



OPERATING INSTRUCTIONS

CALFLO™ CFVF2 THERMAL MASS LIQUID FLOW METER



Dimensions (In) mm

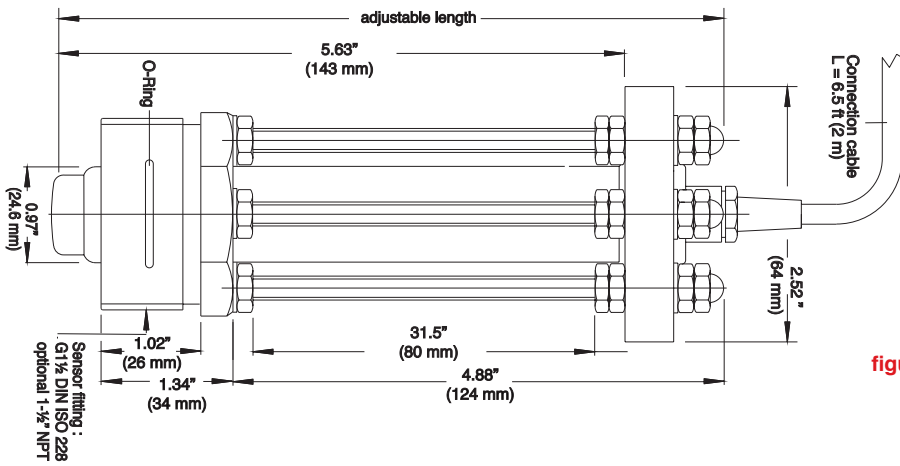


figure 1

Safety Precautions

About This Manual:

PLEASE READ THE ENTIRE MANUAL AND SPECIFICATIONS PRIOR TO INSTALLING OR USING THIS PRODUCT.

This manual includes information on all models of CalFlo™ CFVF2 Thermal Mass Liquid Flow Meter. Please refer to the part number to verify the exact model which you have purchased.

User's Responsibility for Safety:

FLO-CORP provides a wide range of flow and level technologies. While this device is designed to operate in a wide variety of applications, it is the user's responsibility to select a model that is appropriate for the application, install it properly, perform tests of the installed system, and maintain all components. The failure to do so could result in property damage or serious injury.

Wiring and Electrical:

The supply voltage used to power the device should never exceed a maximum of 24 volts DC. Electrical wiring of the device should be performed in accordance with all applicable national, state, and local codes.

Flammable, Explosive and Hazardous Applications:

Flow Meters should not be used with explosive or flammable liquids, which require an intrinsically safe or classified area rating!

Description

The CalFlo™ CFVF2 Thermal Mass Liquid Flow Meter is an industrial purpose flow meter that will monitor a wide range of liquid applications. The CFVF2 provides high accuracy measurement of flow, including very low flow rates, using a solid state design with NO moving parts. The CFVF2 features an adjustable measuring range, easily adjusts to variable insertion depths, and fit pipes up to 24" in diameter.

Specifications



| | |
|-----------------------|---|
| Service | Compatible Liquids |
| Measuring Range | 0.25 to 10 fps (3 mps) |
| Pressure | 261 psi (18 bar) |
| Accuracy | < 3% |
| Repeatability | < 1% / Response time to flow rate change 10 sec. typ. |
| Supply Voltage | 24 VDC ± 10% |
| Consumption | Approx. 100-200 mA |
| Output | 4-20 mA |
| Resistive Load | 0-600 Ohm |
| Process Temperature | F: 32° to 176° C: 0 to 80° |
| Ambient Temperature | F: -4° to 160° C: -20° to 70° |
| Enclosure Rating | NEMA 4X (IP65) |
| Enclosure Material | Stainless Steel |
| Sensor Fitting | 1½" NPT |
| Cable | |
| Cable Jacket Material | Oilflex |
| Cable Length | 6.5' (2m) |

Note: Please Consult Factory for Special Requirements

Connection Diagram

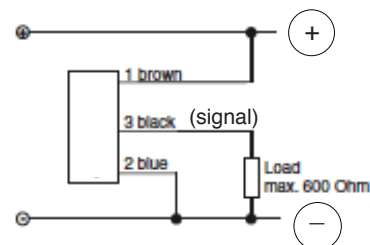


figure 2

Installation and Instructions

Please read carefully! No liability can be accepted for damage caused by improper use of the CFVF2 Flow Meter.

1.0 Installation Instructions

1.1 Installation depth: 1/7x ID pipe sizes from 1.5" to 24"

1.2 Orientation to flow: See Figure 5

1.3 **Fitting position:** Preferably in ascending pipes or in horizontal pipes with flow meter in horizontal position.
For optimal flow, straight pipe should be min. 10 x ID before, and 5 x ID after the flow meter.

1.4 Insertion Mounting into a Standard Process Pipe:

For larger pipe diameters than 2 inch, Insert meter through a hole drilled into the pipe at the 2,3 or 4 O'clock position in the pipe. Avoid drilling the mounting hole directly on top or directly on the bottom of the pipe as this may cause turbulent flow or air pockets around the meter sensing head/body. The hole diameter will need to be 1.10 inch diameter to accommodate proper insertion of the meter sensing head/body. The CalFlo meter includes a 1.50 inch MNPT process connection which should be threaded into a customer supplied 1.50 inch FNPT weld-o-let or standard pipe fitting. Thread in flow meter into the fitting on the pipe side and fix it at the correct insertion depth of 1/7 x ID of the pipe.

Insertion Mounting into a Standard Pipe Tee Fitting:

For pipe diameters 1 1/2" to 2" using a standard 1 1/2" inch pipe tee, Insert meter through exposed threaded hole with process piping inlet and outlet plumbed into the in and out process ports. Make sure the insertion port is oriented at the 2,3 or 4 O'clock position in the pipe. Avoid placing the meter port directly on top or directly on the bottom of the pipe as this may cause turbulent flow or air pockets around the meter sensing head/body. The CalFlo meter includes a 1.50 inch MNPT process connection which should be threaded into a customer supplied 1.50 inch FNPT standard pipe tee. Thread in flow meter into the fitting on the pipe side and fix it at the correct insertion depth of 1/7 x ID of the pipe.

1.5 **Initial operation:** Connect flow meter to 24 VDC according to connection diagram and wait approx. 2 min. before starting any measurement. The flow meter has been calibrated to the specified type related flow rate(related to water):
CFVF2-05: 0 to 10 fps (3.0 mps)

At customers plant signal may vary dependent on individual mounting and medium conditions. If re-adjustment is required, please refer to point 3.

2.0 Adjustment Procedure

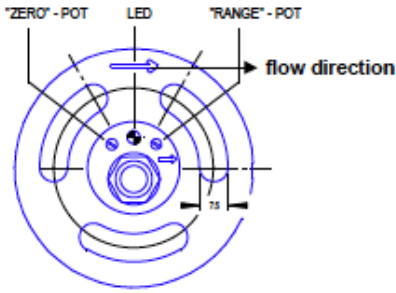
2.1 Zero point adjustment in stationary medium (roughly): Adjust zero point potentiometer after 2 min. so, that
 $I_a \approx 4 \text{ mA}$, i.e. at $I_a > 4 \text{ mA}$ turn pot. to the left,
at $I_a < 4 \text{ mA}$ turn pot. to the right.

2.2 Measuring range adjustment at max. flow: Measuring range adjustable from 0.25 to 0.65 fps to 0.25 to 6.5 fps (related to water). Accelerate flow of the medium to a point, where the flow meter should give an output signal of 20 mA and wait min. 2 minutes. Turn range pot. until $I_a = 20 \text{ mA}$ (to the left I_a will be bigger, to the right I_a will be smaller). The color of the LED will change from green ($I_a \leq 20 \text{ mA}$) to red (exceeding measuring range).

2.3 Fine adjustment of zero point: After at least 3 minutes standstill of flow turn zero point slightly so, that I_a is just 4 mA (turning direction as in 2.1) .

2.4 Repeat adjustment according to 2.2 and 2.3 until the zero point (4 mA) and max. range setting (20 mA) remain constant.

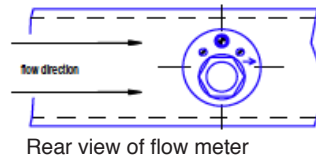
Installation



Potentiometer, 18 turn, endless
figure 3

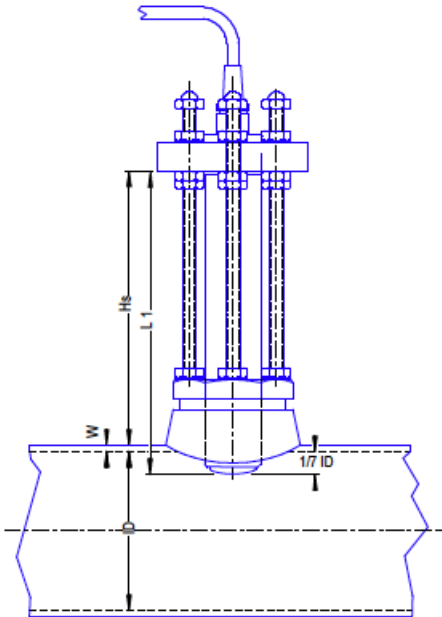
Positioning

figure 4



Rear view of flow meter

Calculation of the standard height for 1/7 ID (insertion depth)



$$H_s = L_1 - W - (1/7 \times ID)$$

Hs: standard height
L₁ : unit length (see drawing)
W: wall thickness of pipe
ID: inner pipe diameter

For example:

$$\begin{aligned} L_1 &= 143 \text{ mm} \\ W &= 5 \text{ mm} \\ ID &= 50.4 \text{ (2") } \\ H_s &= 143 - 5 - (1/7 \times 50.4) \\ &= 143 - 5 - 7.0 \\ &\approx 131 \text{ mm} \end{aligned}$$

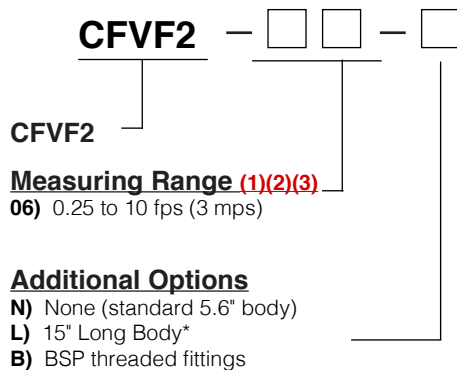
Ordering Information

FLO-CORP MODEL NUMBER BUILDER

For Assistance Call 877.356.5463

Use the diagram below, working from left to right to construct your FLO-CORP Model Number.
Simply match the category number to the corresponding box number.

Example: CFVF2-06-N CalFlo™ CFVF2 Thermal Mass Liquid Flow Meter, 0.25 to 10 fps Measuring Range with no additional options.



Ordering Notes:

- (1) Select the best configuration based on your requirements.
- (2) This unit comes standard with a NPT (US) threaded union nut for installation.
- (3) Comes complete with 6.5' (2m) pre-wired cable and manual.



*Long body option shown