

100 Series

Flow Switches



Compact and rugged paddlewheel sensors for accurate and reliable liquid flow monitoring

100 Series flow switches monitor cooling fluids or other liquid flows and trip an internal relay if the flow rate falls below an adjustable trip point. The relay can be used to sound an alarm or shut down a system or process before damage is done to valuable equipment and products.

- » Flow ranges from 0.2 to 227 LPM / 0.06 to 60 GPM
- » Liquid temperatures to 100 °C / 212 °F
- » Pressure to 1724 kPa / 250 psi with metal faceplate
- » User-selectable relay trip point
- » Reliability underwritten by 5-year warranty

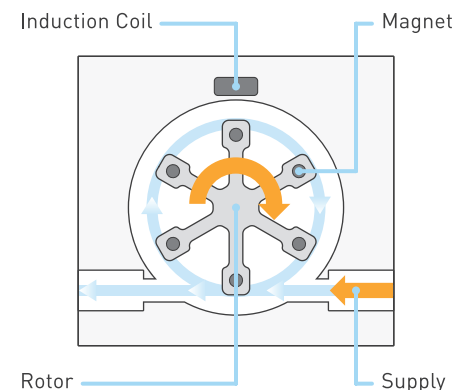
Fail-Safe System Protection

Unlike pressure-activated sensors, the Proteus flow switch provides a true interlock—it will not be fooled by downstream blockages that maintain pressure while stopping flow. The active design combats the problem of particle buildup, which can jam many other types of flow switches: because the rotor is constantly spinning, it clears itself of most buildup. In the unlikely event that a large object in the line interferes with the rotor, the rotor stops turning and the switch goes to its alarm condition.

When a Proteus flow switch indicates that liquid is flowing, there is **always** flow through the switch.

How It Works

As liquid flows through the flow sensor cavity, it causes a rotor to spin. Magnets embedded in the rotor induce voltage in a coil. A simple electronic circuit compares the measured voltage to a user-selected trip voltage. When the measured voltage is greater than the selected trip point, a relay is held in its active position. If the measured voltage falls below the selected trip point, or if the liquid stops flowing, the relay is switched off. The change of state of the relay contacts is used to trigger your interlock or alarm system.



Easy Trip Point Adjustment

A 20-turn potentiometer provides fine adjustment of the trip point. The potentiometer is positioned in a recess in the electronics cover so that it cannot be adjusted by accident. Turning counterclockwise increases the trip point, and turning clockwise decreases the trip point.

Flow Visibility

A clear polysulfone faceplate allows the rotor to be fully visible, telling you at a glance if your cooling liquid is flowing. Optional metal faceplates enable brass and stainless steel versions to be operated at pressures up to 1724 kPa / 250 psi.

Selecting the Right Flow Switch for Your Application

1. Review the operating temperature and pressure limits to identify suitable materials for the flow sensor.
2. Select a flow body material with the best chemical compatibility with your liquid.
3. Select a flow range so that:
 - a. your nominal flow rate is around 50–60% of the upper flow limit of the sensor;
 - b. your maximum flow rate is lower than the upper flow limit; and
 - c. your trip point flow rate is higher than the lower flow limit.
4. Select your power supply input voltage: 24 VDC or 120 VAC.

For assistance in selecting the flow switch that is best suited to your flow measurement or control process, contact Proteus Applications Support at tech@proteusind.com or (650) 964-4163.

Flow Ranges, Connections, and Model Numbers

| FLOW RANGE ¹ | | CONNECTIONS | MODEL NUMBER ² | | | |
|-------------------------|------------|-------------|---------------------------|---------------|----------|-----------------|
| LPM | GPM | | CELCON | POLYPROPYLENE | BRASS | STAINLESS STEEL |
| Selectable ³ | | 1/4" FNPT | 0100Cxxx | 0100Pxxx | 0100Bxxx | 0100SSxxx |
| 0.2 – 2.3 | 0.06 – 0.6 | 1/4" FNPT | 0104Lxxx | 0104Pxxx | 0104Bxxx | 0104SSxxx |
| 0.4 – 3.8 | 0.1 – 1.0 | 1/4" FNPT | 0101Cxxx | 0101Pxxx | 0101Bxxx | 0101SSxxx |
| 1.9 – 9.5 | 0.5 – 2.5 | 1/4" FNPT | 0105Cxxx | 0105Pxxx | 0105Bxxx | 0105SSxxx |
| 3.0 – 23 | 0.8 – 6.0 | 1/4" FNPT | 0103Cxxx | 0103Pxxx | 0103Bxxx | 0103SSxxx |
| 5.7 – 45 | 1.5 – 12 | 1/2" FNPT | 0150Cxxx | 0150Pxxx | 0150Bxxx | 0150SSxxx |
| 15 – 76 | 4.0 – 20 | 1/2" FNPT | 0155Cxxx | 0155Pxxx | 0155Bxxx | 0155SSxxx |
| 23 – 114 | 6.0 – 30 | 3/4" FNPT | n/a | 0160Pxxx | 0160Bxxx | 0160SSxxx |
| 38 – 227 | 10 – 60 | 1" FNPT | n/a | 0170Pxxx | 0170Bxxx | 0170SSxxx |

¹Listed flow ranges are for water at 25 °C / 77 °F.

²The "xxx" in the model numbers is a placeholder for the power supply input voltage indication: "24" = 24 VDC; "110" = 120 VAC.

³0100xxxx models with a selectable flow range can be configured for any of the three flow ranges available in the 0101xxxx, 0105xxxx, or 0103xxxx models. For more information, please refer to the 100 Series Technical Reference Manual.

Temperature and Pressure Limits

| FLOW BODY MATERIAL | FACEPLATE MATERIAL | TEMPERATURE LIMIT* | | OPERATING PRESSURE LIMIT | | BURST PRESSURE (5:1) | |
|--------------------|--------------------|--------------------|-----|--------------------------|-----|----------------------|------|
| | | °C | °F | kPa | psi | kPa | psi |
| Celcon® | Clear Polysulfone | 75 | 167 | 517 | 75 | 2586 | 375 |
| Polypropylene | Clear Polysulfone | 70 | 158 | 517 | 75 | 2586 | 375 |
| Brass | Clear Polysulfone | 100 | 212 | 689 | 100 | 3447 | 500 |
| | Brass | 100 | 212 | 1724 | 250 | 8618 | 1250 |
| Stainless Steel | Clear Polysulfone | 100 | 212 | 689 | 100 | 3447 | 500 |
| | Stainless Steel | 100 | 212 | 1724 | 250 | 8618 | 1250 |

*This is the fluid temperature that can be sustained with the flow meter cooled by ambient air up to 20 °C / 68 °F. The temperature of the electronics should not exceed 50 °C / 122 °F. For liquid temperatures above 85 °C / 185 °F, the electronics should be mounted remotely from the flow sensor.

Specifications

| | |
|------------------------|--|
| Ambient Temperature | 0 to 100 °C / 32 to 212 °F (non-condensing) |
| Kinematic Viscosity | Up to 120 cSt at operating temperature |
| Hysteresis | Typically 15% of selected trip point flow rate |
| Pressure Drop | Typically less than 41 kPa / 6 psi at maximum flow rate |
| Switch Type | Relay closure, normally open (N.O.) and normally closed (N.C.) contacts provided |
| Relay Rating | SPDT, 3 A at 30 VDC for a non-inductive load. Mechanical rating > 10 ⁶ cycles. |
| Power Requirements | 24 VDC version: 24 VDC ± 10%, 30 mA 120 VAC version: 120 VAC ± 10%, 30 mA, 50–60 Hz |
| Electrical Connections | 24 VDC version: 5-core conductor for relay and power 120 VAC version: 3-core conductor for relay; 2-pin plug for power |
| Wetted Materials | Flow body: 316 stainless steel • brass • polypropylene • Celcon® Faceplate: polysulfone (options for models with a metal flow body: brass • stainless steel) Rotor: PPS Rotor shaft: 316 stainless steel (option: alumina) O-ring: Buna-N (options: Viton® • EPDM • silicone rubber) |
| Weight | 0.9 to 2.7 kg / 2 to 6 lb, depending on model and materials |

Wiring

» 24 VDC Version

| COLOR | FUNCTION | COLOR | FUNCTION |
|-------|--------------------------|-------|--------------------|
| Brown | +24 VDC (Power Supply +) | Red | Relay N.O. Contact |
| White | 0 VDC (Power Supply -) | Green | Relay N.C. Contact |
| | | Black | Relay Common |

» 120 VAC Version

| COLOR | FUNCTION |
|-------|--------------------|
| Red | Relay N.O. Contact |
| Green | Relay N.C. Contact |
| Black | Relay Common |

Customization is Our Way of Life

Whether you need a compact manifold, a critical calibration or a coolant monitoring system for your most critical flow-management tasks, our engineers and applications specialists have the experience, expertise, and inspiration to create a solution that will delight you! Instrumentation with specialized plumbing connections, wiring harnesses, precision control valves—even software—can be quickly designed and prototyped.

When your new product goes to production, fittings will be properly positioned, entire units and sub-assemblies will be certified leak-tight, all electrical connections will be tested end-to-end, and the system's calibration will be certified to the specified accuracy. Our lean manufacturing processes and ISO 9001-certified procedures will ensure that your instruments will arrive at your location ready for use, the first time and every time.

Let us put our knowledge base to work on solving your most demanding flow measurement challenges! Contact Proteus Applications Support to discuss your requirements for a customized solution.

Need More Information?

- » Visit our website A comprehensive technical reference manual containing technical descriptions, performance specifications, installation instructions, maintenance guidelines, and other valuable information is accessible at www.proteusind.com/100.
- » Contact us Our flow management experts will be pleased to answer your questions! Email us at tech@proteusind.com or call us at (650) 964-4163.