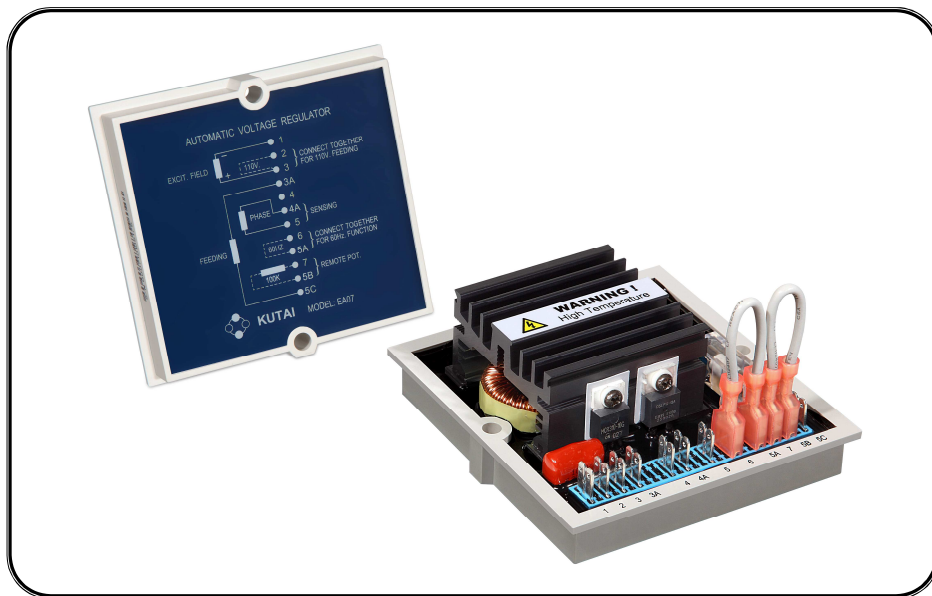


EA07

Generator Automatic Voltage Regulator Operation Manual



Suitable for Single or Three Phase Self Excited Brushless Generator
Compatible replacement for Mecc Alte SR-7

* Not a genuine Mecc Alte product.



固也泰電子工業有限公司
KUTAI ELECTRONICS INDUSTRY CO., LTD.



Headquarters : No.3, Lane 201, Chien Fu ST., Chyan Jenn Dist., Kaohsiung, TAIWAN

Tel : + 886-7-8121771

Fax : + 886-7-8121775

URL : <http://www.kutai.com.tw>

1. SUMMARY

EA07 is a self excited Analogue type Automatic Voltage Regulator. The sensing and power inputs are independent and accept power input from the auxiliary winding. The wide voltage adjustment range fulfills any voltage adjustment requirements.

The EA07 is equipped with adjustable under frequency protection and adjustable over excitation voltage protection for preventing generator from over loading or over excitation.

Both protections status are indicated by two individual LED when protection is activated. Also the AVR has a built in EMI filter to prevent interference to the generator.

2. SPECIFICATION

Sensing Input 4, 5C

Voltage Range 80~350VAC 1 phase 50/60Hz

Power Input 3A, 5

Voltage 80 ~ 270V 1 phase 50/60Hz

Output F+, F-

Voltage Max. 63 VDC @ 220VAC

Current Continuous 6A

Max. Intermittent 7A for 10 sec

Exciter Field DC Resistance

10 ~ 100 Ohm

Voltage Regulation

< ±1% (with 4% engine governing)

Voltage Build-up

Residual voltage at AVR terminal > 5 VAC, 25Hz

External VR

100K ohm 1/2 watt ± 7%

Over Excitation Protection

40~Max VDC @ 0.3~20sec

Under Frequency Protection

Adjustable range 42 ~ 60 Hz

EMI Suppression

Internal electromagnetic interference filtering

Unit Power Dissipation

Max. 5 watt

Operating temperature

-40 ~ 65 °C

Storage temperature

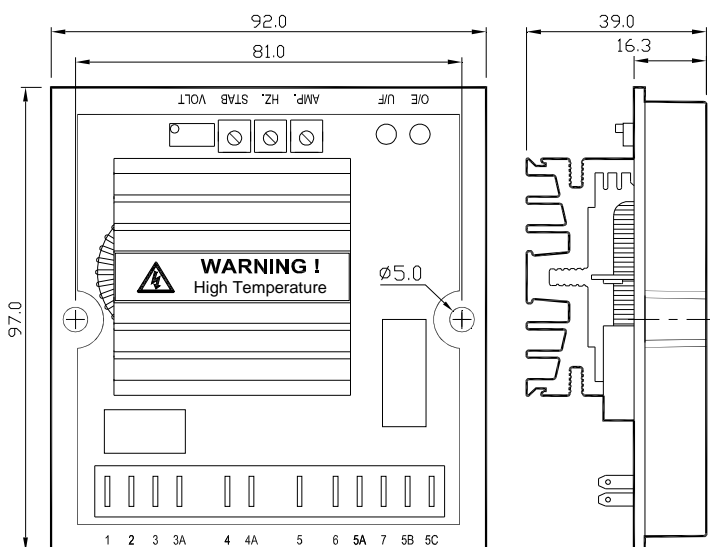
-40 ~ 80 °C

Dimensions

97mm L * 92mm W * 39mm H

Weight

275g ± 2%



Outline and Drilling Diagram
Figure 1

UNIT : mm

OUTLINE / DIMENSION

1. AVR can be mounted directly on the engine, genset, switchgear, control panel, or any position that will not affect operation. For dimension reference, please see Figure 1.
2. Secure all wiring connection. Do not install AVR at a place with high vibrations to prevent loose connections. For safety do not touch the heat sink while in operation.
3. Fuse specification : 20mm 6.3A / 250V.

3. WIRING / ADJUSTMENTS

3.1 Field Excitation Wiring 「 3 F+, 1 F- 」

- Connect AVR terminal “3” to field “+”, connect AVR terminal “1” to the field “-”.

NOTE

The Exciter field resistance is between 10~100 Ohm.

- If field resistance is less than 10 Ohm when generator is under full load and the field voltage is under the maximum output, please series a suitable wattage (W) resistor to have the overall field resistance to equal to 10~ 100 Ohm.

3.2 Sensing / Power Input 「 4, 5C 」

- The rated sensing input range is 80 to 350VAC. If the generator voltage is greater than the rated, please connect through N (Neutral) to phase. (Reference from Fig.2).

3.3 Frequency Selection 「 6, 5A 」

When the terminals 6 & 5A on the AVR are bridged, the system frequency is 60Hz. In the contrary, when bridge is removed the system frequency is 50Hz.

3.4 External Voltage Adjustment VR 「 7, 5B 」

Connect a 100K Ohm 1/2W voltage rheostat at VR terminals to enable a $\pm 7\%$ voltage adjustment from rated voltage.

* The terminals must be bridged when the external voltage adjustment function is none required.

3.5 Power Input 「 3A, 5 」

The Power input range is 80 to 270VAC, connecting from either main winding or auxiliary winding.

3.6 VOLT. Voltage Adjustment

User can adjust the generator voltage by rotating the “VOLT” potentiometer on the AVR. Rotate the potentiometer clockwise to increase voltage and decreasing when rotate counterclockwise. The voltage adjust rate is less than 1% when the power factor equals to 1 to 0.8 (PF 1 to 0.8) and frequency variation within 6%.

3.7 STAB. Stability Adjustment

- Slowly and precise adjustment of “STAB” potentiometer can change the respond time between the AVR and generator. Inadequate

adjustment will cause voltage instability and over adjusting will cause sudden overly voltage variation under heavy load.

- Analogue type multi voltmeter is suggested when adjusting the voltage stability. Adjust the “STAB” potentiometer until the pointer on the multi voltmeter is oscillating to its minimal.

3.8 Circuit Protection

- AMP. Over excitation protection (Overload protection)

Set the 「 AMP 」 Overload protection value according to the generator maximum excitation voltage (40~Max VDC). When over excitation occurs maintain the status for a short period of time then decrease the generator voltage down to residual voltage. When the Over excitation protection is activated the yellow LED will illuminate, the higher the over excitation value is the shorter delay time becomes. The generator will require stopping operation to reset.

NOTE

When AMP potentiometer is adjusted fully clockwise, the Over Excitation protection will be disabled.

- Hz. Under Frequency Protection Adjustment

「 Hz. 」 Is used to set the under frequency protection knee point. When the generator frequency declines to setting point, the generator voltage will also decrease in the same time to prevent high excitation current from damaging the AVR or the exciter.

- **Adjustment procedure**

1. Start generator and let voltage build up.
2. Adjust engine frequency to the appropriate low frequency value.
3. Slowly adjust Hz. Potentiometer until the red LED illuminates.
4. Finally adjust the engine frequency until the LED is turned off.

4. OPERATION PROCEDURE

4.1 Please confirm the follow condition before starting the generator :

- **Starting Setting**

1. Confirm if the AVR specification conforms to the system requirements ?
2. Confirm the AVR wiring ?

3. Confirm correct frequency selected ?
4. Confirm the generator rated voltage with the AVR sensing input ?
5. Adjust "VOLT" potentiometer fully counterclockwise?
Adjust "STAB" potentiometer to the center position?
Adjust "AMP" potentiometer fully clockwise?

4.2 Starting Generator

1. Reconfirm all setting and wiring.

ATTENTION

The AVR reading AC voltage are all average value.

2. Start generator and adjust to rated frequency. The first measured voltage value should be under the rated voltage. If not, then reconfirm the start setting.
3. Slowly adjust "VOLT" potentiometer to the rated voltage, at this time the generator voltage may become unstable. Adjust the "STAB." potentiometer anticlockwise, until the oscillation stabilizes. Over adjustment may cause short oscillation when load applied or load type varies.

SUGGESTION

Adjust the "STAB." potentiometer to the point where the oscillation occurs and then adjust the potentiometer counterclockwise by 1/6 of rotation.

4. If voltage can not be adjusted or to the rated value, please check to see if the generator frequency is too slow (Under frequency protection activated). If residual voltage is below 5VAC, then please execute field flashing to help build up the residual voltage.
5. Make sure the generator and AVR are both under normal operation conditions.
6. The voltage adjustable range should be $\pm 1\%$ under no load or full load. If the adjustable range in not within such range, please check the below :
 - Generator under frequency (Lower than low frequency protection knee point).
 - Severely deformed generator output wave form.
 - Capacitive load over ratio (Power factor in lead).
 - Change the AVR and restart.

- Under over excitation voltage protection (Overload protection).

4.3 Field Flashing

When the regulator is operated with the generator for the first time, the polarity residual magnetism may not correct or the magnitude not enough. If the generator does not build-up after startup, shut down the prime mover and proceed with the following steps:

1. Stop generator operation, disconnect AVR + and – wirings then apply a DC source (Not grounded) of not more than 12VDC, to generator F+ (Positive) and F– (Negative) in series with a limiting resistor of 3 to 5 ohms 20 watt.
2. Allow approximately 3 seconds before removing the dc source.
3. Start generator and measure residual voltage at generator leads 3A, 5. If measured voltage is greater then 5VAC please carefully reconnect all AVR wirings. Please repeat field flashing procedure if less than 5VAC residual voltage is measured.
4. If residual voltage is greater than 5VAC, but AVR still unable to build up voltage, please replace with another AVR.

WARNING

Overly field flashing may damage the AVR or generator excitation winding.

4.4 Maintenance

Regular maintenance to make sure the AVR surface is clean and free from oil or moisture. All connection terminals and wirings must be firmly tightened and no signs of visible oxidation or erosion.

ATTENTION

All voltage readings are to be taken with an average-reading voltmeter Meggers and high-potential test equipment must not be used. Use of such equipment could damage the AVR.

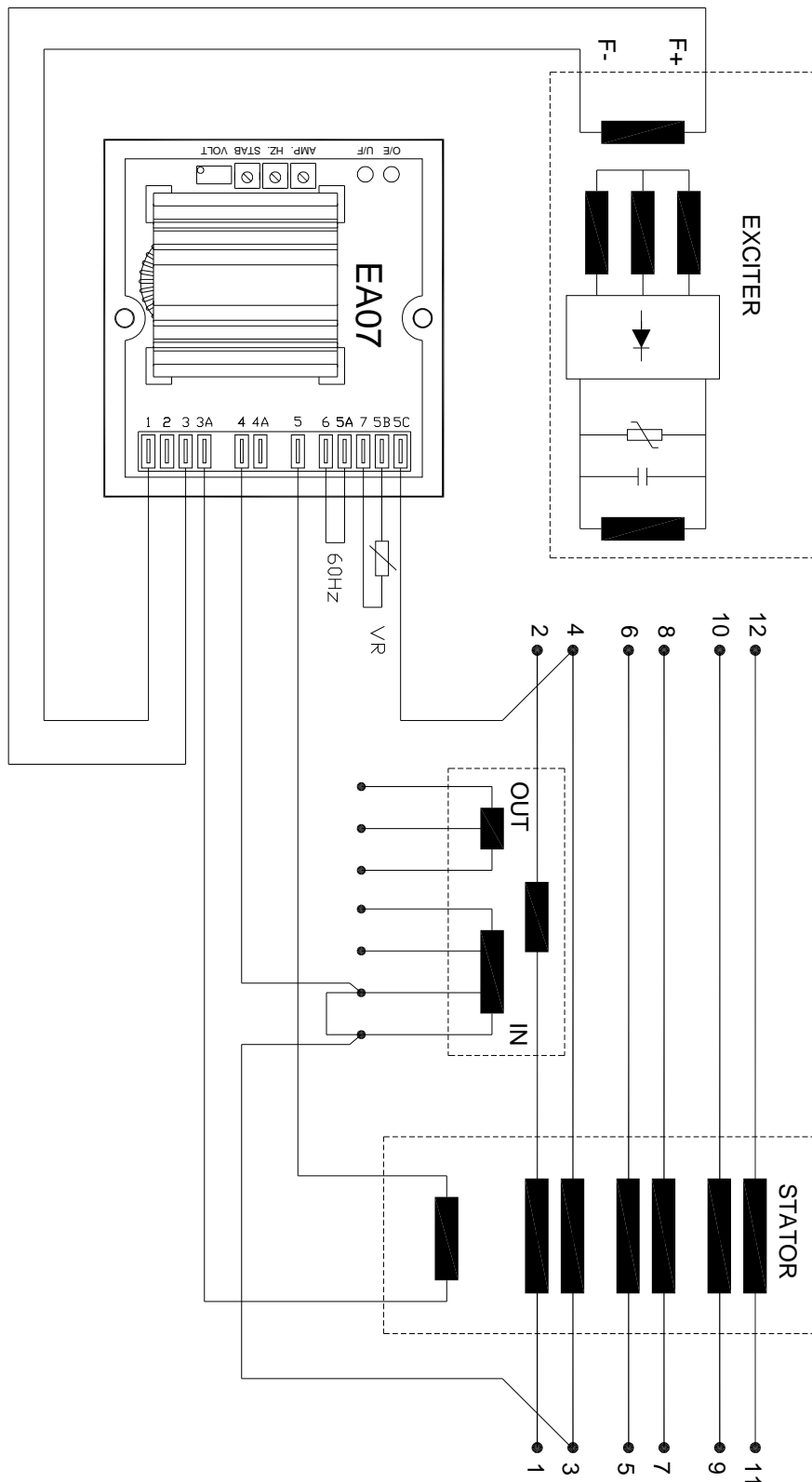


Figure 2 Diagram

- ※ Use only original supplied spare protection fuse for fuse replacement.
- ※ Please accept our sincere apology if any modification in performance, specification or appearance is made without prior notice.