BARO SENSOR
810 .. 1065 MBAR
Description D032

Figure 1. The Baro Sensor

Short description

The Baro Sensor (032) is a sensitive pressure meter for the range of 810 up to 1065 mbar. The pressure is measured via a pressure port, which is located on the side of the box. A tube can be connected to the pressure port to measure the pressure in a sealed space.

The baro sensor uses the SenSym SDX15A4 pressure chip. This element has a membrane that flexes as pressure changes. It is arranged to measure absolute pressure, so one side of the membrane is a vacuum. The sensor produces an output voltage that varies in a linear way with absolute pressure. It includes special circuitry to minimize errors caused by changes in temperature.

The pressure sensor is fairly durable but it is designed only for use with non-corrosive, non-ionic working gasses such as air, dry gases and the like. Do not get it wet.

The baro sensor is equipped with a BT-plug and can be connected to the following CMA interfaces:

- **ULAB**
- CoachLab
- CoachLab II
- UIA/UIB through Measuring console (via 0520 adapter[1]).

Furthermore the sensor can be used in combination with other interfaces, like Texas Instruments CBL™, CBL2™ and Vernier LabPro without the need of an adapter.

Suggested experiments

The baro sensor can be used in various experiments such as:

- measurements of the air pressure over a longer period of time (weather studies);
- measurements of the pressure in liquids by connecting the sensor to a tube, which is submerged in a solution;
- measurements of pressure differences between different floors of buildings;
- together with the portable interface like **U**LAB or CBL the baro sensor can be used as an altimeter for measurements of the air pressure at different altitudes.

Calibration

In most cases you can simple use the calibration provided in the Coach 5 software. For the very best results you can calibrate the sensor. Use the reliable mercury or aneroid barometer to measure the local air pressure. Adjust the sensor pressure reading to the local air pressure value by using an offset potentiometer.

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[1] The CMA adapter 0520 allows connecting sensors with BT-plugs to 4-mm inputs.

The offset potentiometer allows adjusting the pressure reading up or down. There is a small hole on one end of the sensor box with a small slotted screw inside. A small screwdriver can be used to turn this screw. This is a 15-turn potentiometer so the adjustment can be made very gradually. Simple monitor the readings from the baro sensor and adjust the screw until readings match the desired air pressure. (It is also possible to shift calibration in Coach, see the Coach Help, keyword: 'Shift the calibration').

Airports and television stations usually report the sea-level pressure rather than the local pressure (station pressure). "Sea-level pressure" is the pressure after it has been adjusted to its equivalent at sea level. You can adjust your baro sensor to read sea-level pressure instead of local pressure by using the offset potentiometer.
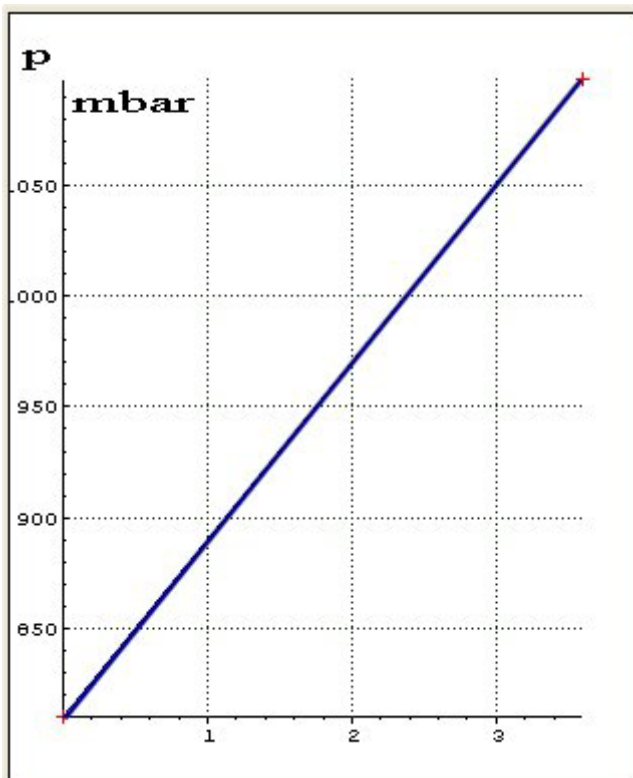
Figure 2.
Default calibration graph of the baro sensor (used in the standard Coach library)

$$p \text{ (mbar)} = 80 * V_{out} \text{ (V)} + 810$$

Coefficients of the calibration function:
a= 80; b= 810.

The name of the Baro sensor in the sensor library of Coach 5 program is
Baro sensor (032&bt) (CMA)(0..1050mbar)

Technical data

Pressure range	810 – 1065 mbar
Voltage output range	0 - 3.25 V
Calibration function	p (mbar) = 80 * V_{out} (V) + 810
Sensitivity	12.8 mV/mbar
Resolution using 12 bit AD converter	0.1 mbar
Max. pressure	2065 mbar without permanent damage
Connection	Pressure port for use with standard plastic tubing
Usage	Only for non-corrosive gasses, non-ionic working gasses such as air, dry gases and the like. Keep the sensor dry!
Long term stability	± 0.1 % full scale reading
Response time	100 μs
Adjustment	Offset potentiometer
Connection	BT (British Telecom) plug

This product is to be used for educational purposes only. It is not appropriate for industrial, medical, research, or commercial applications.   Rev. 10/6/03