THE BUBBLER SYSTEM
## *LIQUID LEVEL MEASUREMENT*

DESCRIPTION

The **Bubbler System** is an inexpensive but accurate means of measuring the fluid level in open or vented containers, especially those in harsh environments such as cooling tower sumps, swimming pools, reservoirs, vented fuel tanks, drain sumps, air washers, etc. The system consists of a source of compressed air, air flow restrictor, sensing tube and pressure transmitter. The only component of the **Bubbler System** that is exposed to the elements is the sensing tube. All other components can be remotely located in a protected area.

The sense tube is installed in the tank and connected to the pressure transmitter and the air supply through the flow restrictor as shown in Figure#1. Since the pressure required to displace the liquid is determined by the depth of the fluid, the transmitter output indicates the fluid depth above the open end of the sense tube. Note that it is not necessary to extend the sense tube to the bottom of the container if you are only interested in the fluid height in the top part of the container. Using a shorter sense tube and lower range pressure transmitter will improve the resolution and accuracy of the system.

It may be necessary to install a check valve at the high point in the air line if the fluid level is above the air supply and pressure transmitter. This may prevent siphoning of the fluid back to the transmitter and air compressor if there is a power failure.

Figure 1
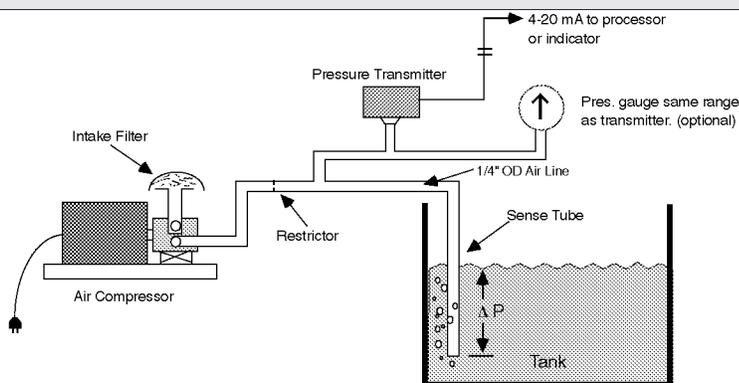
OPERATION

If the fluid is not water, use the following conversion formula to determine the maximum depth:

$$\frac{\text{Max Depth Above End of Sense Tube (water)} \ ①}{\text{Specific Gravity of Liquid} \ ②} \quad X \quad \left(\frac{mA - 4}{16}\right) = \begin{array}{l}\text{Depth of Fluid (inches) Above}\\ \text{End of Sense Tube}\end{array}$$

① See Ordering information for standard max. depths
② See S.G. in chart below

Specific Gravity of Common Liquids

Liquid	S.G.	Liquid	S.G.	Liquid	S.G.
Acetic acid	1.06	Fluoric acid	1.50	Palm oil	0.97
Alcohol, commercial	0.83	Gasoline	0.70	Petroleum oil	0.82
Alcohol, pure	0.79	Kerosene	0.80	Phosphoric acid	1.78
Ammonia	0.89	Linseed oil	0.94	Sulphuric acid	1.84
Benzine	0.69	Mineral oil	0.92	Tar	1.00
Bromine	2.97	Muriatic acid	1.20	Turpentine oil	0.87
Carbolic acid	0.96	Naphtha	0.76	Vinegar	1.08
Carbon disulphide	1.26	Nitric acid	1.50	Water	1.00
Cotton-seed oil	0.93	Olive oil	0.92	Water, sea	1.03

CONVERSION FACTOR

1 psi = 27.7 in. water = 2.31 ft. water = 2.04 in. Hg = 6.89 kPa

CAUTION: It may be necessary to install a check valve at the high point in the air line if the fluid level is above the air supply and pressure transmitter. This should prevent siphoning of the fluid back to the transmitter and air compressor if there is a power failure.

ORDERING INFORMATION

PRESSURE TRANSMITTER			
Manufacturer	Model	Range	Max. Depth (Water)
Modus	T30-100	0 to 10" H_2O	10"
Robinson-Halpern	360C-P015	0 to 1.5 psig	41"
Robinson-Halpern	360C-P030	0 to 3 psig	82"
Robinson-Halpern	360C-P060	0 to 6 psig	166"
Robinson-Halpern	360C-P110	1-10 psi	277"

The output of all pressure transmitters is 4-20 mA over the range indicated.