EXPERIMENT NO. 9

DISPLACEMENT MEASUREMENT BY LINEAR VARIABLE DIFFERENTIAL TRANSFORMER (LVDT)

1. **Course, Subject & Experiment Details**

Course & Semester	First Year Bachelor of Technology (F.Y. B.Tech.) – Semester II
Subject Name	Measuring Instruments & Testing Tools (MI&TT) – VSE11EC01
Title of Experiment	Displacement Measurement by Linear Variable Differential Transformer (LVDT)
Chapter No. & Unit No.	Ch.5 – Sensors & Transducers (Unit No. 5.4)
Lab Outcomes (LO)	**CO-4 :-** Select suitable test & measuring instrument for any given system, application

2. **Student Details**

Student's Name			
Roll / ID No.		**Student's Signature**	

3. **Assessment Rubrics & Evaluation**

| Attendance, Preparation, Credibility & Timeline (02 Marks)	Experiment Setup & Performance (02 Marks)	Involvement & Participation (03 Marks)	Data Evaluation & Format Presentation (03 Marks)	OVERALL MARKS (10 Marks)
Regularity in Approach	Practical Skills	Team Work & Ethics	Analysis & Capability	
Assessment by Subject Faculty I/C	**Dr. Deepak V. Bhoir** **Professor, Dean – Academics & Subject I/C**			

4. **Aim & Objective of Experiment**

- To understand the physical construction of the linear variable differential transformer (LVDT)
- To practically operate the linear variable differential transformer (LVDT) for displacement measurement
- To sketch the input & output characteristics of the linear variable differential transformer (LVDT)
- To determine the sensitivity & linearity of linear variable differential transformer (LVDT)

5. **Expected Outcomes of Experiment**

- Students are able to understand the physical construction of the linear variable differential transformer (LVDT)
- Students are able to practically operate linear variable differential transformer (LVDT) for displacement measurement
- Students are able to sketch the input & output characteristics of the linear variable differential transformer (LVDT)
- Students are able to determine the sensitivity & linearity of linear variable differential transformer (LVDT)

6. Hardware Setup & Configuration
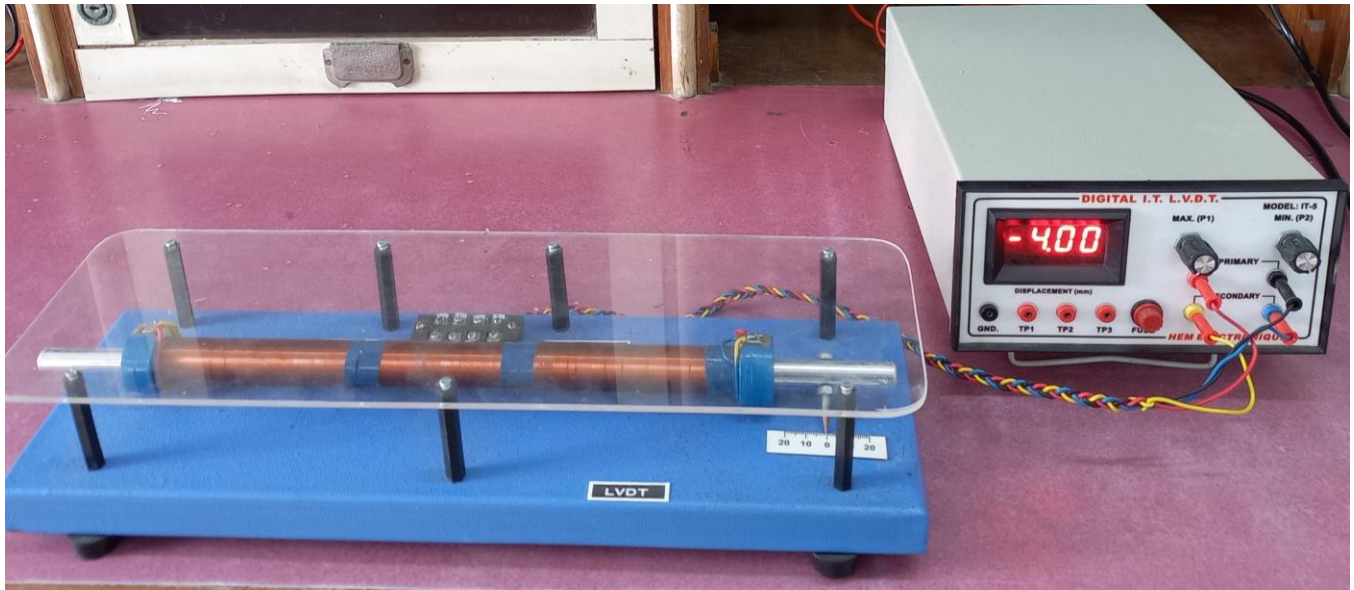
7. Experimental Procedure

1. Arrange the experimental setup & make appropriate connections as shown in the diagram.
2. With the shaft centered to the scale reading at zero (0) note down the corresponding output voltage.
3. Move the shaft inwards & record the corresponding output voltage, which should have negative polarity.
4. Move the shaft outwards & record the corresponding output voltage, which should have positive polarity.
5. Plot a graph of the input displacement (x) against the corresponding output voltage (V_o).
6. Measure the sensitivity & linearity of the LVDT from the input – output characteristics.

8. Observation Table

No.	Input Displacement x (mm)	Output Voltage V_o (mV)
1	– 20 mm	
2	– 19 mm	
3	– 18 mm	
4	– 17 mm	
5	– 16 mm	
6	– 15 mm	
7	– 14 mm	
8	– 13 mm	
9	– 12 mm	
10	– 11 mm	
11	– 10 mm	
12	– 9 mm	
13	– 8 mm	
14	– 7 mm	
15	– 6 mm	
16	– 5 mm	

No.	Input Displacement x (mm)	Output Voltage V_o (mV)
17	– 4 mm	
18	– 3 mm	
19	– 2 mm	
20	– 1 mm	
21	0 mm	
22	1 mm	
23	2 mm	
24	3 mm	
25	4 mm	
26	5 mm	
27	6 mm	
28	7 mm	
29	8 mm	
30	9 mm	
31	10 mm	
32	11 mm	
33	12 mm	
34	13 mm	
35	14 mm	
36	15 mm	
37	16 mm	
38	17 mm	
39	18 mm	
40	19 mm	
41	20 mm	

9. Input & Output Characteristics

Students are required to sketch the input & output characteristics, from the above observation table showing the variations in the output voltage (V_o) with changes in the input displacement (x) in a neat & systematic manner

10. Post Lab Questions

1. With a neat sketch / diagram, describe the construction of linear variable differential transformer (LVDT).
2. Explain the working / operation of the linear variable differential transformer (LVDT) a with neat sketch / diagram.
3. Describe the characteristics of the linear variable differential transformer (LVDT) with a neat sketch / diagram.
4. Mention the various advantages & disadvantages of the linear variable differential transformer (LVDT).

11. Conclusions & Inferences

Students are required to mention their conclusions & inferences by performing the experiment through the observation table obtained, the calculations performed (if any) & the input-output characteristics

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