

HI-AVR

High-frequency Automatic AC Voltage Regulator

**AR-1K/AR-3K/AR-5K
AR-7.5K/AR-10K/AR-15K/AR-20K**

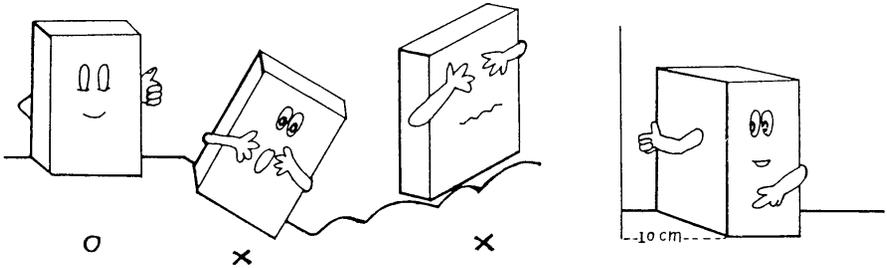
USER'S MANUAL

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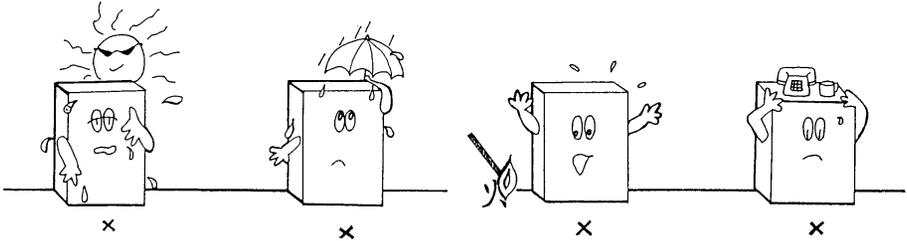
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The Protection and Maintenance of HI-AVR

1. Please clean and maintain the HI-AVR periodically to keep from dust for lasting machine life.
2. Please use soft cloth for wiping, and please don't use sandpaper as detergent.
3. Please check every kind of connection wires every month periodically to prevent the loosing or abrasion.
4. Please place the unit on a flat or even surface.
5. This unit should be situated with well-ventilation, please allow at least 10 cm clearance from the rear front, left and right side, and these ventilation openings of right and left front , and rear line should never be blocked.



6. Please avoid the direct sunshine, rain or moisture place.
7. Keeping the unit away from fire and high temperature to avoid overheat.
8. Please don't place any object on the top.
9. Avoiding the installing place that contains the corrosion gas.
10. Operating temperature is between 0°C and 40°C .



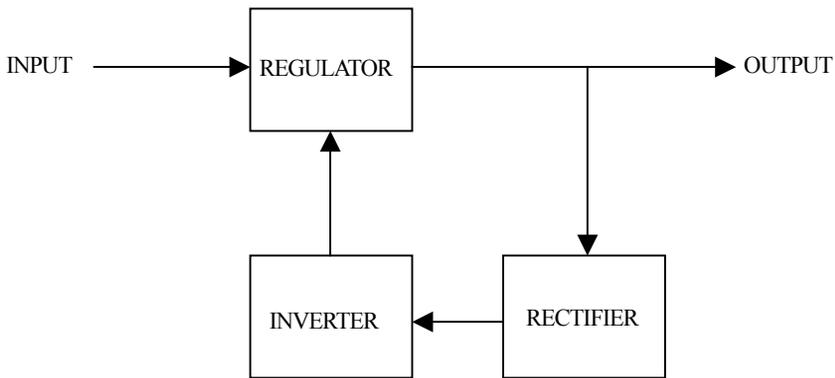
Introduction

To react with the uprising power environment protection notion, so we provide you a regulator designed to meeting environment protection concept : green power **HI-AVR**.

The regulator on the open market is divided into relay type, servo motor type and electronic type. And the electronic type could also be divided into full-electronic type and electronic-jumper type. All of them are large size, slow response, bad load characteristics, and high price. The announced AR series are the full-electronic high-frequency linear regulators that improved the defects mentioned above. The AR series are small but economic and steady regulators, and they are electricity saving and steady electric power equipment for customer's use.

Characteristics / Purpose

The AR series have the first new design structure and circuit in the world. The central is controlled by CPU, therefore the stability and response speed of the new HI-AVR are much quicker than ever. There are output high or low voltage protection HI-AVR and maintained by-pass switch HI-AVR for another choice. The product with excellent performance could be applied to home-using appliances (including refrigerator, television), general OA machine (including copying machine), all kinds of tooling machines (including CNC tooling machine), and all kinds of precise apparatuses (including medical, science, military apparatuses).



HI-AVR Function Schema Diagram

Functions Instruction

CB1: no-fuse circuit breaker.
Main power switch.

CB2: no-fuse circuit breaker. (option)
Total output switch.

CB3: no-fuse circuit breaker. (option)
Maintenance bypass switch.

※ Please remember that CB3 is used only for service technician.
Non-maintenance personnel must not open it to use, otherwise, HI-AVR
could be break down because of improper operating.

ON push switch (red button): (option)
Controlling the output (ON) action.

OFF push switch (green button): (option)
Controlling the output (OFF) action.

SW1 by-pass switch: (option)

ON (1): HI-AVR (INV) no action, so the output has no voltage stability function.
OFF (0): HI-AVR (INV) action, so the output voltage is steady.

LED Indicators:

Green LED light shows that HI-AVR is in normal status.

Red LED light shows that HI-AVR is in abnormal status.

Voltage and current indicator: (There is no current meter indication below
2KVA).

Voltage meter (V) indicates the output voltage.

Current meter (LOAD %) indicates the output current consumption percentage.

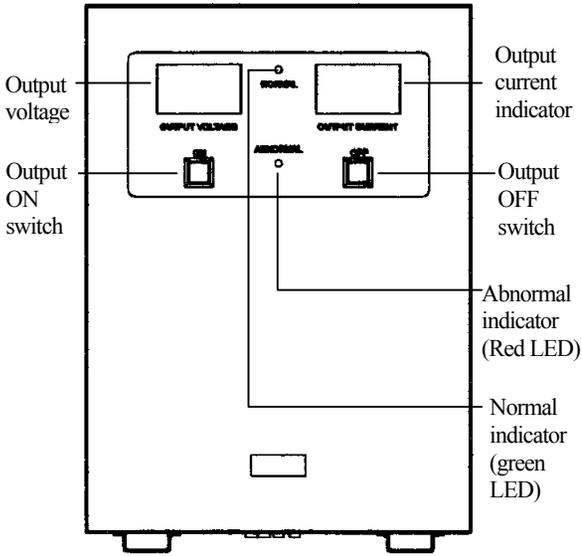
Warning sound:

There is warning sound as CB1 is opened; this means HI-AVR is activated then
begins the self-test about 2.5 seconds.

If there were still warning sound after 2.5 seconds from activating CB1, this is
the abnormal status.

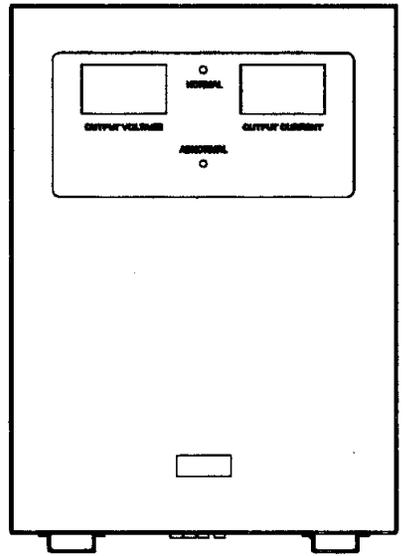
Machine View / Indicator Explanation

FRONT VIEW



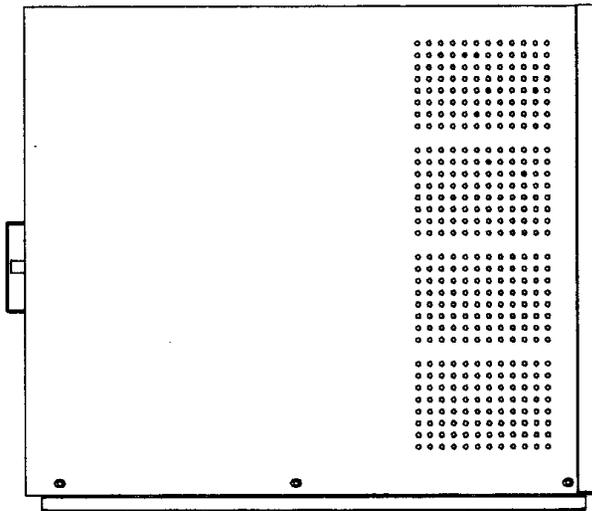
Maintenance By-pass Model

FRONT VIEW

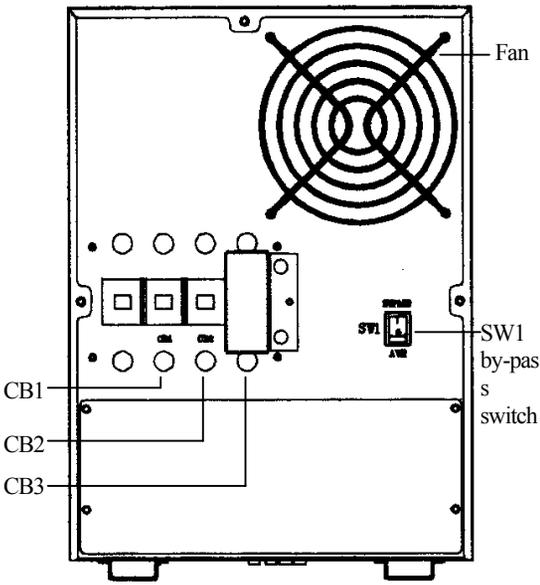


Standard Model

AR-7.5K / 10K / 15K SIDE VIEW

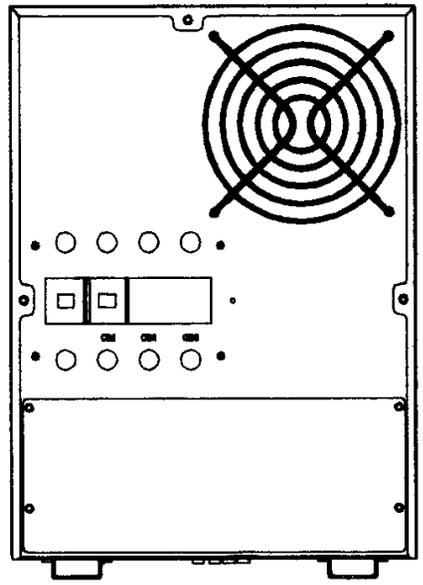


REAR VIEW

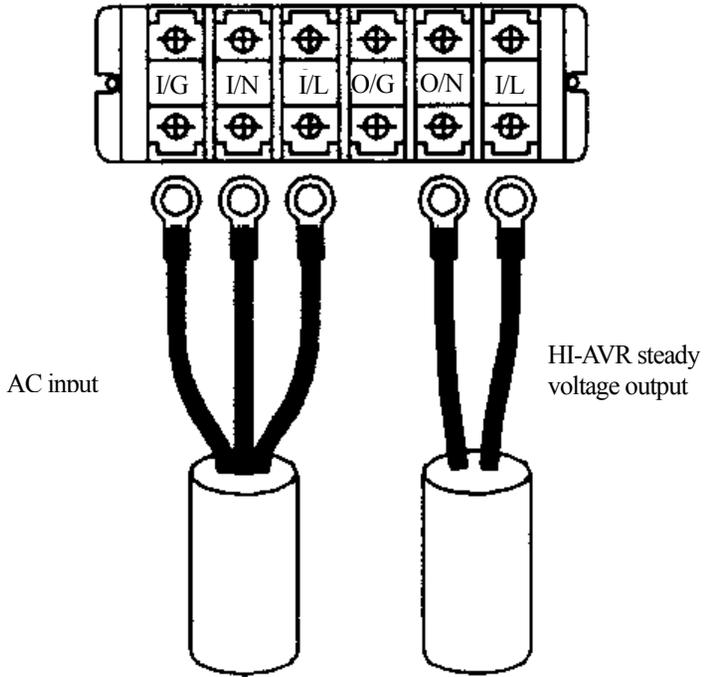


Maintenance By-pass Model

REAR VIEW



Standard Model



Operating Procedures

I. Preparation before operation:

Checking the input power is correct or not, then closing all switches (including every load).

II. [standard Model]

a. Starting procedures:

1. Turn on CB1 no-fuse circuit breaker up to ON position. At this time, buzzer warning sounds about 2.5 seconds and abnormal LED (red LED) light on about 2.5 seconds.
After this abnormal LED (red LED) would be extinguished and normal LED (green LED) light on.
2. Using TURE RMS voltage meter to measure the O/P N, L on the terminal block, and comparing this value with the reading value of indicator voltage meter on front panel for similarity confirmation. If the output voltage is correct, HI-AVR is activated successfully.
3. Opening the electric power switch on equipment, and the consumption power is shown on the indicator current meter on front panel.

b. Stopping procedures:

1. Closing the power switch of every load.
2. Turning off the CB1 no-fuse circuit breaker down to OFF position.

III. [Maintenance By-pass Model]

a. Starting procedures:

1. Turning on the SW1 switch of rear panel to AVR position (0).
2. Performing the same step 1 of standard model.
3. Turning on the CB2 no-fuse circuit breaker up to ON position.
4. Pushing the red button (ON) on front panel, then there is output voltage.
5. Performing the same step 2 of standard model.
6. Performing the same step 3 of standard model.

b. Stopping procedures:

1. Performing the same step 1 of standard model.
2. Pushing the green button (OFF) on front panel, although there is no output voltage, the HI-AVR is still in action.
3. Turning off the CB1 no-fuse circuit breaker to OFF position for closing the HI-AVR thoroughly.
4. Switching the CB2 no-fuse circuit breaker to OFF position.

The Operation Procedures of Maintenance Bypass Switch

Starting procedures:

1. If the HI-AVR is abnormal, switching the SW1 of rear panel to Bypass position (1), then the power supplied from bypass circuit.
2. Opening the protection cover of CB3.
3. Turning ON the maintenance by-pass CB3 no-fuse circuit breaker.
4. Turning OFF the total output no-fuse circuit breaker CB2.
5. The HI-AVR could be maintained But the CB2 must not be open at this time, or the HI-AVR could be easily to cause break down.

After maintaining, the power of HI-AVR supplied from bypass circuit could be changed to from stable voltage status, so HI-AVR could be back to normal status by following sequential actions:

1. Confirming the SW1 bypass switch is on BYPASS position (1).
2. Activating the total output no-fuse switch CB2.
3. Closing the maintenance bypass no-fuse switch CB3
4. Turning on the SW1 bypass switch to AVR position (0), then closing the protection over for keeping from machine burned out because of the imprudent touch by non-service personnel.

Trouble shooting Guide

HI-AVR Status Indicator:

:light

:extinguish

: warning buzzer

:no warning buzzer

LED status		Voltage Meter Reading	Current Meter Reading	Warning Sound	Process Methods
green	red				
		110V or 220V ±2.5%	The load % indicated under 100% area.	✘	Normal
		110V or 220V ±2.5%	The load % indicated under 100% area.	✔	If the output current exceeds the rating current, please reduce load to below the 90% of safety rating current.
		Input voltage is the same as the output voltage.	1.The load % indicated under 100% area. 2.The load % indicated over 100% area.	✔	1. If HI-AVR overheats, please check the environment is hard or not. 2. If the overload causes overheat, please improve environment or reduce load to below the 90% of the safety rating current.
		None	None	✔	If the input voltage exceeds or below the rating voltage, this machine is normal; if not, please notify the service personnel (MB model).
		None	None	✘	Ensuring CB3 is closed as OFF and CB2 is activated as On, then pushing the red button once, if there is still no voltage, please notify the service personnel (MB model).
		Input voltage is the same as the output voltage.	The load % indicated under 100% area.	✘	1. Check SW1 to position (1). 2. Please notify the service personnel.

The materials linked on HI-AVR must meet the following specification to ensure the safety as equipping them on HI-AVR.

VA	Output rating current		AWG		mm ²		VA	Output rating current		AWG		mm ²	
	110V	220V	110V	220V	110V	220V		110V	220V	110V	220V	110V	220V
1K	6.4A	3.2A	16	16	1.25	1.25	7.5K	47.7A	23.7A	6	10	14	5.5
2K	12.7A	6.4A	12	16	3.5	1.25	10K	63.6A	31.8A	6	8	14	8
3K	19.1A	9.6A	12	14	3.5	2	15K	95.5A	47.7A	4	6	22	14
5K	31.8A	15.9A	8	12	8	3.5	20K		63.6A		6		14

Specifications

Model		AR-1K	AR-3K	AR-5K	AR-7.5K	AR-10K	AR-15K	AR-20K
Power rating	P.F. = 0.7	1KVA/ 700W	3KVA/ 2.1KW	5KVA/ 3.5KW	7.5KVA/ 5.25KW	10KVA/ 7KW	15KVA/ 10.5KW	20KVA/ 14KW
Input	Frequency	50 HZ or 60 HZ						
	Voltage Phase	110V, 115V, 120V, 220V, 230V, 240V, 1Ø 2W 1Ø 3W						
	Range	+15% (Option +25%)						
Output	Voltage	110V, 115V, 120V, 220V, 230V, 240V, 1Ø 2W 1Ø 3W						
	Voltage Regulation	Typical +1%						
	Frequency	50 Hz or 60 Hz						
	Efficiency	>95%						
	Power Factor	+0.7						
	Harmonic Distortion	<3% of T.H.D. at linear load						
AVR	Control Method	SPWM (Sinewave Pulse Width Modulation)						
	Master Control Component	IGBT & MOSFET inside						
	Working Frequency	20KHz						
Working Conditions	Temperature	0 °C~40 °C						
	Relative Humidity	0% - 95% Non-condensing						
Protection	Over voltage	Option						
	Over load	Option						
	Surge Absorbing	Varistor						
	Noise Filter	E.M.I. Filter or LC Filter						
Indication	O/P Voltage Indication	✓						
	O/P Current Indication	✗	✓					
	Lights	Normal : Green Abnormal : Red and Warning Buzzer						
Maintenance	Maintenance Bypass Switch	Option						
Size	W*D*H (mm)	120*200*320	244*392*342					280*420*390
Weight	Net weight	7.5kgs	15kgs	20kgs	24kgs	27.5kgs	32kgs	40kgs

Specifications are subject to change without notice.