UC Berkeley
Mechanical Engineering Department

ME103:: Experimentation and Measurements

Lecture #8

ME103:: Experimentation and Measurements

Engineering Ethics & Measurements

Many of these have come up without the ethics-label

- Falsifying Data
- Ignoring Outliers without justification
- Copying Data
- Ignoring Safety during Experiments

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gradescope

Lab 0 - Data Collection and Uncertainty

● Ungraded

[redacted]

Total Points

- / 54 pts

Question 1

General Lab Report Layout		15 pts
1.1	Name and Title	1 pt
1.2	Introduction/Background	2 pts
1.3	Methods and Methodology	3 pts
1.4	Data	3 pts

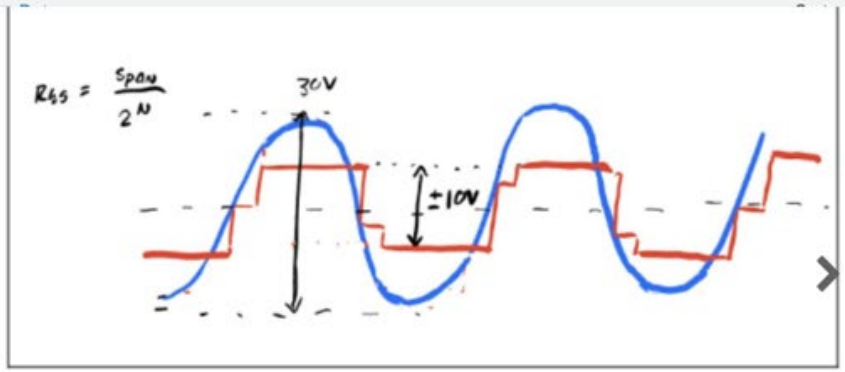

Figure 8: Expected DAQ output wave.

All Pages

Select a question.

More

Resubmit

Next Question

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[redacted]

Total Points

- / 54 pts

Question 1

General Lab Report Layout 15 pts

1.1 Name and Title 1 pt

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1.3 Methods and Methodology 3 pts

1.4 Data 3 pts

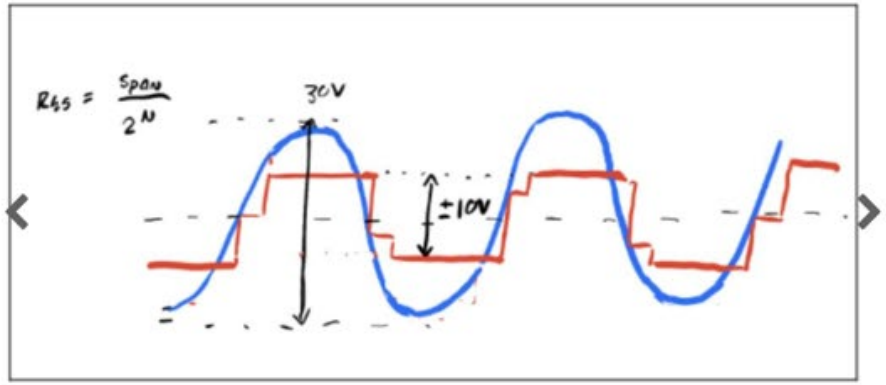

Figure 8: Expected DAQ output wave.

All Pages

Select a question.

More

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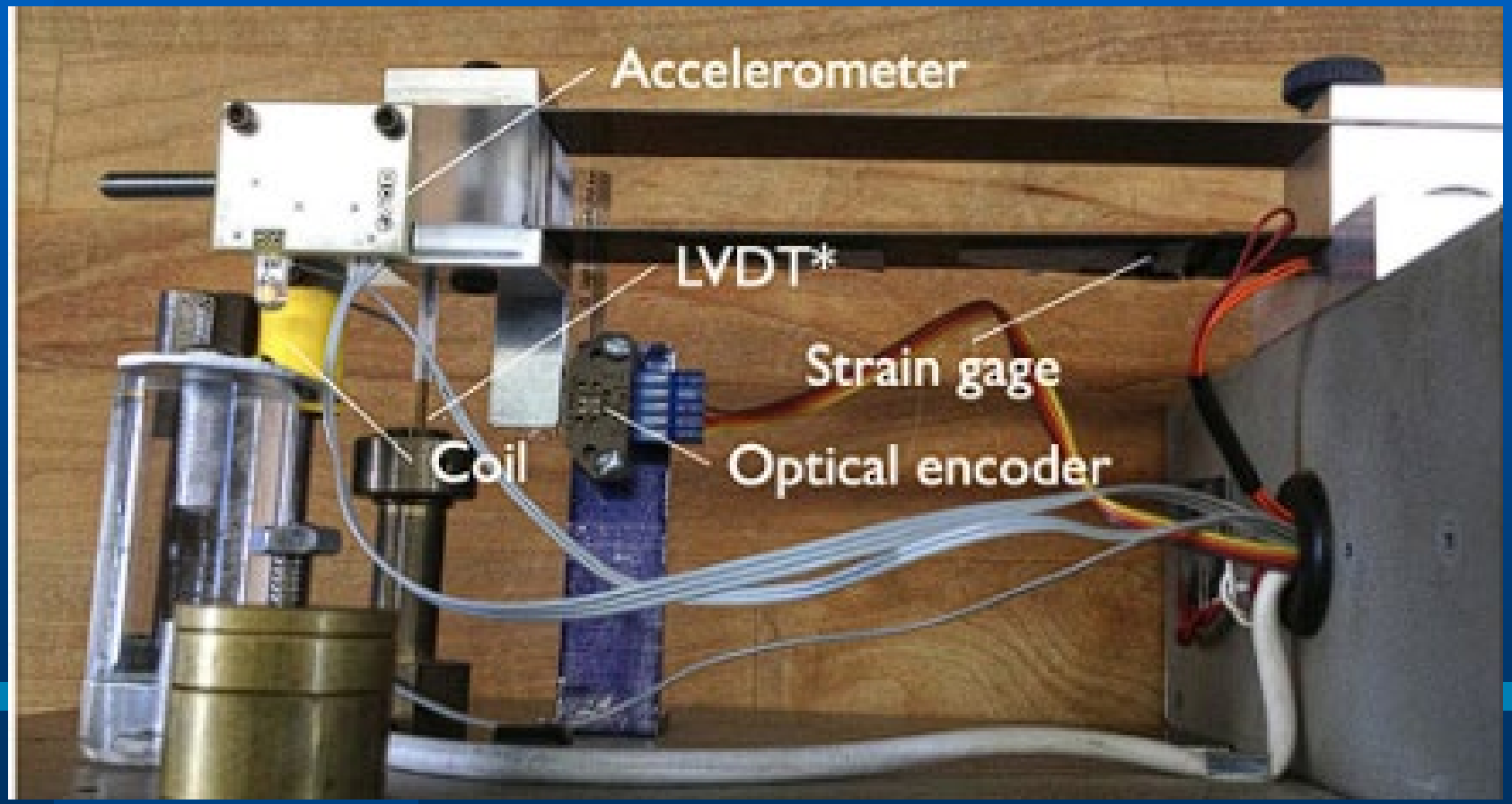
Lab #3 Vibrating Beam



Sensors :

1. Accelerometer
2. Strain Gage
3. Optical Encoder
4. Linear variaable Differential Transformer

Actuators :

1. Voice Coil

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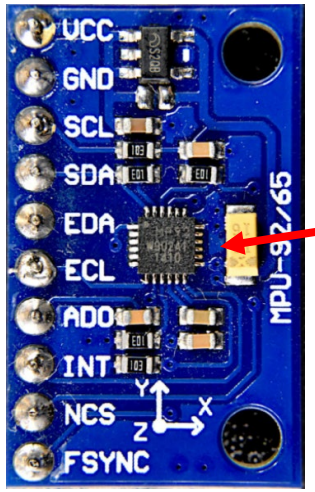
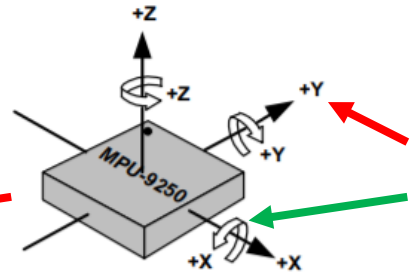
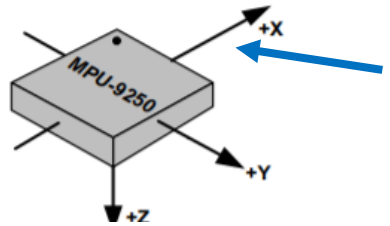
1. Accelerometer

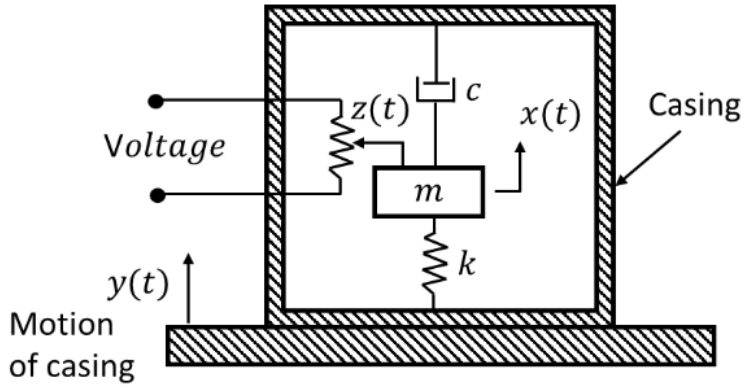
- MEMS device
- Output voltage proportional to accelerometer
- Effected by gravity





3-axis Accelerometer
3-axis Gyroscope





In the absence of gravity

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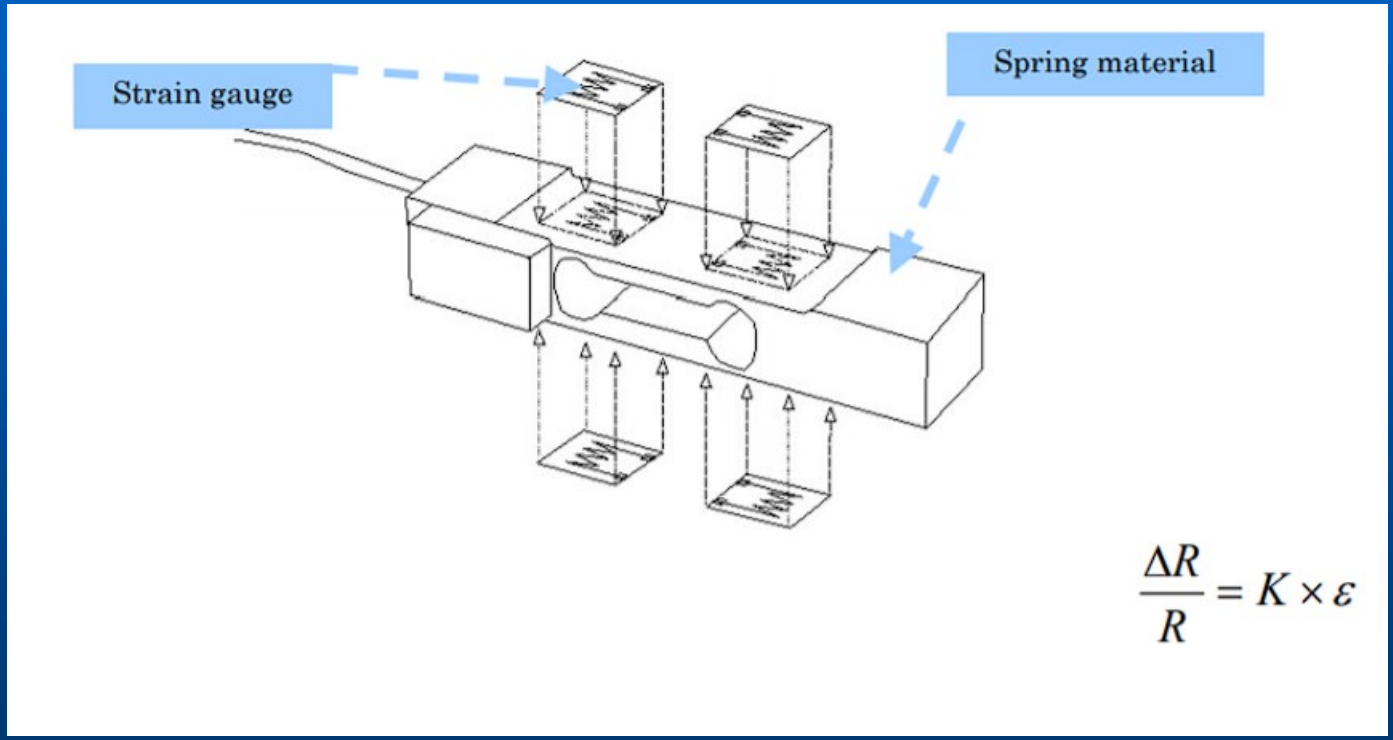
1. Strain Gage

   - Typically 4 resistors arrange in a Wheatstone Bridge configuration



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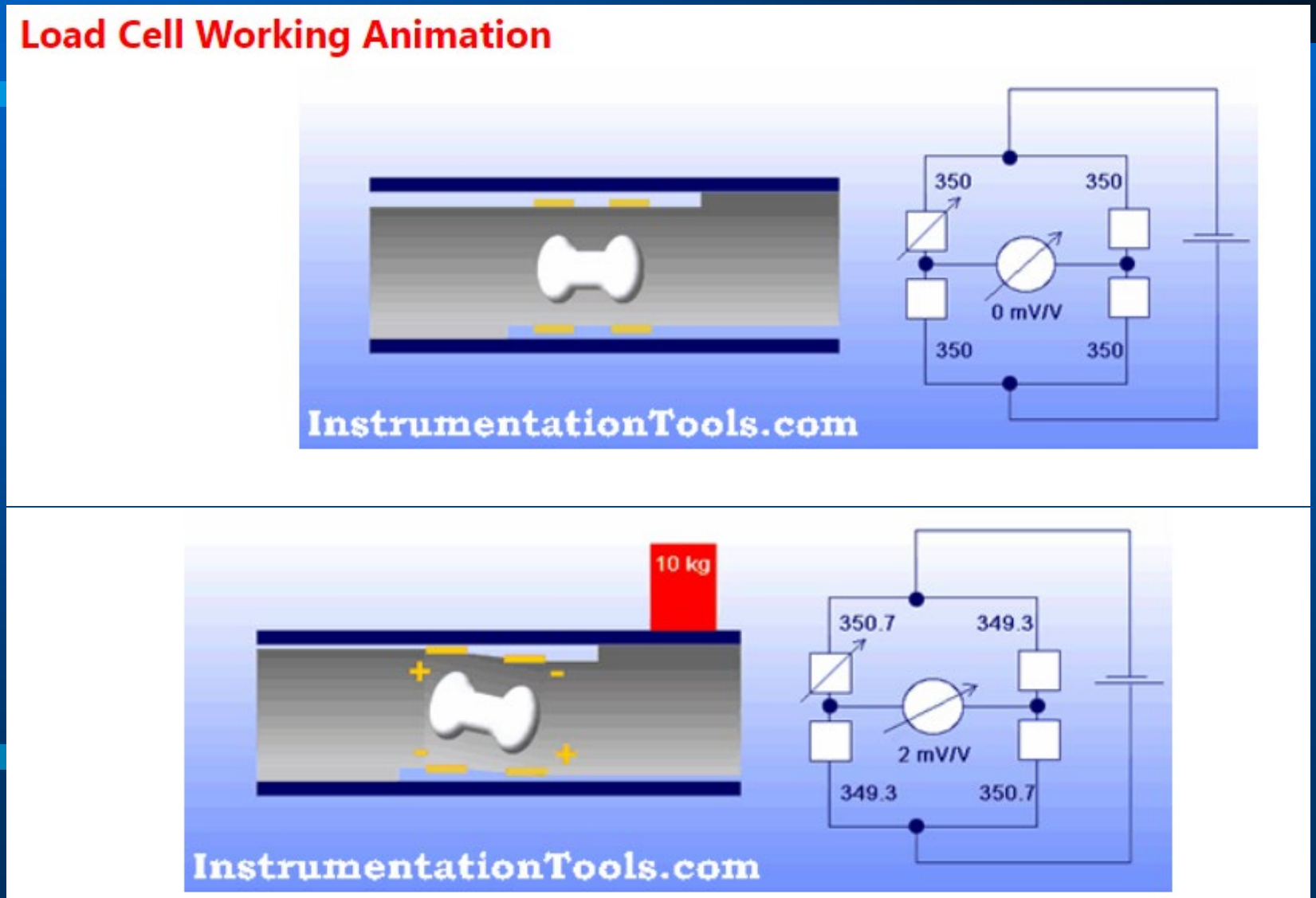

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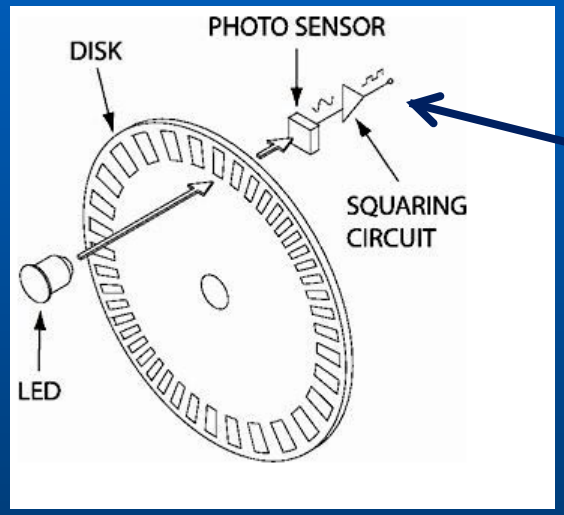
3. Incremental Encoder:



Single Channel
(Digital Tachometer)

Most Encoders has two channels

Phase A
Phase B

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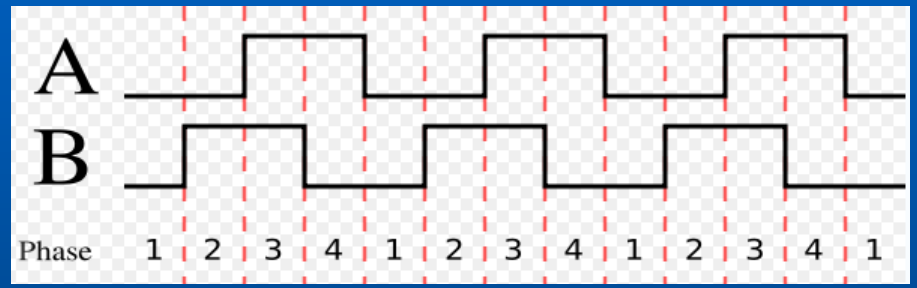

Quadrature : 4x resolution by counting every edge of the signal

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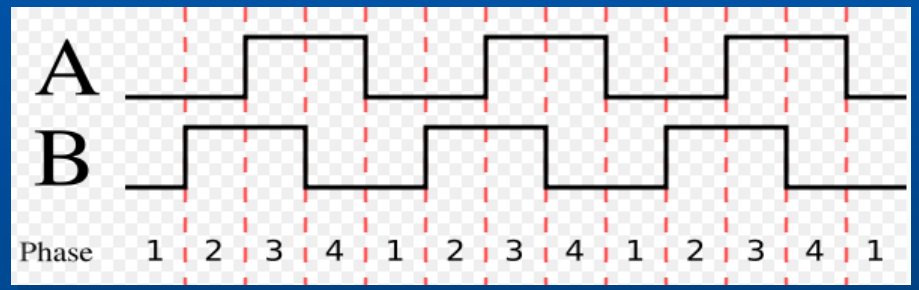
Most common Encoders are considered as digital signals.

Ideally suitable of microprocessor or microcontroller use.



→ Digital Counter

→ Latched on rising edge of Phase A

If Phase B is high count up if low count down

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4. LVDT (Linear Variable Differential Transformer)

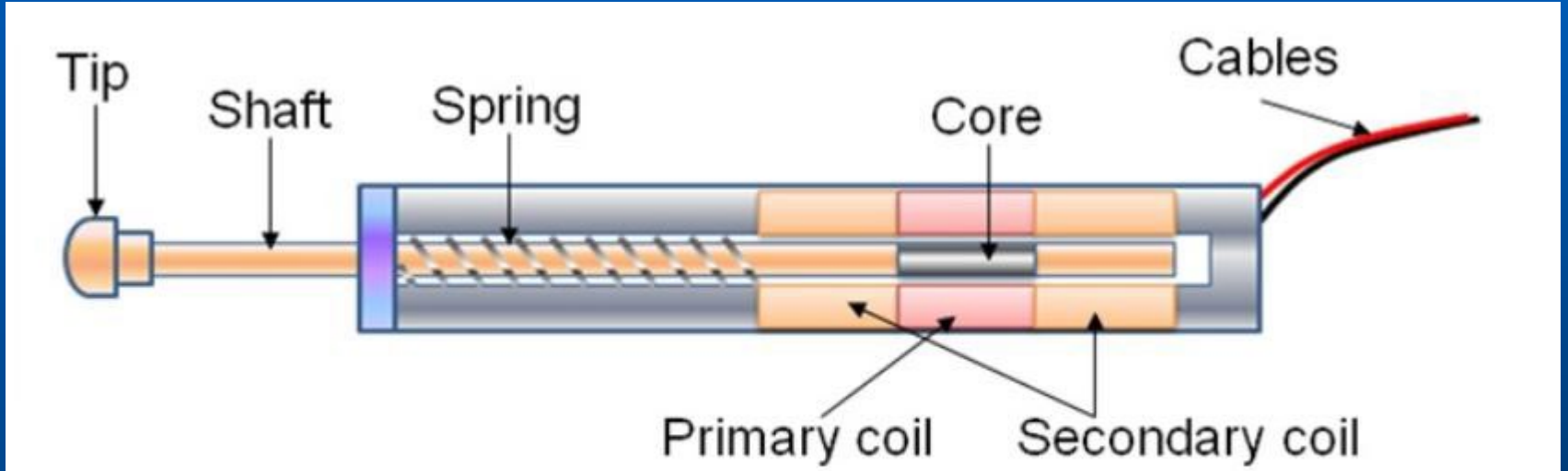

Figure 2.2.6 Construction of LVDT sensor

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4. LVDT (Linear Variable Differential Transformer)