



## Series VFCR Visi-Float® Flowmeter with Roto-Gear Valve Technology

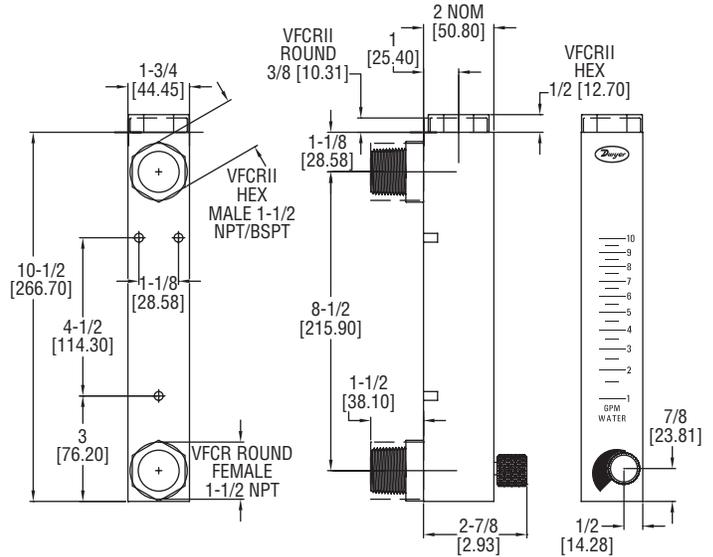
### Specifications - Installation and Operating Instructions



VFCR Left with 1" female  
NPT Connections



VFCR with 1" male  
NPT Connections



The innovative **Series VFCR Visi-Float® Acrylic Flowmeter with Roto-Gear Technology** is a direct reading variable area flowmeter with scales for liquid or gas applications. Roto-gear valve technology permits full open to close adjustment while maintaining fine flow control of the process media in one valve design. Installation, operation, and maintenance are simple ensuring a long, accurate, and trouble-free operation life.

#### CALIBRATION

All flowmeters are calibrated at the factory and normally will remain within their accuracy tolerance for the life of the device. If at any time you wish to re-check its calibration, do so only with instruments or equipment of certified accuracy. Do not attempt to check the Visi-float® flowmeter with a similar flowmeter as even minor variations in piping and back pressure can cause significant differences between the indicated and actual readings. If in doubt, your flowmeter may be returned to the factory for evaluation.

#### LOCATION

Select a location where the flowmeter can be easily read and where the temperature will not exceed 120°F (48°C). The mounting surface and piping to the flowmeter should be free from vibration which could cause fatigue of fittings or mounting inserts. Piping must be carefully arranged and installed to avoid placing stress on fittings and/or flowmeter body. Damage due to contact with incompatible gases or liquids is not covered by warranty. Compatibility should be carefully determined before placing in service.

#### PIPING

##### Inlet Piping

It is good practice to approach the flowmeter inlet with as few elbows, restrictions and size changes as possible. Inlet piping should be as close to the flowmeter connection size as practical to avoid turbulence which can occur with drastic size changes. The length of inlet piping has little effect on normal pressure fed flowmeters.

##### Discharge Piping

Piping on the discharge side should be at least as large as the flowmeter connection. For pressure fed flowmeters on air or gas service, the piping should be as short and open as possible. This allows operation at or near atmospheric pressure and assures the accuracy of the device. This is less important on water or liquid flowmeters since the flowing medium is generally incompressible and back pressure will not affect the calibration of the instrument.

#### SPECIFICATIONS

**Service:** Compatible gases and liquids.

**Wetted Materials:** Body: Acrylic plastic; O-ring: Buna-N (optional fluoropolymer); Valve: Delrin®; Float: Stainless steel; Float stop: Polyolefin (range no. 141 Polyolefin and PVC); Float rod: 18-8 SST; Fittings: PVC (VFCR II Delrin®).

**Temperature Limit:** 120°F (48°C).

**Pressure Limit:** 100 psig (6.9 bar).

**Accuracy:** 2% of FS.

**Process Connection:** VFCR: 1" female NPT back connections; VFCR II: 1" male NPT back connections.

**Scale Length:** 5" (127 mm).

**Mounting Orientation:** Mount in vertical position.

**Weight:** 25.6 oz (0.73 kg).

#### POSITION AND MOUNTING

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

##### Surface Mounting

Drill three holes in panel using dimensions shown in dimensional drawing. Holes should be large enough to accommodate #10 - 32 machine screws. Drill two additional holes for clearance of fittings. Install mounting screws of appropriate length from rear. Mounting screws must not be longer than the panel thickness plus 3/8" (9.66 mm), 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 until the first screw has been inserted to expand the boot. Use pipe thread sealant tape or pipe thread sealant to insure against leakage.

**CAUTION:** Do not overtighten fittings or piping into fittings. Maximum recommended torque is 10 Ft-Lb (13.56 N-m). Hand tighten only.

**CAUTION:** Do not overtighten the valve knob. Overtightening the valve beyond a torque rating of 0.25 Ft-Lb (0.34 N-m) may result in valve misalignment and alteration. Hand tighten only.

## OPERATION

Once all connections are complete, introduce flow as slowly as possible to avoid possible damage. With liquids, make sure all air has been purged before taking readings. Once the float has stabilized, read flow rate by sighting across the largest diameter of the float to the scale graduations on the face of the device. 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. Refer to Figure 1 for proper float installation. In the event that the float is not aligned with a graduation, 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.

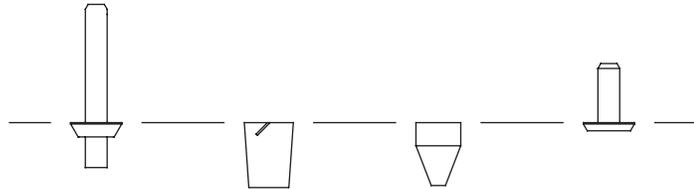


Figure 1

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: Q1 = Actual or Observed Flowmeter Reading  
 Q2 = Standard Flow Corrected for Pressure and Temperature  
 P1 = Actual Pressure (14.7 psia + Gage Pressure)  
 P2 = Standard Pressure (14.7 psia, which is 0 psig)  
 T1 = Actual Temperature (460 R + Temp °F)  
 T2 = 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<sub>2</sub> = 68.5 SCFH Air

## Removal of Valve Cartridge

Easily remove the valve cartridge by referring to Figure 2 below and following the steps below:

1. Turn the knob counterclockwise until the valve is completely open. Then close the valve half turn (Allow the cartridge (F) to easily disengage.)
2. Remove knob (A)
3. Remove the clip (B)
4. Unscrew the fitting (H)
5. Remove the wave washer (G)
6. Turn the acrylic body with the threaded opening (C) face down and apply a gentle force on stem (D) from the opposite side
7. The cartridge (F) will easily slide out from the threaded opening

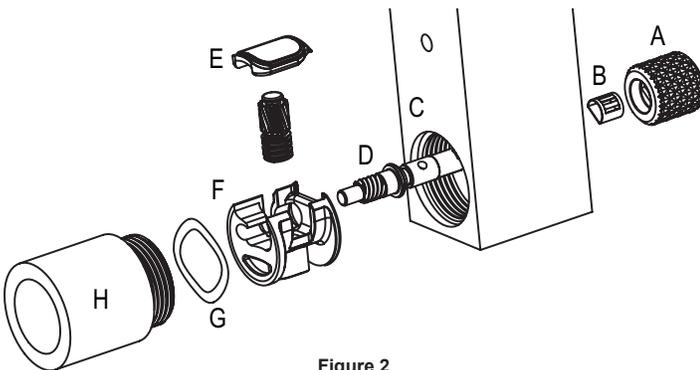


Figure 2

## Re-assembly of Valve Cartridge

Reinstall a valve cartridge by referring to Figure 2 and following the steps below:

1. Insert the stem (D) into the cartridge (F) to engage with the gear and clip (E).
2. Turn stem (D) counterclockwise until the clip (E) contacts the cartridge (F)
3. Move the cartridge (F) with clip and stem into the threaded opening (C)
4. Insert wave washer (G)
4. Thread fitting (H) into threaded opening (C)
5. Insert clip (B) on stem (D)
6. Insert knob (A) onto clip (B) that should already be on stem (D)

MODEL CHART	
Model	Description
A-VFCR-KITB	Replacement valve cartridge buna O-rings
A-VFCR-KITV	Replacement valve cartridge fluorelastomer O-rings

## Disassembly of Float Rod

The flowmeter can be completely disassembled by removing the connection fittings and top plug. The guide rod is threaded into the top plug on one end and the rod guide on the other end. When disassembling, be careful not to lose the plastic tubing which serve as float stops. Note the orientation of the float before disassembly.

## Re-assembly of Float Rod

Easily reinstall the float rod by referring to Figure 3 and following the steps below:

1. Reassemble the top fitting and float rod, ensuring the float is properly oriented. See Figure 1 for float orientation.
2. Turn the top fitting (K) to the fully tightened position. For models VFCR-141, VFCR-142, VFCR-151 and VFCR-152, skip step 3 below.
3. Turn top fitting counter-clockwise (loosening) until the 4 alignment notches (L) on the bottom of the guide rod holder are positioned to the side, front, and back surfaces of the acrylic meter body while ensuring minimal movement of the top fitting. The orientation of the notches is essential for optimal meter performance.

**Note:** A light coat of grease on the O-rings will help maintain a good seal as well as ease assembly

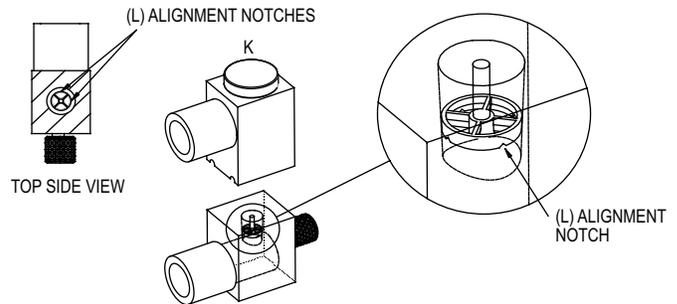


Figure 3

## ADDITIONAL INFORMATION

For additional flowmeter application information, conversion curves, correction factors and other data covering the entire line of flowmeters, please request a Dwyer Instruments, Inc. full-line catalog available on our website.

## MAINTENANCE/REPAIR

Upon final installation of the Series VFCR, only routine maintenance is required. The Series VFCR should be returned if repair is needed. Field repair should not be attempted and may void warranty.

## Cleaning

The flowmeter body and all other parts can be cleaned by washing in a mild soap and water solution. A soft bristle bottle brush will simplify cleaning of the flow tube. Avoid ammonia, benzene, acetone, carbon tetrachloride, gasoline, alkaline detergents, caustic soda, liquid soaps, (which may contain chlorinated solvents), and avoid prolonged immersion.

## WARRANTY/RETURN

Refer to "Terms and Conditions of Sale" in our catalog and on our website. Contact customer service to receive a Return Material Authorization number before shipping the product back for repair. Be sure to include a brief description of the problem plus any additional application notes.

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