



FBA Series

Mass flow sensors for gases

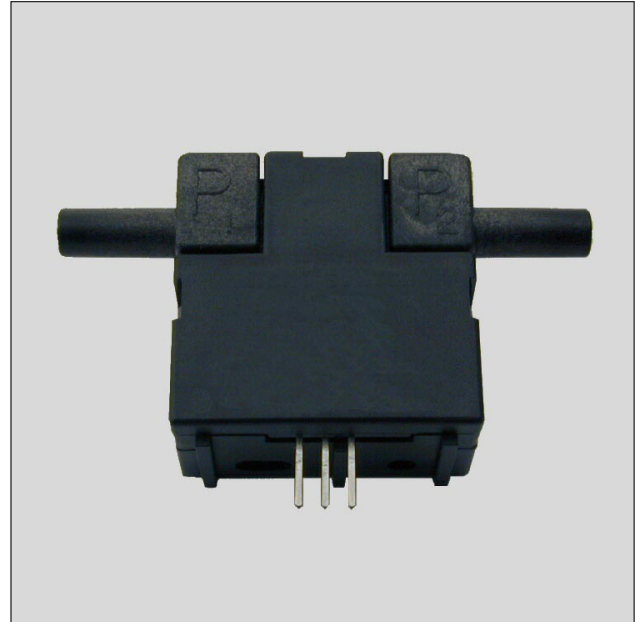
FEATURES

- Ranges 0...30 to 0...±1000 sccm¹
- 1...5 V or 1...3.75 V output
- Actual mass flow sensing
- Sensortech PRO services

MEDIA COMPATIBILITY

To be used with dry gases only

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



SPECIFICATIONS

Maximum ratings

Supply voltage² 8 to 15 V
typ. 10 ±0.01 V

Power consumption
FBAL001DB typ. 100 mW
all others typ. 50 mW, max. 60 mW

Temperature limits
Operating -25 to 85°C
Storage -40 to 90°C

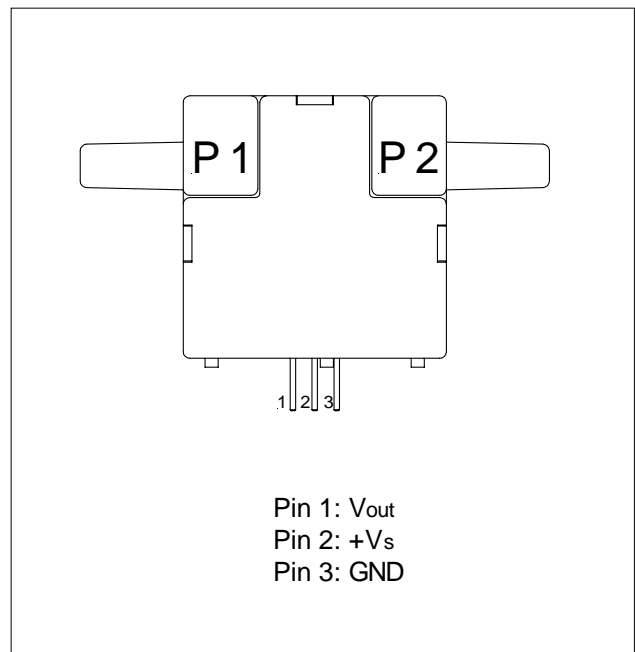
Mechanical shock 100 g (5 drops, 6 axes)

Note:

¹ sccm denotes standard cubic centimeters per minute

² Output voltage is ratiometric to supply voltage

ELECTRICAL CONNECTION





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 |
|-----------|-------------------------|-------------------------------|-----------------------------|
| FBAM200DU | 200 sccm | 5.0 l/sec | 5 V @ 200 sccm |
| FBAM030DU | 30 sccm | 5.0 l/sec | 3.4 V @ 25 sccm |
| FBAL001DU | 1000 sccm | 5.0 l/sec | 5 V @ 1000 sccm |
| FBAL001DB | ± 1000 sccm | 5.0 l/sec | 5 ± 0.15 V |

PERFORMANCE CHARACTERISTICS

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

| Characteristics | | | | Min. | Typ. | Max. | Unit |
|---|--------|--|------------|------|-----------|-----------|-----------|
| Zero offset | | | FBAM200DU | 0.95 | 1.0 | 1.05 | V |
| | | | FBAM030DU | 0.90 | 1.0 | 1.10 | |
| | | | FBAL001DU | 0.90 | 1.0 | 1.10 | |
| | | | FBAL001DB | 2.95 | 3.0 | 3.05 | |
| Repeatability and hysteresis (combined) | | | FBAM200DU | | | ± 0.5 | % reading |
| | | | all others | | | ± 1.0 | |
| Temperature effects | Offset | -25 to 85°C ⁵ | FBAM030DU | | ± 100 | | mV |
| | | | FBAL001DB | | ± 50 | | |
| | | | all others | | ± 25 | | |
| | Span | -25 to 25°C | FBAM200DU | | | -4.0 | % reading |
| | | | FBAM030DU | | | ± 5.0 | |
| | | | FBAL001... | | | -5.0 | |
| | | 25 to 85°C | FBAM200DU | | | 4.0 | |
| | | | FBAM030DU | | | ± 5.0 | |
| | | | FBAL001... | | | 5.0 | |
| Response time ⁶ | | | | | 1.0 | 3.0 | ms |
| Common mode pressure | | | | | | 25 | 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 .

⁶ Initial warm-up time for signal conditioned circuitry is 1 minute max.



FLOW SPECIFICATIONS

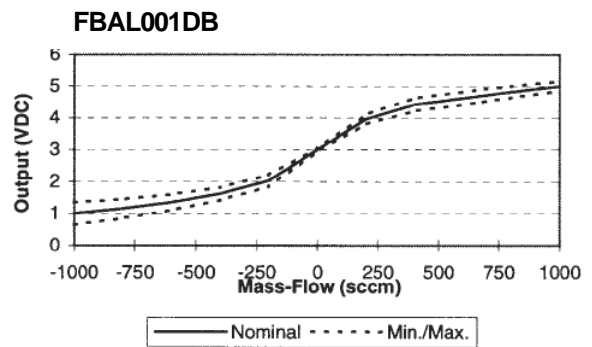
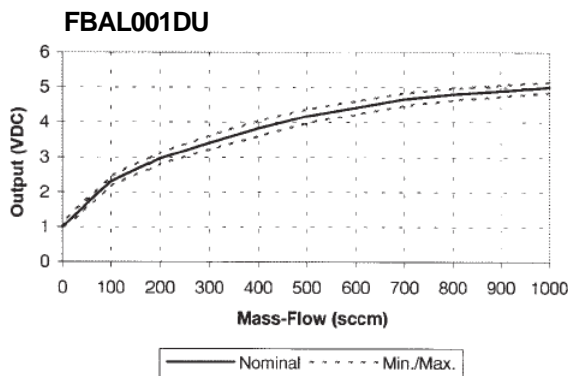
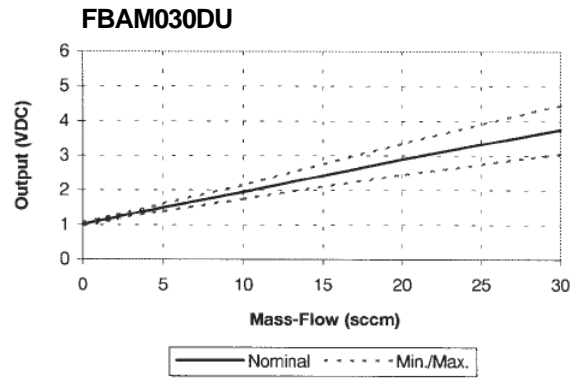
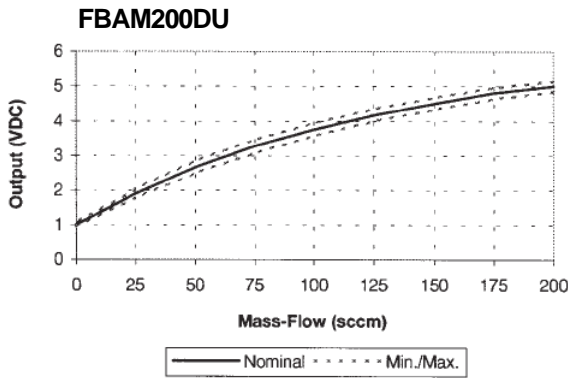
($V_S = 10 \pm 0.01$ V, $T_A = 25^\circ\text{C}$)

| FBAM200DU | | | | FBAM030DU | | | | FBAL001DU | | | | FBAL001DB | | | |
|---------------|--------------------------|-------------------|-----------------------|---------------|--------------------------|-------------------|-----------------------|---------------|--------------------------|-------------------|-----------------------|---------------|--------------------------|-------------------|-----------------------|
| Press. (mbar) | Flow (sccm) ⁷ | Nom. (V_{DC}) | Tol. ($\pm V_{DC}$) | Press. (mbar) | Flow (sccm) ⁷ | Nom. (V_{DC}) | Tol. ($\pm V_{DC}$) | Press. (mbar) | Flow (sccm) ⁷ | Nom. (V_{DC}) | Tol. ($\pm V_{DC}$) | Press. (mbar) | Flow (sccm) ⁷ | Nom. (V_{DC}) | Tol. ($\pm V_{DC}$) |
| 0.49 | 200 | 5.00 | 0.15 | 2.50 | 30 | 3.75 | 0.70 | 3.40 | 1000 | 5.00 | 0.15 | 3.49 | 1000 | 5.00 | 0.15 |
| 0.42 | 175 | 4.80 | 0.16 | 1.70 | 20 | 2.90 | 0.45 | 2.90 | 900 | 4.90 | 0.16 | 2.42 | 800 | 4.82 | 0.18 |
| 0.35 | 150 | 4.50 | 0.17 | 0.84 | 10 | 1.95 | 0.20 | 2.40 | 800 | 4.80 | 0.17 | 1.59 | 650 | 4.67 | 0.20 |
| 0.28 | 125 | 4.17 | 0.18 | 0.42 | 5 | 1.50 | 0.10 | 2.00 | 700 | 4.66 | 0.18 | 0.83 | 400 | 4.42 | 0.20 |
| 0.21 | 100 | 3.75 | 0.19 | 0.34 | 4 | 1.40 | 0.08 | 1.60 | 600 | 4.42 | 0.19 | 0.31 | 200 | 3.96 | 0.15 |
| 0.14 | 75 | 3.27 | 0.19 | 0.26 | 3 | 1.30 | 0.08 | 1.20 | 500 | 4.18 | 0.20 | 0.00 | 0 | 3.00 | 0.05 |
| 0.09 | 50 | 2.67 | 0.17 | 0.17 | 2 | 1.20 | 0.07 | 0.80 | 400 | 3.82 | 0.21 | -0.31 | -200 | 2.03 | 0.18 |
| 0.04 | 25 | 1.90 | 0.13 | 0.08 | 1 | 1.10 | 0.06 | 0.54 | 300 | 3.41 | 0.19 | -1.59 | -600 | 1.35 | 0.25 |
| 0.00 | 0 | 1.00 | 0.05 | 0.00 | 0 | 1.00 | 0.05 | 0.31 | 200 | 2.96 | 0.17 | -2.42 | -800 | 1.15 | 0.30 |
| | | | | | | | | 0.12 | 100 | 2.30 | 0.14 | -3.44 | -1000 | 1.00 | 0.35 |
| | | | | | | | | 0.00 | 0 | 1.00 | 0.10 | | | | |

Note:

⁷ Devices are calibrated in mass flow. Tolerance values apply to calibration type only.

OUTPUT VS. FLOW CURVES

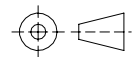
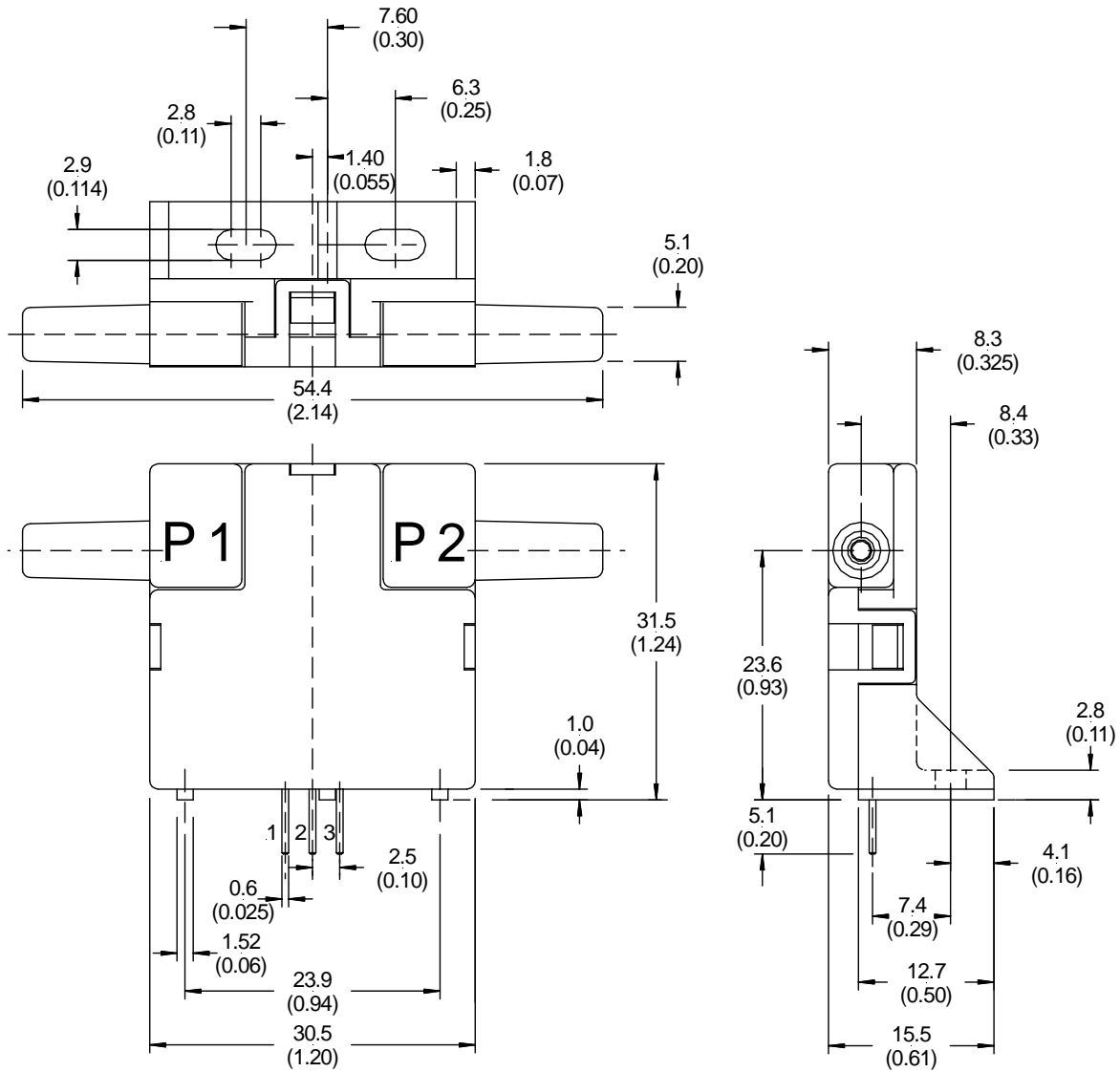




FBA Series

Mass flow sensors for gases

OUTLINE DRAWING



third angle projection

mass: approx. 10.8 g

dimensions in mm (inches)

Note: Positiv flow direction is defined as proceeding from port 1 (P1) to port 2 (P2) and results in positive output.



GAS CORRECTION FACTORS⁸

| Gas type | Correction factor (approx.) |
|-------------------------------------|-----------------------------|
| Helium (He) | 0.5 ⁹ |
| Hydrogen (H ₂) | 0.7 ^{9,10} |
| 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:

⁸ 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.

⁹ 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

¹⁰ 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

Note: Preferred listings are highlighted in grey

| Flow range | Dry gas |
|----------------|-----------|
| 0...30 sccm | FBAM030DU |
| 0...200 sccm | FBAM200DU |
| 0...1000 sccm | FBAL001DU |
| 0...±1000 sccm | FBAL001DB |

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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