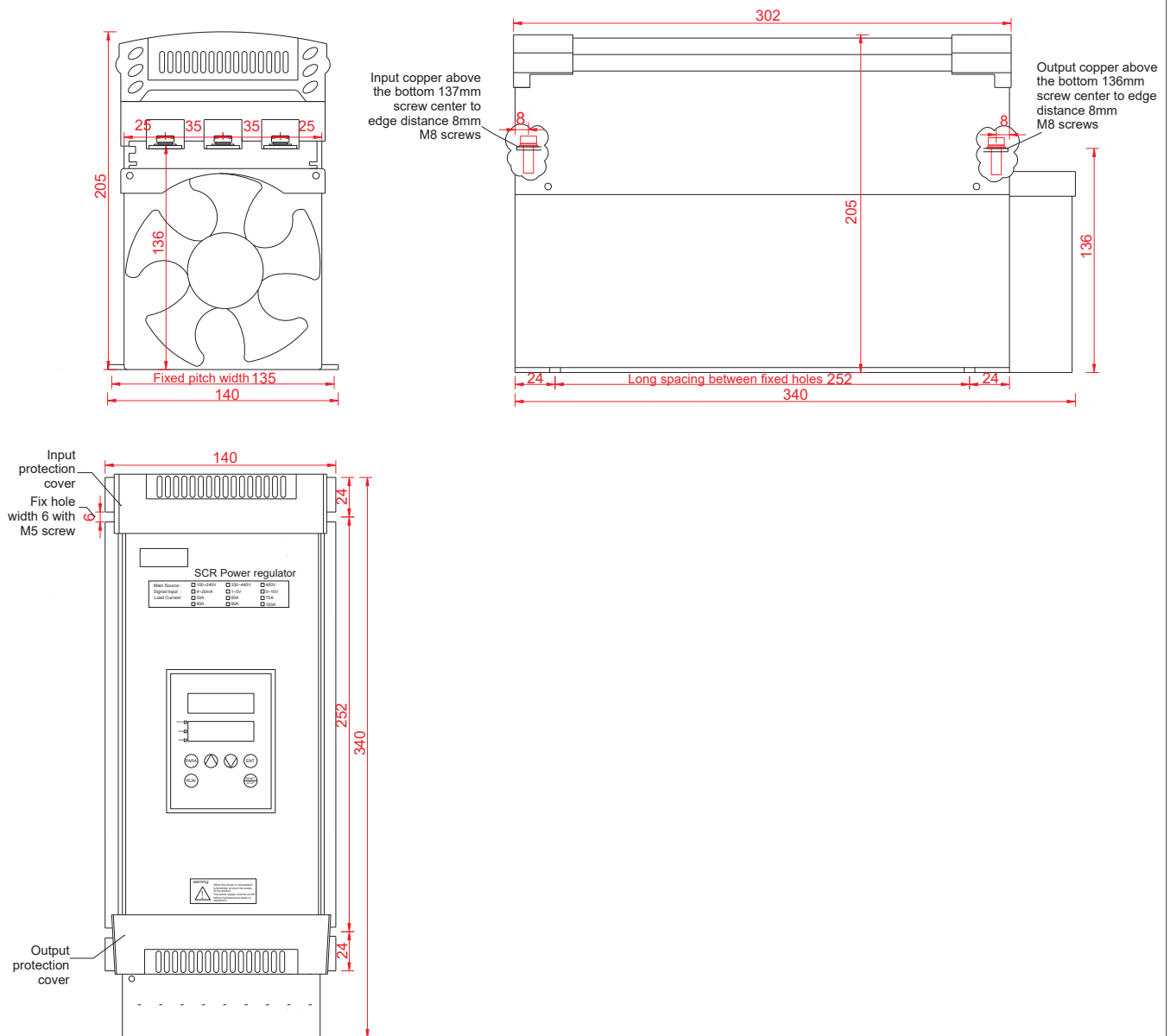
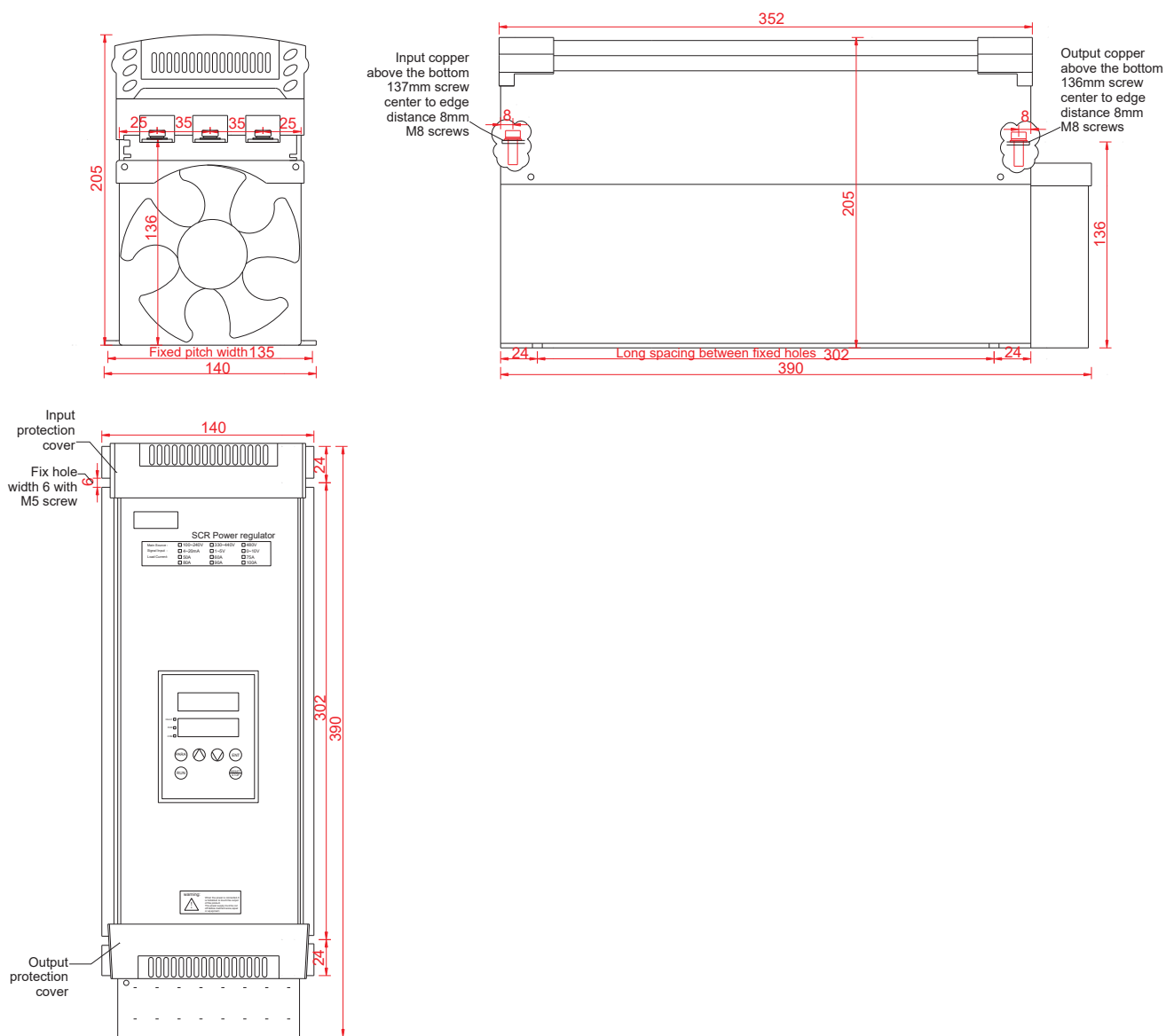


Figure 6  
HGW6-4-4-150-P



**Figure 7**  
 HGW6-4-4-175-P



