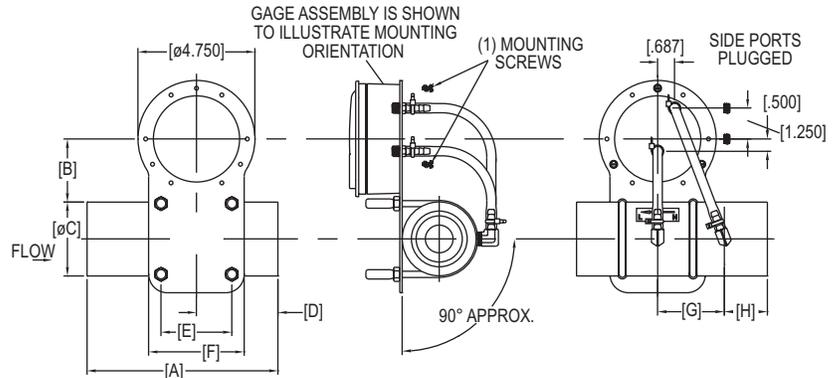




## Series VFLO Venturi Flow Meter with Magnehelic® Gage

### Specifications - Installation and Operating Instructions



The **Venturi Flow Meter with Magnehelic® Gage** is fabricated from aluminum and has a gradual Venturi profile to reduce pressure losses through the meter. Flexible connections enable the meter to be used in vertical or horizontal applications. The Magnehelic® gage provides a large, clear and accurate display of your differential pressure reading. Each meter is calibrated at standard atmospheric conditions. The dual scale reads in SCFM and in w.c. The meter is supplied with flow correction calculation sheet for various flow conditions. It is available in line sizes from 1" to 4" and can handle vacuum and pressure applications.

#### MOUNTING

##### Location:

The flow tube should be installed with minimum 8 diameters of pipe run ahead and 5 diameters of pipe run after. This will ensure steady flow and accurate readings.

##### Installation:

1. The meter can be installed in a vertical or horizontal position. The Magnehelic® gage must be positioned such that it is read in a horizontal orientation. The meter comes in a horizontal left to right configuration. If a vertical orientation is required remove the three mounting screws (1) from the back of the Magnehelic® gage, reposition the gage within the bracket and re-tighten the screws.
2. The Magnehelic® gage can be mounted remotely from the meter. If this is done make sure to keep the Magnehelic® gage above the Venturi Flow Tube assembly. Condensation may collect in the tube if it is below the gage and cause false readings.
3. The Venturi Flow Tube must be connected in the correct orientation. For example, in a left to right flow, the high pressure side which is on the left connects to the high pressure port on the Magnehelic® gage. The low pressure side is on the right and connects to the low pressure port of the Magnehelic® gage.

#### SPECIFICATIONS

**Service:** Air and non-combustible, compatible gases.

**Wetted Materials:** Aluminum, silicone, acrylic, polycarbonate, high carbon steel, low carbon steel, brass, paper, acrylic paint, enamel paint, alkyd coating, nickel plate, zinc plate, hessel FC, 300 series stainless steel, PTFE, Loctite® AV sealant, commercial black rubber, neoprene, samarium cobalt, nickel alloy steel cover, beryllium copper.

**Housing:** Die cast aluminum case and bezel, with acrylic cover. Exterior finish is coated gray to withstand 168 hour salt spray corrosion test.

**Accuracy:** ± 2.5% FS.

**Pressure Limits:** -20" Hg to 15 psig (-0.677 bar to 1.034 bar); MP option: 35 psig (2.41 bar). For applications with high cycle rate within gage total pressure rating, next higher rating is recommended.

**Overpressure:** Relief plug opens at approximately 25 psig (1.72 kPa).

**Temperature Limits:** 20 to 140°F (-6.67 to 60°C).

**Size:** 4" (101.6 mm) diameter dial face.

**Mounting Orientation:** Diaphragm in vertical position. Consult factory for other position orientations.

**Process Connection:** Female NPT of nominal line size (from 1" to 4").

**Weight:** Gage only: 1 lb 2 oz (510 g), MP & HP 2 lb 2 oz (963 g). Venturi: 1": 3 lbs (1.36 kg); 1-1/2": 4.5 lbs (2.04 kg); 2": 6 lbs (2.72 kg); 3": 11 lbs (4.99 kg); 4": 18 lbs (8.16 kg).

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## Venturi Flow Meter with Magnehelic® Gage - Flow Correction Equations

The stocked venturi flow meter is built with a gauge calibrated to read the correct SCFM flow rate when operating in a process at 68°F, 14.7 psia (standard temperature and pressure). If the flow meter is operating in a process line with different operating pressure and temperature then the operator will have to apply a correction factor to the SCFM reading on the gauge to obtain the accurate SCFM measurement in the pipe.

Converting measured flow on a calibrated gauge to the actual flow:

$$F_{actual} = F_{calibrated} \sqrt{\frac{P_{actual}(T_{calibrated} + 460)}{P_{calibrated}(T_{actual} + 460)}}$$

Where:

*F<sub>actual</sub>*: Actual SCFM flow rate in the pipe.

*F<sub>calibrated</sub>*: The SCFM flow rate measured directly off the gauge when operating.

*P<sub>calibrated</sub>*: 14.7psia – standard pressure for which the gauges are calibrated at.

*T<sub>calibrated</sub>*: 68°F – standard temperature for which gauges are calibrated at.

*P<sub>actual</sub>*: The actual operating pressure of the process in psia.

*T<sub>actual</sub>*: The actual operating temperature of the process in °F.

For example:

The stocked flowmeter was calibrated at 14.7 psia and 68°F. It is now being deployed in a process operating under vacuum at 10" Hg and 100°F. The current reading on the gauge is shown to be 100 SCFM. To determine the actual SCFM rate:

*F<sub>calibrated</sub>*: 100 SCFM.

*P<sub>calibrated</sub>*: 14.7psia

*T<sub>calibrated</sub>*: 68°F

*P<sub>actual</sub>*: 10" Hg(g) = 14.7psia - (10"Hg x 0.491  $\frac{psi}{Hg}$ )  
=9.79 psia.

*P<sub>actual</sub>*: 100°F

$$F_{actual} = F_{calibrated} \sqrt{\frac{P_{actual}(T_{calibrated} + 460)}{P_{calibrated}(T_{actual} + 460)}}$$

$$F_{actual} = 100 \sqrt{\frac{9.79(68 + 460)}{14.7(100 + 460)}}$$

*F<sub>actual</sub>* = 79.2 SCFM

To convert the actual SCFM values calculated above to the actual ACFM values, the following equation can be used:

$$F_{acfm} = F_{scfm} \times (P_{standard} \times (460 + T_{actual})) / (P_{actual} \times (460 + T_{standard}))$$

$$F_{acfm} = 79.2 \times (14.7 \times (460 + 100)) / (9.79 \times (460 + 68))$$

$$F_{acfm} = 79.2 \times 1.59$$

$$F_{acfm} = 126 \text{ ACFM}$$

## MAINTENANCE

After final installation of the Venturi Flow Meter with Magnehelic® Gage, no routine maintenance is required. A periodic check of system calibration is suggested. These devices are not field repairable and should be returned if repair is needed. Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.