



Flow Line Options



ThermoMassFlo Flow Meter for Gas Flow

Features & Benefits

- Rigid metallic construction
- Available flow ranges starting from 9 to 10 sccm up to 0 to 1000 slpm
- Maximum pressure of 500 psig (34.5 bars)
- Leak integrity 1×10^{-7} of helium
- NIST traceable certification
- Built-in tiltable LCD readout (some models)
- 0-5 Vdc and 4-20 mA signals
- Circuit protection
- Can be used as a portable device
- Engineering units or 0 to 100% displays
- Totalizer option

Specifications

ACCURACY: $\pm 1.5\%$ of full scale, including linearity for gas temperatures of 59°F to 77°F (15°C to 25°C) and pressures of 5 to 60 psia (0.4 to 4.1 bars) Optional $\pm 1\%$ of full scale (certified calibration accuracy) associated with a given set of temperature and pressure values.

REPEATABILITY: $\pm 0.5\%$ of full scale

RESPONSE TIME: Generally 2 seconds to within $\pm 2\%$ of actual flow rate over 25 to 100% of full scale.

TEMPERATURE COEFFICIENT: 0.15% of full scale/ $^{\circ}\text{C}$

PRESSURE COEFFICIENT: 0.01% of full scale/psi (0.07 bar)

MAXIMUM PRESSURE DROP: see scale 3

GAS and AMBIENT TEMP: 32°F to 122°F (5° to 50°C)

OUTPUT SIGNALS: Linear 0-5 Vdc. 1000 ohms min. load independence and 4-20 mA 0-250 ohms loop resistance.

TRANSDUCER INPUT POWER: +12 Vdc; 200 mA of maximum. +24 Vdc optional

TIME CONSTANT: 800 ms

GAS PRESSURE: 1000 psig (70 bars) maximum FCM 17, 37, 47. 20 psig (1.4 bars) optimum. 500psig (34.5 bars) FCM 57, 67, 77. 20 psig (1.4 bars) optimum

MATERIALS IN FLUID CONTACT: a. Aluminum models FCM Series: anodized aluminum, 316 stainless steel, brass and viton® O-rings

b. Stainless steel models FCM17S, 37S 47S, 57S, 67S and 77S: 316 stainless steel and viton® O-rings. Optional O-rings: Buna®, EPR and Kalrez®

ATTITUDE SENSITIVITY: No greater than +15 degree rotation from horizontal to vertical; standard calibration is in horizontal position

CONNECTIONS: FCM 17 & 37: 1/4" compression fittings. Optional: 1.4" VCR, 1/8" or 3/8" compression fittings (FCM 17)

FCM 47: 3/8" compression or NPT fittings

FCM 57: 3/8" compression or NPT fittings

FCM 67: 1/2" compression or NPT fittings

FCM 77: 3/4" FNPT fittings or 3/4" compression fittings (FCM 77)

LEAK INTEGRITY: 1×10^{-7} smL/sec of helium maximum to the outside environment

CE COMPLIANT: EN 55011 class 1, classB; EN50082-1

Description

FCM Mass flow meter

A low cost solution to thermal mass flow metering for gases is presented by FLO-CORP in introducing the model FCM flow meter line. The FCM design combines the convenience and accuracy of conventional mass flow devices with low costs previously unattainable. Each of these meters incorporate an advanced straight tube sensor in conjunction with flow passage elements constructed of aluminum and brass for non-corrosive gases or 316 stainless steel for corrosive applications.

Principles of Operation

Metered gases are divided into two laminar flow paths, one through the primary flow conduit, and the other through a capillary sensor tube. Both flow conduits are designed to ensure laminar flows and therefore the ratio of their flow rates is constant. Two precision temperature sensing windings on the sensor tube are heated, and when flow takes place, gas carries heat from the upstream to the downstream windings. The resultant temperature differential is proportional to the change in resistance of the sensor windings.

A Wheatstone bridge design is used to monitor the temperature dependent resistance gradient on the sensor windings which is linearly proportional to the instantaneous rate of flow.

Output signals of 0 to 5Vdc and 4 to 20mA are generated indicating mass molecular based flow rates of the metered gas.

Flow rates are unaffected by temperature and pressure variations within stated limitations.

General Description

Compact, self contained FCM mass flow meters are designed to read flow rates of gases. The rugged design coupled with instrumentation grade accuracy provides versatile and economical means of flow control.

Aluminum or stainless steel models with readout options of either engineering units (standard) or 0 to 100 percent displays are available. The mechanical layout of the design includes an LCD readout built into the top of the transducer. This readout module is tiltable over 90 degrees to provide optimal reading comfort. It is connected to the transducer by a standard modular plug, and is also readily removable for remote reading installations. Transducers without LCD readout are offered for OEM applications.

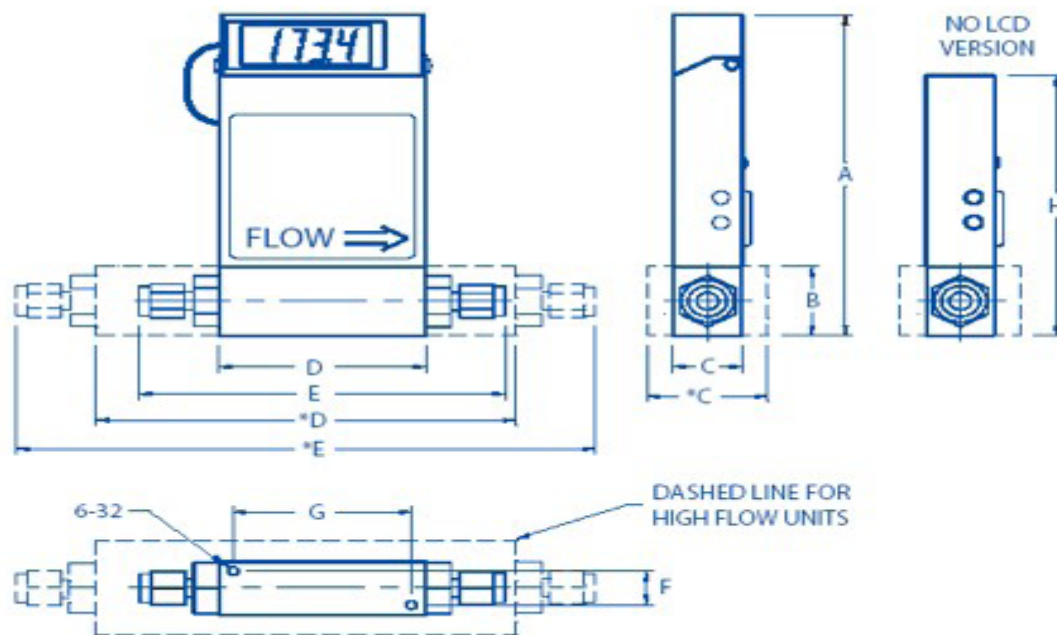
FCM mass flow meters are available with flow ranges from 10 sccm to 1000 sL/min N₂. Gases are connected by means of 1/4" 3/8" 1/2" compression fittings and 3/4" FNPT fittings. Optional fittings are available. These controllers may be used as benchtop units or mounted by means of screws in the base.

Transducer power supply ports are fuse and polarity protected.

Leak Integrity

1 x 10⁻⁷ smL/sec of helium maximum to the outside environment.

Dimensions



Model & Flow Range

| ThermoMassFlo | Model No. | Description | Range | Pressure Rating |
|------------------------------|--------------|-----------------------------|-------------|-----------------|
| Price Includes | FCM17A-VADL2 | 1/4", LCD Display Aluminum | 0 to 10 l/m | 1000 PSIG |
| Fittings: Compression or NPT | FCM17S-VADL2 | 1/4", LCD Display, SST | 0 to 10 l/m | 1000 PSIG |
| 115V/24V power supply | FCM37A-VADL2 | 1/4", LCD Display, Aluminum | 0-50 l/m | 1000 PSIG |
| | FCM37S-VADL2 | 1/4", LCD Display, SST | 0-50 l/m | 1000 PSIG |
| | FCM47A-VDDL2 | 3/8", LCD Display, Aluminum | 0-100 l/m | 1000 PSIG |
| | FCM47S-VDDL2 | 3/8", LCD Display, SST | 0-100 l/m | 1000 PSIG |
| | FCM57A-VDDL2 | 3/8", LCD Display, Aluminum | 0-200 l/m | 500 PSIG |
| | FCM57S-VDDL2 | 3/8", LCD Display, SST | 0-200 l/m | 500 PSIG |
| | FCM67A-VEDL2 | 1/2", LCD Display, Aluminum | 0-500 l/m | 500 PSIG |
| | FCM67S-VEDL2 | 1/2", LCD Display, SST | 0-500 l/m | 500 PSIG |
| | FCM77A-VFDL2 | 3/4", LCD Display, Aluminum | 0-1000 l/m | 500 PSIG |
| | FCM77S-VFDL2 | 3/4", LCD Display, SST | 0-1000 l/m | 500 PSIG |

Accessories

| TOTALIZER | |
|-----------------|---|
| TOT-10-OC | Totalizer (5Vdc-10Vdc signals), calibrated. |
| TOT-10-ON | Totalizer (5Vdc-10Vdc signals), uncalibrated. |
| CBL-TOT10 | Cable & splitter, used in conjunction with display. |
| IO INPUT/OUTPUT | |
| 10-232-C | Input/Output to RS232, 0-5Vdc |
| 10-232-E | Input/Output to RS232, 4-20mA |
| 10-485-C | Input/Output to RS485, 0-4Vdc |
| 10-485-E | Input/Output to RS485, 4-20mA |