

SHUNT, SERIES, COMPOUND EXCITED DIRECT CURRENT MACHINE

Experiment 1: No-Load Speed Characteristic of a DC Shunt Motor

Um	Im	Iu	n d/dak	Exp

Evaluation :

1)Explain what happens if the motor is started without using the starting rheostat.
2)Explain what happens to the rotational speed (n) when the field current (Iu) decreases.
3)Does the armature current (Im) change as the rotational speed (n) increases? Explain the reason.
4)Explain how the speed of a DC shunt motor is adjusted, and whether the speed can be changed when the field resistance is zero (field rheostat short-circuited). Describe how this can be done.
5)Using the experimental data, plot the no-load speed characteristic curve of the DC shunt motor showing the relationship between (n) and (Iu).
6)Explain the observations you obtained at the end of the experiment.

Experiment 2: Load Operation of the DC Shunt Motor – External Characteristic

Um	Im	Iu	n	Nm	Exp
200 V 200 V 200 V 200 V 200 V 243 V					

Evaluation:

1)Does the motor speed change as the load increases? Explain the reason.
2)Does the field circuit current change when the armature current (Im) varies? Explain the reasons.
3)What happens if the motor terminal voltage is not kept constant as the load increases? Explain.
4)Why does the motor current increase as the load increases? What happens to the voltage drop caused by the armature internal resistance?
5)What happens if the motor is operated at its nominal load without using a starting procedure? Observe and explain the reasons.
6)Using the measured Im and n values, plot the load characteristic curve of the motor, explain your observations at the end of the experiment, and compare and analyze the results with the measured torque (Nm) values.

Experiment 3: Starting and Load Operation of the DC Series Motor

Um	Iy	Im	Um	n	Exp

Evaluation:

1)Using the values obtained in the experiment, plot the loaded operating characteristic curve of the DC series motor showing the relationship between load current (Iy) and rotational speed (n).

2)Why does the speed change when the load varies?

3)Is the relationship between load and speed proportional? At which load condition does the speed change behave differently? Explain the reason.

4)Why cannot a DC series motor be operated under no-load conditions, and what happens if it is operated without load? Explain.

5)What happens if the motor is started without a starting rheostat? What can be used instead of a starting rheostat, and how is speed control achieved in a DC series motor? Explain.

6)Explain your observations at the end of the experiment.

Experiment 4: Measurement of Armature and Field (Excitation) Resistance

Evaluation

1)Using the U–I values recorded during the armature resistance measurement, calculate the armature resistance.
2)Explain why the series pre-resistor (Rö) is used during the armature resistance measurement.
3)Why did the armature (DC machine shaft) begin to rotate during the armature resistance measurement? Analyze the measured U–I values and the calculated resistance (R) in this context.
4)Using the U–I values recorded during the field resistance measurement, calculate the field (excitation) resistance.
5)Explain why a series pre-resistor is required when measuring the series field winding resistance.
6)List the components of the DC machine used in the experiment.
7)Explain your observations at the end of the experiment.