PRESSURE APPLICATION ADAPTOR FOR EMANT300, EMANT380

The Pressure Application Adaptor is used for the teaching or demonstrating of PC or Smartphone Based Data Acquisition. Used with the **EMANT300** USB Data Acquisition Module or the **EMANT380** Bluetooth Data Acquisition Module, they form a very low cost PC or Smartphone based Manometer. It is ideal for use in hands-on teaching laboratories and projects involving pressure measurements.

FEATURES

- 200 kPa Freescale MPX2202
- Temperature Compensated Over 0°C to +85°C
- ±0.25% Linearity
- Differential Configuration

Examples of project and demonstrations that can be built around this board
- medical diagnostics
  - blood pressure measurement
  - spirometer
- pump/motor controllers
- robotics
- level indicators

The MPX2202 series device is a silicon piezoresistive pressure sensor that provides a highly accurate and linear voltage output - directly proportional to the applied pressure. The sensor is a single monolithic silicon diaphragm with the strain gage and a thin-film resistor network integrated on-chip. The chip is laser trimmed for precise span and offset calibration and temperature compensation.
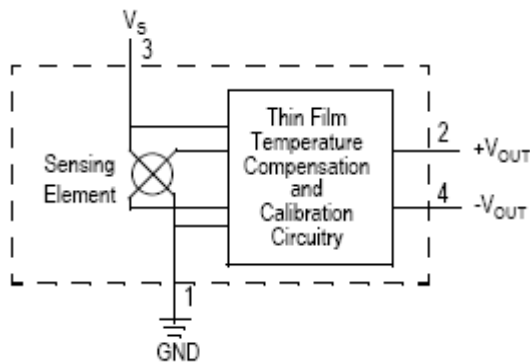
The differential voltage output of the sensor is directly proportional to the differential pressure applied. The absolute sensor has a built-in reference vacuum. The output voltage will decrease as vacuum, relative to ambient, is drawn on the pressure (P1) side. The output voltage of the differential or gauge sensor increases with increasing pressure applied to the pressure (P1) side relative to the vacuum (P2) side.
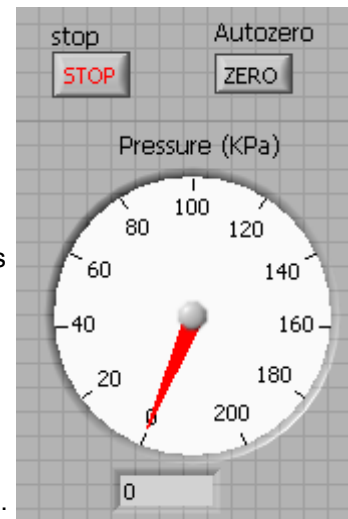
With a 10V excitation, it measures from 0 TO 200 kPA (0 TO 29 psi) giving a 40 mV full scale span. The output is ratiometric when excited by voltages lower than 10V.

In our adaptor design, the sensor is excited at V_{EXC}=3.3V. With this excitation voltage, the full span output is scaled to 13.33mV. When the input of the EMANT300 is set to this range, the module can measure better than 1uV due to its programmable gain amplifier and the resolution of the ADC.

Thus the pressure in kPa with respect to the voltage output V_O (seen at the differential input AIN4, AIN3) is given by
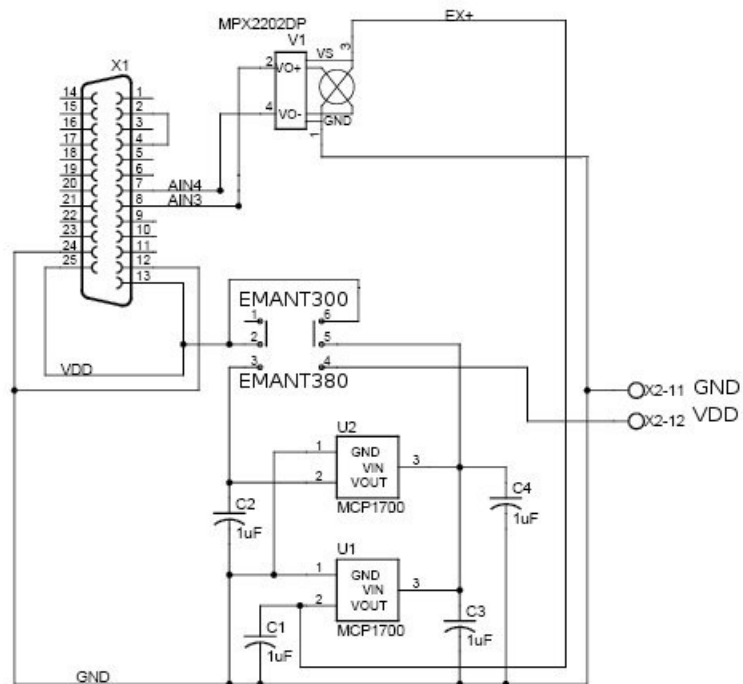
$$\rho = V_O * 15000$$
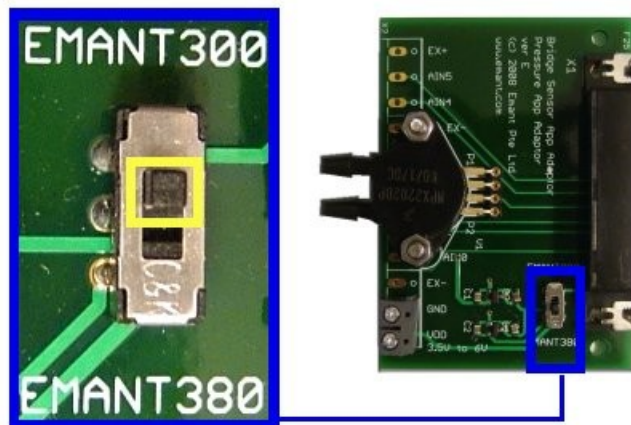
Figure 1: Pressure Application Adaptor Schematic

Note: Absolute Maximum Pressure (P1 > P2) **800 kPa.** Exposure beyond the specified limits may cause permanent damage or degradation to the device.
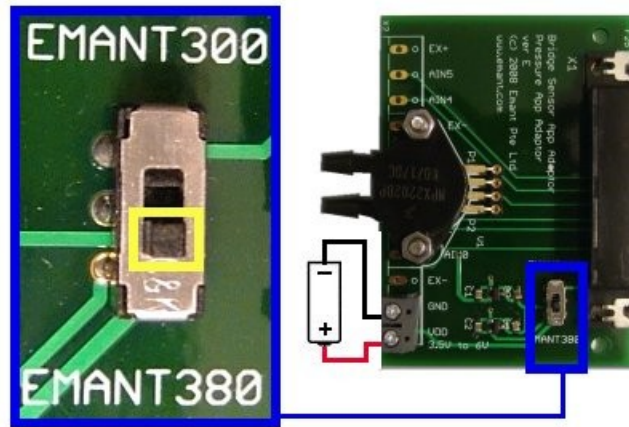
Switch setting

EMANT300 USB DAQ

1. Push switch towards the word **EMANT300**
2. Connect the adaptor to the EMANT300 USB DAQ module
3. Plug USB cable from USB DAQ to PC
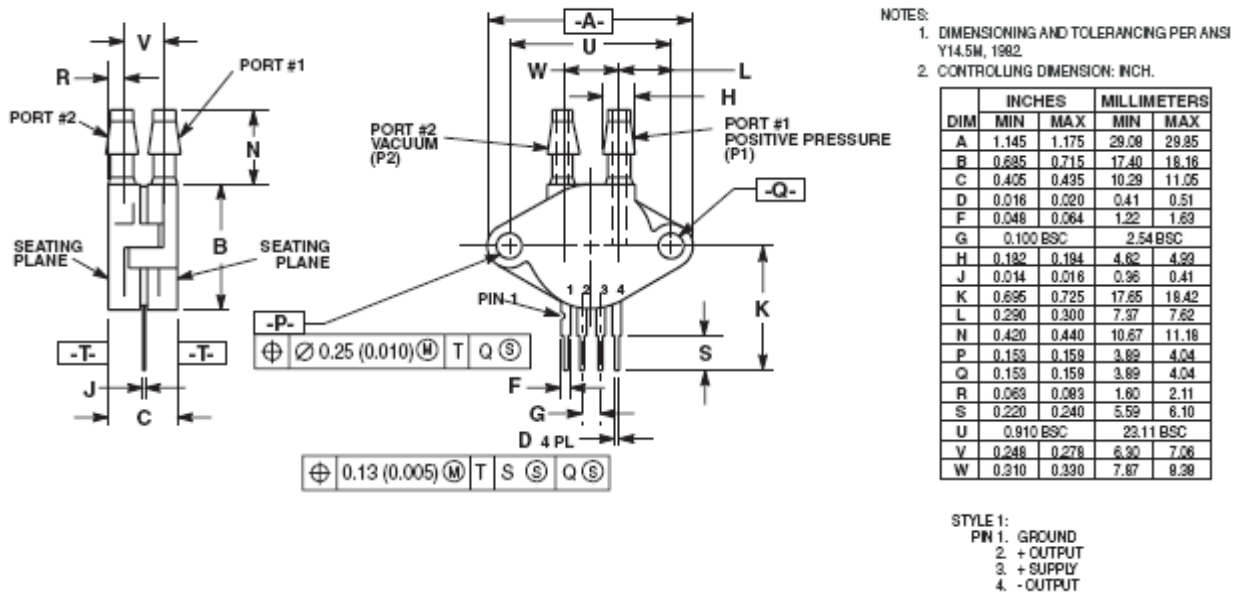
EMANT380 Bluetooth DAQ

1. Push switch towards the word **EMANT380**
2. Connect the adaptor to the EMANT380 Bluetooth DAQ module
3. Connect power supply (3.5V to 6V Max)

Difference in Pressure Application Adaptor versions

There are two versions of the Pressure Application Adaptor. The latest version is version E and can be identified by the version printed on the PCB as well as the presence of a switch and additional power screw terminals. The difference between the two versions are

- version E can connect to either the EMANT300 USB DAQ or the EMANT380 Bluetooth DAQ. The earlier version can only be used with the EMANT300 USB DAQ
- the excitation voltage for version E is 3.3V whereas the excitation voltage for the earlier version is 2.5V

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.145	1.175	29.08	29.85
B	0.685	0.715	17.40	18.16
C	0.405	0.435	10.29	11.05
D	0.016	0.020	0.41	0.51
F	0.048	0.064	1.22	1.63
G	0.100 BSC		2.54 BSC	
H	0.182	0.194	4.62	4.93
J	0.014	0.016	0.36	0.41
K	0.695	0.725	17.65	18.42
L	0.290	0.300	7.37	7.62
N	0.420	0.440	10.67	11.18
P	0.153	0.159	3.89	4.04
Q	0.153	0.159	3.89	4.04
R	0.063	0.083	1.60	2.11
S	0.220	0.240	5.59	6.10
U	0.910 BSC		23.11 BSC	
V	0.248	0.278	6.30	7.06
W	0.310	0.330	7.87	8.38

STYLE 1:
PIN 1. GROUND
2. + OUTPUT
3. + SUPPLY
4. - OUTPUT

Sensor Dimensions (Differential)