

## **Pressure sensor (transducer, or sender) application guide.**

*Preliminary,  
May. 2009*

### **Pressure Sensor (Sender) Type**

In general, the automobile pressure sensor can be divided into two classes, the basic resistive sensor and precision sensor (or transmitter).

A) For the resistive sensor, the pressure change is converted into a resistance change of the sensor. This type of sensor is not very accurate. It is sensitive to the temperature change also. It can be used for warning purpose but not accurate enough for most control applications. It is mostly used for engine pressure and fuel pressure. SYL-1812 can be set for 0-375 ohm pressure sensor. All VDO resistive pressure sensors are in this range. They should work with the SYL-1812. We believe other manufacture's product will be the same.

B) The precision pressure transmitter is temperature compensated and calibrated to give a linear output. It can be used as booster sensor (or MAP) sensor, oil pressure, or fuel pressure. There are two signal formats, the 0-5V range linear output and pulsed output. Only Ford Motor Company makes a capacitive sensor with pulsed output. Their signal amplitude is proportional to the pulse frequency. Auber SYL-1812 meter will not work with this type sensor. For the sensor with output of a 0-5 V (or 0.2-4.8V) signal that is proportional to the pressure, SYL-1812 can work with all of them. Our user has tried GM, Chrysler, and VW sensors with success. In addition, there are many independent pressure sensor manufactures that offer similar type sensor for automobile application.

### **Power supply voltage**

All precision pressure sensors (transmitters) have three wires. One for power supply, one for ground and one for signal output. Some sensors can take power from an unregulated 8 to 16 V DC power supply. They can be powered by the car battery directly. Most other sensors need regulated 5 VDC power supply. Sensor for industrial application sometime needs regulated 24VDC power supply. Auber meter can be used with all three types of sensor. However, for the sensor that needs regulated power supply, earlier production of Auber SYL-1812 needs to be modified. The Auber meter has both regulated 5 VDC and 24 VDC power supply inside. We didn't put it out because it has too many options but only one terminal (terminal 10) is available for this application. If you need a 5 VDC power supply, you need to introduce the 5 VDC to the terminal 10. If you need 24 VDC, you can introduce the 24 VDC to terminal 10. This can be done by following our instruction named "Quick Guide for MAP Sensor Installation" attached below.

Start from March 2009, we can ship a modified SYL-1812R with 5 VDC ready without extra charge. This model is labeled as SYL-1812R1. You need to send us an email after the order to request this model.

## Appendix 1, Set up for GM 12223861 3 Bar MAP Sensor or Auber 103 MAP Sensor

In order to display the pressure in correctly, we need to find what the meter should display when voltage input is 0V and 5V, assuming the input signal is linear in the entire 0-5V range.

GM published data.

For display in Bar,

0.4 bar = 0.619V

3.04 bar = 4.818 V

Because the signal is linear in that range, it can be represent by

$$V = a \times P + b$$

Where P is the pressure, V is the voltage. **a**, is the slop, **b** is the intersection at zero pressure,

To find slop **a**.

$$a = (4818 - 0.619) / (3.04 - 0.4) = 1.5905$$

To find intersection **b**

$$b = V - a \times P = 4.818 - 3.04 \times 1.5905 = -0.01712$$

$$\text{So, } V = 1.5905P - 0.01712, \text{ or } P = (V + 0.01712) / 1.5905$$

Assume the sensor is liner over the 0-5V range

Then,

At 0 V, P = 0.01076,

At 5 V, P = 3.154.

To display in absolute pressure,

**Set dot to 00.00,**

**PuL=0.01,**

**PuH=3.15**

If you want display to show zero at atmosphere pressure (standard atmosphere=1.00bar), (let 1 bar display as zero pressure),

**PuL = 0.01076-1 = -0.99,**

**PuH = 3.154-1 = 2.15**

For display in PSI, 1bar=14.503PSI

To display in absolute pressure,

**Set dot to 000.0,**

**PuL=0.2,**

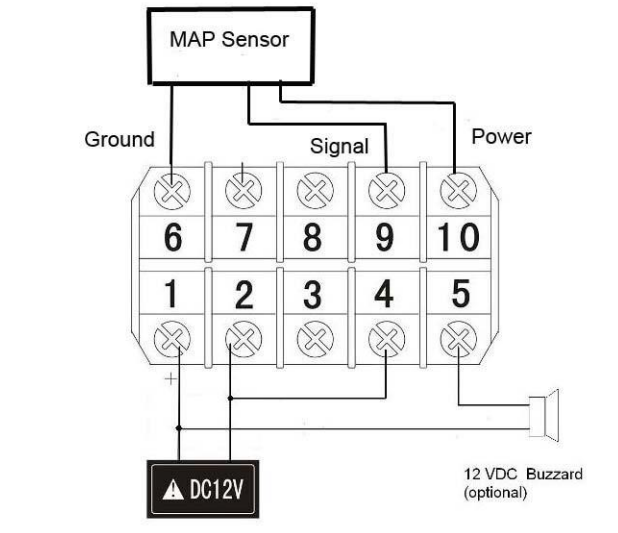
**PuH=45.7**

If you want display to show zero at atmosphere pressure (standard atmosphere=1.00bar), then

**PuL= - 14.4, PuH = 31.2**

**Please note**, the meter will not display zero pressure unless the absolute barometer pressure is 1.00 bars. The barometer reported from location weather station is the pressure converted at sea level, or relative barometer. It is not the absolute barometer pressure at the local altitude.

B) Connecting the pressure transducer. The ground should be connected to terminal 6. Signal to terminal 9 and power supply to terminal 10.



## Appendix 2

### Earlier SYL-1812 model modification guide for MAP Sensor Installation.

A). Introducing the regulated 5 VDC to terminal 10.

- 1) Open the controller. Using two small flat screw drivers to press down the two taps on the side of meter and push the back of the controller forward Fig 1 and 2.



Fig 1. Gently insert a small screw drive. Don't press too hard. Otherwise the tap will break.







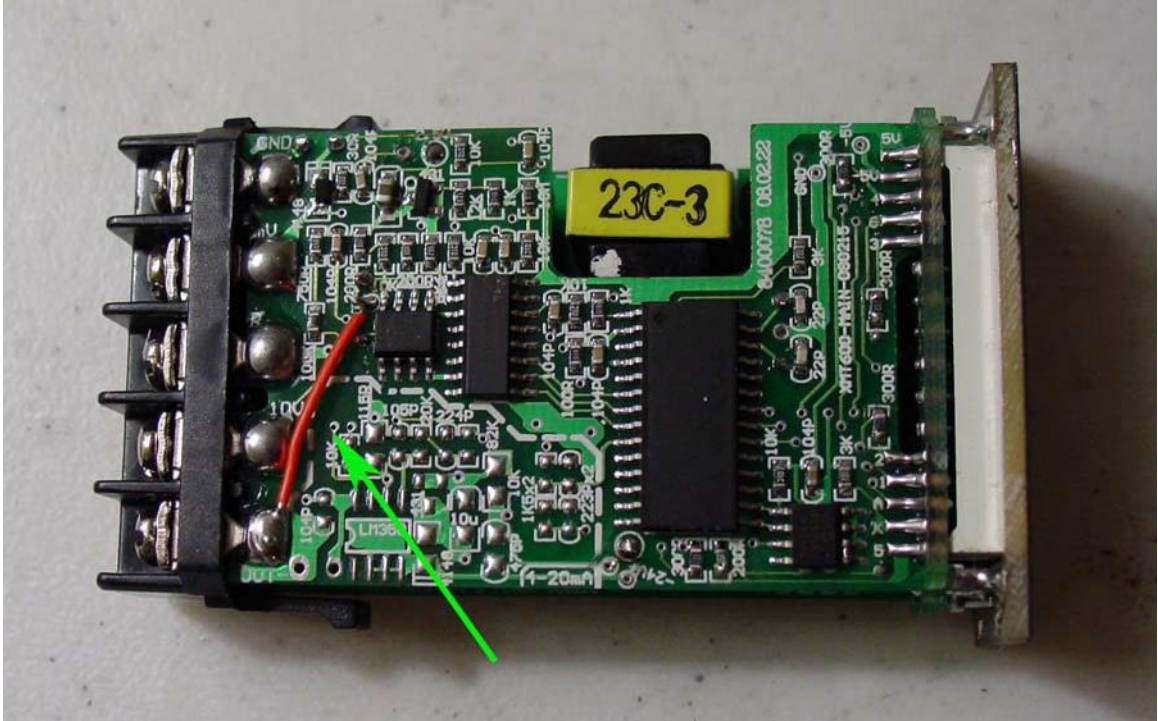


Fig 4. A red wire is soldered between 5VDC and terminal 10 (green arrow).

4) Put the core of the meter back to the meter shell.

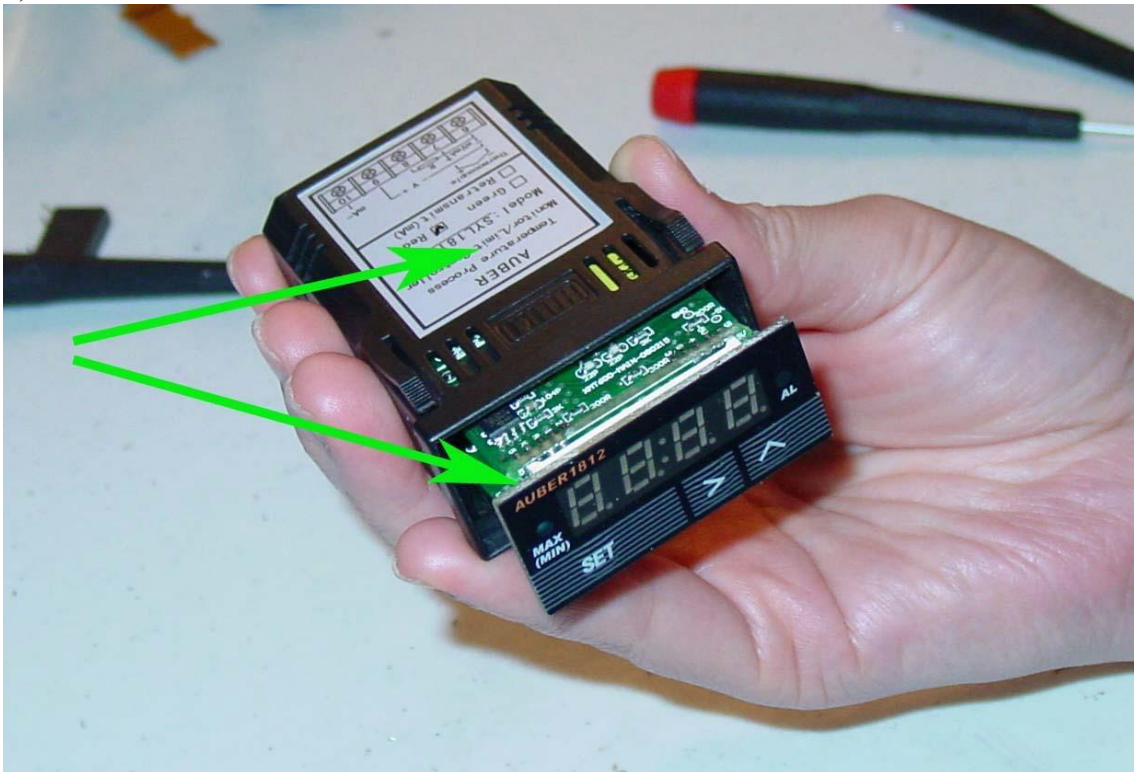
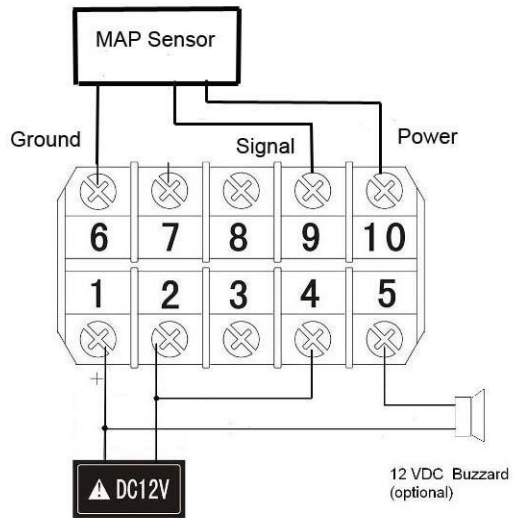


Fig 5. Put the core of the meter back. Make sure the top of front is aligned with the side of case that has AUBER name as indicated by the green arrows.

B) Connecting the pressure transducer. The ground should be connected to terminal 6. Signal to terminal 9 and power supply to terminal 10.



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