

Quality assurance programme is a continuous process envisaging the entire stages of manufacture right from the receipt of components till the fabrication of the end product by the manufacturer. Successful launching of such programme depends upon proper quality audit checks of the records of the manufacturer at appropriate stages in a systematic manner, before the equipment is offered to the Quality assurance officer for quality assurance.

The quality assurance officer should arrange with the manufacturer so that the representative would visit at regular intervals to check the quality control records. Quality assurance officer will also give the firm the areas and stages where such audit is intended to be carried out. Broadly the areas may cover :

- (a) Inward goods check on components/materials
- (b) Inward goods check on sub-assemblies inter stage
- (c) Check on adequacy of accuracy of instruments/calibration

Soon after the manufacturer accepts a contract he starts planning in all possible ways to meet the target date of supplies. Apart from design drawing machine shop efforts would be directed towards purchasing large quantity of components, materials and sub assemblies which are not manufactured in his premises. Quality Assurance officer has to obtain in the first instance from the manufacturer the list of components and the sources of supplies. The Quality Assurance officer can advise the firm to obtain his supplies from the approved sources as far as possible.

On obtaining the adequate first hand information of the planning from the manufacturer, the Quality Assurance officer would decide the area and stages of quality control audit.

The proforma 'A' attached with this instruction is meant to exercise check on the manufacturer's quality control on the incoming materials/components. In the case of a new firm, a thorough scrutiny should be carried out about the system adopted by the firm. The stages and periodicity of checks should be decided by the firm. The factors prevailing in the factors prevailing.

The proforma 'B' is meant to cover the Q.C. audit of the incoming sub-assemblies. It will be interesting to note whether the firm is adopting sampling methods of quality checks or 100 percent quick tests are done on each sub-assembly. In this case the Quality Assurance Officer may advise the firm, regarding the particular assembly being critical/non-critical and the amount of check is adequate or

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Inadequate. In certain cases, it may be advisable to subject final product to screening/aging process as well. By now since the specification, the tests and the parameters are more specific. The firm is expected to thoroughly test the end product before the same is offered for Quality Assurance. Quality Assurance done by the firm before tendering the store for Quality Assurance and records of such testing would be made available to the Quality Assurance Officer and the firm provide the necessary facility and assistance.

Proforma 'C' is meant to check the adequacy of the Test Instruments/equipment/available with the firm. The system adopted by firm to get his instruments calibrated periodically and the source from where he is getting it done should be checked before starting any Quality Assurance activities. It is important to record such noting and the inadequacies should be brought to his notice.

Through these checks right from planning of procurement of stores and inward goods Quality Assurance by the manufacturer to the end product and with the full co-operation of the manufacturer in such programmes, it would not only meet the specified parameters but also a high and a sustained quality of the end product can be maintained. Such systems working successfully would help both the supplier and the purchaser alike instead of getting into complications at a later stage.

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PROFORMA 'A'

QUALITY AUDIT SHEET

(INWARDS MATERIALS | COMPONENTS)

Sl No	Incoming Material/Component	Store	Supplier	Lot No.	Qty	Lot & date	Manufacturer's reference of QC Record	Status (Satisfactory/unsatisfactory)	Re
1				3		4	5	6	7
2									

- * This may also include :
- (a) If there has been a change in the supplier/sub-contractor
 - (b) If there has been a change in the specification
 - (c) If the Quality Assurance Officer has carried out any tests at his discretion
 - (d) Any screening/ageing/burning in test carried out

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QUALITY AUDIT SHEET
(INTER SEAGE SUB ASSEMBLY)

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PROFORMA 1B

Sl No	Interstage sub-assembly	Sub-contractor if any	Batch No & date	Qty	Manufacturer's reference of QC Record	Status satis/ factory/ unsatis/ factory	Remarks (Change of supplier, specification etc. may be noted/analysed. Screening/ageing if done may also be noted)
1	2	3	4	5	6	7	8

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PROFORMA 'C'

RECORD SHEET FOR CALIBRATION OF TEST EQUIPMENTS MEASURING DEVICES
AVAILABLE WITH THE MANUFACTURER

Sl No	*Test equipment/ device available with the manufa cturer	Date last calibrated	Agency by whom calibrated	Manufacturer's ref of record	Remarks (Satisfactory/ Unsatisfactory)
1	2	3	4	5	6

* This will include all those which have been used for manufacture, testing of the processes,
sub-assemblies/assemblies and main equipment

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I.T-5. for Voltage Regulator RN-10.

PART II

Test No/ Test
cl.ref

Test equipments

Test method and requirement

Remarks/ observation

1	2	3	4	5	6
	Al/1.2.1 and 3.2	Checking of completeness and correspondence with drawings :			
		(a) Overall mounting dimensions and outer appearance	(a) Slide call-perse (b) graduated scale (c) Magnifying glass	Overall dimensions shall be as per Drg RN.10.000 G4 (a) Length : 265 mm (b) Height : 108 mm (c) Depth : 196 mm	
	(b) Visual examination			<u>Mounting dimensions</u> centre to centre Lengthwise: 232$\pm$0.25mm Depthwise : 124$\pm$0.25mm Weight: Not to exceed 5 kg Ensure that the voltage regulator is of (i) Good finish. (ii) Quality soldering (iii) Absence from loose fastening (iv) Conforms to the wiring diagram (v) Free from blemishes, cracks (vi) and conforms to standard Engineering practice	

1

2

3

4

5

6

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(vii) The wiring shall be neat and clean and all loose wiring shall be suitably bunched and cleas'd and identification ferrules are provided at each end of the wire

(viii) Regulator shall be marked as per Drg No. RN 10.000 G4

(ix) Aluminium anodised etched/engraved plate ~~wherever~~ required shall be provided by rivetting the same as shown in Drg No. RN 10000 G4

PART III

A2/1.2.2 Test for vibration and vibration at fixed frequency table

This test is carried out in order to detect the crude technological defects encountered during manufacturing process. The regulator shall be checked for correctness of the wiring diagram before subjecting to vibration strength test. The regulator while under subjecting for this test shall be in OFF condition, without shock absorbers and rigidly fastened to the platform of the stand in horizontal position with base downwards

The test shall be carried out in one of the frequency between 20-25Hz at acceleration of Ag for 30 minutes. After the test the following performance check shall be carried out :

(a) Visual examination : There shall be no physical damage to any of the components of the regulator

A2(b)
3.42
3.4.2

1. Variable speed drive with generator VG 8500 N
2. Ammeter 0-10A
3. Ammeter 0-300A
4. Voltmeter 0-50 V
5. Load 300A
6. Rheostats (field circuit)
7. Digital tachometer upto 8000 rpm

Checking
of
voltage
Regulator
circuit

Checking of voltage regulator value (generator's)

Checking of voltage regulator (generator's) value maintained by the regulator during change of speed of rotation of armature of generator and load is done as under:

Connect the voltage regulator Rx.10 to the generator as shown in circuit diagram (with necessary metering and loading)

VR-1. The generator should be capable of running under a variable speed of 3650rpm to 8000 rpm. by a suitable prime mover.

Run the generator on no load with voltage regulator in circuit for not more than

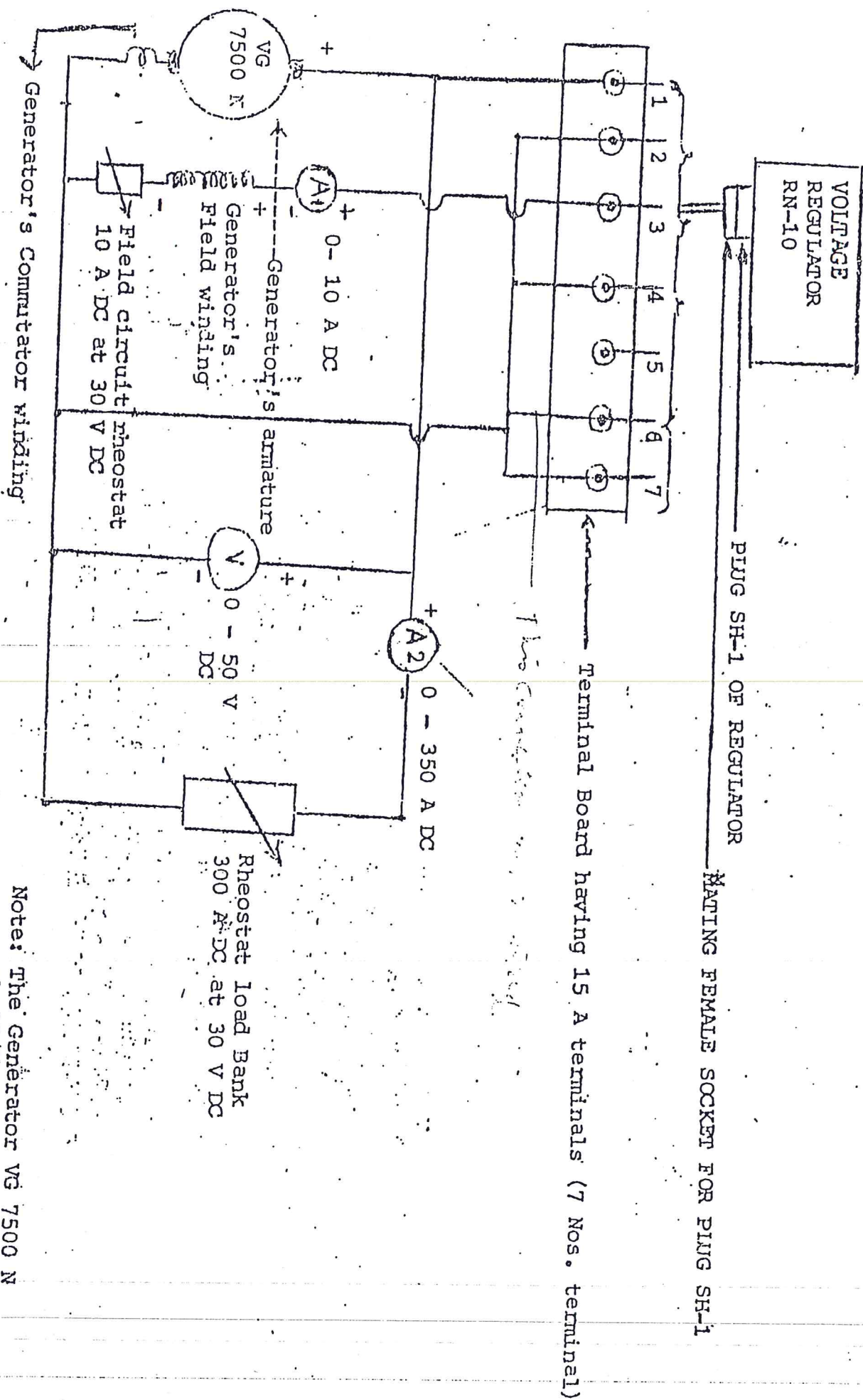
5 minutes. Measure the regulated output voltage by voltmeter V. It should be 26.5 to 28.5V.

Record the readings.

Run the generator at this speed for 4 hours under no load. Adjust the field rheostat so that the ammeter in the field circuit A1 reads 4.5 to 5A. Measure the regulated output voltage of generator read by voltmeter V. The voltage shall be 26.5 to 28.5V. Record the readings

Then vary the load rheostat so that a load current of 10A is flowing through Ammeter A2. Smoothly raise the speed of rotation of generator to 8000 rpm and then smoothly lower it to halt. Measure the regulated output voltages by voltmeter V at the following speeds:

CIRCUIT DIAGRAM VR-1



Note: The Generator VG 7500 N shall be mechanically coupled to variable

A2(c)
-4.3

Checking
of
frequency
of
oscillation.
Hicn.

1. Same as for A2(b) above
2. Incandescent lamp 28V, 10-15W
3. Ammeter DC 30-0-30
4. 24V, 240 Ah storage batteries

C: Checking of frequency of oscillation

Rig up the circuit as per circuit diagram VR.2. Run the generator at 3650 rpm for 5 minutes with batteries connected in parallel. There shall be ~~any~~ flickering of incandescent lamp noticeable to eye. Then gradually increase the speed upto 8000 rpm. Lower the speed smoothly to a value where the generator voltage is equal to the battery voltage. This can be ensured when the ammeter A2 (zero centered ammeter) is showing zero reading. At this condition there shall not be any noticeable flickering of incandescent lamp to the eye.

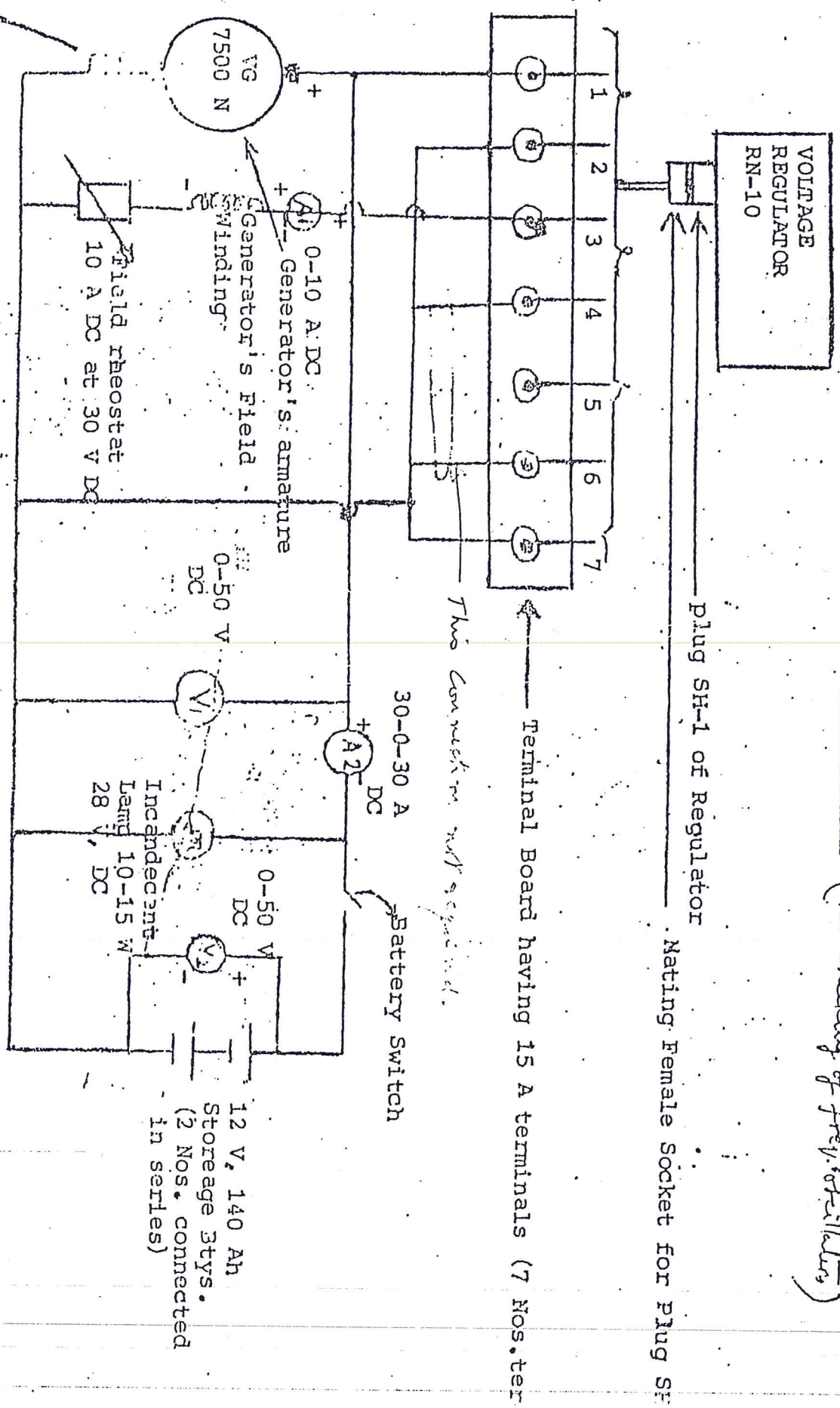
Direct

- (a) At 8000 rpm
(b) At 7000 rpm
(c) At 6000 rpm
(d) At 5000 rpm
(e) At 4150 rpm
(f) At 3650 rpm
- The voltage measured shall be 26.5 to 28.5V. Record the results. Then ~~very~~ the load rheostat so that a load current of 300+ 5A is flowing through the load circuit. Smoothly raise the speed of armature upto 8000 rpm. Then smoothly lower the speed upto its halt. Measure the regulated output voltage by voltmeter V at the following speeds:
- a) 8000 rpm
 - b) 7000 rpm
 - c) 6000 rpm
 - d) 5000 rpm
 - e) 4150 rpm
 - f) 3650 rpm

The voltage measured shall be 26.5 to 28.5V
Record the readings.
Disconnect the set up.

CIRCUIT DIAGRAM VR-2

(For checking of frequency stability)



Generator's commutating winding

Note: Battery switch to be closed after ensuring that

Battery voltage is less than Generator's voltage and no reverse current is flowing through Ammeter A2