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Series VF Visi-Float® Flowmeter

Specifications - Installation and Operating Instructions





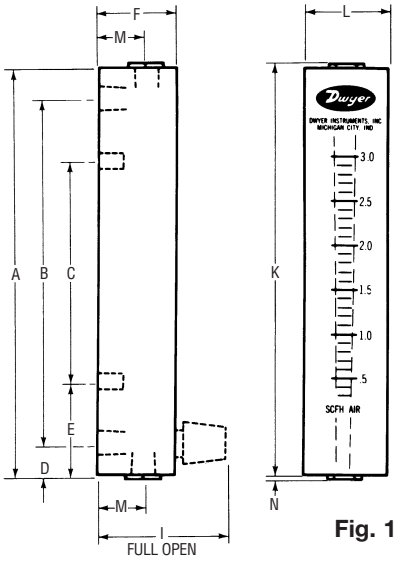


Fig. 1

Dwyer Visi-Float® Series Flowmeters are furnished in two models (see Figure 1) each available in a broad choice of flow ranges with direct reading scales for air, gas or water. Installation, operation and maintenance are very simple and only a few common sense precautions must be observed to assure long, trouble-free service.

CALIBRATION

Each Dwyer flowmeter is calibrated at the factory. If at any time during the meter's life, you wish to recheck its calibration, do so only with devices of certified accuracy. **DO NOT** attempt to check the Dwyer Visi-Float® Flowmeter with a similar flowmeter as seemingly unimportant variations in piping and back pressure may cause noticeable differences in the indicated reading. If in doubt, return your Dwyer flowmeter to the factory. It will be checked for conformance at no charge. Before proceeding with the installation of your Dwyer Visi-Float® Flowmeter, check to be sure you have the model and flow range you require.

LOCATION

Temperature, Pressure, Atmosphere, and Vibration:
Visi-Float® Acrylic Flowmeters are exceptionally tough and strong. They are designed for use at pressures up to 100 psi (7 bar) and temperatures up to 150°F (66°C). DO NOT EXCEED THESE LIMITS! The installation should not be exposed to strong chlorine atmospheres or solvents such as benzene, acetone, carbon tetrachloride, etc. The mounting panel should be free of excessive vibration since it may prevent the unit from operating properly.

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 i.e. 1/8″ Iron Pipe Size. Length of inlet piping makes little difference for normal pressure fed flowmeters.

For flow meters 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. This is of less importance on water or liquid flowmeters since the flowing medium is generally incompressible and moderate back pressure will not affect the accuracy of the instrument as calibrated.

DIMENSION-IN INCHES		
	Model VFA	**Model VFB**
A	4	6½
B	3 (⅛ female NPT)	5½ (⅛ female NPT)*
C	1⅝ (10-32 Thread)	3½ (10-32 thread)
D	½	½
E	1 3/16	1½
F	1¼	1¼
I	2 1/16 (BV or SSV)	2 1/16 (BV or SSV)
K	4 3/32	6 19/32
L	1	1⅜
M	¾ (EC)	¾ (EC)
N	3/32 (EC)	3/32 (EC)
*VFB ranges 85 and 86 have ¼" NPT back connections or ⅜" NPT end connections.		

SPECIFICATIONS

Service: Compatible gases & liquids.
Wetted Materials:
Body: Acrylic plastic.
O-ring: Buna-N (Viton® available).
Metal Parts: Brass standard, stainless steel optional.
Float: Stainless steel, black glass, aluminum, K Monel depending on range.
Temperature & Pressure Limits:
Without Valve: 100 psig (6.9 bar) @ 150°F (65°C);
150 psig (10 bar) @ 100°F (38°C).
With Valve: 100 psig (6.9 bar) @ 120°F (48°C).
Accuracy: VFA = 5% of full scale; VFB= 3% of full scale.
Process Connection: 1/8″ female NPT. VFB ranges 85 and 86 have 1/4″ NPT back connections or 3/8″ NPT end connections. These ranges not available with brass valves.
Scale Length: VFA 2″ typical length; VFB 4″ typical length.
Mounting Orientation: Mount in Vertical Position.
Weight: VFA: 4.0-4.8 oz (.11-.14 kg). VFB: 7.2-8.8 oz (.20-.25 kg).

POSITION AND MOUNTING

All Visi-Float® Flowmeters must be mounted in a vertical position with the inlet connection at the bottom and outlet at the top.

Surface Mounting: Drill appropriate holes in panel using the dimensions shown in Figure 1. Hold the flowmeter in position in front of the panel and install the mounting screws through the panel from the rear. Mounting screws must not be longer than the panel thickness plus 1/4″, or the screw will hit the plastic and may damage the meter. The screws will require additional force during the initial installation, since the insert boots are of a collapsed thread type and must be expanded into the plastic for the knurled surface to take hold. Insert boots will not have the proper 10-32 threads

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POPULAR RANGES

Model VFA — 2" Scale			
Range No.	Range SCFH Air	Range No.	Range LPM Air
1	.1-1	21	.06-0.5
2	.2-2	22	.15-1
3	.6-5	23	.6-5
4	1-10	24	1-10
5	2-20	25	3-25
6	4-30	26	6-50
7	5-50	27	10-100
8	10-100		
9	20-200		
	CC Water per min.		Gal. Water per hour
32	6-50	41	.6-5
33	10-100	42	1.2-10
34	20-200	43	3-20
		44	8-40

Model VFB — 4" Scale			
Range No.	Range SCFH Air	Range No.	LPM Air
50	.3-3	65	.2-4
91	1-10	66	1-10
51	2-20	67	1-20
52	4-40	68	3-30
53	10-100	69	4-40
54	15-150		CC/Min. Water
55	20-200	82	2-30
	SCFM Air		GPH Water
90	.3-3	80	.5-12
	CC/Min. Air	83	1-20
60	100-1000	81	6-60
			GPM Water
		85	.2-2
		86	.5-5

until the first screw has been inserted to expand the boot. Pipe up inlet and discharge using RTV silicone sealant or Teflon® tape on pipe threads to insure against leakage.

Surface Mounting on Piping Only: An alternate method of surface mounting is by omitting the mounting screws and supporting the Visi-Float® Flowmeter on the connecting piping only. For this method extra long or straight pipe threads should be used so that nuts may be run onto the pipe and later tightened against the back of the panel to retain the unit in proper position. Use the appropriate hole layout information from Figure 1, but omit the small holes.

Mounting on Piping Only Without Panel: For the temporary or laboratory type installation, the panel may be omitted altogether and the flowmeter installed directly in rigid piping. Its light weight permits this without difficulty.

OPERATION

To start system, open the valve slowly to avoid possible damage. Control valves on BV and SSV models are turned clockwise to reduce flow, counter clockwise to increase flow. A nylon insert is provided in the threaded section of the valve stem to give a firm touch to the valve and to prevent change of setting due to vibration.

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.



CAUTION

Do not completely unscrew valve stem unless flowmeter is unpressurized and drained of any liquid. Removal while in service will allow gas or liquid to flow out front of valve body and could result in serious personal injury. For applications involving high pressure and/or toxic gases or fluids, special non-removable valves are available on special order. Contact factory for details.

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 SCFH Air

MAINTENANCE

The only maintenance normally required is occasional cleaning to assure reliable operation and good float visibility.

Disassembly: The flowmeter can be disassembled for cleaning by simply disconnecting the piping, dismounting the unit from the panel and removing the top-plug-ball stop. Take out the ball or float by inverting the body and allowing the float to fall into your hand. (Note: It is best to cover the discharge port to avoid losing the float through that opening.) When removing the float guide assembly on VFB models 85 and 86, be careful not to lose the short pieces of plastic tubing on both ends of the guide which serve as float stops.

Cleaning: The flow tube and flowmeter body can best be cleaned with a little pure soap and water. Use of a bottle brush or other soft brush will aid the cleaning. Avoid benzene, acetone, carbon tetrachloride, alkaline detergents, caustic soda, liquid soaps (which may contain chlorinated solvents), etc. and avoid prolonged immersion.

Reassembly: Reinstall the float, remount, connect and place the unit back in service. A little stop cock grease or petroleum jelly on the "O"rings will help maintain a good seal as well as facilitate assembly. No other special care is required.

For VFB models 85 and 86, first install the lower fitting, next the float guide and float and finally the upper fitting and plug. Be certain that both ends of the float guide are properly engaged and the float is correctly oriented.

ADDITIONAL INFORMATION

For additional flowmeter application information, conversion curves, factors and other data covering the entire line of Dwyer full-line catalog.

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Printed in U.S.A. 1/05 FR# 52-440241-00 Rev.3

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