



⑥ Magnetisation characteristics

Experiment Name :

DC Shunt Generator Date:

Aim:- Draw the magnetization characteristic of DC Shunt Generation. Determine critical field resistance.

Apparatus:-

① Volt meter MC [0-300V]

② Ammeter MC [0-1A]

③ Tacho meter.

Name plate Details

Starter

DC Motor

DC Generators

Type - 3 point

Type: Shunt

Type: Shunt

Volt - 220V

Arm Voltage: 220V

Arm Voltage: 220V

HP - 5

Arm Current: 19A

Arm current: 13.6A

Man Speed: 1500 rpm

Man Speed: 1500 rpm

HP/kw = 5HP

HP/kw = 3kw

Field voltage: 220V

Field voltage: 220V

Field current: 1A

Field current: 1A

$R_s : 1.8 \Omega$

$R_s : 2.3 \Omega$

Theory:-

The emf produced by the DC generator is proportional to flux acting on the arm gap & speed at which the armature is rotating.



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§ Some internal parameter of the generators. The flux is dependent on the field current of the generator. The flux produced by the field winding acts on the air gap, § armature core.

For satisfactory voltage build up, the following conditions are to be satisfied.

- ① presence of residual magnetism.
- ② correct direction of rotation.
- ③ the field circuit resistance must be less than the critical resistance.

The magnetization characteristic show the relation between the no load generated e.m.f (E_0) § the field current (I_f). Magnetization curve is practically same for all generators. The voltage equation of a D.C generator is given by
If speed is constant in the above relation E is directly proportional to flux, when field current is increased from its initial small value, generated from its R_{mf} E_0 increases

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directly with the field current till the poles are saturated. But as the flux increases, the poles become saturated & the generated e.m.f becomes almost constant. Due to residual magnetism in the poles, small e.m.f is generated even, when $i_f = 0$, hence, the curve starts little way up. It is to be noted that magnetization curve for a higher speed should be above this curve & for lower speed it would be below the curve.

Procedure

- ① Connections are made as per circuit diagram.
- ② Keep the field regulator of DC motor in min position & field regulator of DC generator in max position.
- ③ DC supply is given to the motor.
- ④ DC motor is started with help of 3-Point.
- ⑤ Open the switch 'S' note voltmeter readings.
- ⑥ Close the switch 'S' note down corresponding ammeter & voltmeter readings by

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Varying field regulator of generator with constant speed.

- ⑦ Bring all regulators to their initial position & switch off the supply.
- ⑧ Draw the graph b/w I_f & E_o and find the critical field resistance of Dc Shunt generator.

Precautions:-

- ① Avoid loose connections.
- ② Take the readings without error.

Result:-

The critical field resistance is determined.