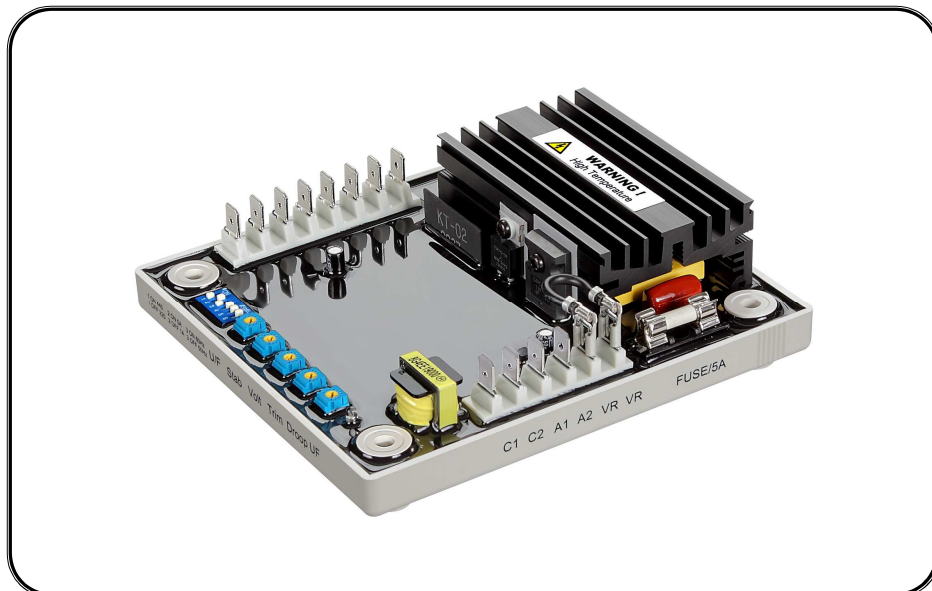


EA64-5

Generator Automatic Voltage Regulator Operation Manual



Self Excited Automatic Voltage Regulator



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SECTION 1 : SPECIFICATION

Sensing Input S1, S2

Voltage 220 / 440 Vac, 1 Phase
 190 – 290 Vac @ 220 Vac
 330 – 515 Vac @ 440 Vac
 Frequency 50 / 60 Hz (SW1 Selectable)

Power Input P1, P2

Voltage 30 – 260 Vac, 1 Phase
 Frequency 40 – 500 Hz

Output

Voltage Max. 85 Vdc @ power input 110 Vac
 Max. 170 Vdc @ power input 220 Vac
 Current Continuous 5A
 Intermittent 10A for 60 sec.
 Resistance > 9 ohms
 Fuse Spec. 5 x 20mm S505-5A / 250V
 (slow blow type)

Voltage Regulation

< +/- 0.5% (with 4% engine governing)

Typical System Response

< 1 Cycle

Build Up Voltage

Residual voltage at AVR terminal > 5 Vac @ 25 Hz

Thermal Drift

0.45% per °C change in AVR ambient

External Volts Adjustment C+, C-

+/- 5% 1K ohm 0.5 watt potentiometer
 +/- 10% 2K ohms 0.5 watt potentiometer
 External filter capacitor terminal

Unit Power Dissipation

Max.12 watts

Quadrature Droop Input

CT 1A / 5A > 5VA (SW2 Selectable)
 Max. +/- 7% @ P.F +/- 0.7

Analogue Input

Un 0 – 15% @ 0 – 10 Vdc

Under Frequency Protection (Factory Knee Point Setting)

50/60 Hz (SW3 Selectable)
 40 – 50 Hz @ 50 Hz Preset 47 Hz
 49 – 60 Hz @ 60 Hz Preset 57 Hz

Environment

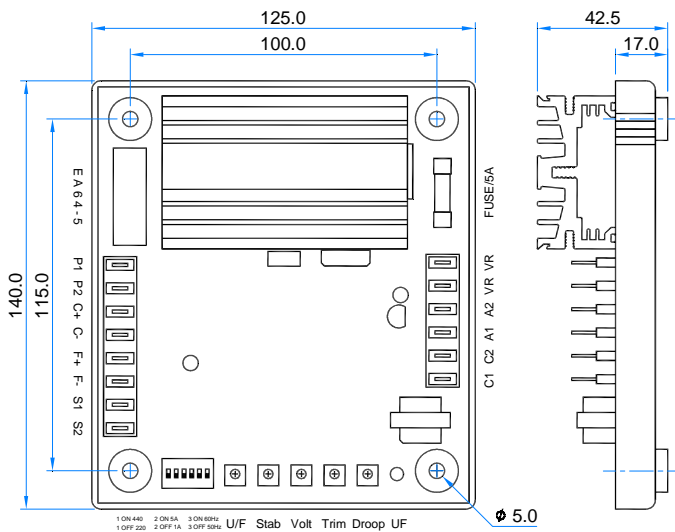
Operation Temperature -40 – +70 °C
 Storage Temperature -40 – +85 °C
 Relative Humidity Max. 95%
 Vibration 3 Gs @ 100 – 2K Hz

Dimensions

140.0 (L) x 125.0 (W) x 51.0 (H) mm

Weight

578 g +/- 2%



Outline Drawing
 Figure 1

ATTENTION

1. AVR can be mounted directly on the engine, genset, switchgear, control panel, or any position that will not affects operation.
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. 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.
4. Terminal : "Fast-On" terminals 6.35mm (1/4 inch) & With 4mm crimping terminal.

SECTION 2 : DIP SWITCH ADJUSTMENT (SW)

2.1 SW1 Voltage Selection

SW1 is to select the suitable genset sensing input voltage (S1, S2). When sensing input is 440 Vac (380 – 480) Switch the SW1 to ON. If the sensing input is 220 Vac please switch SW1 to off position. (Please Reference from Figure 2).

ATTENTION

If system voltage is 220V but the SW1 is setting at "ON" (440V) then it will cause genset over voltage and sever damage.

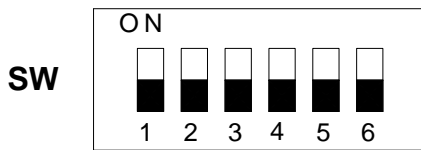


Figure 2 DIP Switch (SW)

2.2 SW2 C.T. Current Compensation

SW2 is to select the suitable C.T. Current transformer current input (C1, C2) If C.T. Current is 5A then please switch SW 2 to ON. If C.T. Current is 1A then please switch SW 2 to OFF position.

2.3 SW3 Frequency Selection

If genset rated frequency is 60 Hz please switch SW3 to ON position and switch to OFF position is rated frequency is 50 Hz.

ATTENTION

If the frequency 60 Hz is selected while the generator rated frequency is 50Hz then it may result in under voltage. If a 60Hz generator is selected at 50 Hz, when executing engine stop, the over excitation current may damage then AVR and generator.

2.4 SW4, 5, 6 Genset Capacity Selection

2.4.1 If genset capacity is below 90 KW please switch SW4, 5, 6 to OFF position.

2.4.2 If capacity is 90 – 200 KW please switch SW4 to ON position and 5, 6 remain in OFF position.

2.4.3 If capacity is greater than 200 KW please switch SW4, 5, 6 to ON position.

ATTENTION

Each time when SW4, 5, 6 position is changed, the STAB (stability) must be readjusted to achieve the optimum genset performance. The setting of the DIP switches SW must be conducted while the generator is not in operation.

SECTION 3 : ADJUSTMENT

3.1 VOLT

Voltage setting adjusting the genset rated output voltage.

3.1.1 When SW1 is "OFF" (220V) adjustable range is 190 – 290 Vac.

3.1.2 When SW1 is "ON" (440V) adjustable range is 330 – 515 Vac.

ATTENTION

The AVR reading AC voltage are all average value.

3.1.3 External VR : Connect 1K ohm 0.5 watt VR to the VR terminal, the adjustable voltage range = +/- 5%Un, 2K ohms 0.5 watt adjustable voltage range = +/- 10%Un.

3.1.4 If this function is not required, please short circuit the two terminals.

3.2 STAB

Stability adjustment. Correct stability adjustment must be conducted while the generator is operating without load, firstly adjust the STAB potentiometer (POT) clockwise until voltage becomes unstable, and then slightly adjust anti-clockwise. (approximately 1/5 of rotation). When the voltage just reaches the critical point (knee point) of stabilization. Where the voltage is stable yet very close to become unstable.

3.3 U/F

Under frequency protection adjustment. When generator RPM falls below the knee point, the under frequency protection circuit will begin to intervene and voltage and frequency begin to decrease in linear descend. Coordinate with the DIP switch SW3 frequency selection 50/60 Hz.

When selecting 50 Hz the adjustable range is from 40 to 50 Hz and the factory presets at 47 Hz.

When selecting 60 Hz the adjustable range is from 49 to 60 Hz and the factory presets at 57 Hz.

3.4 U / FL

When under frequency protection is activated, the RED LED will light up.

3.5 DROOP

Droop adjustment. When paralleling, the AVR compensate the input rating and voltage shifting basis on load current, through internal circuit calculation and increase or decrease the voltage. When phase current lag the voltage, it decreases original voltage setting and if the phase current lead the voltage then it increases the original voltage setting. The increase and decrease range can be preset by the DROOP adjustment.

3.6 TRIM

Analogue voltage Input sensitivity. When terminal A1 and A2 is added with a DC input (0 – 10V), the TRIM is used to adjust the influence level from the DC input to the rated voltage. If the TRIM potential (POT) is adjusted fully counter-clockwise, and then the additional signal will not cause any influence. On the contrary if the TRIM is adjusted fully clockwise, then the additional signal will produce a maximum effect.

SECTION 4 : CONNECTION TERMINAL

- 4.1 P1, P2 : Fundamental / Harmonic power input.
(Input range 30 – 260 Vac, 40 – 500 Hz, 1 Phase)
- 4.2 C+, C- : External filter capacitor terminal.

ATTENTION

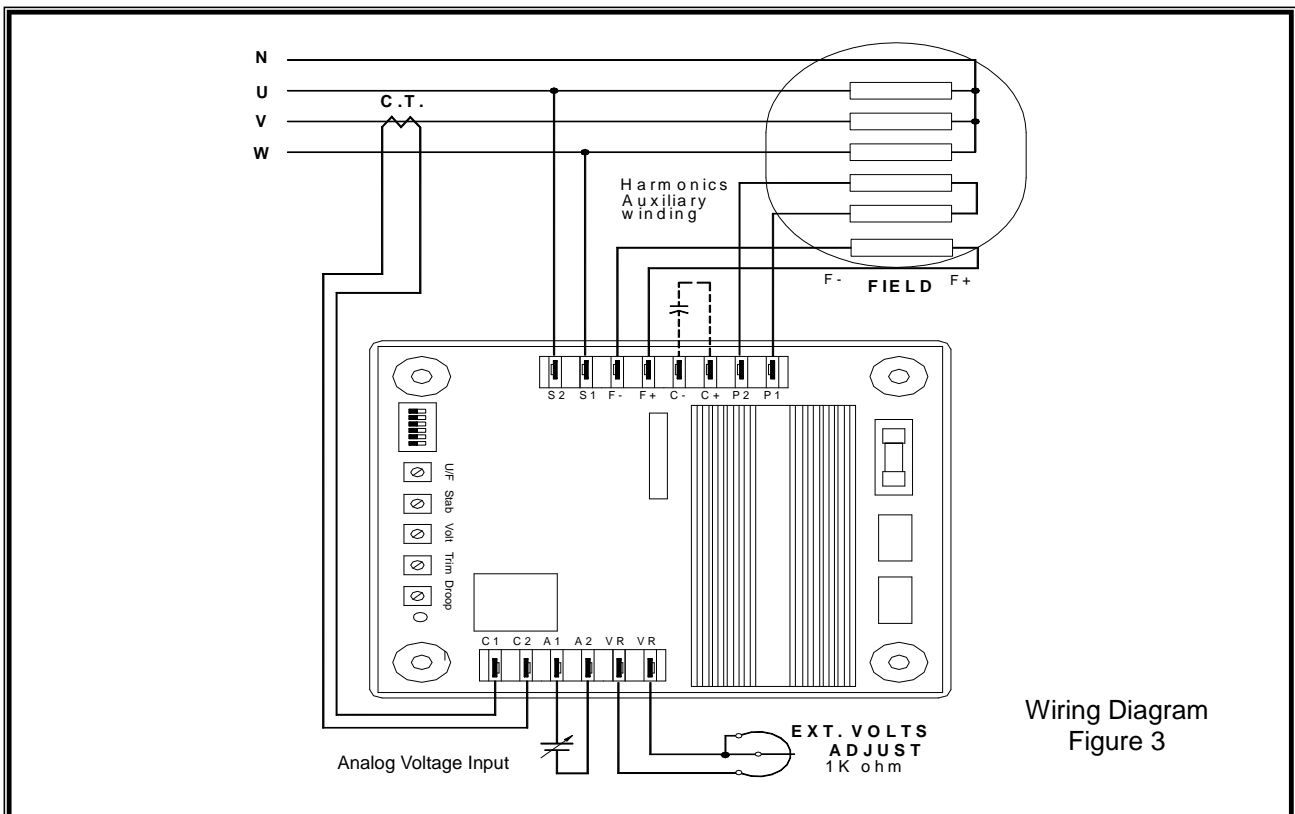
If a Permanent Magnet Generator (PMG) is used to supply voltage, the capacitor (included in the AVR box) must be connected to C+ and C- terminals.

- 4.3 F+, F- : Excitation output. Connect to generator excitation winding.
- 4.4 VR : External voltage adjustment. Use an 1K ohm 0.5 watt VR (Voltage adjustable range +/- 5%), 2K ohms 0.5 watt VR (Voltage adjustable range +/- 10%), If this function is not required, please short circuit the two terminals.
- 4.5 C1, C2 : Load current compensation. Input range 1A or 5A (Selected by SW2) > 0.2VA.
- 4.6 S1, S2 : Sensing Input. Input range 220 or 440 Vac (Selected by SW1) Input resistance > 2M ohms.
- 4.7 A1, A2 : Analogue voltage Input terminal.

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.



Wiring Diagram
Figure 3