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Eee Power Solutions

Creative Solution Provider & Manufacturer

One stop shop for all electrical solutions with creativity

Instruction Manual for Automatic Voltage Regulator



Client: _____

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Introduction

We proudly introduce **Eee Power Solutions** is one of the leading manufacturer and solution provider of electrical requirements. A company established to facilitate the customers with optimum solution with innovative and new technologies introduced in the market. Technology that assures optimized performance and accelerated productivity.

We manufacture servo stabilizer, control panel and provide a complete range of electrical equipments that deliver quality and cost efficiency. We also render technical support to ensure that queries are resolved. **Eee Power Solutions** gives the one stop solution to the different customers. The key promoters of the company having more than 15 year industrial experience. The professionals having knowledge and experience in the field of energy management, energy saving, power conditioning. The company has more than 100's satisfying customers.

Our Mission

"Is to achieve excellence in serving best ever solution to customers through continuous improvement in product, quality, delivery and services."

WHY NEED

It is commonly observed that AC main supply is never 230 Volt (phase-neutral) or 400 Volt, (phase-phase) but varies from 120 Volt -300Volt (phase-neutral) and 210 Volt -520 Volt (phase-phase). The difficulties caused by them are well known, such as over load condition, line losses poor power factor and several other reasons. Generally constant voltage which is required to load is never constant but in fluctuation manner. It is observed that during the day time the voltage is quiet low and during the night the voltage is high then the normal.

This fluctuation in supply system results frequent breakdown, **low production and also loss of energy**. The performance of any electrical equipment is optimum at its rated voltage. Both over / under voltages are **harmful for the system**. The under voltage reduces efficiency whereas the over voltage shortens the life.

The power agencies insist the customer to fix the capacitor to **improve the power factor** to get better result in power saving. But Voltage is far more important factor to **save the power loss**.

In case of very low /high voltages, the telecom systems are powered by DG set, our line conditioner unit meets the requirement of input voltage variation from 110V-300V single phase and 200-520v three phase.

In India there is large voltage variation in the mains power supply. To overcome this problem, we are offering line conditioner unit.

General

Automatic Voltage Regulators are automatic line voltage corrector using synchronous motor in close loop control. The stabilizer employ continuously variable auto transformer, buck boost transformer, AC synchronous motor, state of the art IC closed loop control system with all protection, metering indication and control systems to give desire output voltage within the specified limits for a range of input voltages. Provision for manual correction of voltage can also be provided.

Features

➤ **Advanced PIC Microcontroller based advance design.**

- Audio/Visual alarm (optional).
- Manual mode for field testing.
- User programmable parameters:
Under Voltage, Over Voltage, Over Load, Time delay, Output voltage, Sensitivity, CT Ratio
- Auto trip signal for under voltage, over voltage and over load with time delay.
- Digital measures & displays 4 parameters including:
Output Voltage, Input Voltage, Output Current, Frequency
- High accuracy of output voltage within +/- 1%
- Controller is designed with innovative software algorithms residing on latest technology PIC microcontroller chips. The design is conceived so as to **reduce maintenance cost.**
- Suitable for unbalanced input voltage supply
- Panel mounted ergonomic design with easy to operate keys.
- Full integrated drive for AC synchronous servo motor
- Bright 3 digit 7 Segment LED display.
- Oil Temperature Sensor.
- Supports 110 Volts.
- Fully programmable (on site- off site) with 2 – level password protection.

Connection Diagram rear on the controller

1	2	3	4	5	6	7	8	9
	CTS-1	CTS-2				REV	FWD	NEUTRAL
10	11	12	13	14	15	16	17	18
Input Phase	Output phase		Buzzer	Buzzer		Relay NC	Relay NO	Relay COM

Quick Setup, While Power will ON

It is much easier to set up the control panel this selection explains you, how to set up.

1. Connect the meter to the output of Automatic Voltage Regulator
2. Press the Up/Down to select output voltage input voltage, output current, frequency meter or temperature meter

Programming the following parameter for accurate readings.

Parameter	Allowed range		Default
	220V Model	110 V Model	
under voltage (O/P)	170-230	60-120	190V (80V)
over voltage (O/P)	190-270	80-160	250V (140V)
output voltage	180-260	70-150	230V(110V)
sensitivity (O/P)	1-9		±5V
CT ratio	5-999		100 Amps
over load current(O/P)	1-999		100 Amps
over load cut off timer	1-90		10 Sec
delay timer(HI/LO cut off	1-10		2 Sec
code/password	001-999		000

Programming Guide

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- Press *RIGHT*, *LEFT* and *DOWN* simultaneously, until the display shows *COD*.
- Select the three digit password using *UP* and *DOWN* key.
- Press *ENTER* to enter in programming mode. (factory password"000")
- The display will show the programmable parameters in sequence.
- Press *RIGHT* to enter change mode, else *ENTER* to skip.
- Once in change mode, change default value using *UP* and *DOWN* (tip press *RIGHT* to know what parameter you are currently programming.)
- *ENTER* to store the new value and proceed further for next parameter (tip after the "COD" the unit will exit programming mode.)
- For the fast scrolling, Press "*LEFT* and "*UP*" or " *LEFT*" and "*DOWN*"

Under voltage Und	Overvoltage Our	Output Voltage Out
Sensitivity Sen	CT Ratio Ctr	Over load current Oul
Overload Timer OLt	Delay Timer dLy	code password Cod

Manual Mode (Recommended for field testing)

- Press *ENTER* for 10 second to enter Manual Mode for field testing.
- Press *UP/DOWN* to increase/decrease voltage.
- Press *Enter* to exit Manual Mode.

Trip Indications

HI <i>High Voltage</i>	LO <i>Low voltage</i>	OL <i>Over Load</i>
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Current Signal Connections

CAUTION: - Before **wiring, de-energize the CT secondary by shorting it via a shorting block.**

Under no circumstance must the CT secondary be left open circuited, even momentarily, when primary current is flowing. This causes high voltages that will overheat and explode the secondary of the CT and damage the instruments as well.

CT Polarity

When the meter is connected using the CTs, you must maintain the correct CT polarities. CT polarities are dependent upon correct connections of CT leads and upon the direction the CTs are facing when clamped around conductors.

Failure to connect CTs properly result in inaccurate reading. If your meter is not reading data properly, it is more than likely that the CT is incorrectly connected.

Smart Overloading

The meter has provision of smart overloading which can programmed as mentioned below

1. Enter programming mode
2. Scroll down to over load timer
3. Change the default value as per your requirements.
 - A. For regular overload mode i.e. permanent TRIP
OLT should be between 1to 10 seconds
 - B. Smart overload mode
 - C. 11-90 Seconds (i.e.3 auto recovery every (selected) second.
If over loaded for more than 10 seconds

Cable selection chart

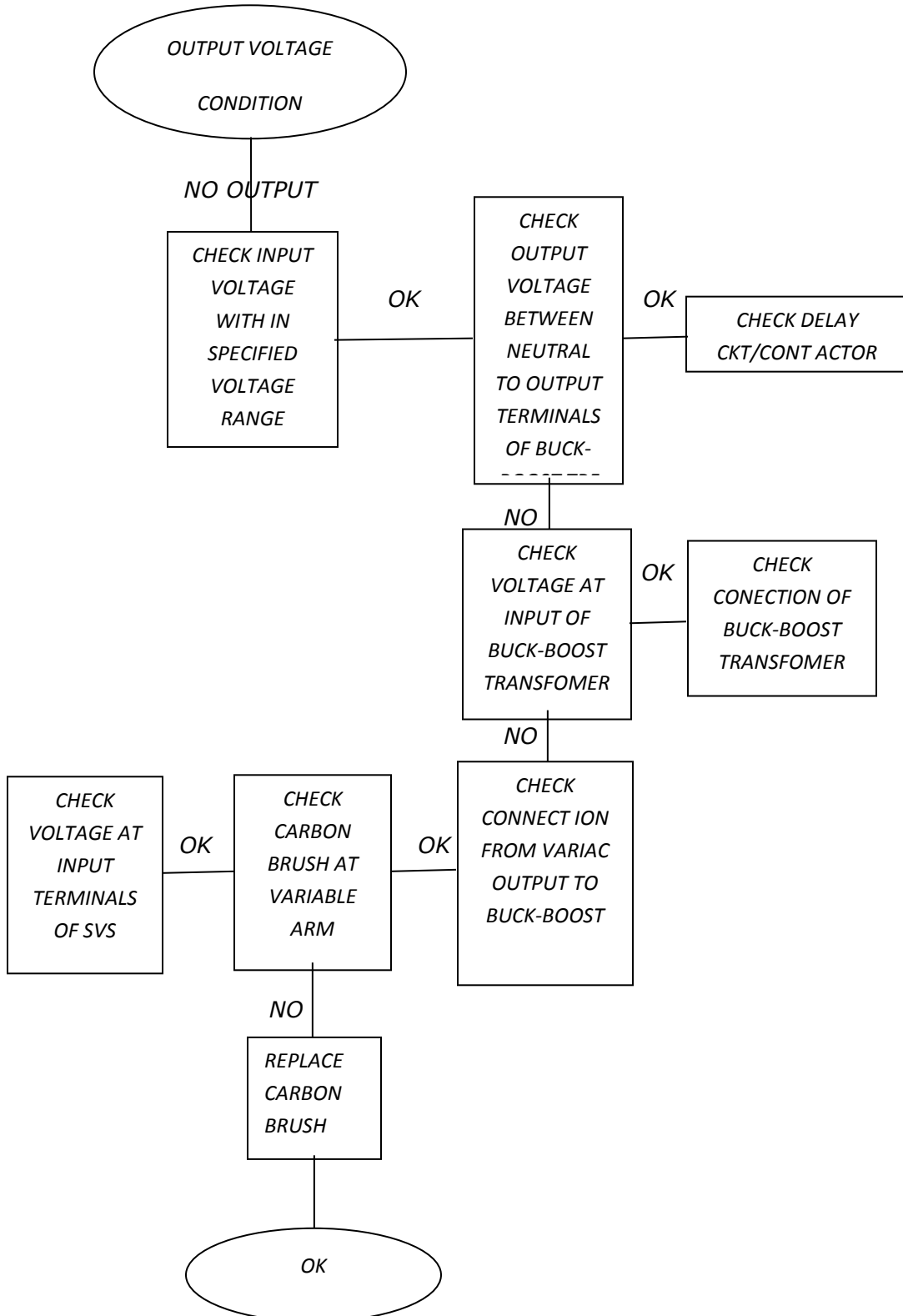
Cable size	Core	Amps
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(sq mm)	(Al)	in Air
10	Three & Half	40
16	Three & Half	57
25	Three & Half	71
35	Three & Half	86
50	Three & Half	105
70	Three & Half	130
95	Three & Half	155
120	Three & Half	180
150	Three & Half	205
185	Three & Half	240
240	Three & Half	280
300	Three & Half	315
400	Three & Half	375
500	Three & Half	410
630	Three & Half	455

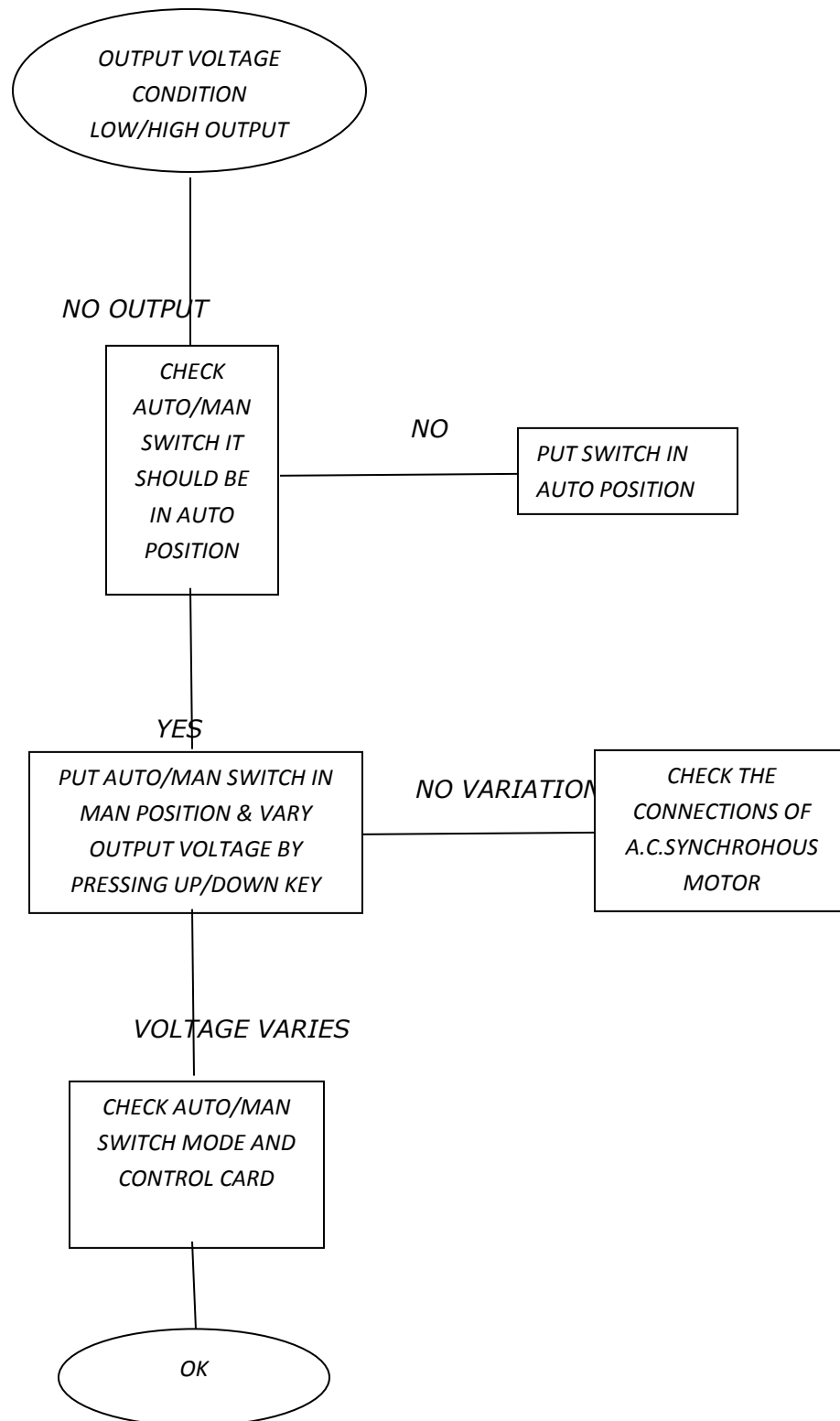
Installation & Operating Procedure:-

- Check for any physical damage to the equipment.
- Connect mains input supply as shown in the below pic i.e. 1U,1V,1W and N to the input terminals provided in the cable box of the servo voltage stabilizer Ensure proper connections thru a suitable ON /OFF Switch & thick wire.
- Connect the output load as shown in the below pic i.e. 2U,2V,2W and N to the outgoing terminals provided in the cable box of the servo voltage stabilizer.
- Connect earthing to Provide at the servo voltage stabilizer
- Put the control panel on the top cover of servo voltage stabilizer
- Connect male/female 24 pin connector
- Keep AUTO / MANUAL switch in auto position
- Now switch on the ON/OFF switch installed at the input supply.
- Now check specified output voltage thru the voltmeter provided at the front panel.
- And programmed require voltage thru RIGHT, LEFT, UP, DOWN programmed key
- Now switch off the mains supply and connect load to output terminals provided at the front of the servo voltage stabilizer
- Ensure proper connections thru suitable thick wire.

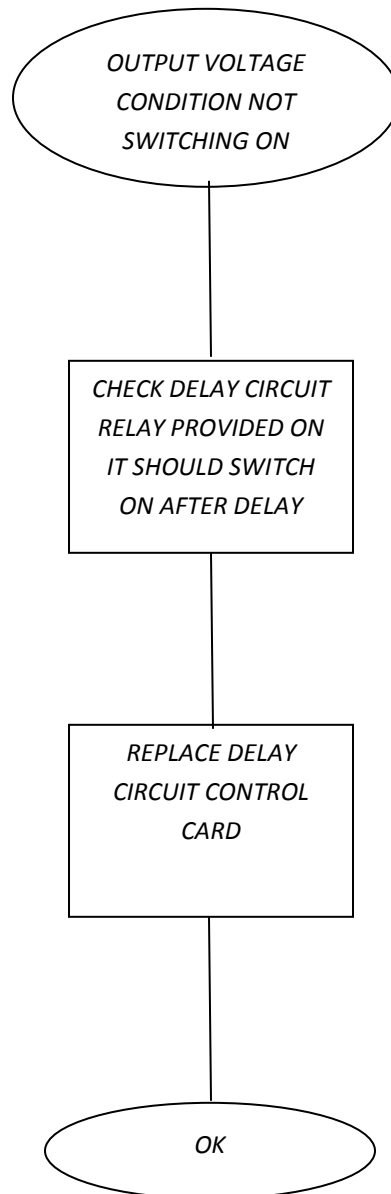
Fault Diagnosis & Remedies



Fault Diagnosis & Remediescont.



Fault Diagnosis & Remediescont.



Specification:-

S.NO	Parameter	Single phase unit	Three phase unit
1	Rating	5kvato25 kva	10 kvato2500kva
2	Input Voltage Range	120to280 volt	210-485 volt
3	Nominal Output Voltage	230Volt	400Volt
4	Output Voltage Accuracy	±1%	±1%
5	Line Frequency Variation	47Hz-53Hz	47Hz-53Hz
6	Effect of power factor	None	None
7	Wave form distortion	None	None
8	Control	Digital	Digital
9	Response Time	10 mili sec.	10 mili sec.
10	Voltage Correction Rate 1. Air Cooled 2. Oil Cooled	8-25V/Sec	14-45V/Sec
11	LCD Display	Input Voltage, Output Voltage, Frequency, Current,	Input Voltage, Output Voltage, Frequency, Current,
12	Programmable Feature	Output Voltage High Voltage Cut-Off Low Voltage Cut-off O/L trip Set Time Delay Set Operating mode(Auto/Manual) CT Selection	Output Voltage High Voltage Cut-Off Low Voltage Cut-off O/L trip Set Time Delay Set Operating mode(Auto/Manual) CT Selection
13	Efficiency	96-99%	96-99%
14	Protection(standard/ optional)	Automatic Switch Off against:- 1. Under Voltage 2. Over Voltage 3. Over Load 4. Single phasing 5. Short Circuit Condition 6. Surge protection	Automatic Switch Off against:- 1. Under Voltage 2. Over Voltage 3. Over Load 4. Single phasing 5. Short Circuit Condition 6. Surge protection

Where we can use

- *Steel plant*
- *Cement plant*
- *Paper mill*
- *Spinning mill*
- *Telecom sector*
- *Automobile sector*
- *Pharmaceutical companies*
- *C.N.C machines*
- *Jal Nigam*
- *M.E.S*
- *Colleges & Institute*
- *Office*
- *Bank*
- *Domestics,*
- *Data Centre*
- *Railway*
- *Metro Rail Corporation*
- *Hotels*
- *Farm house*

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