

EA150A

Generator Automatic Voltage Regulator Operation Manual



***Self Excited Automatic Voltage Regulator
150 Amp AVR Type Generators
With and Without Slip Rings
Full Wave & Half Wave Version***

1. SPECIFICATION

Sensing & power Input

Voltage	100 to 500 VAC Single phase 2 wire
Frequency	50 / 60 Hz, selectable

Output (at 220 VAC input)

Voltage	EA150AH (Half-wave) Max. 90VDC EA150AF (Full-wave) Max. 180VDC
Current	Continuous 150A Intermittent 200A for 10 sec.
Resistance	Min. 1.5 ohm

Voltage Regulation

< ± 1% (with 4% engine governing)

Voltage Build-up

Residual voltage at AVR terminal > 5 VAC (25Hz)

Droop Adjustment

Droop : Current Compensation Input 5A 5VA ±7%
@PF=±0.5 (Droop Adjusted)

Analog input

Analog Voltage Input. Connect to an external DC
Signal ±5VDC 7% Adjustable (TRIM Adjusted)

Operation Temp.

-40 ~ 60?

Battery input (24V)

Power input for the Flash and Alarm

Dimensions

635mm L * 415mm W * 305mm H
Packaging : 780mm L * 580mm W * 500mm H

Weight

EA150AH 23KGS ± 2% (Net Weight)
30KGS ± 2% (Gross Weight)
EA150AF 28KGS ± 2% (Net Weight)
35KGS ± 2% (Gross Weight)

2. WIRING

For wiring information, please refer to **7. SETTING & CONNECTION**, Figure 02 to Figure 05.

3. ATTENTION

3.1 When installing

1. Let only experienced professional installer carry out the installation.
2. Avoid Installing AVR near high temperature, moisture, or location where AVR can not be easily reached.

3.2 When generator is operating

The surface temperature of AVR may reach over 60°C.

3.3 Start Procedure

1. Setting

Check wiring connection and voltage setting (Input Voltage and Fan Voltage).

Set volt trimmer to the minimum position.

Set external trimmer to midway position if fitted.

Set stability trimmer to maximum position.

Connect a voltmeter to field F+, F– terminals.

Connect a 300VAC voltmeter to generator output voltage terminals.

2. Start the generator

Start up generator with no load. Adjust to the correct engine speed. Voltage should build-up at the lowest voltage level. If the voltage does not build up, please refer to **5. FIELD FLASHING** or contact generator supplier.

Slowly adjust volt trimmer clockwise until rated voltage is reached.

Adjust stability trimmer anticlockwise until the output voltage starts to fluctuate, then carefully adjust stability trimmer clockwise until rated stable voltage is achieved.

4. ADJUSTMENT

4.1 Under frequency adjustment

Open the enclosure panel. On the back of EA45AF-1 carefully select the frequency setting.

EA45AF-1 (Front panel) terminals 1 & 2 Open For 50Hz. Factory preset at 45Hz.

EA45AF-1 (Front panel) terminals 1 & 2 Close For 60Hz. Factory preset at 55Hz.

4.2 Voltage adjustment

1. Carefully turn volt trimmer until rated voltage is reached. (Clockwise = Increase)
2. For external voltage adjustment: Connect a 1K 1W voltage rheostat to the EA45AF-1 (Front panel) terminal 3 & 4.
3. For long range external voltage adjustment, please refer to Figure 06. The TRIM on the EA45C module must be adjusted to maximum (Clockwise).

4.3 Stability adjustment

1. By adjusting STAB trimmer will provide the system with stable voltage output. But if it is over adjusted, then the voltage will oscillate (hunt) when heavy load is applied.
2. It is suggested to use a multi-meter DCV to adjust "stability". When adjusting, try to make the multi-meter waving to the minimum. This will improve the full load's voltage drift rate.

4.4 TRIM (EA45C)

TRIM works together with a bias voltage applied to terminals A1 and A2. This signal is supplied by an external Power Factor Paralleling PLC. Use the TRIM potentiometer to adjust the DC voltage input that controls the level of the generator's output voltage. When set counter-clockwise the control level is zero, and if moved clockwise the maximum control range is 10%. The signal connected to A1 and A2 can be unipolar (0,+), or bipolar (+, -). Check with the manufacture of the Paralleling control PLC.

4.5 DROOP (EA45C)

DROOP is the adjustment of influence from CT 1, CT 2 current compensation input value to the generator output voltage decrease ratio. Voltage droop works when the CT and the AVR senses that the output of the generator voltage and current waveforms are out of synch and the AVR droops the output voltage of the generator to correct it. This adjustment is required when generators are paralleled. For paralleling connection please refer to Figure 07. The CT capacity must be greater than 5VA with 5 amperes secondary current.

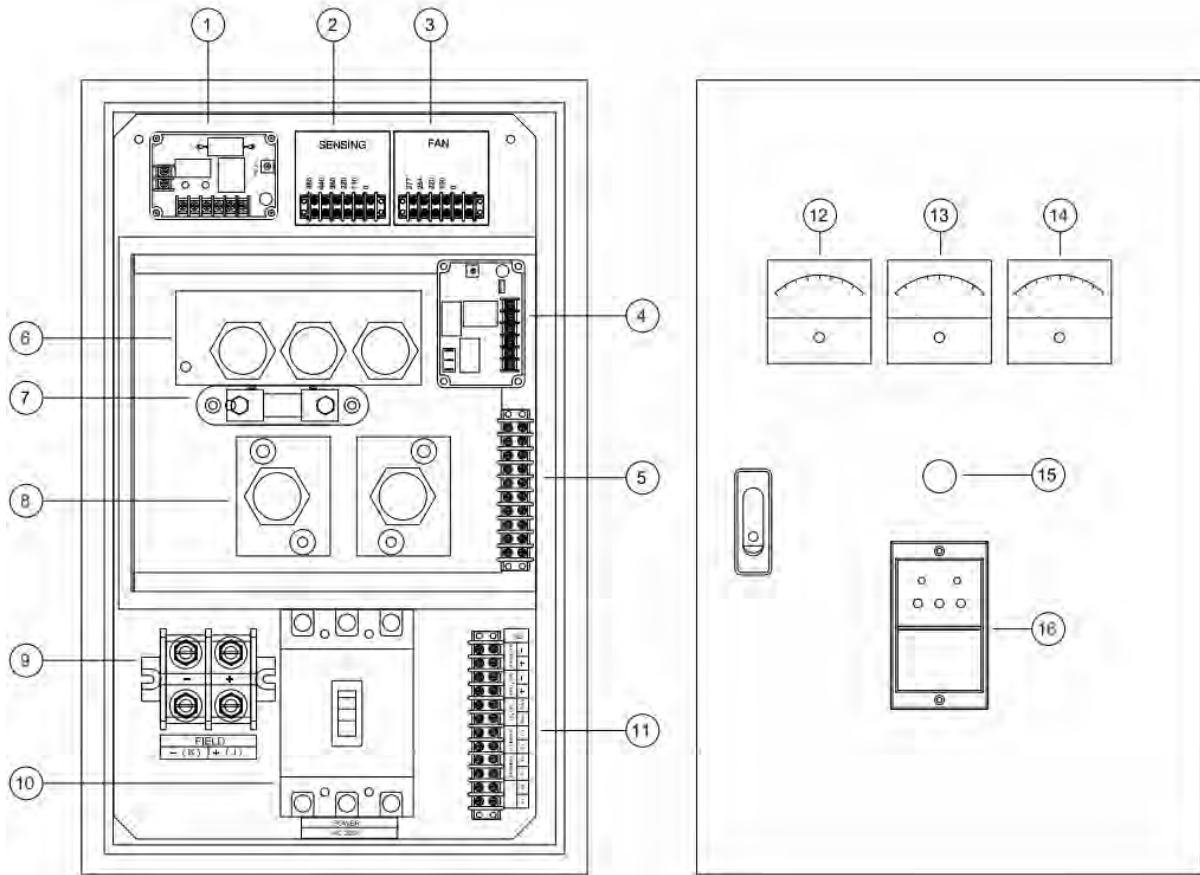
5. FIELD FLASHING

When the regulator is operated with the generator for the first time, the polarity of residual magnetism may be reversed or too small to achieve the necessary build-up voltage for the regulator.

Flash: When the generator residual voltage is below rated, Close the switch after engine reaches rated RPM. The AVR is equipped with EB500 Auto Flash Module for more information; please reference from EB500 user manual.

*If residual voltage from the alternator is sufficient to induce voltage buildup and does not require field flashing, disconnect the battery input and switch (SW1 & SW2 connection on the TB2)

6. INTERNAL SPECIFICATION



Item	Content
1	EA45C
2	Sensing Transformer
3	Fan Transformer
4	EB500
5	Terminal TB1
6	Diode
7	Shunt
8	SCR
9	Field output terminal
10	Power input NFB
11	Terminal TB2
12	Field Current
13	Field Voltage
14	Generator Voltage
15	Over Heat
16	EA45AF-1

Figure 01

7. SETTING & CONNECTION

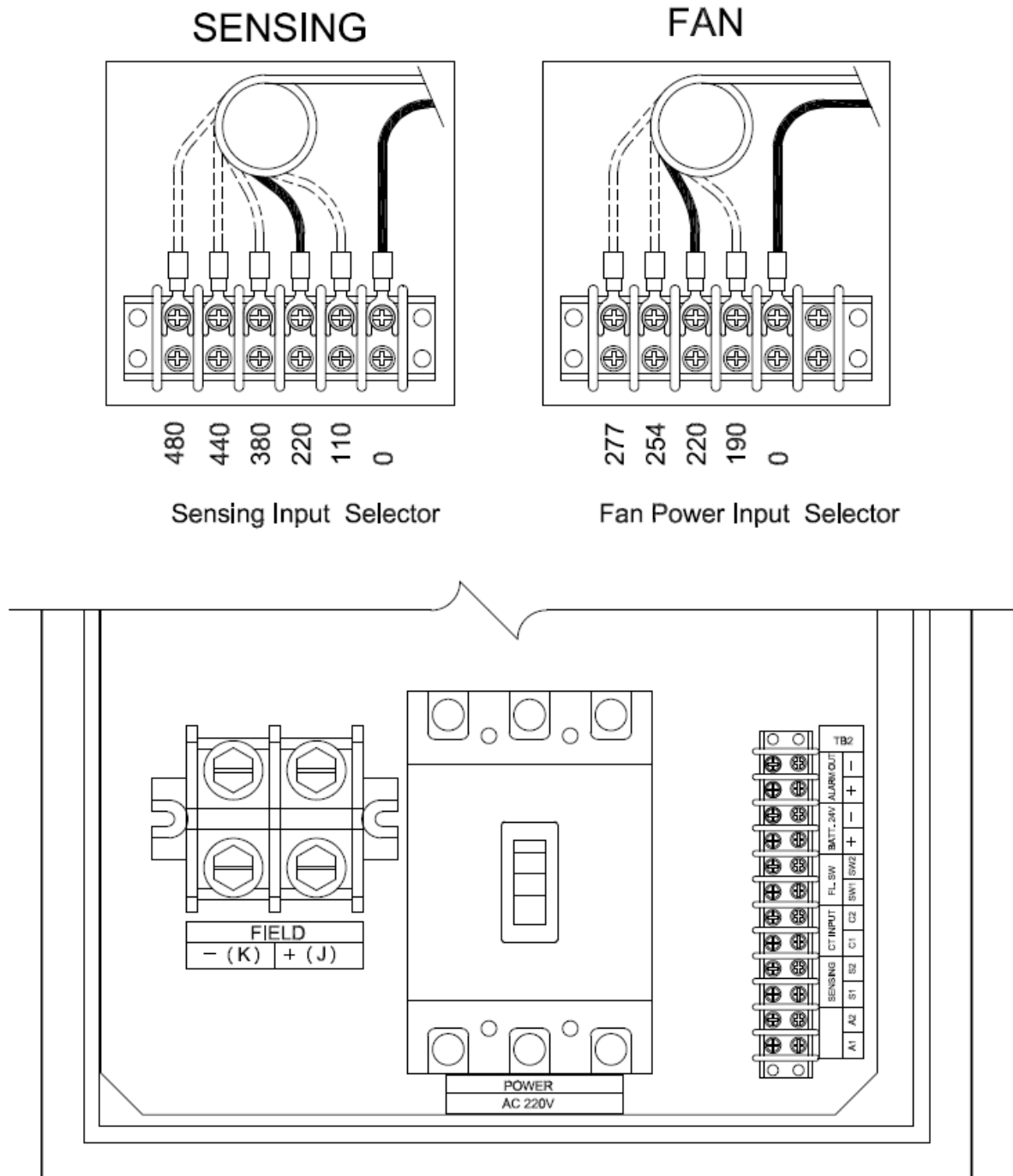


Figure 02

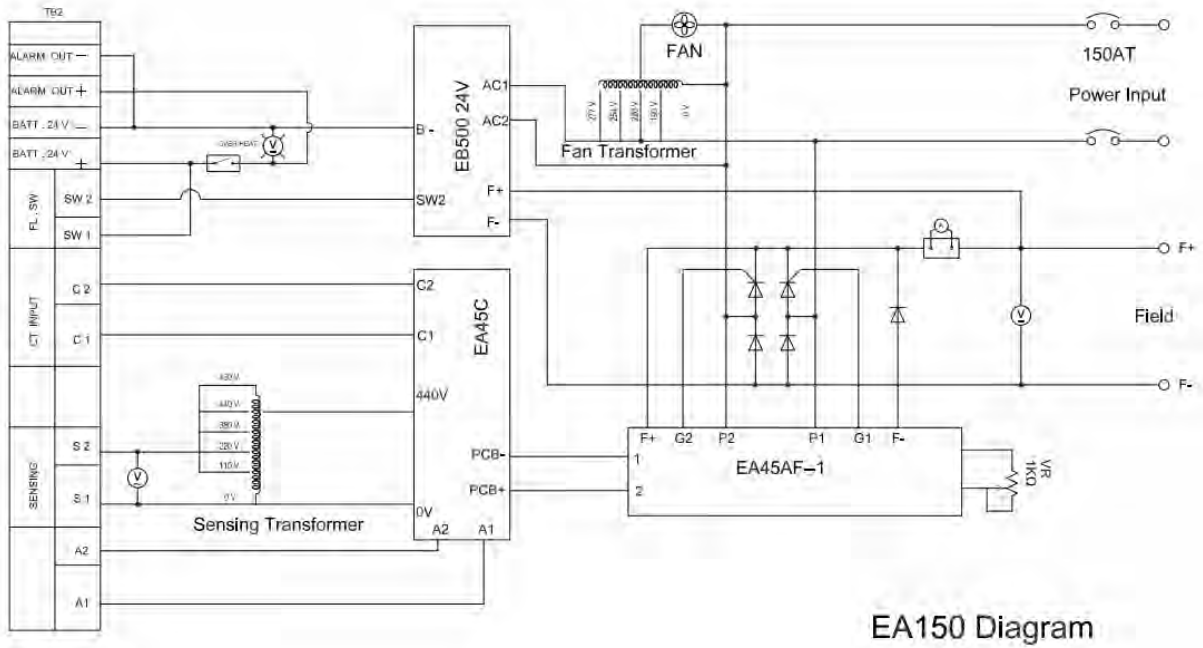


Figure 03

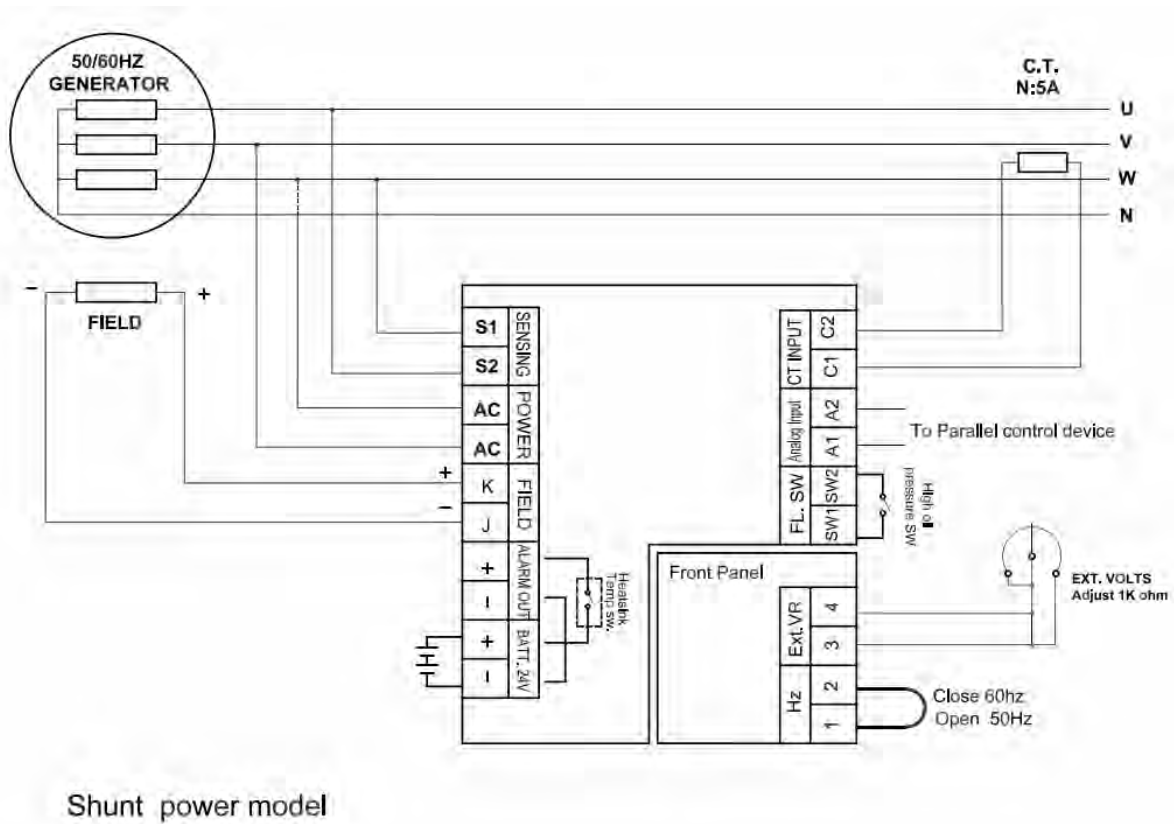
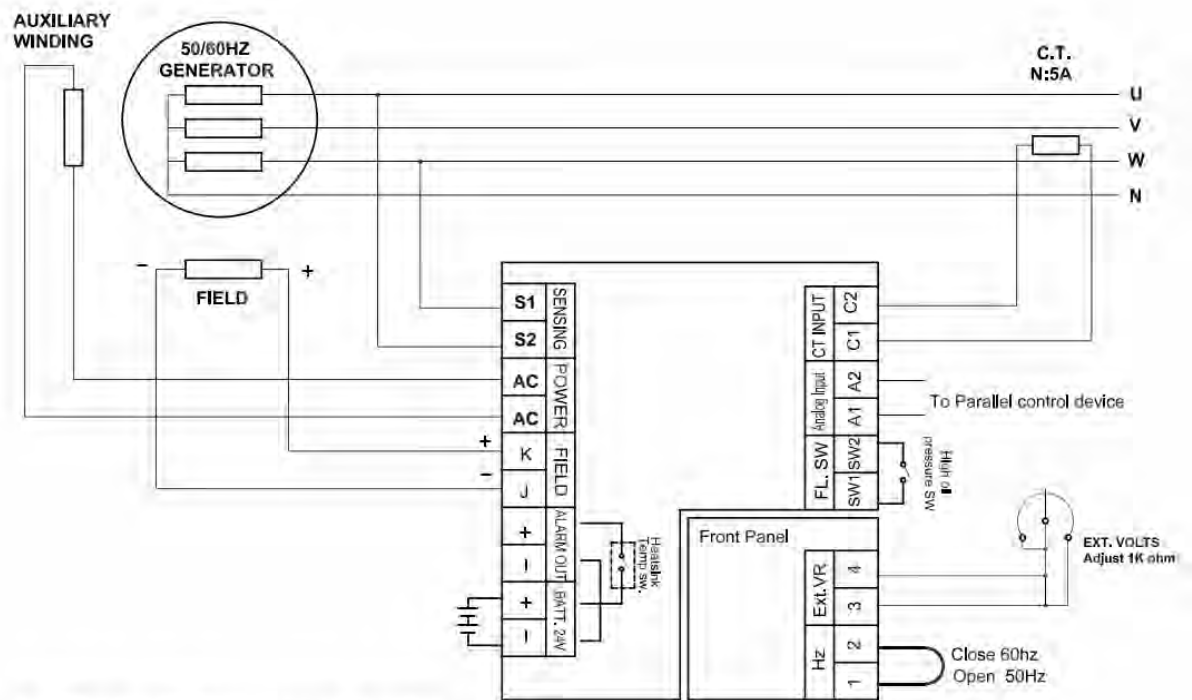
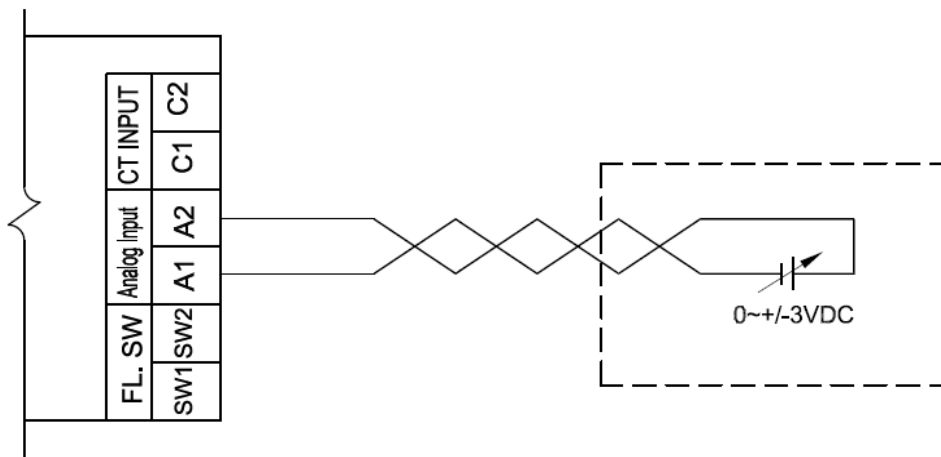


Figure 04



Auxiliary winding power model

Figure 05



Long-range voltage regulation

Figure 06

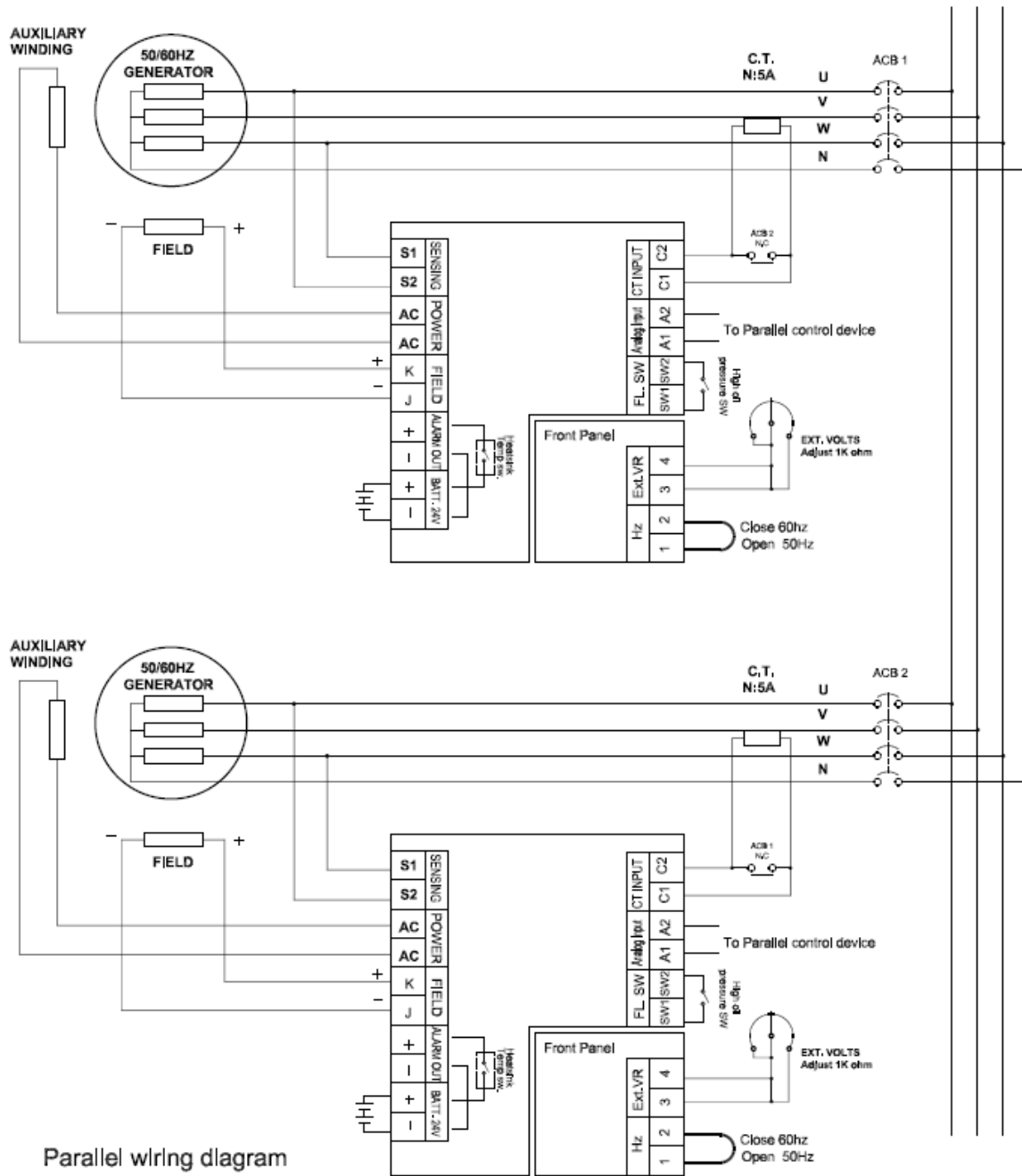


Figure 07

8. TROUBLE SHOOTING

SYMPTOM	CAUSE	CORRECTION
Voltage does not build up	Residual voltage below 5VAC	Flash generator. Please refer to 5. FIELD FLASHING
	Incorrect wiring	Check wiring diagram for proper connection
	Engine under speed	Increase engine speed to above 25HZ
Low Output Voltage	Poor adjustment is made	Turn the trimmer clockwise to reach rated voltage.
	Frequency roll-off	Increase generator speed
	Under Frequency Protection	Please refer to 4.1 Under frequency adjustment
Over Output Voltage	Poor voltage adjustment is made	Turn the trimmer anticlockwise to reach rated voltage. Please refer to the manual.
Instable Output voltage	Poor adjustment is made	Please refer to 4.3 Stability adjustment
	Low field voltage and field resistance	Change or correct the field resistance

- ※ 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.