

Chapter 6
Linear Position or Force Applications

**Objectives of
this Chapter**

Having studied this Chapter you will be able to:

- Describe the construction, principle and characteristics of a Linear Variable Differential Transformer (LVDT).
- Describe the construction and characteristics of a linear variable capacitor.
- Describe the construction and characteristics of a strain gauge.

**Equipment
Required for
this Chapter**

- DIGIAC 1750 Transducer and Instrumentation Trainer.
- 4mm Connecting Leads.
- Digital Multimeter.
- Oscilloscope.

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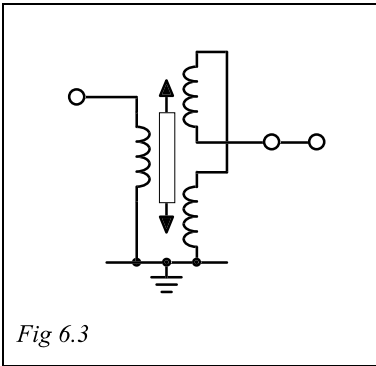
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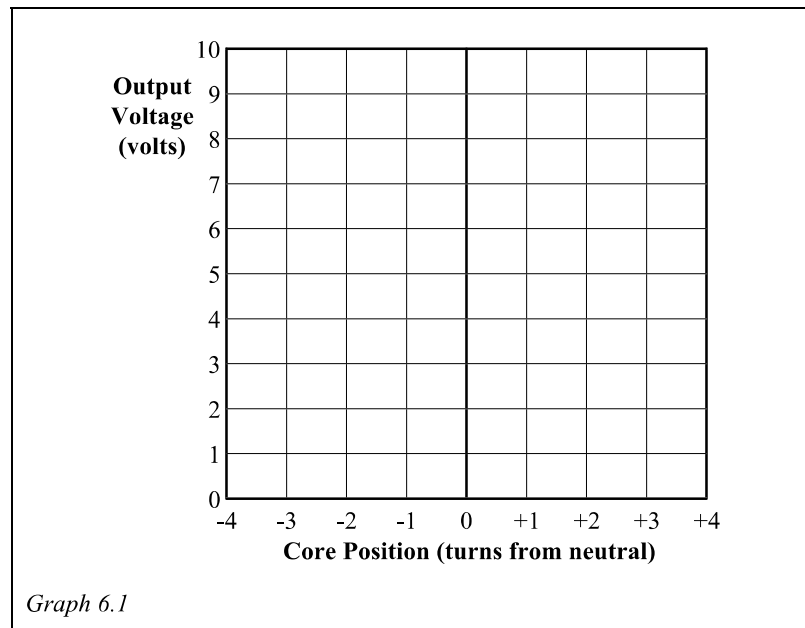
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6.2 Practical Exercise
Characteristics of a Linear Variable Differential Transformer

Core position (turns from neutral)		-4	-3	-2	-1	0	+1	+2	+3	+4
Output Voltage	Digital meter	V	V	V	V	V	V	V	V	V
	Analog meter	V	V	V	V	V	V	V	V	V

Table 6.1



Graph 6.1

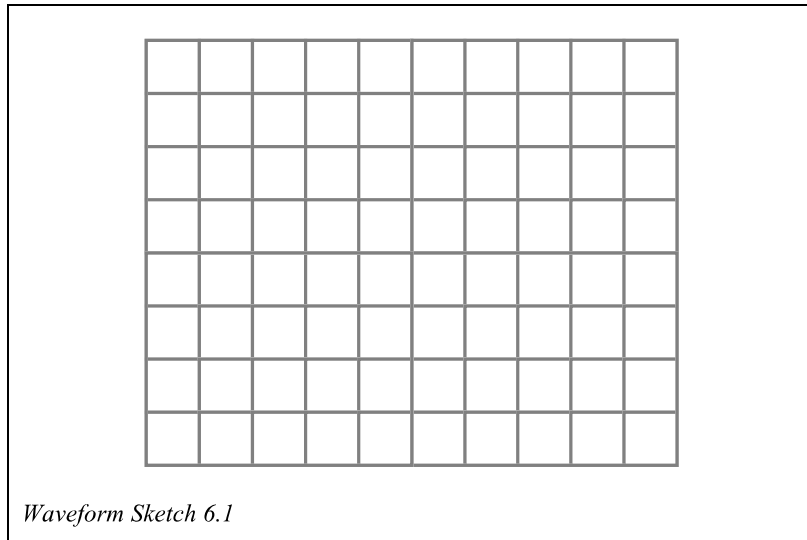
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6.2a Minimum voltage reading from the digital multimeter **mV**

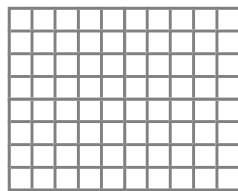


6.2b Voltage reading from the analog multimeter when the core is turned 2 turns out (-2) from the neutral position **V**



6.2c

The waveform sketch, for perfectly coupled coils, would look most like:



Note your response

Notes:

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6.3 The Linear Variable Capacitor

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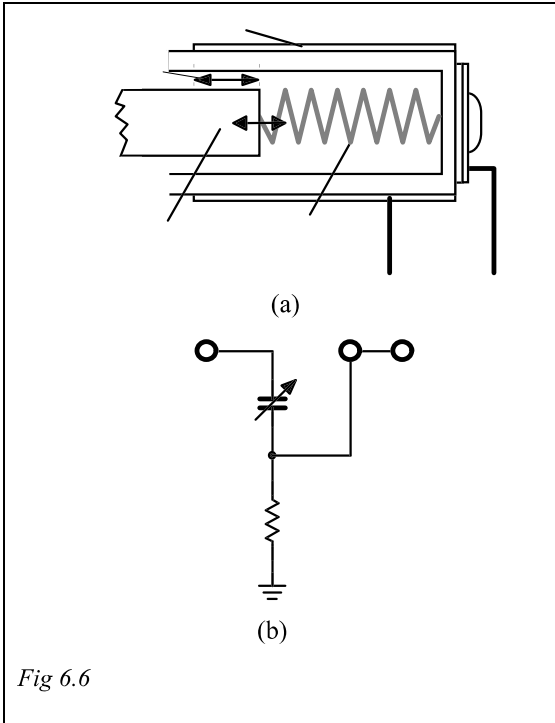


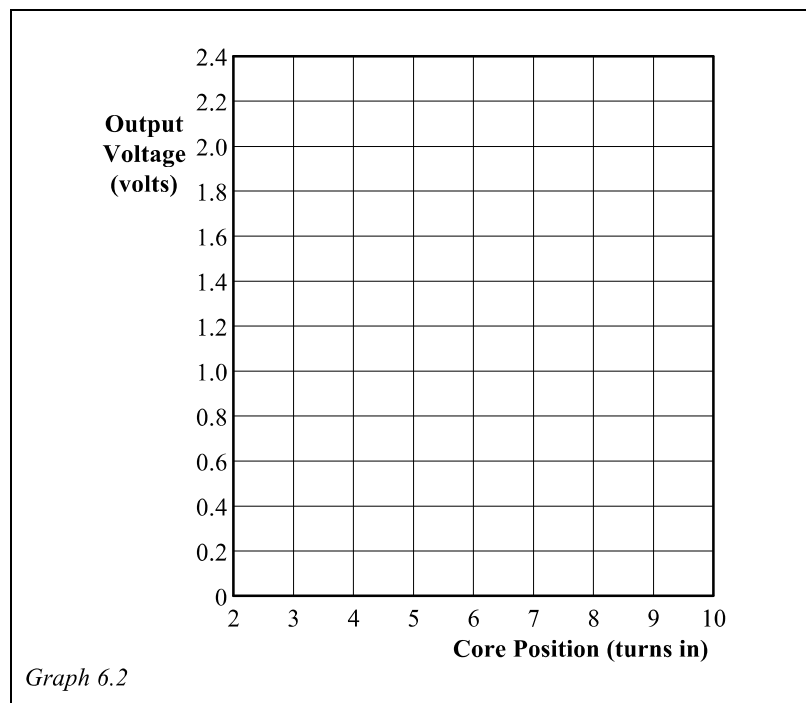
Fig 6.6

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6.4 Practical Exercise
Characteristics of a Variable Capacitor Transducer

Approximate Capacitance	25pF	←Screw full out, minimum									Screw full in, maximum→		50pF
Turns of screw	0	1	2	3	4	5	6	7	8	9	10		
Output Voltage	0 V	V	V	V	V	V	V	V	V	V	V	V	

Table 6.3



Graph 6.2

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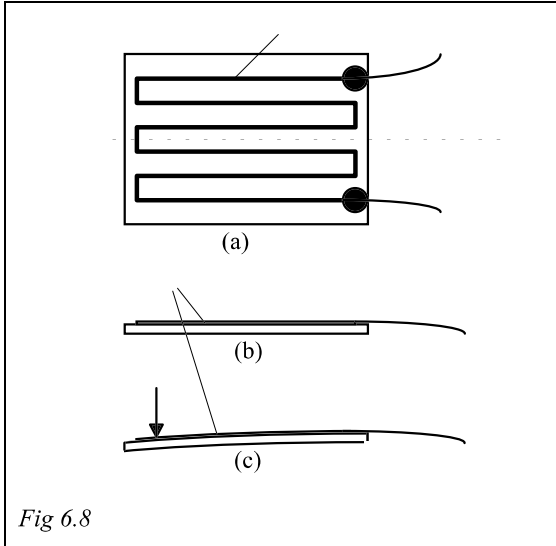


6.4a Output voltage when the core is in position 4 above V



6.4b Is the characteristic linear? YES/NO

6.5 The Strain Gauge Transducer



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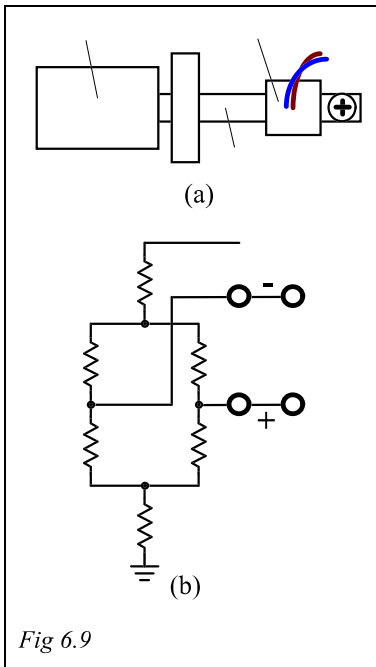
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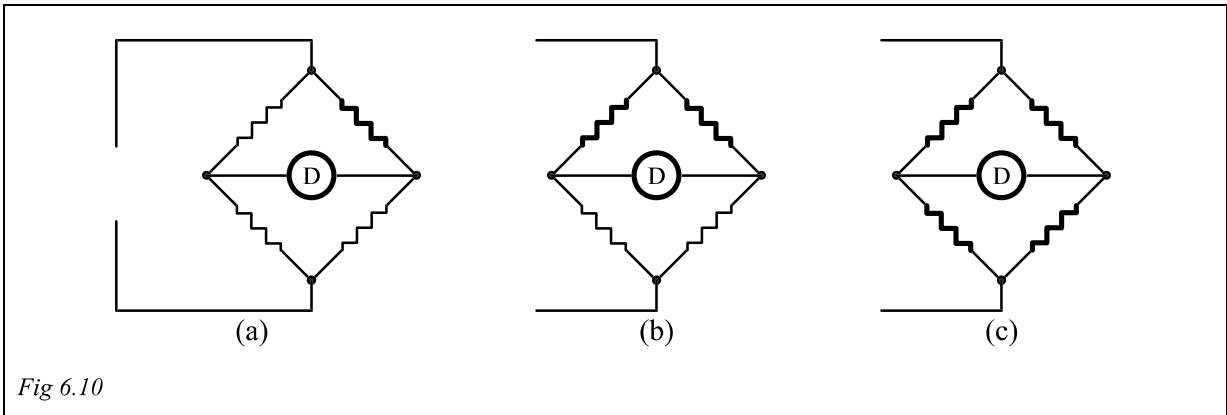
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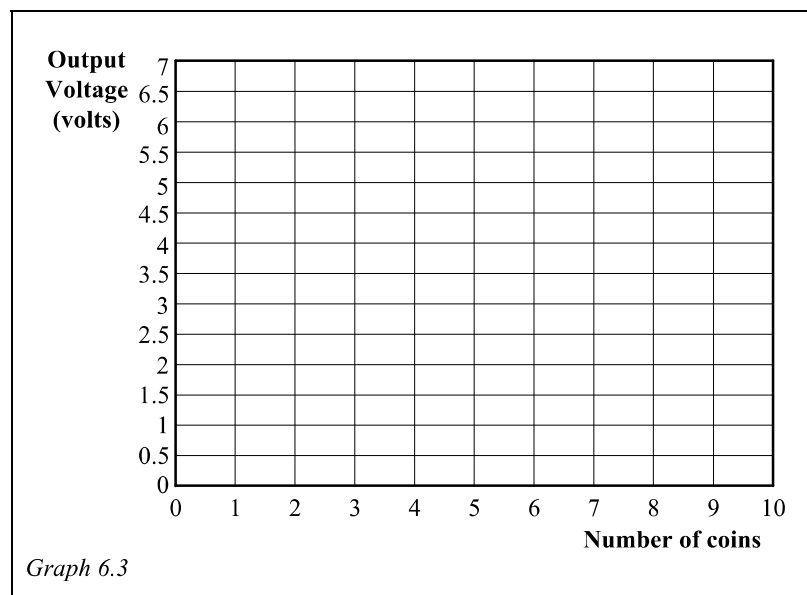
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6.6 Practical Exercise
Characteristics of a Strain Gauge Transducer

Number of coins	0	1	2	3	4	5	6	7	8	9	10
Output Voltage	0 V	V	V	V	V	V	V	V	V	V	V

Table 6.5



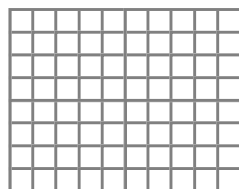
Graph 6.3



6.6a Output voltage obtained with four coins on the platform V



6.6b Your characteristic sketch is most similar to:



Note your response