

**Solid-State TRIAC
Voltage Regulator (AVR)**

LV system (100/110/115/120VAC):
3KVA~10KVA

HV system (200/220/230/240VAC):
3KVA~20KVA

Please read this manual !

This manual provides installation and operation instructions which will ensure the best of performance of your equipment.

Please save this manual !

It includes important instructions for the safe use of the product and obtaining manufacturer's support when needed.

Please keep the packaging materials !

Packaging materials were designing with great care to provide protection from transportation related damage. Please keep the packaging materials as they are necessary in case the equipment needs to be shipped back for service.

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1. INTRODUCTION

1.1 System Description

This product is a solid-state switch automatic voltage regulator (non-relay type). It automatically maintains a stable output voltage and provides protection from lightning surges, overvoltage, and under voltage conditions. It provides multiple steps of voltage regulation to improve voltage stability and ensure reliable power protection for your critical equipment.

1.2 Features

- An intelligent microprocessor-controlled loop enabling precise TRIAC switching operation, compatible with inductive, capacitive, and resistive load types.
- Various functional parameters- including rated voltage, delay time, voltage regulation rate and input range - can be configured through the LCD interface
- Built-in 4-step boost and 3-step buck regulation, achieving a voltage regulation rate up of $\pm 2\%$ for stable output voltage
- The fully electronic circuit design enables spark-free and noise-free voltage regulation with no transfer time, ensuring rapid response and extended service
- The built-in delay time setting (2/30/60/180/300 sec) configurable via LCD to protect equipment.
- The color LCD provides a variety of status displays and indicates abnormal conditions, aiding in equipment maintenance
- Voltage regulation is achieved using TRIAC components with fully low-frequency design, eliminating electromagnetic interference.
- Lightning and surge protection to prevent damage to equipment from electrical shocks
- The system includes built-in environmental temperature monitoring, which ensures proper fan operation and protection functions.

2. INSTALLATION AND OPERATION

2.1 Safety Information

- Do not open the AVR casing to avoid electric shock — high voltage inside!
- Avoid installing the AVR in high-temperature or high-humidity environments.
- Do not allow liquids or objects to enter the AVR.
- Do not place the AVR under direct sunlight or near other heat sources.
- Maintain at least 5 cm of clearance around the ventilation holes on the left, right, and rear sides for proper ventilation and do not place any objects on top of the AVR.
- The power plug should be installed near the AVR.
- It is recommended to use a two-pole, three-wire plug to connect the AVR and ensure proper grounding.
- Follow the wire gauge requirements listed in Table 1 to ensure correct wiring.

2.2 Installation Steps

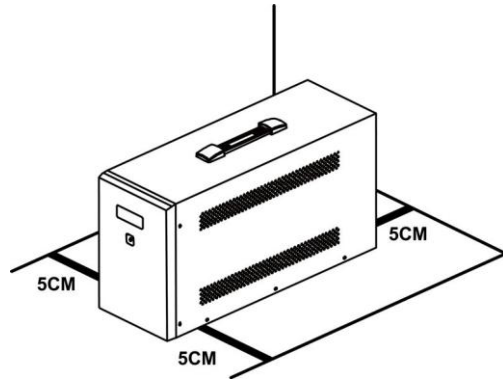
1. Check if the voltage specification on the AVR label matches the utility power voltage.
2. Refer to Table 1 for the wire gauge requirements for each model and connect the AVR input terminal to the utility power.
3. Connect the load equipment to the AVR's output socket or output terminal as needed, and ensure that the load equipment is turned off.
4. Turn on the utility power switch or plug the input power cord into the power outlet. At this time, the AVR will enter the internal startup mode. The LCD will display “OFF,” indicating that the AVR is in standby and has not activated the output.
5. Press and hold the front panel button for 1 second (“D” beep). When the beeping stops, release the button. The AVR will then begin a countdown for the delayed startup time. Once it reaches 0 second, AVR will activate power output

to equipment. The "AVR WORKING" will appear on the LCD screen, indicating normal operation. Please check the voltage displayed on the LCD to ensure it is correct.

6. After confirming that AVR output voltage is correct, you may turn on the power switch of load equipment.
7. Lightly press the front panel button (for less than 1 second), and the LCD will cycle through all function status.
8. Refer to the Chapter 2.6 of "LCD Function Display" for description of different data. Check the loading percentage — for optimal safety, it is recommended to operate under 80% loading capacity.
9. This AVR is highly efficient and does not require regular shutdown. However, if you need to shut it down, press and hold the front panel button for 2 seconds ("D" beep). When the beeping stops, release the button. The AVR will be turned off, and the output voltage will drop to 0Vac.

2.3 Installation Environment Requirements

This product has ventilation holes on both sides of the casing and an air intake vent for the fan on the rear panel. Ensure that there is at least 5 cm of clearance around the unit to allow proper airflow and heat dissipation.



➤ Table 1: Input / Output Current and Wire Gauge for Each Model

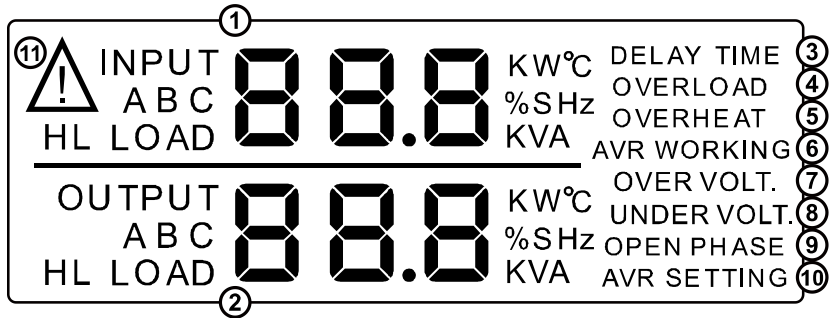
■ Input / Output Wiring Specifications

Capacity	Rated Voltage	Rated Current	Wiring Cable AWG/mm ²
3KVA	100-120Vac	27.27A	12AWG/3.5 mm ²
5KVA		45.45A	10AWG/5.5mm ²
8KVA		72.72A	8AWG/8mm ²
10KVA		90.90A	6AWG/14mm ²

■ Input / Output Wiring Specifications

Capacity	Rated Voltage	Rated Current	Wiring Cable AWG/mm ²
3KVA	220-240Vac	13.64A	14AWG/2mm ²
5KVA		22.73A	12AWG/3.5mm ²
8KVA		36.36A	10AWG/5.5mm ²
10KVA		45.45A	10AWG/5.5mm ²
12KVA		54.55A	8AWG/8mm ²
15KVA		68.18A	8AWG/8mm ²
20KVA		90.91A	6AWG/14mm ²

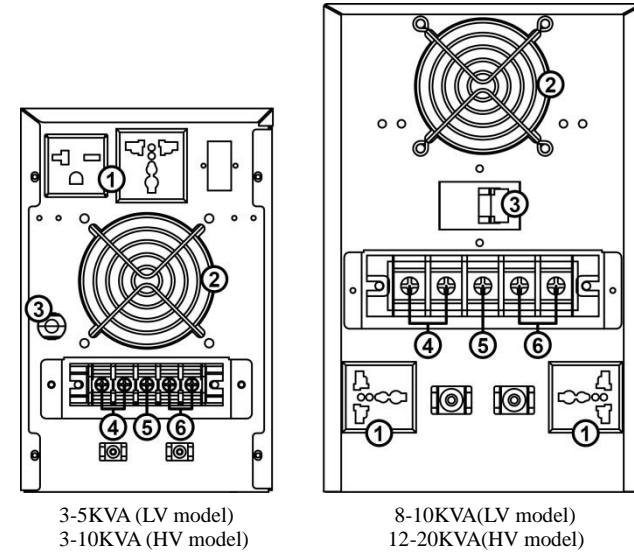
2.4 LCD Indication



1. INPUT: Input Voltage Value
2. OUTPUT: Output Voltage Value
3. DELAY TIME: Delay Time for Startup
4. OVERLOAD: AVR is overloaded
5. OVERHEAT: AVR is overheated
6. AVR WORKING: Voltage regulation is in normal operation
7. OVER VOLT.: Over Voltage
8. UNDER VOLT.: Under Voltage
9. OPEN PHASE: Only available for 2-phase and 3-phase models
10. AVR SETTING: In AVR setting mode

11.  : AVR abnormality

2.5 Rear Panel



1. **Output Socket:** Ensure the maximum output current does not exceed 20A.
2. **Fan:** Equipped with an intelligent fan control circuit. The fan will automatically turn itself off under appropriate temperature conditions.
3. **Input Circuit Breaker:** A protective device for input current. In the event of overcurrent, it will automatically trip and cut off the input. Please check the output ends. To clear an overload condition, remove some loads firstly and press the breaker to reset — the AVR will automatically resume normal operation.
4. **Input Terminals (L/N):** Please refer to the label to confirm that the input voltage matches the unit's specification.
5. **Input / Output Ground Terminal (G):** For safe operation, make sure proper grounding is performed for both input and output wiring.
6. **Output Terminals (L/N):** Confirm the voltage requirements of the load equipment to avoid incorrect voltage that may cause damage to the equipment.

2.6 LCD Function Display

After turning on, lightly press the button to cycle through LCD functions, displaying various functional data. If no button is pressed within 30 seconds, it will automatically return to the main voltage display.


Display	Description
	Press and hold the front panel button for 1 second ("D" beep). After the buzzer finishes the "D" beep, release the button. The AVR will wait for the countdown and then automatically start the output.
	After turned on, the AVR will count down the delay seconds to 0, and then start the output.
	Main Voltage Page: Display the input voltage and output voltage values
	Display the load percentage and current data

Display	Description
	Display the input frequency value and the rated voltage
	A: Temperature of autotransformer
	B: Temperature of compensation transformer
	C: Temperature of voltage stabilizer component (TRIAC)
	Peak load of AVR operation. (data updated every 10 minutes)
	Model rated capacity and maximum inrush current



2.7 Changing AVR Function Parameter Settings

Note: It is recommended to maintain the default settings. Only modify internal parameters if required by the load equipment or operating environment. To change parameter settings, follow the steps below:




1. The AVR must first be turned off. Parameter settings can only be adjusted when the unit is in the "OFF" mode.

Display	Description
	AVR off mode

2. Press and hold the front panel button for 5 seconds. When the AVR emits two beeps ("D-D-"), release the button. The AVR will enter the internal parameter setting mode. The bottom left corner of the LCD will display "AVR SETTING".
3. A1 refers to the Delay Time setting. The screen will show the current delay time in seconds. To change it, press and hold the button for about 2 seconds until the AVR emits one beep ("D"), and the seconds value will begin flashing (e.g., "2" S flashing). Lightly press the button to cycle through all values (e.g., 30→60→180→300→2). To set it to "30" seconds, press and hold the button for about 2 seconds while "30" is displayed. When the AVR beeps ("D"), the new setting has been saved.

Display	Description
	A1: Output delay time setting — can be set to 2S / 30S / 60S / 180S / 300S
	A2: Rated output voltage setting — can be set to 100V / 110V / 115V / 120V or 200V / 220V / 230V / 240V

3. You can lightly press the button to cycle through function settings in this order: A1→A2→A3→A4→EE. To modify any of these settings, follow the same steps described in point 3. For details of each function, please refer to the table of AVR parameter setting on page 9.
4. Once all parameter changes are made, lightly press the button until the screen displays "EE". Then, press and hold the button for 2 seconds. When the AVR beeps ("D"), it means the MCU has saved the settings to its memory. Important: If you skip the "EE" save step, the modified parameters will not be saved, and the original settings will remain unchanged.
5. If there is no button pressed within 15 seconds while in the setting mode, the AVR will automatically exit the parameter setting mode without saving any changes.











Display	Description
	A3: Output voltage regulation rate setting — can be set to 2% (default), 3%, 4%, or 5% (The smaller the regulation rate %, the more energy-saving the mode it can reach)
	A4: Input voltage range setting — can be set to 20%, 25% (default), 30%, or 35%
	EE: When this screen is displayed, press and hold the button for about 2 seconds. After the AVR emits a "D" beep, the configuration parameters will be saved and exit the setting mode.

3. TROUBLESHOOTING

When the AVR encounters an abnormal issue, please refer to the table below.

If the issue cannot be resolved, contact your distributor and provide model number, serial number, purchase date, date of failure, and a detailed description of the issue - including load conditions, LCD screen display status, beeping sounds, installation environment, etc.

****When an abnormality occurs, the buzzer will beep continuously. To stop the beeping and enter OFF mode, press and hold the button for 2 seconds.**

Code	Display	Issue
E01		Output short circuit
E02		Autotransformer overheating
E03		Compensation transformer overheating
E04		TRIAC overheating
E05		Model setting error
E06		Phase error
E07		NTC1 component abnormality
E08		NTC2 component abnormality
E09		NTC3 component abnormality
E10		Output overload

Note: During heavy load and significant power fluctuations, it is normal for the casing to feel warm to the touch. This is a normal condition, so please use with confidence.

4. SPECIFICATION

■ Model of 100Vac / 110Vac / 115Vac / 120Vac:

Capacity	3KVA/2.4KW	5KVA/4KW	8KVA/6.4KW	10KVA/8KW
INPUT				
Rated Voltage	100Vac / 110Vac / 115Vac / 120Vac, Single-phase 2-wire + Ground (G)			
Voltage Range	±20%, ±25% (default), ±30%, ±35% (configurable via LCD)			
Frequency	50Hz/60Hz +/-5%			
Power Factor	PF: more than 0.98 (with resistive load)			
OUTPUT				
Rated Voltage	100Vac / 110Vac / 115Vac / 120Vac, Single-phase 2-wire + Ground (G)			
Regulation Rate	±2% (default), ±3%, ±4%, ±5% (configurable via LCD interface)			
Transfer Time	0ms			
Distortion	No distortion (same as input waveform)			
Response Time	Less than 20ms			
Efficiency	More than 96% under full load			
Power Factor	More than 0.8			
DISPLAY				
LCD	Input voltage, output voltage, load, temperature, data of various operating states and abnormal conditions			
ENVIRONMENT				
Operating Environment	Temperature: 0–40°C			
	Humidity: 0–95%			
Noise Level	Less than 40 dB at 1M			
PHYSICAL				
Dimension	430*145*220mm(D*W*H)		390*182*285mm(D*W*H)	

■ Model of 200Vac / 220Vac / 230Vac / 240Vac:

Capacity	3KVA/2.4KW	5KVA/4KW	8KVA/6.4KW	10KVA/8KW
INPUT				
Rated Voltage	200Vac / 220Vac / 230Vac / 240Vac, Single-phase 2-wire + Ground (G)			
Voltage Range	±20%, ±25% (default), ±30%, ±35% (configurable via LCD)			
Frequency	50Hz/60Hz +/-5%			
Power Factor	PF: more than 0.98 (with resistive load)			
OUTPUT				
Rated Voltage	200Vac / 220Vac / 230Vac / 240Vac, Single-phase 2-wire + Ground (G)			
Regulation Rate	±2% (default), ±3%, ±4%, ±5% (configurable via LCD interface)			
Transfer Time	0ms			
Distortion	No distortion (same as input waveform)			
Response Time	Less than 20ms			
Efficiency	More than 96% under full load			
Power Factor	More than 0.8			
DISPLAY				
LCD	Input voltage, output voltage, load, temperature, data of various operating states and abnormal conditions			
ENVIRONMENT				
Operating Environment	Temperature: 0–40°C Humidity: 0–95%			
Noise Level	Less than 40 dB at 1M			
PHYSICAL				
Dimension	430*145*220mm(D*W*H)			

■ Model of 200Vac / 220Vac / 230Vac / 240Vac:

Capacity	12KVA/9.6KW	15KVA/12KW	20KVA/16KW
INPUT			
Rated Voltage	200Vac / 220Vac / 230Vac / 240Vac, Single-phase 2-wire + Ground (G)		
Voltage Range	±20%, ±25% (default), ±30%, ±35% (configurable via LCD)		
Frequency	50Hz/60Hz +/-5%		
Power Factor	PF: more than 0.98 (with resistive load)		
OUTPUT			
Rated Voltage	200Vac / 220Vac / 230Vac / 240Vac, Single-phase 2-wire + Ground (G)		
Regulation Rate	±2% (default), ±3%, ±4%, ±5% (configurable via LCD interface)		
Transfer Time	0ms		
Distortion	No distortion (same as input waveform)		
Response Time	Less than 20ms		
Efficiency	More than 96% under full load		
Power Factor	More than 0.8		
DISPLAY			
LCD	Input voltage, output voltage, load, temperature, data of various operating states and abnormal conditions		
ENVIRONMENT			
Operating Environment	Temperature: 0–40°C Humidity: 0–95%		
Noise Level	Less than 40 dB at 1M		
PHYSICAL			
Dimension	390*182*285mm(D*W*H)		