



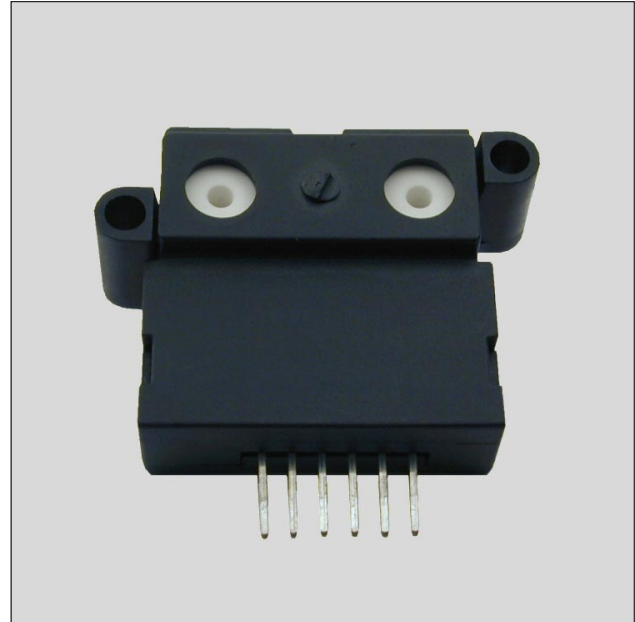
FEATURES

- Ranges 0...±25 and 0...±1000 sccm¹
- Bidirectional sensing
- Actual mass flow sensing
- Ceramic flow tube
- Manifold mount/O-ring sealed
- Sensortech PRO services

MEDIA COMPATIBILITY

To be used with dry gases only.
The FMOM025HB is a special sensor for hydrogen (H₂) flow.

The FMO series is NOT designed for liquid flow and will be damaged by liquid flow through the sensor.



SPECIFICATIONS

Maximum ratings

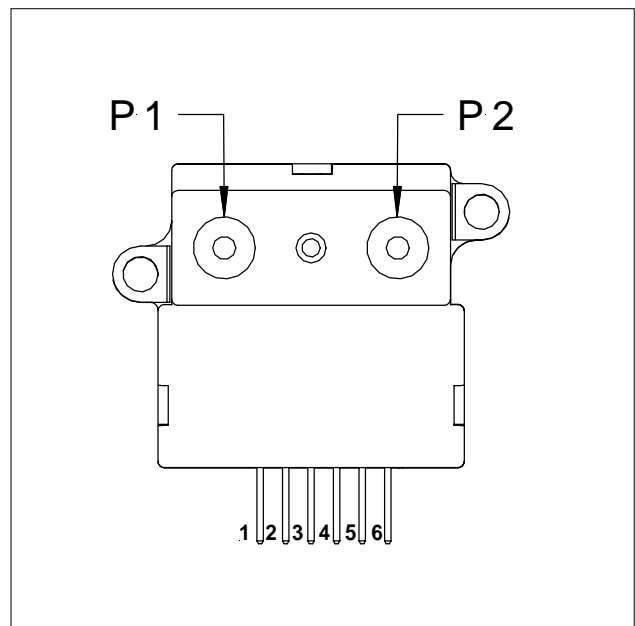
Supply voltage ²	8 to 15 V typ. 10 ±0.01 V
Power consumption	max. 60 mW
Temperature limits	
Operating	-40 to 125°C
Storage	-40 to 125°C
Mechanical shock	100 g (5 drops, 6 axes)

Note:

¹ sccm denotes standard cubic centimeters per minute

² Output voltage is ratiometric to supply voltage

ELECTRICAL CONNECTION





FMO Series

Mass flow sensors for gases

FLOW SENSOR CHARACTERISTICS³

($V_s = 10 \pm 0.01$ V, $T_A = 25^\circ\text{C}$)

Part no.	Flow range (full scale)	Max. flow change ⁴	Output voltage @ trim point
FMOM025HB	± 25 sccm	5.0 l/sec	8.5 ± 1.5 mV @ 25 sccm
FMOL001DB	± 1000 sccm	5.0 l/sec	54.7 ± 3.7 mV @ 1000 sccm

PERFORMANCE CHARACTERISTICS

($V_s = 10 \pm 0.01$ V, $T_A = 25^\circ\text{C}$)

Characteristics			Min.	Typ.	Max.	Unit
Zero offset		FMOM025HB	-1.0	0	1.0	mV
		FMOL001DB	-1.5	0	1.5	
Repeatability and hysteresis (combined)		FMOM025HB			± 0.35	% reading
		FMOL001DB			± 0.50	
Temperature effects ⁵	Offset	-25 to 85 °C		± 0.20		mV
	Span	-25 to 25 °C		2.5		% reading
		25 to 85 °C		-2.5		
Response time				1.0	3.0	ms
Common mode pressure					150	psi

Notes:

³ A 5 micron filter is recommended for all devices.

⁴ Maximum allowable rate of flow change to prevent damage.

⁵ Shift is relative to 25 °C.



FLOW SPECIFICATIONS

($V_s = 10 \pm 0.01$ V, $T_A = 25^\circ\text{C}$)

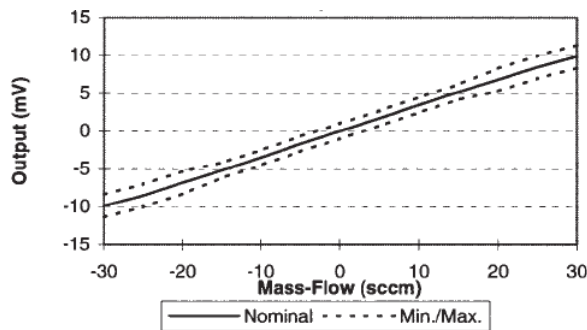
FMOM025HB				FMOL001DB			
Press. (μbar)	Flow (sccm) ⁶	Nom. (mV)	Tol. (\pm mV)	Press. (mbar)	Flow (sccm) ⁶	Nom. (mV)	Tol. (\pm mV)
20	30	9.9	1.5	2.23	1000	54.7	2.0
17	25	8.5	1.5	1.52	800	53.0	2.0
14	20	6.8	1.5	0.94	600	49.3	2.5
10	15	5.2	1.0	0.49	400	42.5	3.5
7	10	3.5	1.0	0.19	200	29.8	4.0
3	5	1.7	1.0	0.00	0	0.0	1.5
0	0	0.0	1.0	-0.19	-200	-29.8	4.0
				-0.49	-400	-42.5	5.0
				-0.94	-600	-49.3	6.0
				-1.52	-800	-53.0	6.0
				-2.23	-1000	-55.2	6.0

Note:

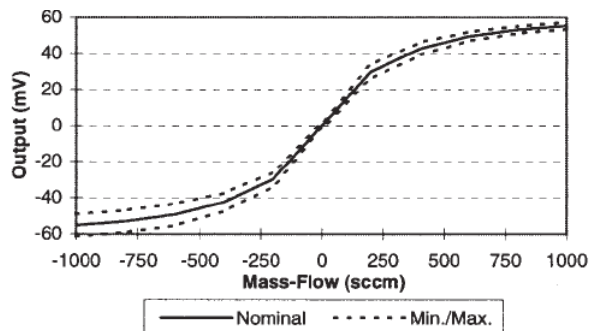
⁶ Devices are calibrated in mass flow. Tolerance values apply to calibration type only.

OUTPUT VS. FLOW CURVES

FMOM025HB

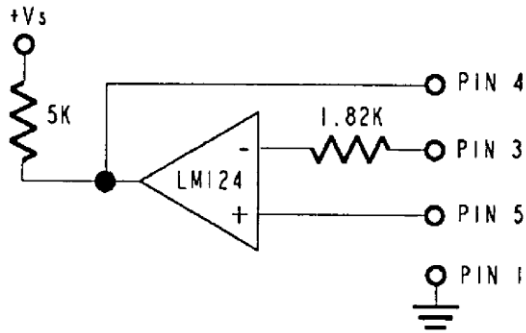


FMOL001DB

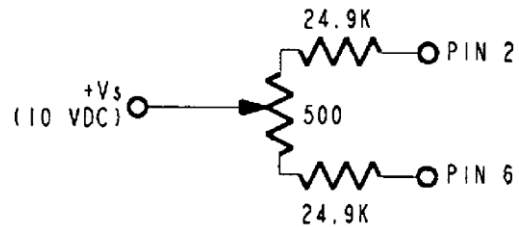




HEATER CONTROL CIRCUIT



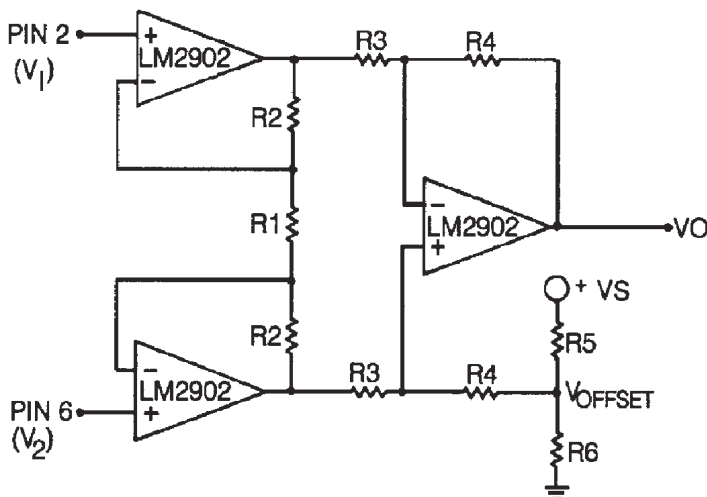
SENSING BRIDGE SUPPLY CIRCUIT



Note:

These circuits are required for operation per specifications. Circuits are not on board the sensor.

DIFFERENTIAL INSTRUMENTATION AMPLIFIER CIRCUIT (optional)



$$V_O = \left(\frac{2R_2 + R_1}{R_1} \right) \left(\frac{R_4}{R_3} \right) (V_2 - V_1) + V_{Offset}$$

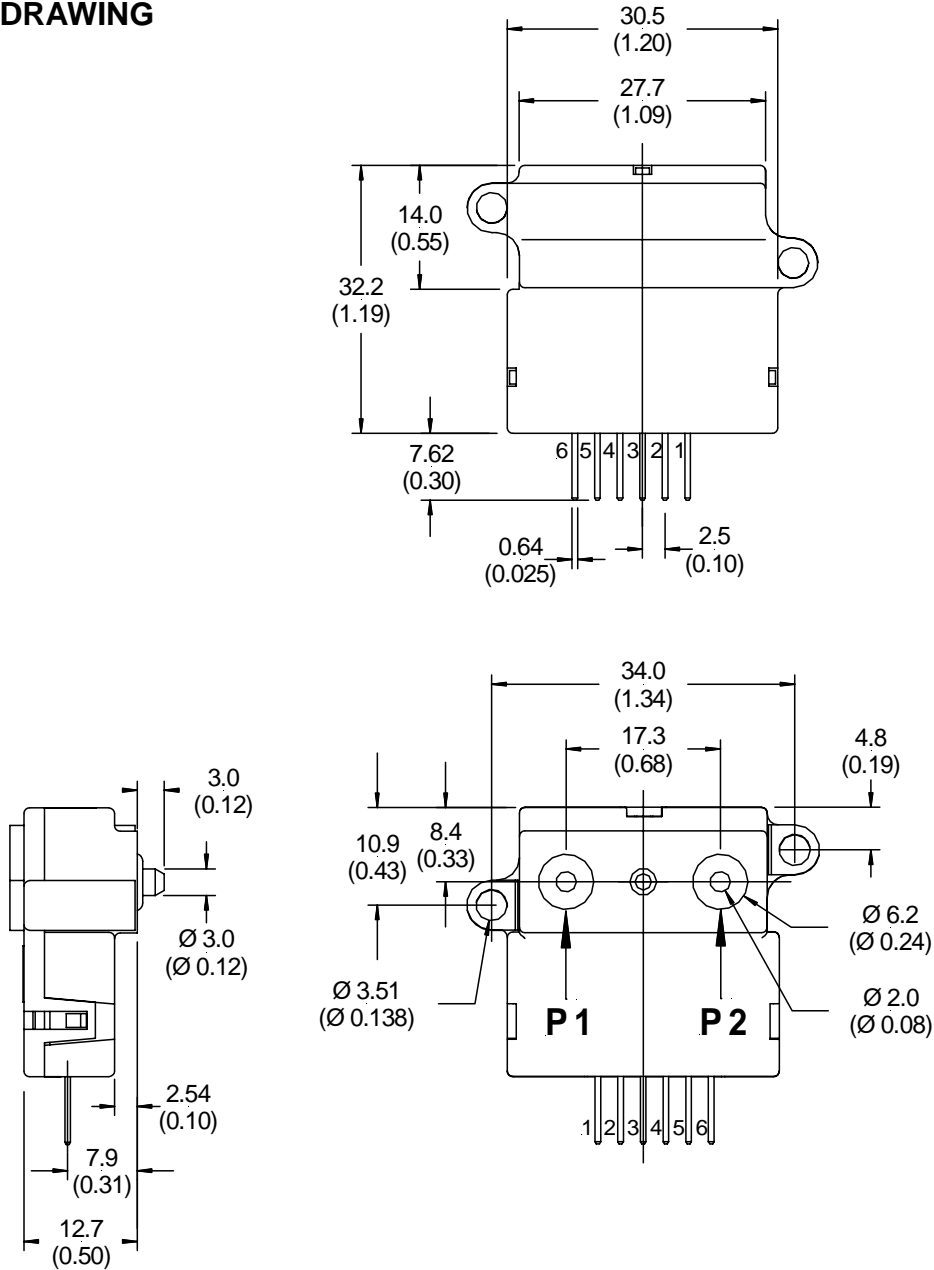
where $V_{Offset} = V_S \left(\frac{R_6}{R_6 + R_5} \right)$



FMO Series

Mass flow sensors for gases

OUTLINE DRAWING



mass: approx. 14 g

dimensions in mm (inches)

Note: Positive flow direction is defined as proceeding from port 1 (P1) to port 2 (P2) and results in positive output (pin 6 > pin 2). Negative flow direction is defined conversely and results in negative output (pin 6 < pin 2).



GAS CORRECTION FACTORS⁷

Gas type	Correction factor (approx.)
Helium (He)	0.5 ⁸
Hydrogen (H ₂)	0.7 ^{8,9}
Argon (Ar)	0.95
Nitrogen (N ₂)	1.0
Oxygen (O ₂)	1.0
Air	1.0
Nitric oxide (NO)	1.0
Carbon monoxide (CO)	1.0
Methane (CH ₄)	1.1
Ammonia (NH ₃)	1.1
Nitrous oxide (N ₂ O)	1.35
Nitrogen dioxide (NO ₂)	1.35
Carbon dioxide (CO ₂)	1.35

Notes:

⁷ Gas correction factors are referenced to nitrogen (N₂) as calibration gas type. Approximate gas correction factors are provided as guidelines only. Individual gas types may perform differently at temperature extremes and varying flow rates.

⁸ When sensing Hydrogen (H₂) or Helium (He) it may be necessary to power the mass flow sensor using increased supply voltage: Hydrogen typ. 12 V, Helium typ. 15 V

⁹ Hydrogen (H₂) flow measurement requires the use of a special sensor. These devices provide normal operation when sensing hydrogen flow and are designated with an "H" at the end of the order number.

ORDERING INFORMATION - AVAILABLE LISTINGS

Flow range	Dry gas	Hydrogen gas ⁹
±25 sccm	-	FMOM025HB
±1000 sccm	FMOL001DB	-

Sensortech PRO services:

- Extended guarantee period of 2 years
- Improved performance characteristics
- Custom product modifications and adaptations even for small quantities
- Advanced logistics models for supply inventory and short delivery times
- Technical support through application engineers on the phone or at your site
- Fastest possible technical response for design and QA engineers
- ... plus other services on request

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