

INSTRUCTION MANUAL



Electrogard

In quest of perfection

SERVO VOLTAGE STABILIZER



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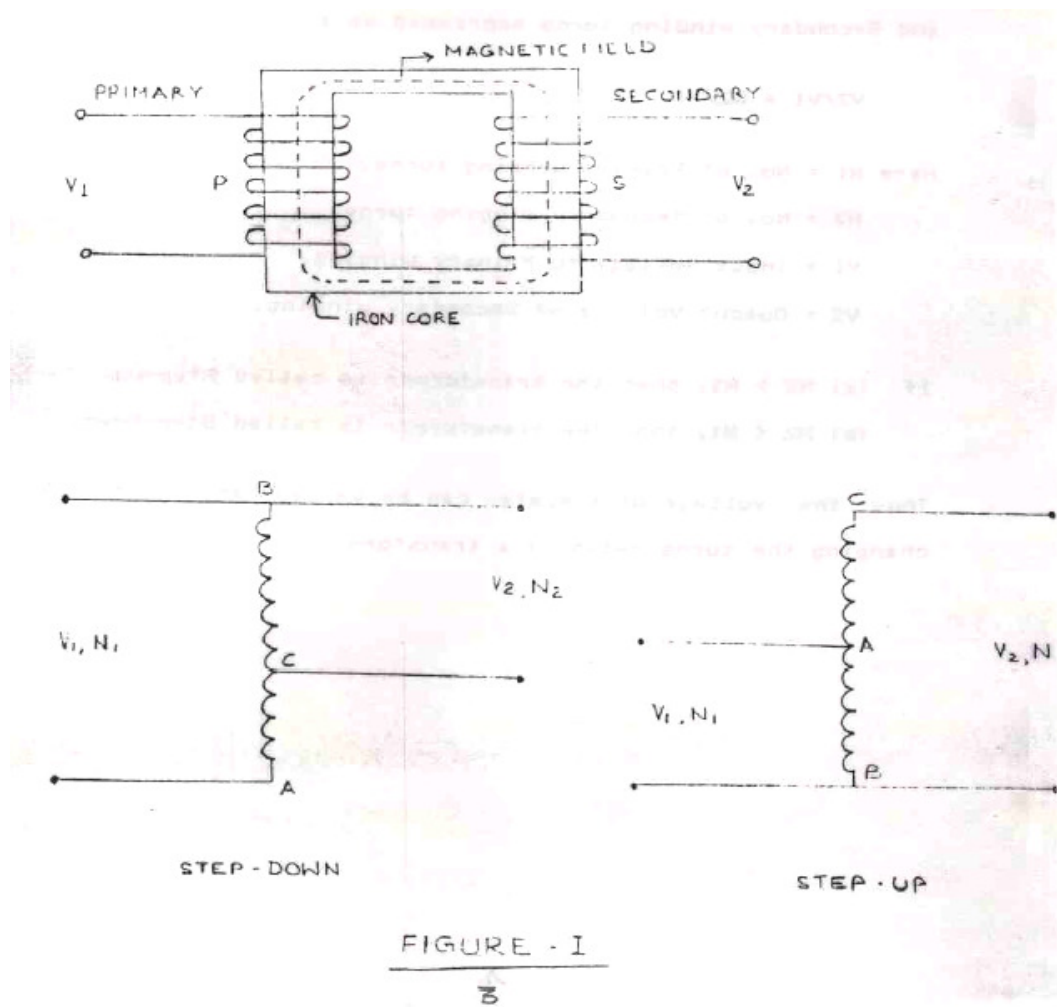


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(1) Introduction to Electrical Transformer :

A transformer is a static A.C. Machine used for transfer of power from one circuit to another without any change in frequency and electrical contact. In its simplest form, transformer consists of two conducting coils, physically separated but magnetically linked. The coil which receives the electric power is called the Primary winding. Both the coils are wound on a laminated core of magnetic material. Figure - I shows magnetic circuit, winding, Input and output of a Transformer.





The two coils have a high mutual inductance. When the primary winding is connected to a source of alternating current an alternating flux is set up in the laminated core. This flux is linked with the Secondary winding produces an induced e.m.f.(voltage) in it. If the Secondary winding circuit is closed a current flows through it. Thus electrical energy is transferred magnetically without any physical contact from the Primary winding to the Secondary winding.

The output voltage depends on the ratio of the Primary winding and Secondary winding turns expressed as:

$$V2 / V1 = N2/N1$$

Here $N1$ = No. Of Primary winding turns.

$N2$ = No. Of secondary winding turns.

$V1$ = Input Voltage to Primary winding.

$V2$ = Output Voltage of Secondary winding.

If (a) $N2 > N1$, then the transformer is called Step – Up.

(b) $N2 < N1$, then the transformer is called step – Down.

Thus the voltage of a system can be varied and controlled by changing the turn's ratio of a transformer.

2. Servo Controlled Voltage Stabilizers:

A system, which provides highly accurate voltage through Servo Motor Controlled System, is called a Servo Controlled Voltage Stabilizer. The transformers used in Servo voltage Stabilizer along with other controls are as under:

- (i) **Continuously Variable Auto Transformer** : It has a single Winding used for input & output as shown in fig-II. Portion AB of the winding is used as Primary winding & CD through a Variable arm is used as Secondary winding where we can have any desired voltage depending on the position of Variable Arm 'D'.

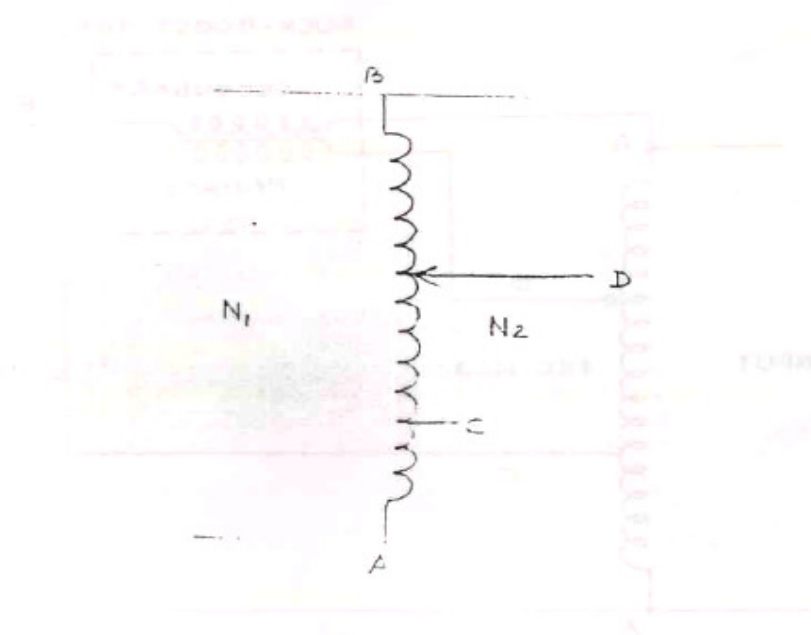


FIGURE- 11

(ii) **Buck-Boost Transformer:** It is a step up Transformer Primary winding of which is connected to secondary winding of variable transformer. Secondary winding of this Transformer is connected in series with the primary winding of variable Transformer as shown in Fig 'III'. Input is applied to AB, Depending on the position of moving Arm 'D'. Voltage of Secondary winding CD is applied to Buck Boost Transformer output of which either Aids or opposes the input Voltage applied. Thus we have a desired output voltage at AE by selecting the Position of Variable Arm 'D'

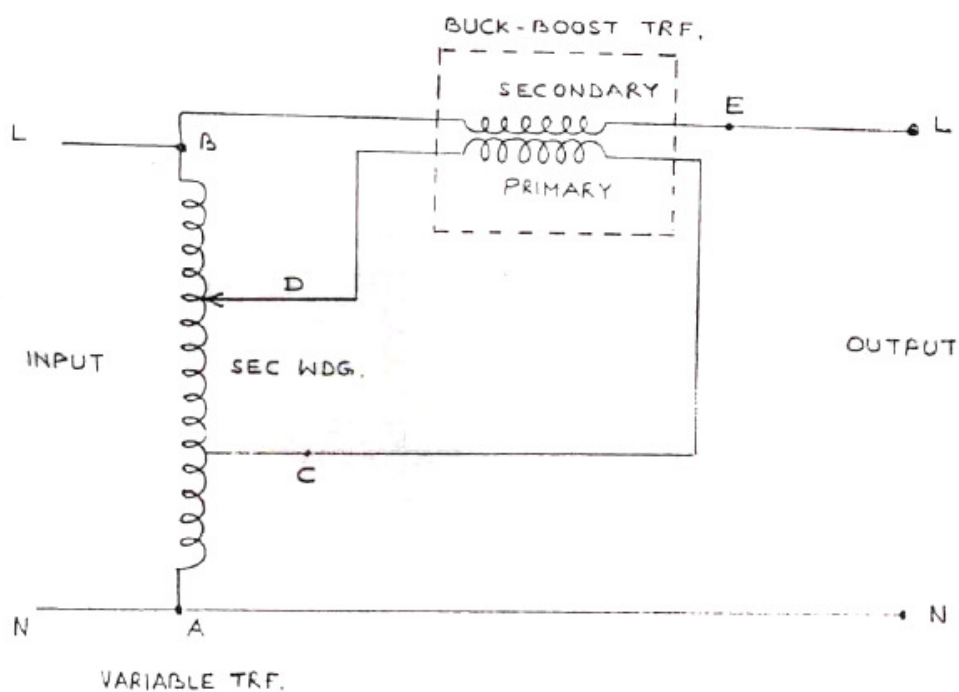
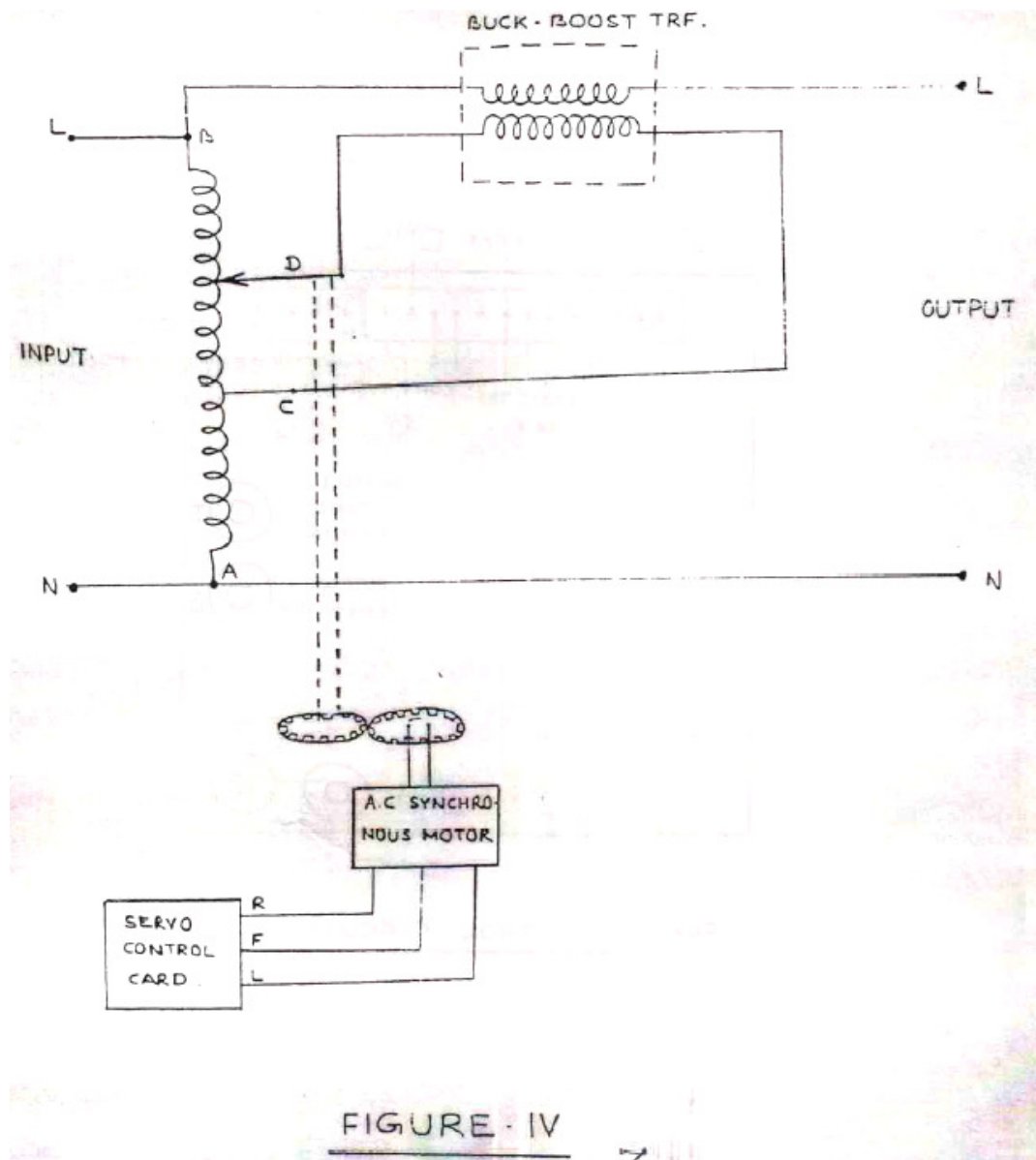
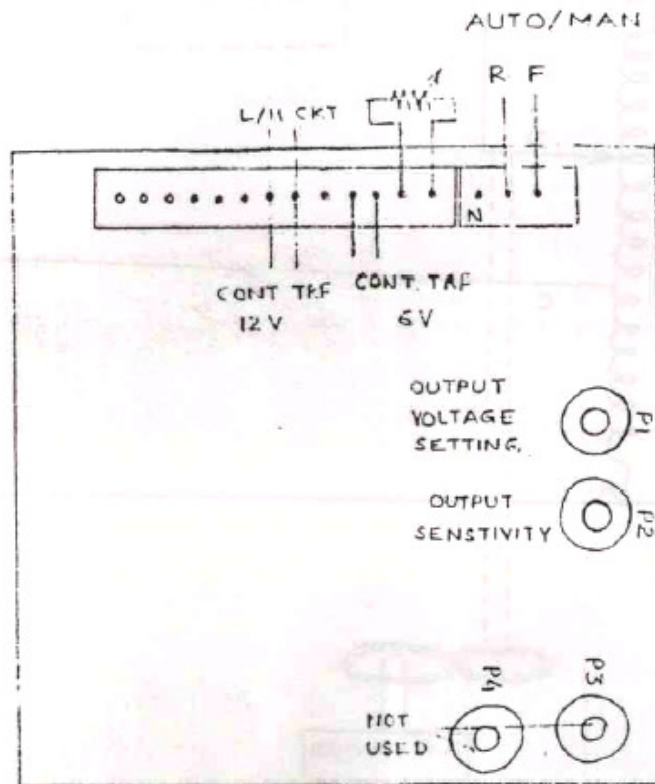


FIGURE - III

- (iii) **Servo Controlled Motor:** This is An AC Synchronous motor which can Rotate Both sides i.e. clockwise or Anticlockwise. It is coupled to variable arm of variable Transformer thru' a reduction gear. The movement of Motor depends on the Power supply given to it thru' a Electronic Control Card. Ref. Fig 'IV'



(IV) **Electronic Control Card:** This device is connected to the output of the stabilizer and senses the error in the output voltage. Depending on the Error either negative or positive it gives power to the Motor, which moves the moving Arm of variable Transformer to correct the error. When the error is corrected the motor comes to a stand still.



SERVO CONTROL CIRCUIT



3. Installation & Operating Procedure:

Check for any physical damage to the equipment.

Connect mains input supply to the input terminals provided at the rear of the Servo voltage stabilizer. Ensure proper connections thru' a suitable ON/OFF Switch & Thick wires.

Keep AUTO / MAN switch in Auto Position and MCB in ON position both provided on the front panel.

Now switch on the unit thru' the ON/OFF switch installed at the input supply.

The stabilizer provides output after a delay of appx.3 minutes when the input is within specified Range i.e. 110-280 Volts for Single Phase & 290-470V for 3 phase supplies.

To override Delay, press Quick start switch provided at the front panel.

Now check specified output voltage thru' the voltmeter provided at front panel. Adjust thru' V ADJ. knob if required.

Now throw AUTO/MAN switch to 'MAN' Position and increase or decrease slightly output voltage with the help of INCR/DECR press switch provided on the front panel.

Age:- throw AUTO/MAN switch to 'AUTO' Position. Output voltage should restore to pre-adjusted voltage.

Now switch off the mains supply and connect load to output terminals provided at the rear of Servo voltage Stabilizer.
Ensure proper connections thru' suitable thick wires.



4. Fault Finding:

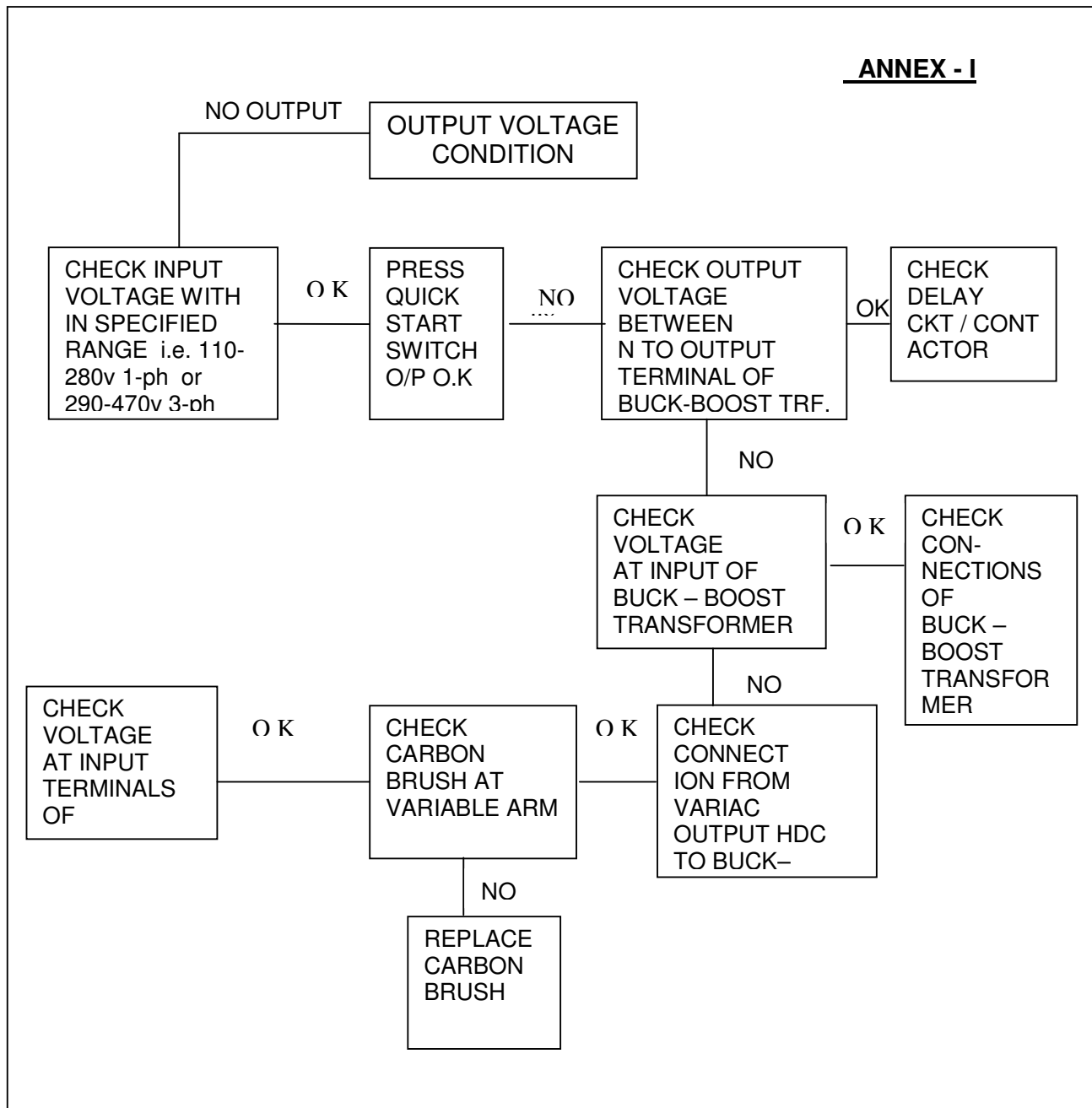
Broadly spreading the commonly encountered faults can be divided into two following categories.

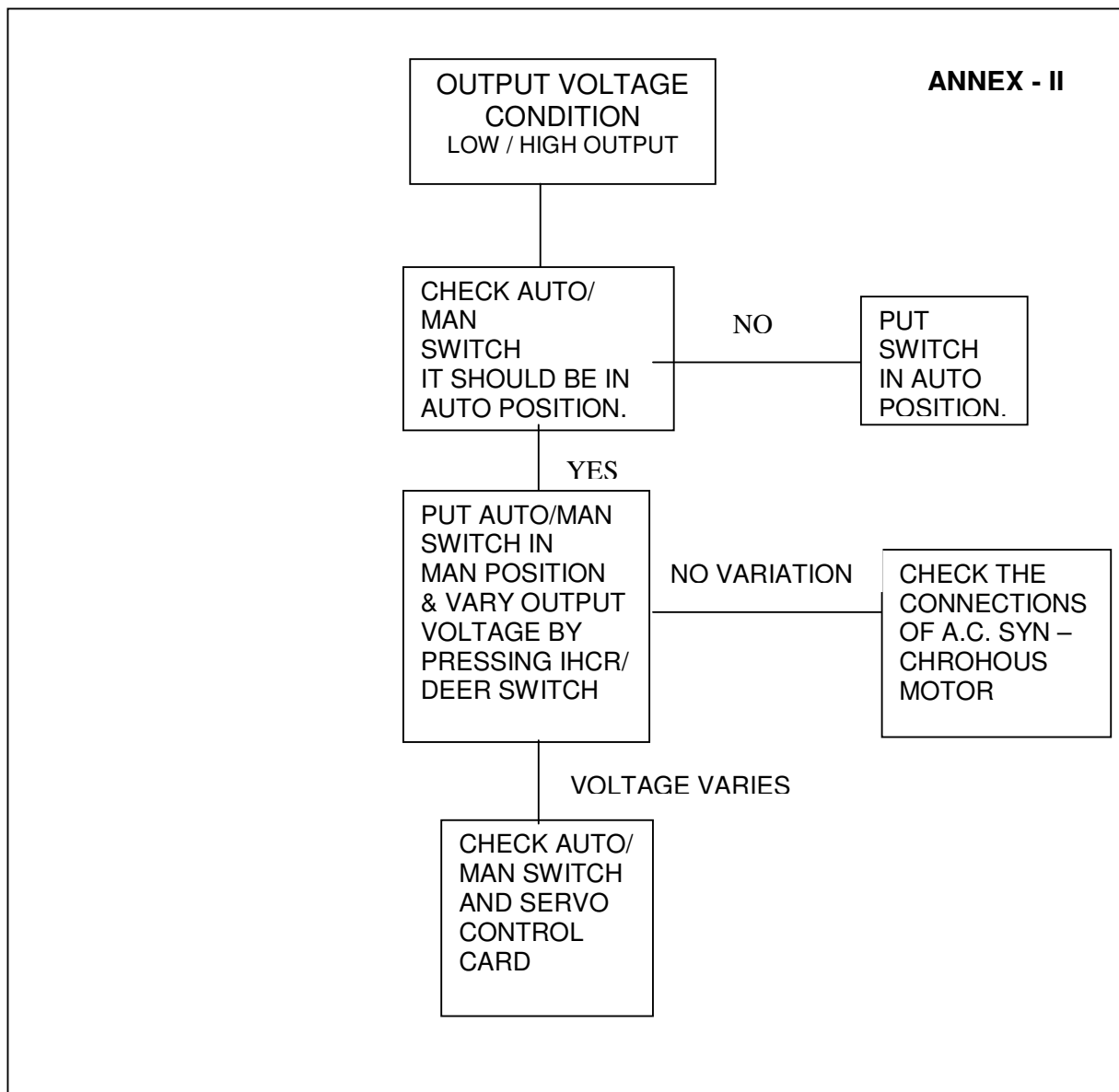
- (a) Faults due to mishandling/tempering viz. poor installation, loose connection, damaged components like switches, MSB, Relays etc. Rain/water splashes damages transformer & other components.
- (b) Faults in control card like component failure, dry soldering etc. However these faults occur rarely.

Fault diagnosis & remedies are given in enclosed sheets as per Annex 1 to 3.



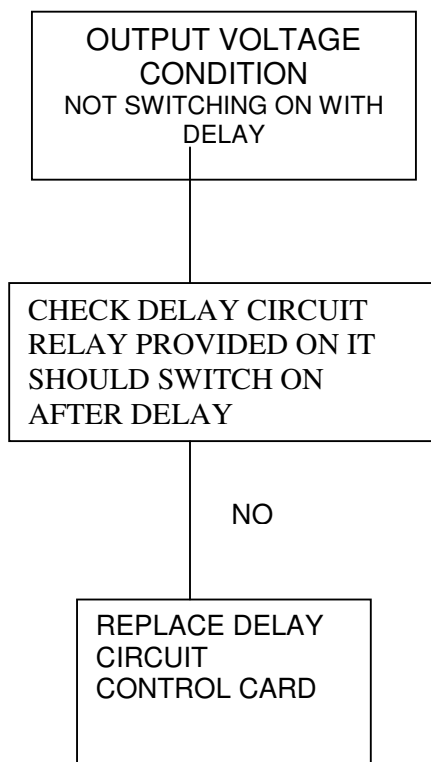
ANNEX - I







ANNEX - III



FRONT PANEL

