

# EA230

## **Generator Automatic Voltage Regulator Operation Manual**



Self Excited Automatic Voltage Regulator  
Compatible with Leroy Somer R230\*

\* All manufacturer names and numbers are used for reference purpose only and do not imply that any part is the product of these manufacturer.

# SECTION 1 : SPECIFICATION

## Sensing Input

Voltage 90 – 140 Vac @ 120 Vac  
 1 phase 2 wire  
 Frequency 50/60 Hz

## Excitation Output

Voltage Max. 100 Vdc @ power input 120 Vac  
 Current Continuous 3.5A  
 Intermittent 5A for 10 secs.  
 Resistance Min. 15 ohms  
 Fuse Spec. Slow blow 5 x 20mm UDA-8A / 250V

## External Voltage Adjustment

Max. +/- 5% @ 1K ohm 0.5 watt potentiometer

## Voltage Regulation

Less than +/- 1% ( with 4% engine governing )

## Build Up Voltage

6 Vac residual volts at power input terminal

## EMI Suppression

Internal electromagnetic interference filtering

## Static Power Dissipation

Max.6 watts

## Under Frequency Protection (Factory Presets)

Adjustable range 45/55 Hz

## Voltage Thermal Drift

Less than 3% at temperature range -40 to +70 °C

## Environment

Operating Temperature -40 to +60 °C  
 Storage Temperature -40 to +85 °C  
 Relative Humidity Max. 95%  
 Vibration 1.5 Gs @ 5 – 30 Hz  
 5.0 Gs @ 30 – 500 Hz

## Dimensions

140.0 (L) x 75.0 (W) x 51.0 (H) mm

## Weight

310 g +/- 2%

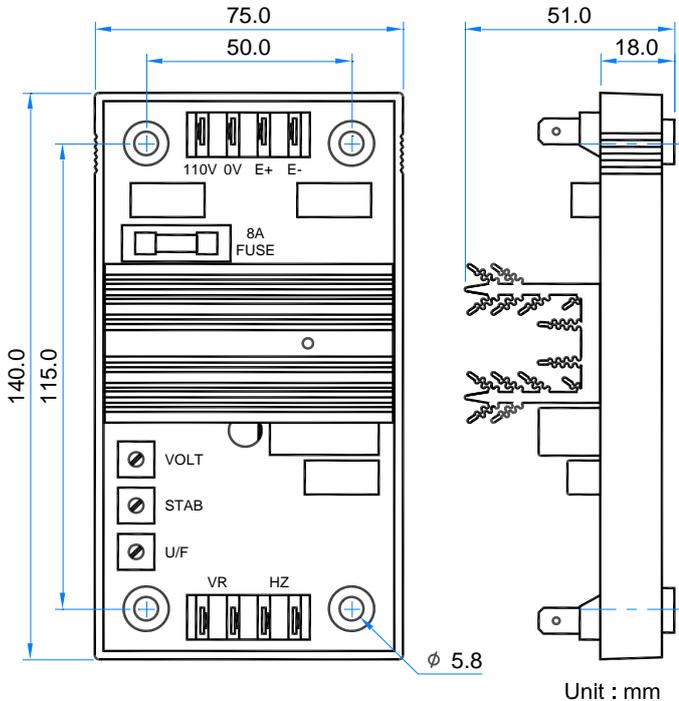


Figure 1 Outline Drawing

### ATTENTION

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. 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.
3. Terminal : "Fast-On" terminals 6.35mm (1/4 inch)
4. Improper setting of under-frequency protection could cause the output voltage of the unit to drop or become unstable under with changes in load. Avoid making any changes to the U/F setting unless necessary.

## SECTION 2 : WIRING

### 2.1 Operation

The following system operation procedures provide instructions for adjusting the EA230 voltage regulator. Symptoms resulting from a faulty regulator and certain generator system problems are included, together with suggested remedies.

### 2.2 Wiring (Refer to Figure 2, 3)

2.2.1 Connect E+1, E- to DC output port.

2.2.2 Connect the sensing port at 100V, 0V

2.2.3 External voltage regulator is as Figure 2, 3

Complete the following steps before proceeding with the system start-up.

#### ATTENTION

**Meggers and high potential test equipment must not be used. Incorrect use of such equipment could damage the semiconductors contained in the regulator.**

### 2.3 Preliminary SET-UP

2.3.1 Verify that the voltage regulator specifications conform with the generator system requirements.

2.3.2 Ensure the voltage regulator is correctly connected to the generator system.

2.3.3 Install the correct fuse (8A / 250V) to prevent damage caused from short circuit.

2.3.4 Set the regulator 「VOLT」 and external 「VOLT ADJ」 ( if used ) as follows:

Regulator 「VOLT」 : Fully CCW

Remote 「VOLT」 : Centered

2.3.5 Adjust the front panel STAB control that controls the system stability. Rotation of the front panel STAB control in the counter-clockwise (CCW) direction will speed up response time and if over rotated in CCW direction, the generator voltage may oscillate (hunt).

2.3.6 Rotated the front panel STAB control CCW until the system start oscillating and then rotate CW just past the point where oscillation occurred.

### 2.4 System START-UP

2.4.1 Perform preliminary set-up as described in the above paragraphs.

#### ATTENTION

**The AVR reading AC voltage are all average value.**

2.4.2 Start prime mover and bring up to rated speed.

#### RESULT :

Voltage should build up. If not, perform Field Flashing.

2.4.3 Slowly adjust the regulator 「VOLT」 CW until the generator output voltage reaches the nominal value. If used, adjust the remote 「VOLT」 to set the generator voltage to the exact value desired.

#### RESULT :

Voltage should build up to rated value. If voltage does not build up to the rated value, check generator for short or excessive load.

2.4.4 Check regulator under normal operating and loading conditions.

#### RESULT :

Voltage regulation should be better than +/- 1.0% no-load to full-load. If regulation is not within this range, perform the following steps :

- (1) Voltage reduction under load may be due to speed change from no load to full load. causing the frequency compensation (V/Hz) circuit to reduce voltage at lower frequencies.
- (2) Replace voltage regulator.

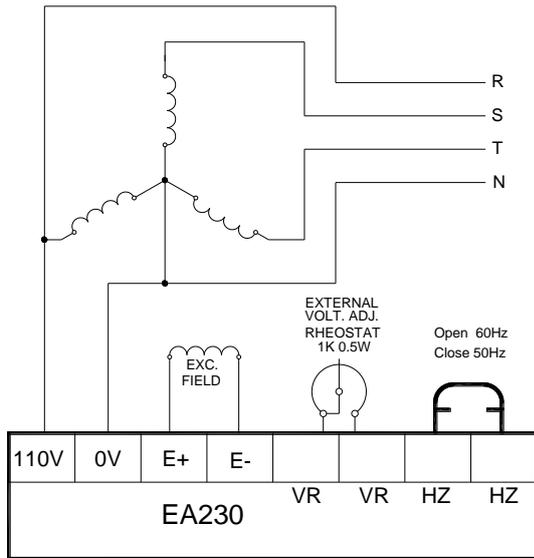
### 2.5 Operational Test

2.5.1 Connect the test setup as shown in the following figure, Operational Test. Do not apply power. Ensure that the light bulb is rated for 120V and is less than 100W.

2.5.2 Adjust the regulator 「VOLT」 or remote 「VOLT」 to maximum CW.

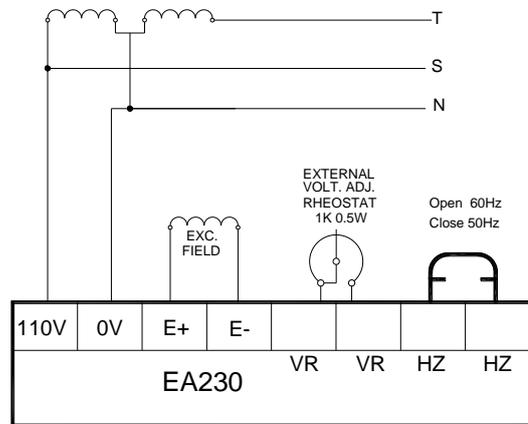
2.5.3 Apply 120V, 50/60 Hz power to the regulator. The light bulb should illuminate

2.5.4 Slowly adjust the regulator 「VOLT」 control CCW. At the regulation point, the light bulb should extinguish.



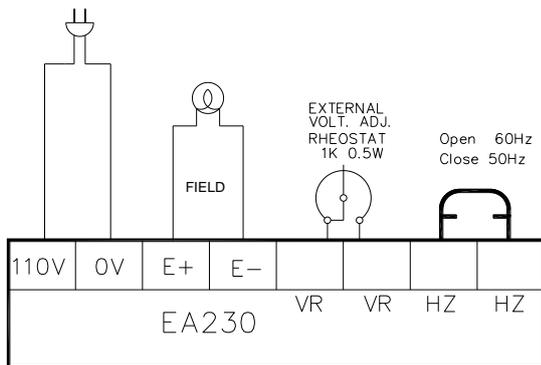
Interconnection Diagram, 120 / 208 V Nominal, 3-Phase, 4-Wire

Figure 2



Interconnection Diagram, 120 / 240 V Nominal, 1-Phase, 3-Wire

Figure 3



Operational Test

Figure 4

**WARNING**

Please make sure you have read and understand the contents of the instruction manual prior to installation. Incorrect wiring connection may result in irreversible damage to the product and other equipments.

This Automatic Voltage Regulator is not equipped with loss-Sensing Protection function / Over Excitation Protection. An additional Over-Voltage Protection device for load may be required to avoid possible damage to the equipment or severe personal injury or death.

※ Use only the replacement fuses specified in this user manual.

※ Appearance and specifications of products are subject to change for improvement without prior notice.