

Pressure Measurements

Remote Lab instructions

Air-pump, Gauges, Arduino

V1

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| Reviewed By: | | Date: | |

Pressure Measurement Instructions

1.1 Objectives

- To check and compare two types of indicators and pressure transducers.

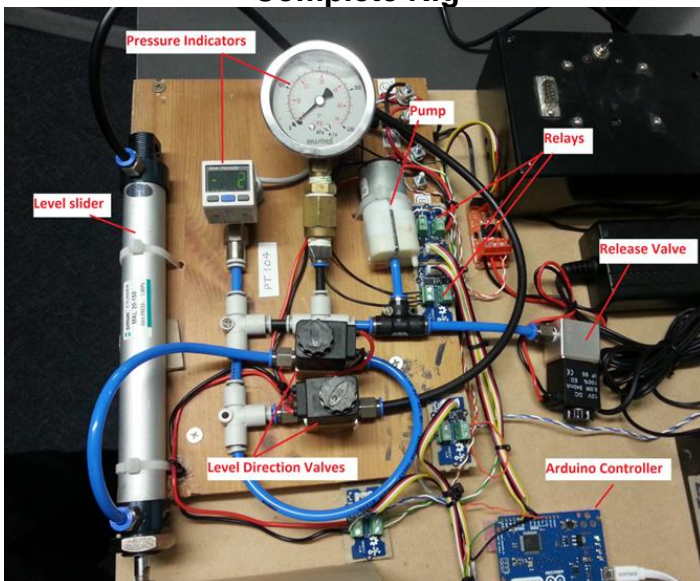
1.2 Open the relevant programs

- Logon to Electmeet (Follow the How to Connect to Remote Labs_Electmeet_HTML5_Remote_Lab Instructions document)
- The software to control the pressure is installed on **Remote Lab 10**
- On the remote lab, you will find a folder on the desktop called **IPKIT** which contains the shortcuts to the software to be used.

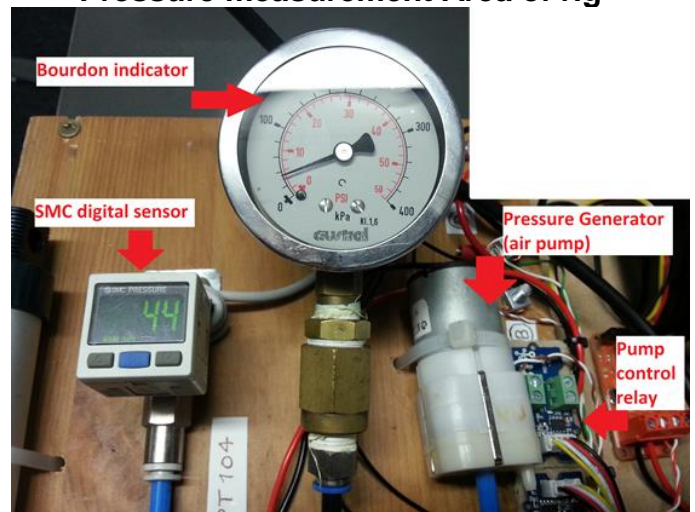
1.3 Equipment used for exercise (Installed on Remote Lab)

- Pressure generator (air pump)
- SMC digital pressure switch ISE30A-01-N-F (incorporates own pressure transducer) PT 104
- Bourdon tube mechanical type indicator 55mm dia., oil filled Austral KL.16, PI 101

Complete Rig



Pressure measurement Area of rig



1.4 Software Initialisation

- On the remote lab, specified above, you will find a folder on the desktop called IPKIT which contains the shortcuts to the software to be used.
- Activate/open the Remote Lab Webcam view of the pressure rig. The Cam icon next to the lab will open the lab cams (see below).

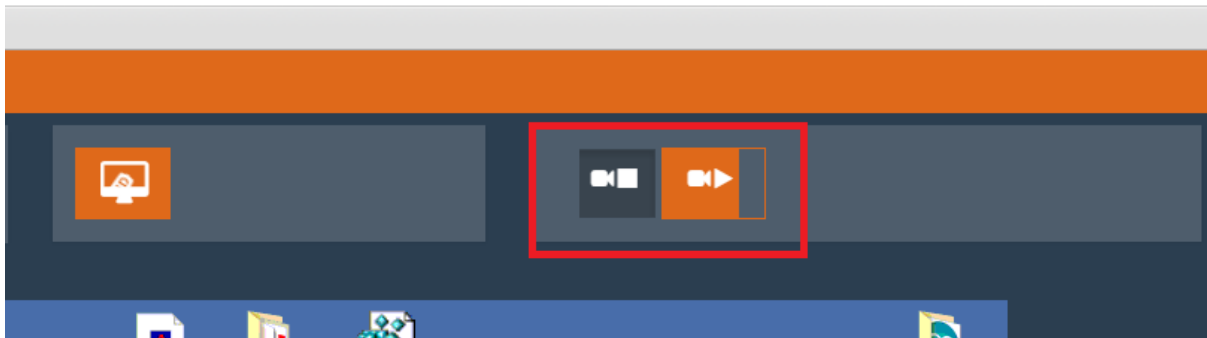
Pressure control

Pressure will be applied to both the SMC and Bourdon indicators, using an air-pump. The readings of both indicators will be recorded in order to note any difference in readings.

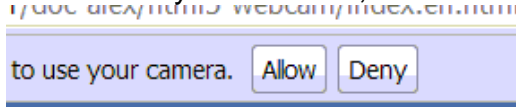
Have the live streaming Lab cam open while doing this exercise, since the pressure will be indicated in real-time on the instruments.

The Lab Cam can be accessed:

- a. By clicking the view Labcam button (The cams appear after a few seconds. If the wrong image shows, simply activate the other camera.)



- b. The camera will appear on the right hand side (be sure to have allowed Camera on your browser, else find it here)



The Lab Cam should then appear.



1. Check that the SMC pressure transducer display is lit up.
2. Note the readings on both the bourdon indicator and the SMC display. The SMC acts as the calibrated sensor for this exercise.

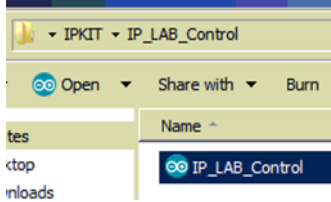
The pressure source is applied by using an automated air pump. This can be switched on and off using a relay, controlled from an Arduino Leonardo board.

- A) Write down the (estimated) pressure readings on both indicators.
(Remember, view the Lab cam once you've switched on the pump, to quickly take measurements):

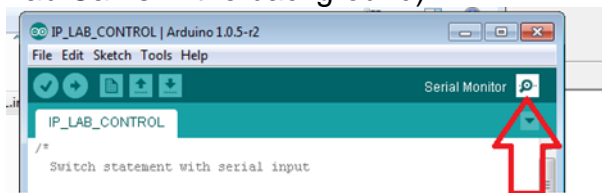
1. Open the IPKIT folder on the Remote Lab desktop




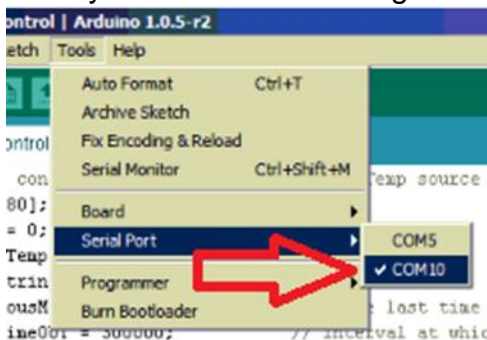
2. In the IP_LAB_Control subfolder, open the “IP_LAB_Control.ino” Arduino program (Shortcut in the “IPKIT / IP_LAB _Control” folder)



3. Click the “Serial Monitor” (Move the new window around in order to see the Lab Cams in the background)



4. It should open a connection automatically. If it does not, go to “Tools” -> “Serial Port”, and select the COM 8/10 port shown. (If no serial port is shown, close the Arduino program and re-open it, and try again. If more than one port shown (and an error occurs), go to device manager and click on COM ports to see on which one the Leonardo is connected. If it fails again, reprogram, , and try the Serial Monitor again. – else contact support)



5. In “Serial Monitor” type the following command (Be sure the Lab cam is visible showing the indicators) **(Remember to type the # at the end. It is case sensitive):**

Pump# (press Enter)

6. View the Lab webcam.
7. Note and write down the stabilised readings on both the bourdon indicator and the SMC display. Write it in the table below.
8. After about 1 minute, the pump will switch off and release the pressure automatically.

Repeat the above (from step 5) twice more and note the values in the table.

The system works on a timer, and will automatically reset everything after a few minutes.

| SMC Calibrated pressure (kPa) | Bourdon PI 101 pressure (kPa) |
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PLEASE CLOSE ALL THE OPEN SOFTWARE WINDOWS IN THE LAB ONCE DONE