

LOW FLOW TURBINE METERS

For Liquid and Gas Applications

FLR1000 Series



Optional

- ✓ PPS or Brass Construction
- ✓ 1% Accuracy for Liquids
- ✓ Up to 0.2% Repeatability
- ✓ 0 to 5V Analog Output
- ✓ Available With or Without Display

FLR1000 Series flow sensors can measure extremely low flow rates from 20 mL/min to 5 L/min. These sensors are suitable for a wide variety of industrial, commercial, and laboratory flow applications. FLR1000 Series flow sensors operate on 12 Vdc power and are designed for incorporation into data acquisition systems that supply 12.5 Vdc to sensors and receive 0 to 5 Vdc linear signals in return. Because of their cost effectiveness, FLR1000 Series units may replace conventional glass tube and ball flowmeters in applications in which an electrical signal proportional to flow rate is desired.

The FLR1000 Series uses a Pelton-type turbine wheel to determine the flow rate of the gas. The rotation rate of the turbine wheel is linear over a wide dynamic range. The electro-optical system consists of a diode emitting energy in the infrared spectrum. Light energy is alternatively reflected and absorbed from "spokes" deposited on the small turbine wheel. This reflected light energy is detected by a photodiode. Thus, as the turbine wheel rotates in response to gas flow rate, electrical pulses are generated. Processing circuitry provides a DC voltage output proportional to the flow rate. For example, output signal is 1.0 Vdc at 20% of rated flow, 2.5 Vdc at 50% of rated flow, 4.0 Vdc at 80% of rated flow, and 5.0 Vdc at 100% of rated flow. Sensors can handle 20% above their rated flow without being damaged.

For liquid flow metering with integrated rate display, the FLR1000ST-D Series has been setting the pace. Their advanced Pelton-turbine design provides high turndown ratios, fast response, and repeatable accuracy. A 0 to 5 Vdc analog output is standard. Featuring a 3½-digit display of flow rate in engineering units, these flowmeters are perfect for any laboratory or test facility. For higher-pressure applications or where metal may be required, the FLR1000ST Series is the solution, see page F-89 for complete details.



FLR1001, shown actual size.



FLR1009ST-D, shown actual size.

Specifications (FLR1000 Series)

Accuracy: ±1% FS (liquids), ±3% (gases)

Display: 3½-digit LCD, 22 mm (7/8") H

Output Signal: 0 to 5 Vdc, adjustable ±20% (typical)

Power Requirement: 11.5 to 15 Vdc regulated, 30 mA (typical)

Standard Sensor Material: 40% glass filled polyphenylene sulfide, glass window, stainless steel bearing support; sapphire shaft and bearing; FKM rubber O-rings standard

Pressure Rating: 40 psi at 20°C (68°F) for gas, 100 psi for liquid, 500 psi for brass units using liquid services

Temperature Rating: 0 to 50°C (32 to 122°F)

Temperature Sensitivity: ±0.2%/°C

Linearity: ±3% FS

Repeatability: ±0.5% FS from 50 to 100% of rated maximum flow for gas; ±0.2% FS for liquid

Cable Assembly: 0.9 m (3') cable length

Dimensions:

Display: 76 x 44 x 89 mm (3 x 1.75 x 3.5")

Non-Display: 60 x 42 x 37 mm (2.35 x 1.65 x 1.25")

Pressure Sensitivity: ±0.07%/mm Hg (using air at 1 to 3 atm)

Mounting: Holes for #4 screw provided



FLR1010-D, shown smaller than actual size.

Options

Order Suffix	Description	Compatible Units
-BR	Brass body	Liquid: FLR1007-1013
-P	Pulse output	Liquid: FLR1007-1013
-BR-D	Brass body and display	Gas: FLR1001-1006, FLR1201 Liquid: FLR1007-1013
-BR-P	Brass body and pulse output	Liquid: FLR1007-1013

To Order

Model No. (No Display)	Model No. (Display)	Gas Flow Range	Maximum Pressure Drop (inches water)	Acetal Tube Fitting (inch)
FLR1001	FLR1001-D	20 to 100 mL/min	20	1/8
FLR1002	FLR1002-D	40 to 200 mL/min	8	1/8
FLR1003	FLR1003-D	100 to 500 mL/min	2	1/8
FLR1004	FLR1004-D	200 to 1000 mL/min	2	1/8
FLR1005	FLR1005-D	0.4 to 2.0 L/min	2	1/4
FLR1006	FLR1006-D	1.0 to 5.0 L/min	2	1/4
FLR1201	FLR1201-D	2.0 to 10.0 L/min	3	1/4
FLR1202	FLR1202-D	4.0 to 20.0 L/min	3	3/8
FLR1203	FLR1203-D	10 to 50 L/min	3	3/8
FLR1204	FLR1204-D	20 to 100 L/min	3	1/2
FLR1205	FLR1205-D	40 to 200 L/min	5	1/2
FLR1206	FLR1206-D	100 to 500 L/min	20	1/2
Model No. (No Display)	Model No. (Display)	Liquid Flow Range	Maximum Pressure Drop (psi)	Acetal Tube Fitting (inch)
FLR1007	FLR1007-D	13 to 100 mL/min	10	1/8
FLR1008	FLR1008-D	20 to 200 mL/min	10	1/4
FLR1009	FLR1009-D	50 to 500 mL/min	10	1/4
FLR1010	FLR1010-D	100 to 1000 mL/min	6	1/4
FLR1011	FLR1011-D	0.2 to 2.0 L/min	6	1/4
FLR1012	FLR1012-D	0.5 to 5.0 L/min	6	3/8
FLR1013	FLR1013-D	1 to 10 L/min	10	3/8

Accessories

Model No.	Description
FLR1000-PW	115 Vac power supply
FLR1000-230PW	230 V power supply with European connector
FLR1000-C35	Replacement 0.9 m (3') cable

For a 4-point NIST calibration for air, add suffix "-NISTAIR" to model number for additional cost.

For a 4-point NIST calibration for water add suffix "-NISTWATER" to model number, for additional cost, (FLR1007 calibrations are 3-points).

Comes complete with 0.9 m (3') cable and operator's manual.

Ordering Examples: FLR1012, liquid flow sensor, 0.5 to 5.0 L/min range.

FLR1006-D, gas flow sensor with display, 1.0 to 5.0 L/min range.