THE DISPLACEMENT

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INTRODUCTION
The Displacement Sensors Trainer is a:

- Modular training system
- Suitable for learning about various types of displacement sensors and their instrumentation circuits
- An experiment manual is provided to guide both the students and lecturer
PROJECT OBJECTIVE

Successful completion of studying this trainer will enable learner to:

• Understand the functions of sensors and signal flow
• Analyze the type of sensors and signal flow
• Construct a practical test (sensor)
• Develop a new displacement trainer
PROJECT SCOPES

The trainer covers the following topic areas:

2. Measurement principles
   i. Sensors
   ii. Signal conditioning

3. Sensors (Static Response)
   i. Strain Gauge
   ii. Potentiometric
   iii. Capacitive
   iv. LVDT (Linear Variable Differential Transformer)
PROBLEMS STATEMENTS

• No specific trainer for displacement sensors.
• Develop new displacement sensor trainer.
• As a learning tool to electronic engineering especially Control System.
• Suitable for practical test.
1. Transducer Instrumentation Trainer
   • The trainer consist a various type of sensor.
   • It covered all the electronic sensor which is difficult for student to understand and do the practical test.

2. The Displacement Sensor Trainer
   • This trainer consist only displacement type of sensor which is in the syllabus of Control Systems.
   • The design in user friendly so, student can easily make an experiment by using the
ADVANTAGES

• Learning tool.
• User friendly (well organized)
• Theory applied.
• Portable.
ELEMENTS

The sensors and signal conditioning element of this trainer are typical of those used through industry. These elements include:

- Displacement sensors
- Signal conditioning (convert into voltage, current, or display form).
PROJECT METHOD
INPUT DEVICES

For detection of:

• Length of a physical object (strain gauge)
• Linear or rotary displacements (Potentiometric, LVDT)
• Rotation or rectilinear displacement (Capacitive)
• Shaft Rotation (Resolver)
OUTPUT DEVICES

For the generation of:

- rotary, linear and rectilinear actions.
- Visual indication of voltage, current and display (counter).
- DC Motor
- Buzzer
- LED
PROJECT DESIGN AND LAYOUT
The Sensors trainer is:

- Rugged design
- Self-contained panel trainer with a steel case and integral power supplies.
- Provided a various of motion and position sensors together with associated instrumentation circuitry.
- Technical manual
- Curriculum manual, instruction manual and student work book provided
HARDWARE
SPECIFICATION

Inputs :
• Carbon track, wirewound and precision rotary potentiometers.
• Slide potentiometer.
• Linear variable differential transformer.
• Linear variable capacitor.
• Strain gauge.
• Resolver
Output Devices:

- Ohmeter
- Voltmeter
- Ammeter
- Display (Counter)
- LED
- Buzzer
- Motor
Signal Conditioning:

2. Analog Conditioning
   - Voltage
   - Current

3. Digital Signal Conditioning
   - Counter

4. Linearization
   - Rotary
   - Linear
LVDT SENSOR

STRAIN GAUGE SENSOR

METER

DC MOTOR

HALH EFFECT

INDUCTIVE EFFECT

SERVO POTentiometer

DC MOTOR

DISPLAY

POWER SUPPLY 12V

POWER SUPPLY 5V

-12v 12v 5v

ON/OFF

ON/OFF

RESOLVER SENSOR

VARIABLE CAPACITOR

CAPACITIVE SENSOR

EXT. GROUND

GROUND
PROCESS PLAN
AND
PROJECT SCHEDULE
FLOW CHART OF PROCESS

START

Project Definition

Project Sequencing

Does supervisor agree with the idea?

Yes

No

Project Resource Estimating

Does supervisor agree with the idea?

Yes

No

Project Duration Estimating

Does supervisor agree with the idea?

Yes

No

Schedule Development

Does supervisor agree with the idea?

Yes

No

Schedule Control

End
ACTIVITY DURATION

1) Tools preparation
2) Make Wiring Diagram
3) Wiring the Components
4) Make Casing
5) Arrange circuit
GANTT CHART
STRUCTURE AND BREAKDOWN
PROJECT BUDGET
Quantities Measurement
CONCLUSION

As a conclusion, the Displacement Sensor Trainer is one of the best learning tools for lecturer and students. This trainer offer more benefit and user friendly.

This trainer also can widely use, not only for technical college but also for higher educational such as university and lower educational such as primary and secondary school especially technical and vocational school.

Nowadays, sensors are one of the important electronic devices which has a big role in modern era. Without sensor, we can’t
• Bukan kacang sebarang kacang
   Kacang melilit si kayu jati
   Bukan datang sebarang hajat
   Datang membawa hajat di hati

• Budak-budak berlari ke padang
   Luka kaki terpijak duri
   Berapa tinggi Gunung Ledang
   Tinggi lagi harapan kami

• Kalau ada sumur di ladang.
  Bolehlah hamba menumpang mandi,
  Kalau umur dah tak panjang,
  Lekas-lekaslah belajar mengaji.