King Fahd University of Petroleum and Minerals

University Diploma Program
Electrical Engineering Technology

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EET 027, Experiment # 7
Strain Gauge Measurement using Strain Indicator

Student Name: ___________________________ **Student ID # :** ______________

Objectives:

Find strain of the strain gauge using Strain Indicator.

Apparatus:

Strain gauge
Different Weights 1 kg, 2k, 5 kg.
Strain Indicator

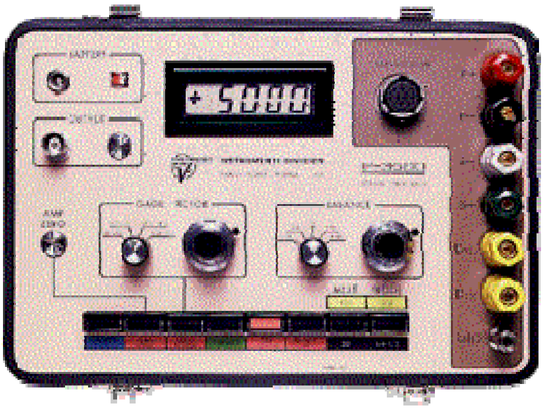
Theory:

The strain gauge is a transducer employing electrical resistance variation to sense the strain produced by a force or weight. It is a very versatile detector for measuring weight, pressure, mechanical force, or displacement.

The Model P-3500 Strain Indicator is a portable, battery-powered instrument with unique features for use in stress analysis testing, and for use with strain gage based transducers. In use, the operator follows a logical sequence of setup steps by activating color-coded push-button controls to prepare the instrument for making accurate and reliable measurements. The P-3500 also incorporates a highly stable DC amplifier, precisely regulated bridge excitation supply, and precisely settable gage factor controls.

Static measurements are displayed directly on the indicator's readout with 1 micro-strain resolution. The instrument will accept full-, half-, or quarter-bridge strain gage inputs, and all required bridge completion components for 120, 350 and 1000 ohm gages are built in.

Gage factor is precisely settable (to a resolution of 0.001) by a front-panel 10-turn potentiometer, and is displayed on the digital readout when the gage factor push button is depressed.



Strain Indicator P-3500 Front Panel

Procedure:

The P-3500 is designed for ease of operation, the push-button switches and front panel controls are arranged such that the proper setup procedure generally follows a straightforward left-to-right sequence. To measure the strain, the steps is outlined below:

1. Select 1/4-1 /2 position of BRIDGE push button.
2. Select Xl position of MULT push button.
3. Connect strain gage to binding posts connector. These binding posts are color-coded in accordance with conventional practice, and are clearly labeled. Input connections are shown on the inside cover of the instrument.
4. Depress AMP ZERO push button. Allow instrument to warm up for two minutes minimum. Set AMP ZERO control for a readout display of ±0000. This adjustment must be made with MULT in Xl position.
5. Depress GAGE FACTOR push button. Set GAGE FACTOR range switch and GAGE FACTOR control for the desired gage factor.
6. Depress the RUN push button. Set the BALANCE switch and the BALANCE control for a reading of ±0000. This setting must be made with the MULT in the Xl position.
7. Depress the CAL push button and verify calibration of the instrument.
8. Select the Xl or Xl 0 MUL T position as required.
9. Depress the RUN push button. Load the strain gage system first using the first position (the hole at the end) of the strain gage and record the reading in the table 1 then load the strain gage with second position (the middle hole in the strain gage) and record the reading in the table 2.

Table 1

Load (kg)	Strain (micro-strain)
0	
1	
2	
3	
4	
5	
Unknown	

Table 2

Load (kg)	Strain (micro-strain)
0	
1	
2	
3	
4	
5	
Unknown	

Find Unknown Load using Graphs:

1. Plot the readings obtained from tables 1 and 2 on the graph paper as strain versus load.
2. Find the unknown load using strain versus load graph (obtained from table 1).

Unknown Load : ______________________ kg.

3. Find the voltage difference using strain versus load graph (obtained from table 2).

Unknown Load : ______________________ kg.

Conclusions:

1. Compare the slope of the two graphs? And write your comments.
2. Compare the unknown load values obtained from the two graphs and write your comments.