



## Mini-Master® Flowmeter Instructions



Mini-Master® flowmeter mounts easily from front of panel. Drill two  $\frac{1}{2}$ " or  $\frac{5}{16}$ " dia. holes in panel on  $2\frac{1}{16}$ " centers. Insert mounting connector spuds. From rear, slide on the two spring retainers (furnished) and push on rubber or plastic tubing.

Connector at top, installed in panel, has retainer and flexible tubing in place. Connector at bottom shows alternative connection with metal or rigid plastic tubing, using a double compression nylon tube union (as Dwyer Instruments, Inc. Part No. A-328).

### Inlet Piping Run

It is good practice to approach the flowmeter inlet with as few elbows and restrictions as possible. In every case the inlet piping should be at least as large as the connection to the flowmeter. Length of inlet piping makes little difference for normal pressure fed flowmeters.

For flowmeters on vacuum air service the inlet piping should be as short and open as possible. This will allow operation near atmospheric pressure and thereby insure the accuracy of the device. (Note that for vacuum air service the flow control valve if any, should be on the discharge side of the flowmeter. Either the TMV unit or a separate in line valve may be applied.)

### Discharge Piping

As on the inlet, discharge piping should be at least as large as the flowmeter connection. In addition, for pressure fed flowmeters on air or gas service the discharge piping should be as short and open as possible. This will allow operation of the flow tube at near atmospheric pressure and insure the accuracy of the device.

### Cleaning

The flow tube and flowmeter body can best be cleaned with a little pure soap and water. Avoid liquid soaps which may have chlorinated solvents in them and avoid prolonged immersion. Flush thoroughly with clear water to remove all soap. When the instrument can no longer be cleaned by this method it should be replaced.

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The performance of low range units used in air or gas applications may be affected by static electricity. Excessive static charge may cause the ball float to behave erratically or provide a false reading. To ensure the proper function of the unit, the application should be designed to minimize or dispel static electricity.

The standard technique for reading a Variable Area Flowmeter is to locate the highest point of greatest diameter on the float, and then align that with the theoretical center of the scale graduation. In the event that the float is not aligned with a grad, an extrapolation of the float location must be made by the operator as to its location between the two closest grads. The following are some sample floats shown with reference to the proper location to read the float.



Variable Area Flowmeters used for gases are typically labeled with the prefix "S" or "N", which represents "Standard" for English units or "Normal" for metric units. Use of this prefix designates that the flowmeter is calibrated to operate at a specific set of conditions, and deviation from those standard conditions will require correction for the calibration to be valid. In practice, the reading taken from the flowmeter scale must be corrected back to standard conditions to be used with the scale units. The correct location to measure the actual pressure and temperature is at the exit of the flowmeter, except under vacuum applications where they should be measured at the flowmeter inlet. The equation to correct for nonstandard operating conditions is as follows:

$$Q_2 = Q_1 \times \sqrt{\frac{P_1 \times T_2}{P_2 \times T_1}}$$

- Where:
- $Q_1$  = Actual or Observed Flowmeter Reading
  - $Q_2$  = Standard Flow Corrected for Pressure and Temperature
  - $P_1$  = Actual Pressure (14.7 psia + Gage Pressure)
  - $P_2$  = Standard Pressure (14.7 psia, which is 0 psig)
  - $T_1$  = Actual Temperature (460 R + Temp °F)
  - $T_2$  = Standard Temperature (530 R, which is 70°F)

Example: A flowmeter with a scale of 10-100 SCFH Air. The float is sitting at the 60 grad on the flowmeter scale. Actual Pressure is measured at the exit of the meter as 5 psig. Actual Temperature is measured at the exit of the meter as 85°F.

$$Q_2 = 60.0 \times \sqrt{\frac{(14.7 + 5) \times 530}{14.7 \times (460 + 85)}}$$

$$Q_2 = 68.5 \text{ SCFH Air}$$