

200 Series Flow Meters



- 0–5 VDC or 4–20 mA output
- Adjustable relay trip point
- Select flows between 0.06 to 60 GPM (0.3 to 230 LPM)
- Visible LED indication of flow
- Available digital display
- 5-year warranty

Proteus 200 Series flow sensors provide a 0–5 VDC or 4–20 mA output proportional to flow rate, and an adjustable relay trip point. The analog output may be used to provide feedback to valves or pumps in a closed-loop system or to provide flow rate information to a PLC or other electronic control. The relay trip point may be used to trigger an alarm or shut down equipment if the flow rate falls below a minimum acceptable level.

How It Works

Liquid flowing through the sensor spins a magnetic rotor to induce a voltage in a coil. An electronic circuit measures the frequency of the electrical pulses generated and computes the flow rate. This rate is converted to a 0–5 VDC or 4–20 mA output proportional to the flow rate.

The output voltage is also compared with a user-adjustable trip voltage. When the measured voltage is above the selected trip voltage a relay is held in its active position. If the measured voltage falls below the selected trip point voltage or should the liquid stop flowing, the relay is switched off. The change of state of the relay is used to trigger your interlock or alarm system.

The relay trip point may be preset at the factory or adjusted by the user by turning a potentiometer. A red-green LED mounted on the side of the flow meter electronics indicates relay state.

Display Flow Rate

Flow can be displayed directly in GPM or LPM on a calibrated digital voltmeter. For ordering details, please see the 200 Series Price List on the Proteus Industries website at www.proteusind.com.

Flow Visibility

If the polysulfone faceplate is selected, the rotor is visible. This gives an equipment operator a quick visual indication of whether liquid is flowing, and an instant view of how clean the coolant is! Metal faceplates are available for use with brass and stainless steel units for operation to 250 PSI.

Easy Maintenance

The faceplate may easily be removed to clean the flow chamber. Annual recalibration by the user or at the factory is recommended to maintain accuracy.

Selecting the Right Flow Meter

1. Select operational temperature and pressure limits from the table below to identify suitable materials
2. Select the flow meter material that is chemically compatible with your liquid
3. Select a flow range so that:
 - a. Your nominal flow rate is approximately 50–60% of the upper flow limit of the instrument
 - b. Your maximum flow rate is less than the upper flow limit of the instrument
 - c. If required, your trip point flow is not less than the stated low-flow value
4. Select SAE connections for use with specialized coolants such as Galden® or Fluorinert®, or for the connection of positionable elbows
5. For part numbers of models with 4–20 mA output, please refer to the 200 Series Price List

Connection Size	Flow Range	Celcon	Polypropylene	Brass	Stainless Steel
¼" FNPT	0.1 – 1.0 GPM 0.4 – 4.0 LPM	201C24	201P24	201B24	201SS24
¼" FNPT	0.5 – 2.5 GPM 1.9 – 9.5 LPM	205C24	205P24	205B24	205SS24
¼" FNPT	0.8 – 6.0 GPM 3 – 23 LPM	203C24	203P24	203B24	203SS24
¼" FNPT	0.06 – 0.6 GPM 0.2 – 1.9 LPM	204L24	204PL24	204B24	204SS24
½" FNPT	1.5 – 12 GPM 6 – 45 LPM	250C24	250P24	250B24	250SS24
½" FNPT	4 – 20 GPM 15 – 75 LPM	Not Available	Not Available	255B24	255SS24
¾" FNPT	6 – 30 GPM 22 – 110 LPM	Not Available	260P24	260B24	260SS24
1" FNPT	10 – 60 GPM 35 – 225 LPM	Not Available	270P24	270B24	270SS24

Temperature & Pressure Operating Limits

The temperature of the electronics package should not exceed 50°C (120°F). For liquid temperatures greater than 85°C (185°F), the electronics should be mounted remotely from the flow sensor unit. For information on specialized insulation jackets and other adaptations for operation below dew point, please contact Proteus Technical Support at (650) 964-4163 or tech@proteusind.com.

Flow Sensor Material	Faceplate Material	Temperature		Pressure Range	
		°C	°F	PSI	kPa
Brass	Clear Polysulfone	100	212	100	690
Brass	Brass	140	284	250	1720
Stainless Steel	Clear Polysulfone	100	212	100	690
Stainless Steel	Stainless Steel	140	284	250	1720
Celcon	Clear Polysulfone	70	158	75	515
Polypropylene	Clear Polysulfone	70	158	75	515

Pressure Drop

Pressure drop across the flow meter is typically less than 6 PSI at the maximum flow rate. For pressure response curves, please contact Proteus Technical Support at (650) 964-4163 or tech@proteusind.com.

Wetted Materials

Component	Available Materials	
	Standard	Optional
Rotor	Carbon fiber filled Nylon 66	PPS, Kynar®
O-Ring	Buna-N	Viton®, Silicon Rubber
Rotor Shaft	316 Stainless Steel	Alumina, Sapphire

Flow Measurement Capability

Accuracy	± 3% of full scale is stated on a Certificate of Conformance Flow response is adjusted at high and low reference flows selected on production standards whose response is controlled to ± 1% of their range.
Linearity	± 1.5% of full scale from 0.1 to 1.0 x the flow range
Repeatability	± 0.5% of full scale from 0.1 to 1.0 x the flow range

The measurement capability of each 200 Series Flow Meter is stated on a Calibration Certificate delivered with each meter. Calibrations are made with water at temperatures between 22°C and 28°C (72°F and 82°F).

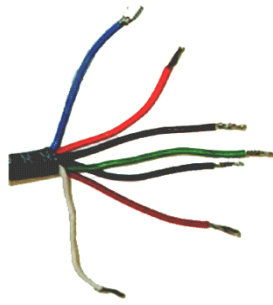
What the specifications really mean

ACCURACY	The closeness of an indicated value to the actual value. Accuracy is expressed as ±% of the highest value at which the calibration adjustment is made.
LINEARITY	The closeness of a calibration curve to a best-fit straight line. Linearity is expressed as the maximum measured deviation of any calibration point from the ideal response line during a single calibration cycle.
REPEATABILITY	The instrument's ability to reproduce readings when the same flow rate value is presented to it consecutively, under the same conditions, and in the same direction. Repeatability is expressed as the maximum difference between output readings.

Electrical Specifications

Power Requirements	24 ± 10% VDC, 100 mA (12 VDC versions are optionally available)
Electrical Connection	3 ft 8/22 AWG PVC insulated cable (included)
Switch Type	Relay Closure, Normally Open contacts
Relay Rating	1 A at 30 VDC
Remote Mounting	Electronics can be mounted up to 30 ft (10 m) from the flow sensor

Electrical Connections & Wiring Diagram



Color	Function	
BROWN	0–5 VDC Output	4–20 mA Output
RED	+24 VDC	
BLACK	Ground	
WHITE	Ground	
ORANGE	+5 VDC Auxiliary Power	
GREEN	Relay – Normally Open contacts	
BLUE	Relay Common	

Dimensions & Outline Drawings

Dimensional drawings are available on the Proteus Industries website at www.proteusind.com.

Need more information? Need specialized measurement capability? We welcome your challenge!

- Review the 200 Series Technical Reference Manual available at www.proteusind.com
- Send e-mail to tech@proteusind.com
- Call (650) 964-4163 and ask for Technical Support. A Proteus flow measurement expert will be pleased to answer your questions!



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Information in this document was correct at the time of printing; however, specifications are subject to change as Proteus Industries' continuous improvement processes establish new capabilities.