PHASE 1 INSTRUMENTS

Project Write-up

Name:…… Group:……

Module Title: Signal Conditioners MODULE NO: I-5

PROJECT DESCRIPTION: Pressure to current Transducer (P/I).

Objective Nos: 1a and 2 Project No:Tn 1

PROJECT WRITE UP SHEET

Principle/Theory of Operation

Draw a simple block diagram of the setup required to calibrate a P/I convertor. Include all inter-connections and labelling.

How could a 4-20 mA signal be converted to a voltage?

PHASE 1 INSTRUMENTS

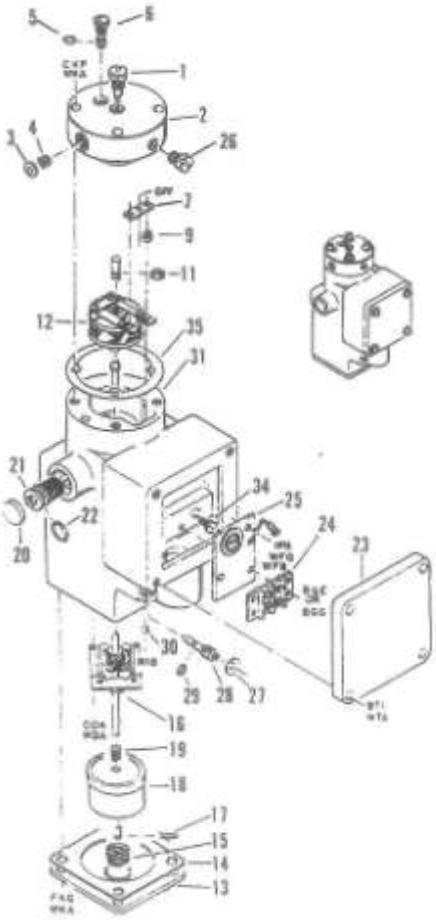
Project Write-up

Name:…… Group:……

Module Title: Signal Conditioners MODULE NO: S1 006 1

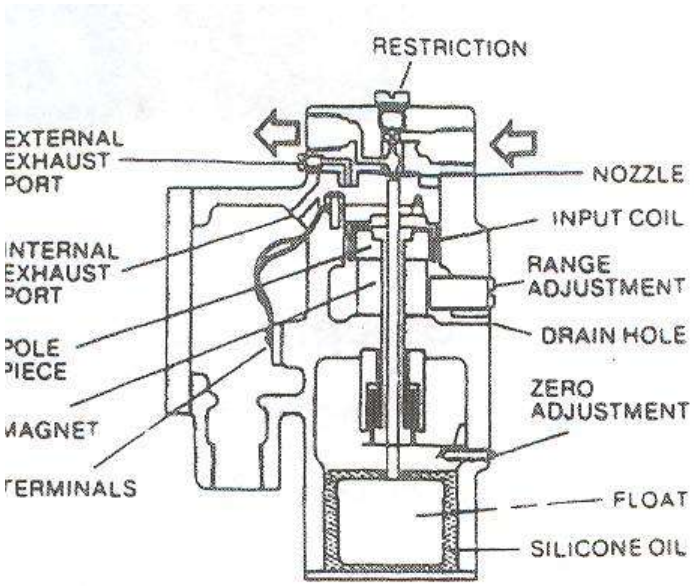
PROJECT DESCRIPTION: Current to Pressure Transducer (I/P)

Objective Nos: 1b and 2 Project No:Tn 2



PROJECT WRITE UP SHEET

Principle/Theory of Operation



What is the name of probably the most common and simplest type of I/P convertor?

What piece of test equipment could be used to provide the input signal for the above I/P convertor?

PHASE 1 INSTRUMENTS

Project Write-up

Module Title: Signal Conditioners **MODULE NO: S1 006 1**

PROJECT DESCRIPTION: Current to Pressure Transducers (I/P's)

SUPPLEMENTARY QUESTIONS:

The successful completion of these questions provide the additional competencies required for Module S1 006 1

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1. (a) What are signal conditioners used for?

   (b) What is the main disadvantage of using multiple conditioners?

2. (a) Briefly describe a practical example of where a current to Pressure (I/P) transducer may be used.

   (b) With reference to the example given in (a), draw a simple block diagram of the setup required to calibrate the loop. Include all inter-connections and labelling.

3. (a) Give a practical example of where a pressure to current (P/I) transducer may be typically used.

(b) With reference to the above example, draw and label a simple block diagram of the loop.

4. What would be the standard outputs from an I/P converter if the following inputs were applied?

4 mA - ……

8 mA - ……

12 mA - ……

16 mA - ……

20 mA - ……

5. Name three other types of signal conditioners and give a practical example of where these may typically be used.

6. An Rt/I transducer provides a 4 – 20 mA output over an input range of 0 - 50ºC. What is the actual temperature being measured if the transducers output was 14.2 mA?

7. A typical P/I works on the principle of varying _____. As the distance between the _____ varies, so does the _____ which is measured and used to produce an output that is proportional to the _____ applied.

8. The Moores I/P transducer works on the principle of _____ law of _____ _____. As current is applied to the _____, the float and _____ assembly moves _____ or _____ from the nozzle. This creates a back pressure which is proportional to the _____ applied, and produces a _____ to _____ output. The device must be mounted _____ because of the _____ which is used to make the float appear _____ and it also helps to absorb shock and _____.

9. Signal conditioners use the standard air and _____ supplies.

10. Draw a simple block diagram of the setup required to calibrate P/I convertor. Include all inter-connections and labelling.

TRANSDUCER PROJECT
Module I-5 Signal Conditioners
Project No: 1

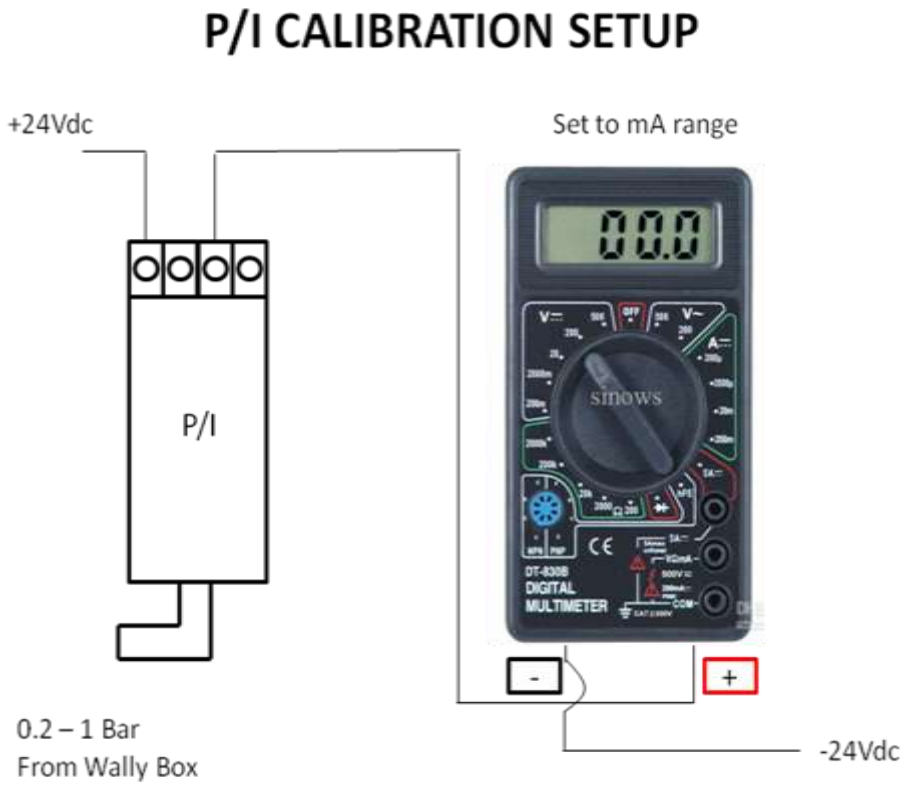
Exercise 1

Obtain a P/I convertor and connect the signal port to either P1 or P2 of a Wally Box.

Following the calibration setup on page 7 of the Signal Convertor notebook, connect up the convertor ready for calibration.

Refer to the information sheet found with the convertors for individual connection details and the data plate on the convertor for the range.

Calibrate the unit and when complete the T.O. will check its accuracy.



TRANSDUCER PROJECT
Module I-5 Signal Conditioners
Project No: 1

Exercise 2

Obtain an I/P convertor.

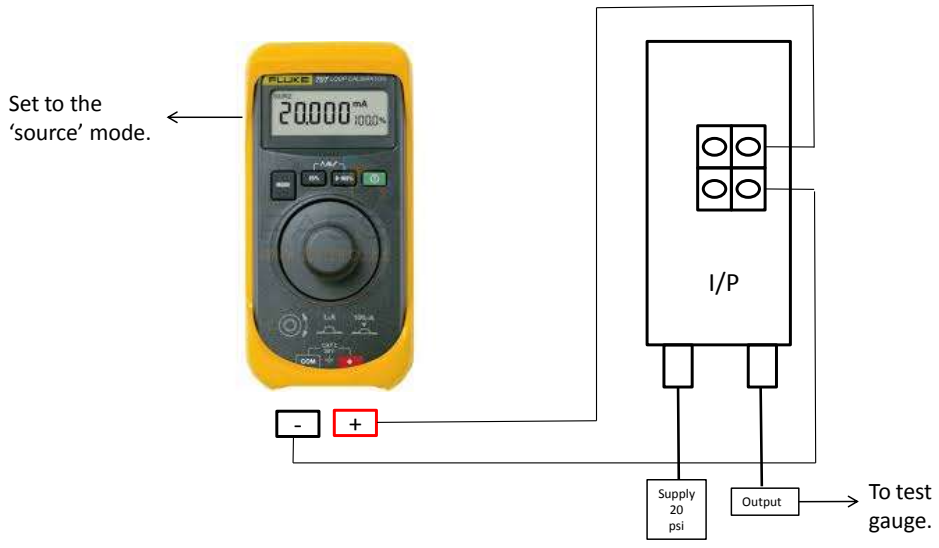
You will need a Druck 705 Lop Calibrator.

Following the calibration setup on page 7 of the Signal Convertor notebook, connect up the convertor ready for calibration. The output of the I/P should be connected to P3 of the Wally Box

Refer to the information sheet found with the convertors for individual connection details and the data plate on the convertor for the range.

Calibrate the unit and when complete the T.O. will check its accuracy.

FOXBORO E69R CALIBRATION SETUP



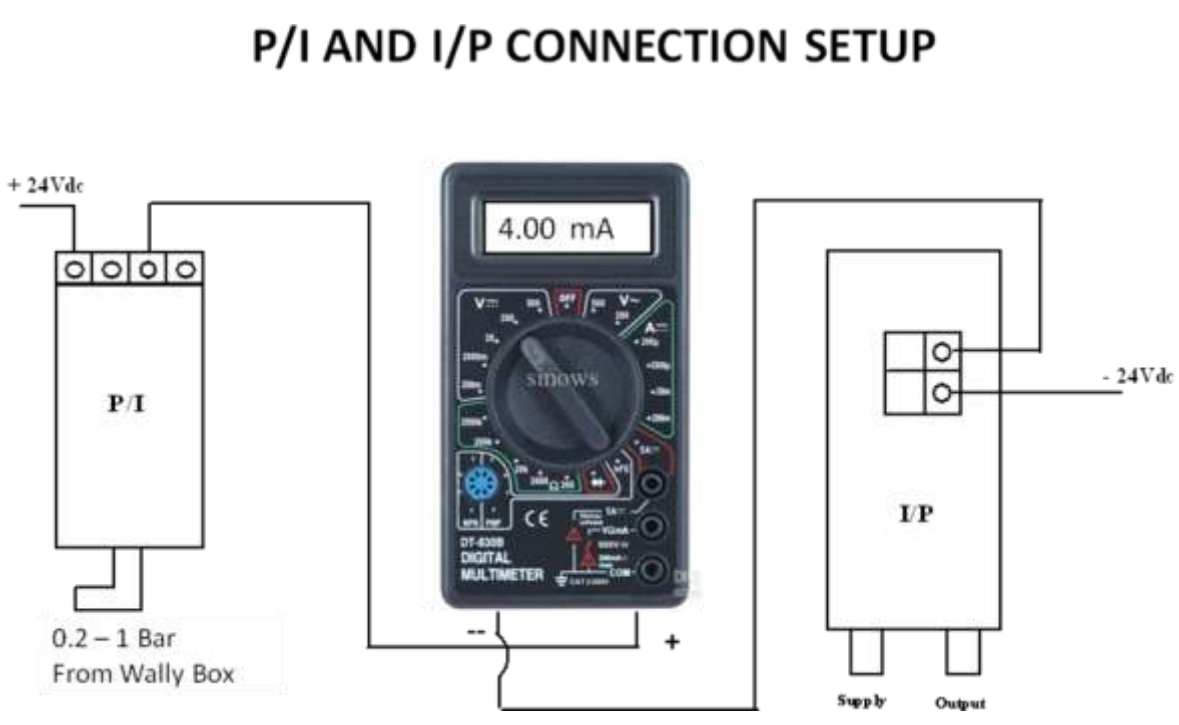
TRANSDUCER PROJECT
Module I-5 Signal Conditioners
Project No: 1

Exercise 3

Using the two units from above connect the output of the P/I to the input of the I./P. using a mA measuring device to monitor the current between the devices. A connection diagram can be found with the convertors. Alter the input to the P/I and record the following:-

Input Pressure	*Current*	*Output Pressure*
0.2 Bar	*mA*	*Bar*
0.6 Bar	*mA*	*Bar*
1.0 Bar	*mA*	*Bar*

If there is any difference between the input pressure and the output pressure, note down why you think this is, and any problems this may cause when installed in a system.



TRANSDUCER PROJECT
Module I-5 Signal Conditioners

Project No: 1

Additional Exercise

Obtain a Foxboro 13A Differential Pressure transmitter and connect it as follows.

Connect the output of the Tx to the input of the P/I in Exercise 3.

Connect a pressure switch to the output of the I/P and construct a circuit so that a light illuminates when the output of the D.P. cell exceeds 25% of scale.
i.e. if the input range is 0-300 mBar then the switch will operate when the input reaches 75 mBar.

HINT – Draw a simple circuit containing a bulb, battery and switch so that when the switch if closed the light illuminates.

Transpose this drawing into the equipment on the bench.