

# EA440

## *Generator Automatic Voltage Regulator Operation Manual*



Self Excited Automatic Voltage Regulator  
Compatible with Newage SX440\*

\* Use for reference purpose only and not a genuine Newage product.

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## 1. INTRODUCTION

### Sensing Input

Voltage 190 ~ 264 VAC, 1 phase 2 wire  
Frequency 50 / 60 Hz, selectable

### Output

Voltage Max. 90 VDC @ 207 VAC  
Current Continuous 4A  
Intermittent 10A for 10 sec.  
Resistance Min. 15 ohm

### Voltage Regulation

<  $\pm 1\%$  ( with 4% engine governing )

### Voltage Build-up

Residual voltage at AVR terminal > 5 VAC

### Thermal Drift

0.05% per  $^{\circ}\text{C}$  change in AVR ambient

### External Volts Adjustment

$\pm 8\%$  with 1K ohm 1 watt trimmer

### Unit Power Dissipation

Max. 12 watt

### Under Frequency Protection

Set point 95% Hz

### ( UFRO )

Slope 170% down to 30 Hz

### Soft Start Ramp Time

2 sec.

### Analogue Input

Max. Input  $\pm 5$  VDC  
Sensitivity 1V for 5% generator volts  
Input Resistance 1K ohm

### Quadrature Droop Input

Burden 10 ohm  
Max sensitivity 0.07 A for 5% droop (PF=0)  
Max. input 0.33 A

### Dimensions

150mm L \* 135mm W \* 40mm H

### Weight

418g  $\pm 2\%$

## 2. WIRING

1. K1,K2 : Field input external switch terminals.  
Linked for normal operation.
2. P2,P3 : External power input terminals.
3. 3,2 : Sensing input terminals.
4. 1,2 : External VR terminals. Linked for useless.
5. X,XX : x connect to field (+), XX connect to field (-).
6. S1,S2 : Droop CT input terminal.
7. A1,A2 : VAR/PF controller input.
8. A,B,C : Link A,C for under 90KW.  
Link B,C for 90 ~ 550KW.  
Link A,B for over 550KW.
9. J1~J8 : jump select terminals, 2-3,4-5,6-7.  
please refer to Figure 2 and Figure 3.

## 3. ADJUSTMENT

### 3.1 Voltage adjustment

The generator output voltage can be altered by adjustment of the volt VR on the AVR board, or by the external trimmer (1K $\Omega$ ) if fitted.

1. The terminals 1&2 must be linked if no hand trimmer.
2. Before start the generator, please turn the Volt trimmer on the AVR board fully anticlockwise  
Turn the external trimmer to midway position.
3. Turn the stability trimmer on the AVR board to midway position.
4. Connect a voltmeter to generator output voltage terminals.
5. Start generator set and run on no load at nominal frequency 50 ~ 53Hz or 60~63Hz.
6. If the red Led is illuminated, refer to the under frequency roll off adjustment.
7. Carefully turn volt trimmer clockwise until rated voltage is reached.

### 3.2 Stability adjustment

If a replacement AVR has been fitted or re-setting of the stability control is required, turn the stability trimmer slowly clockwise until the output voltage is steady, on or off load.

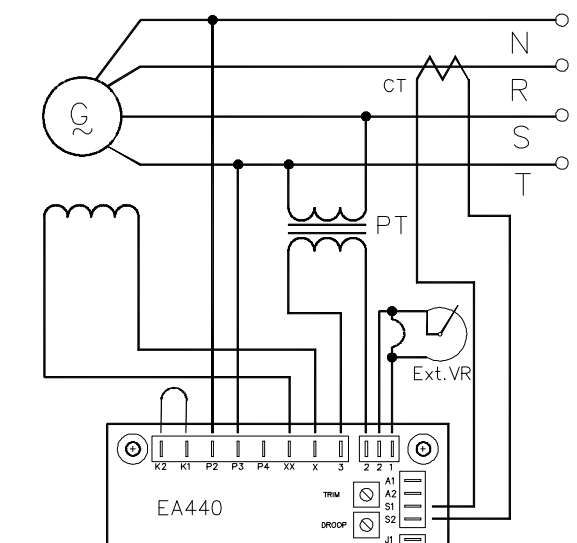
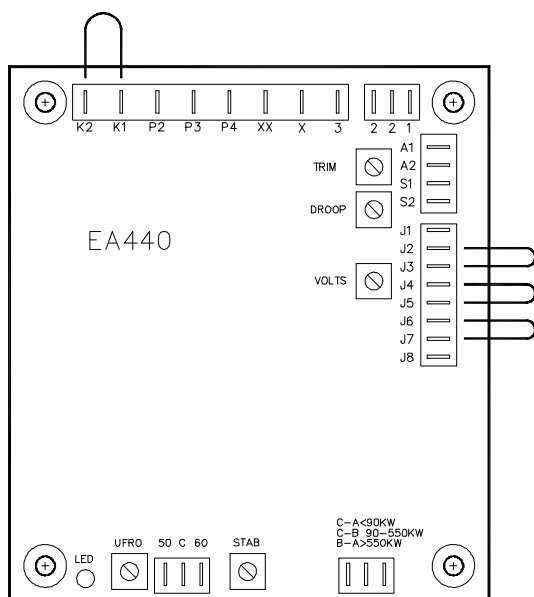
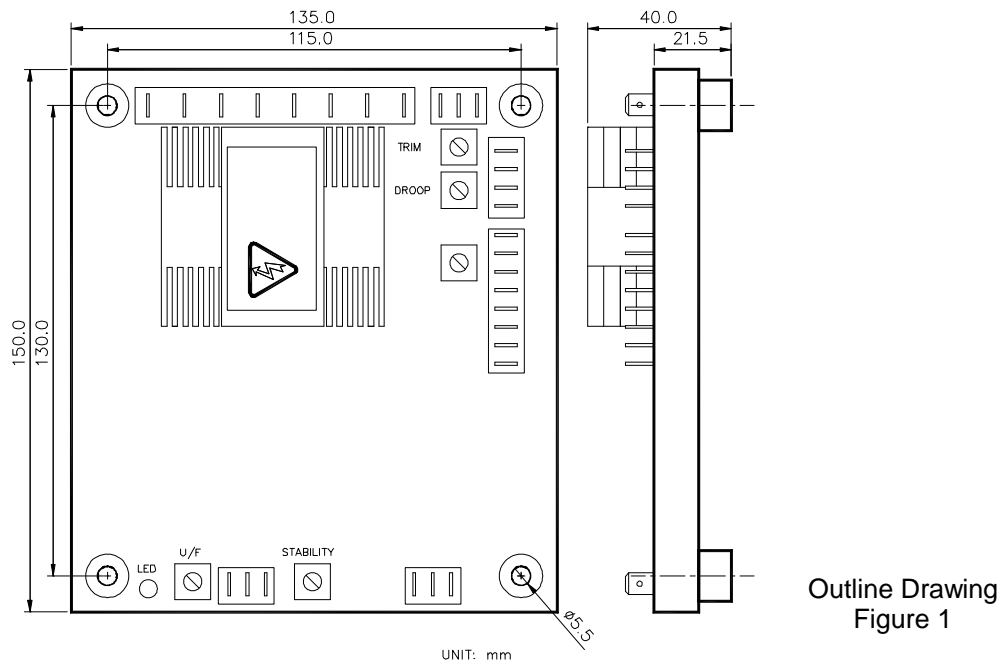
### 3.3 Droop adjustment

Generator intended for parallel are fitted with a quadrature droop CT with provides a power factor dependent signal for the AVR. The CT is connected to S1,S2 on the AVR. The Droop adjustment is

normally present in the works to give 5% voltage droop at full load zero power factor. Clockwise increases the amount of CT signal injected into the AVR and increases the droop with lagging power factor. With the control fully anticlockwise there is no droop.

### 3.4 Trim adjustment

An auxiliary input is provided to connect to A1, A2. It is designed to accept DC  $\pm 5V$ . Turn the TRIM trimmer fully anticlockwise has no effect, Clockwise it has maximum effect.



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## 4. TROUBLE SHOOTING

SYMPTOM	CAUSE	CORRECTION
Voltage does not build up	Engine speed is too low	Please refer to the Generator Manual
	wires are not connected well	Please refer to Figure 2
	Defective Generator	Please refer to the Generator Manual
Out voltage low	External VR broken	Check wiring and testing VR
	Terminal 1&2 not linked	Please linked terminal 1&2
	Terminal 3&2 no sensing input	Please refer to Figure 2
	Under frequency	Please refer to the Generator Manual
	Defective Generator	Please refer to the Generator Manual
Out voltage high	AVR adjustment not well	Please refer to voltage adjustment page
	Defective Generator	Please refer to the Generator Manual

P.S. Please use the fuse of the original plant.