Product Manual

Fully Isolated AC Voltage Regulator Module

I. Product overview

① Examples of product applications

Heating: electric furnaces, injection molding equipment, thermoplastic molding, textile equipment, infrared heating, power distribution systems, drying systems

Lighting: public lighting, industrial lighting, stage lighting

② Product Features

1, No external synchronization transformer, no external input DC power supply, very easy to use.

2, fully support 4-20mA, 0-5Vdc, 0-10Vdc, 1-5Vdc, 0-10mA and other inputs Automatic control mode, also available for manual control. Wide input adjustment range, high output adjustment precision, good three-phase symmetry, strong anti-interference ability.

3, there is a phase shortage protection function, when the module due to three-phase power input phase shortage or voltage instability, the module will immediately shut down the three-phase output, to avoid damage to the load, so as not to cause production losses.

4, overheating protection function, when the module due to poor heat dissipation, the bottom plate temperature exceeds 75 degrees immediately shut down the thyristor output to avoid module damage.

5, the module adopts the original single-chip linear compensation circuit, the output characteristic curve is close to the ideal straight line when accessing the resistive load. The input control range is wider, the signal resolution is finer, and the output voltage regulation precision is higher.

6，Three-phase voltage regulator module is suitable for three-phase four-wire and three-phase three-wire circuits, AC 380V ± 10%,Frequency: 50Hz . Automatically determine the phase sequence, there is no phase sequence requirement for the incoming lines R, S, T of the circuit. If you need to use under special voltage, you can customize it from our company.

7, the input control terminal and the main circuit of the strong power for the full isolation design, insulation medium voltage greater than 2000Vac, the use of UL-recognized safety electronic components. Power thyristor chip and DCB ceramic substrate heat conduction effect is ideal, and the heat will not be transmitted to the control circuit, the technical parameters of the temperature is small, and further improve the anti-interference performance.

8, the use of high-power thyristor chip and low thermal resistance copper ceramic bonding (DCB) base plate vacuum welding, heat dissipation Excellent, stable performance, high reliability.

9, there is a green power indicator POW and red output regulation indicator OUT, as well as the protection status indicator ALM, working status visualization.

10, the product can automatically adapt to the transformer and other inductive loads or electric heating and other resistive loads, load △-shaped or Y-shaped connection can be. When connecting the load in △ or Y shape, the center point of the balanced three-phase load does not need to be connected to the N line.

11, the product is also suitable for small power three-phase torque motor speed control, as well as fans, pumps and other motor speed control, can also be applied to AC motor slow start.

③ Technical parameters

control parameter	Input Voltage Control	0-5V,0-10V
	Input Current Control	4-20mA,0-10mA
	Manual potentiometer control	10kΩ
	LED indication	POW,OUT,ALM three-color indicators
output parameter	Rated Working Voltage	380±10%VAC
	grid frequency	50 Hz
	Peak off-state cutoff voltage Vp	≥1200Vpk
	Surge current (grid week)	800%
	Minimum load current	100mA
	Off-state leakage current	<12mA
	Static voltage rise rate dVs/dt	>200V/μs (enhanced)
	Commutation voltage rise rate dVc/dt	>200V/μs (enhanced)
	Adjusting the response time	≤10ms
	Maximum delay to shutdown	≤10ms
Other parameters	Medium pressure resistance	≥2000Vac
	electrical insulation resistance	>1000MΩ(500Vdc)
	Cooling method	Radiator, forced air cooling

④ Selection Table

The single-phase LSCR-H220 series cannot be used for two-phase 380V regulation. If you need this feature, please contact customer service to recommend a suitable product.

Single phase voltage regulator relay

Product	Single Phase 380V	Single Phase220V	Recommended Heat Sink Units	
	Resistive Loads	Resistive Loads	Heat Sink	Fan
LSCR-1 10A	1.3KW	0.8KW	110*100*80	80*80 220V
LSCR-1 25A	3.3KW	1.9KW	110*100*80	80*80 220V
LSCR-1 40A	5.2KW	3.1KW	150*100*80	80*80 220V
LSCR-1 60A	7.7KW	4.6KW	150*100*80	80*80 220V
LSCR-1 80A	10.3KW	6.1KW	9225	90*90 220V
LSCR-1 100A	12.9KW	7.6KW	9225	90*90 220V
LSCR-1 120A	15.4KW	9.1KW	9225	90*90 220V
LSCR-1 150A	18KW	10.5KW	9225	90*90 220V
LSCR-1 200A	20KW	11.7KW	9225	90*90 220V

Three phase voltage regulator relay

Product	3 Phase 380V	3 Phase 220V	Recommended Heat Sink Units	
	Resistive Loads	Resistive Loads	Heat Sink	Fan
LSCR-3 10A	1.3KW	0.9KW	110*100*80	80*80 220V
LSCR-3 25A	3.1KW	2.1KW	110*100*80	80*80 220V

LSCR-3 40A	5KW	3.3KW	150*100*80	80*80 220V
LSCR-3 60A	7.5KW	5KW	150*100*80	80*80 220V
LSCR-3 80A	10KW	6.7KW	9225	90*90 220V
LSCR-3 100A	12.5KW	8.3KW	9225	90*90 220V
LSCR-3 120A	15KW	10KW	9225	90*90 220V
LSCR-3 150A	18.8KW	12.5KW	9225	90*90 220V
LSCR-3 200A	25KW	16.7KW	9225	90*90 220V

Special Notes

1.Resistive Loads means: incandescent lamps, resistive wires, ovens, heating rods.

2. Cannot be used for inductive loads: transformers, line country, fan motors, pump motors. Can not be speed regulation

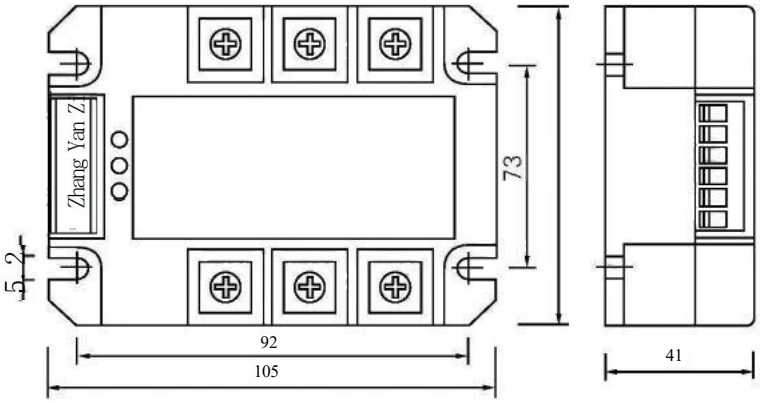
3. Resistive Loads with large changes in thermal resistance, such as silicon-carbon rods, silicon-aluminum rods, platinum Pt, graphite than the selection of inductive loads a grade.

4. Can not use the load: household appliances (such as televisions, computers), electrical appliances with switching power supply.

II. Dimensions and Wiring

① Product external dimensions

Overall dimensions: L105mm x W75mm x H41mm



②Control terminal wiring instructions

※ Instructions for using the fully compatible input control mode

Unique all-compatible input control mode, so that the product for 0-5Vdc, 0-10Vdc, 4-20mA, 1-5Vdc, 0-10mA and other automatic methods can be adapted, without the need for special special order, but also can be used manual control.

4-20mA Control Mode: As shown in the diagram, it can accept 4-20mA analog signals from temperature control meters and other devices, and the input impedance of the 4-20mA terminal relative to the COM terminal inside the module is 250Ω.

Potentiometer manual control mode: According to the diagram, the adjustable end of the potentiometer is connected to the 0-5V terminal of the module, and the other two ends of the potentiometer are connected to the COM terminal and +5V terminal of the module respectively. When the adjustable terminal is changed from 0-5Vdc, the voltage on the AC load is linearly adjustable from 0 volts to the maximum value, and the higher the voltage on the adjustable terminal, the higher the output of the module. The +5V voltage is generated internally by the module itself and does not need to be supplied externally. The +5V is only used with the hand potentiometer, not for other purposes, and the resistance value of the potentiometer used is 10KQ.

0-5Vdc control mode: as shown in the diagram, it can accept 0 -5Vdc analog signal from microcontroller and other devices, the positive pole of input control is connected to 0-5V terminal, the negative pole is connected to COM terminal, the input impedance of 0-5V terminal relative to COM terminal inside the module is more than 30KQ.

0-10Vdc Control Mode: As shown in the diagram, it can accept 0-10Vdc analog signals from PLC and other devices, and the input impedance of 0-10V terminal to COM terminal inside the module is more than 15KΩ. When using this , the +5V terminal and COM terminal are shorted, and the 0-10Vdc control signal enters through the 0-5V terminal.

0-10mA Control Mode: As shown in the figure, a 500Ω, 1/2W resistor should be connected between the 0-5V terminal of the module and the COM terminal the input 0mA corresponds to the 0-5V terminal as OVdc, and the 0-5V terminal corresponds to the 0-5V terminal as 5Vdc the input 10mA is 5Vdc.

Attention:

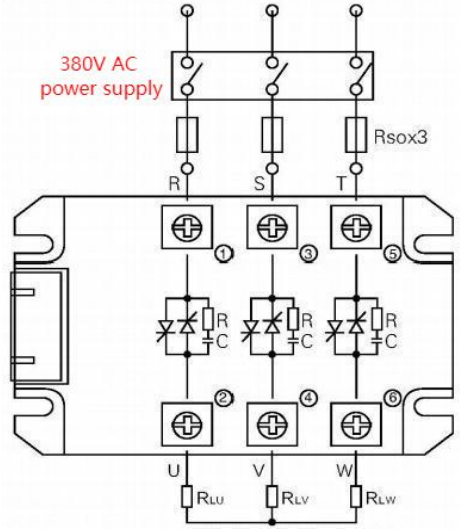
1. Each function terminal must be positive relative to COM terminal, COM terminal is negative, if the polarity is reversed, the main circuit output of the module may be out of control.

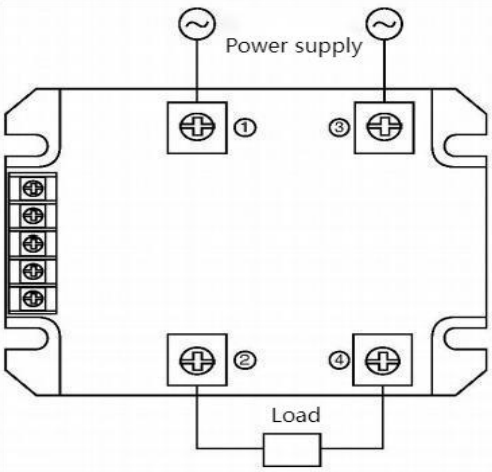
2. The control characteristics of each functional end of the product are positive, i.e., the higher the control voltage, the higher the output voltage of the main circuit of the module.

3. At the same time, it is appropriate to use an input control mode, if more than two modes are input at the same time to use , it is generally a stronger input signal to play a major role, if you want to use both manual and automatic, for example, automatic connected to the 4-20mA terminal, manually connected to the 0-5V terminal, you can switch the function through the double-throw switch.

③ Load Wiring Diagram

Default products can not be connected to the zero line





Installation: wall-mounted vertical installation, the power supply for the upper inlet and lower outlet. When wiring the copper terminals to remove debris, tighten the screws, otherwise it will cause the terminal heat and lead to damage.

There is no phase sequence requirement for the incoming wires of three-phase AC circuits, R, S, T. The thickness of the wires is selected according to the actual current used.

220V power supply can be used with 1 square fine wire, strong power and each input control terminal for the full isolation of the insulation design.

The U, V, and W outputs can be connected to a 380Vac △ load or a 220Vac Y load (no N wire required).

If the three-phase load is balanced, the load center zero line can be connected or not. If the three-phase load is not balanced, the center zero wire must be connected, otherwise it will lead to output voltage deviation.

Overcurrent: If overcurrent occurs in the process of using, you should first check whether the load has short-circuit and other faults. A quick fuse can be installed before the R, S and T terminals of the incoming line of the module, and the specification can be selected according to 1.5 times of the actual load current.

Fully isolated regulator modules are semiconductor devices and should be installed with a heat sink to provide sufficient space for heat dissipation between the product and other devices in the cabinet. When installing a heat sink, the base plate of the module should be evenly coated with thermally conductive silicone grease to ensure good heat conduction between the base plate and the heat sink. LSCR-1/ 3 40A and above should be installed with a 220V AC fan to dissipate the heat. Poor heat dissipation may cause module to overheat and automatically protect itself. We can install suitable heat sink and fan according to the actual power of the load.

III. Selection of specifications and precautions

① Specification Selection Requirements

1, the selection of module current specifications should take into account the fluctuation of the grid voltage and load current impact during startup and other factors, it is recommended to leave an appropriate margin. In order to ensure the long-term reliable operation of the module, it is recommended to choose the following:

Resistive loads: The nominal current of the module is selected to be 3 times the rated current of the load.

Inductive loads: not recommended

2, the module if a long time in the smaller conduction angle (i.e., module high input voltage, low output voltage) output a large current, will make the module serious heat or even burned. This is because in the non-sinusoidal state of the current value measured by an ordinary meter, not the effective value, although the current value displayed by the meter does not exceed the value of the current.

The nominal value of the module is 1/3 or 1/5 of the nominal value of the module, but the effective value may even exceed the nominal value of the module several times. Therefore, it is recommended that the module be operated at a large on-state angle (i.e., output voltage set at more than 1/2 of the input voltage). The maximum permissible output currents of the modules at different output voltages are shown in the following table:

Actual output voltage of the module	380V~	280V~	190V~	100V~	50V~
Actual value of load rated current	100%	85%	60%	40%	25%

② Causes of Failure and Common Problems

※ No-load test output voltage is not adjustable:

The product can not work under no-load conditions. After the installation and wiring is completed, you can first connect a small power load (such as incandescent lamps) for testing, testing is normal before accessing the actual load.

※ The green POW lamp on the console does not light up.

No input from 220V operating power supply at the console , check the operating power supply here.

※ **The red OUT lamp of the control terminal does not light up.**

There is no input signal at the control terminal, or the module's own protection function has been triggered. Please check the size of the signal input.

※ **The yellow ALM lamp on the console lights up.**

The module is protected against overheating and phase loss. Please check the bottom surface of the module for high temperatures and the three-phase input for phase loss or unstable input voltage.

※ **Three-phase output voltage deviation is large:**

The symmetry of three-phase output voltage of the product is good, and the error of three-phase output is not more than ±10V under normal conditions. If the deviation is obvious, please check whether the voltage of three-phase inlet lines R, S and T is the same, and whether the three-phase load is balanced.

※ **Initial operation is normal, after a certain period of time is not normal, after power off and then on again is normal:**

radiator is too small, poor ventilation or current margin is not enough.

※ Can it output low-voltage high-current instead of transformer:

The regulator module should not directly output low voltage and high current, otherwise the module will be burned out by overcurrent. The regulator module and transformer should be used in combination, the regulator module should be used to regulate the primary voltage of the transformer, and then the transformer should be used to step down the voltage, so as to stabilize the output of low voltage and high current. Please refer to "Selection Notes" for the reason.

※The product's main circuit inputs and outputs are burned out:

The product selection specification is too small, resulting in the module internal thyristor burnt. Or there is a direct short circuit of the load, such as high-temperature insulation of the electric heating tube is not good, the silicon carbon rod power contact end of the fire and so on.

※ Poor contact or galvanic corrosion of the main circuit terminals of the product:

Standard wire terminals should be replaced promptly and bolts should be tightened.

※ How to make overcurrent protection measures for products:

During the design and manufacture of your equipment, you should give full consideration to the possibility of avoiding load short-circuit faults (e.g., using high-quality electric heating materials, increasing insulation performance, and replacing aging electric heating tubes in a timely manner, etc.). In addition, you can install a good quality fast fuse at the inlet end of the module for over-current protection. But because the thyristor in the occurrence of load short-circuit over-current burning speed and fast fuse melting speed for the same order of magnitude, so fast fuse can not always play the role of over-current protection.

※ How to make over-voltage protection measures for the product:

A piezoresistor can be connected between the input and output of each phase. A of 820 V can be used for effective over-voltage protection.