

220V 5000W SCR Voltage Regulator User Manual

Product Overview

This 220V 5000W SCR voltage regulator is a high-power AC power control device that utilizes silicon-controlled rectifier (SCR) phase control technology to achieve stepless adjustment of output voltage. It supports multi-scenario applications including motor speed regulation, light dimming, and temperature constant control, making it suitable for both household small appliances and light industrial equipment.

Technical Specifications

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Parameter	Specification
Rated Input Voltage	AC 220V $\pm 10\%$ (50/60Hz)
Maximum Output Power	5000W (Resistive Load Recommended)
Continuous Safe Power	3000W - 3500W
Rated Output Current	22A (Max) / 13A (Continuous)
Voltage Regulation Range	0V - 220V AC (Stepless Adjustment)
Control Mode	Manual Rotary Knob
Load Compatibility	Resistive Loads (Heaters, Lamps, etc.)Single-Phase AC Motors (Inductive Loads, Limited Compatibility)
Protection Features	Surge Suppression, RC Absorption Circuit, Overheat Protection
Material	Aluminum Alloy Heatsink + FR-4 High-Temp PCB
Dimensions	Approx. 85 × 70 × 40mm / 3.35 × 2.76 × 1.57in
Net Weight	Approx. 280g

Safety Precautions

Critical Safety Notes

1. Installation and wiring must be performed by a qualified electrician; power off before operation to avoid electric shock.
2. Do not exceed the rated power (5000W); overloading will cause device burnout and fire hazards.
3. For inductive loads (motors, transformers), reduce actual load power by 50% or more to prevent SCR damage.

4. Ensure the heatsink is properly installed with unobstructed heat dissipation; keep away from flammable materials.
5. Do not short-circuit input/output terminals; avoid water immersion or operation in high-humidity environments.
6. In case of abnormal sounds, overheating, or smoke, immediately cut off the power and stop use.

Installation & Wiring Instructions

Terminal Identification

- **L**: AC Live Wire Input (220V Live)
- **N**: AC Neutral Wire Input (220V Neutral)
- **LOAD + / LOAD -**: Output Terminals (Connect to Load)

Wiring Steps

1. Power Off: Cut off the 220V AC power supply before wiring.
2. Input Connection: Connect the live wire of the 220V power supply to terminal **L** and the neutral wire to terminal **N**.
3. Output Connection: Connect the load (motor, lamp, heater, etc.) to the **LOAD +** and **LOAD -** terminals.
4. Secure Wiring: Tighten all terminal screws firmly to avoid loose connections (which cause overheating).
5. Insulate: Cover wiring with insulating tape or install in a protective casing to prevent short circuits.

Operation Instructions

1. Initial Check: Confirm all wiring is correct and secure before powering on.
2. Power On: Plug in the 220V power supply; the regulator enters standby mode.
3. Adjustment: Rotate the **front rotary knob** clockwise to increase output voltage/power; rotate counterclockwise to decrease.
 - Motor Speed: Rotate the knob to adjust motor speed (low speed for low power, high speed for full power).
 - Light Dimming: Rotate the knob to adjust brightness (0V = off, 220V = full brightness).
 - Temperature Control: Match with a temperature sensor (external thermostat) to achieve constant temperature control (sensor connects in series with the load).
4. Power Off: Rotate the knob to the minimum position first, then unplug the power supply.

Application Notes

1. Motor Speed Regulation

- Suitable for single-phase AC motors (fans, blowers, small drilling machines, etc.).
- For high-power motors, install a thermal protection switch to prevent motor burnout.
- Do not use for motor start/stop frequent switching; extend service life with gradual speed adjustment.

2. Light Dimming

- Compatible with incandescent lamps, halogen lamps (resistive loads).
- Not recommended for LED dimmers (use dedicated LED dimmers instead).

3. Temperature Constant Control

- Match with electric heating elements (electric irons, water heaters, small ovens, etc.).
- Connect an external thermostat in series with the load to set the target temperature; the regulator automatically adjusts power to maintain constant temperature.

Troubleshooting

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Fault Symptom	Possible Cause	Solution
No Output / Device Not Working	1. Loose wiring 2. Power supply failure 3. SCR burnout	1. Check and tighten L/N/LOAD terminals 2. Verify 220V power supply 3. Replace the regulator
Overheating / Heatsink Hot	1. Overload operation 2. Poor heatsink heat dissipation 3. Loose terminals	1. Reduce load power 2. Install a cooling fan 3. Tighten all terminals
Abnormal Noise / Motor Jitter	1. Inductive load incompatibility 2. Voltage regulation instability	1. Reduce motor load 2. Replace with a dedicated motor speed controller
Regulator Burnout	1. Severe overload 2. Short-circuit output	1. Check load power 2. Replace the regulator and inspect the load

Maintenance & Storage

1. Regular Inspection: Check wiring tightness and heatsink dust every 3 months; clean dust with a soft brush.
2. Storage: Store in a dry, ventilated environment (temperature: -10°C ~ 60°C, humidity: <85% RH) to prevent component damage.
3. Replacement: If the regulator is damaged, replace it with the same model; do not modify internal circuits without authorization.

