

# 500 Series Metering Flow Switches

**Flow rates from 0.95 to 17 LPM / 0.25 to 4.5 GPM**  
**Accurately select from 16 trip points**  
**Compact design—volume reduced by 50%**  
**Calibrated 0–5 VDC output**  
**Reliability underwritten by a 5-year warranty**

## It's a switch.

Proteus 500 Series flow meters measure and monitor liquid flow. You can accurately select from 16 trip points with an easily-accessed switch. Trip points can be incremented in steps of 5.9% of the full flow scale. Because you can set the flow switch set point yourself, you can maintain strict control over your flow parameters without additional instrumentation.

## It's a meter.

500 Series flow meters are calibrated to provide a 5 VDC output at their maximum rated flows. This output is accurate to within  $\pm 2\%$  of full scale, assuring you that your liquid flow is within your specification. The actual flow rate can be displayed on a digital voltmeter. Scaled digital display meters are available to provide direct flow readout in LPM or GPM.

## It's a switch and a meter in a single unit.

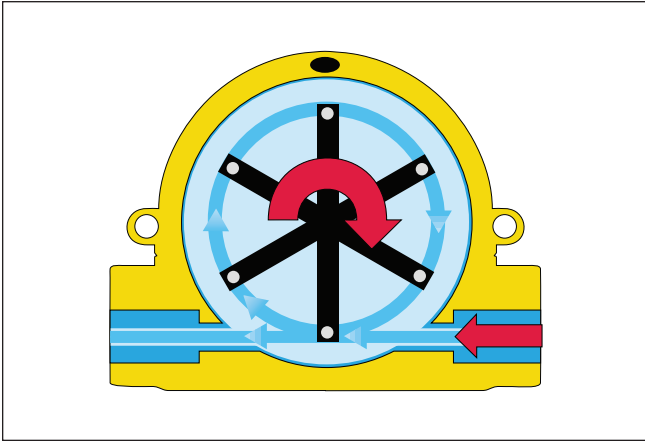
A flow switch combined with a metering function permits display of the flow rate while providing an accurate and predictable set of trip points. A three-color LED indicator that acts like a traffic signal shows actual flow status. When green, the flow rate is more than 15% above your selected trip point. An amber light shows that flow is within 15% of your trip point. When flow falls below your trip point, a red light is displayed. As flow falls below your selected trip point, the built-in relay contacts open, indicating the alarm condition to your control system.

Even if your application doesn't require continuous feedback of the instantaneous liquid flow rate, the calibrated output affirms that your process is being managed properly. Guess work is eliminated. If control parameters do need to be changed, you can make exact and repeatable changes as required.



## How it works

The rotor spins when liquid flows through the meter. Magnets in the rotor switch a Hall-Effect sensor mounted in the meter body. The resulting pulse train is converted by the 500 Series electronics to a flow rate that is output as a 0–5 VDC signal.



## Switching

The measured output voltage is continually compared to a user-selected trip-point voltage. When the measured voltage is above the trip point, the built-in relay remains in its active state. If the measured voltage falls below the trip point due to reduced or stopped flow, the relay contacts open, signaling an alarm condition to your control system.

## Metering

Accuracy of calibration to  $\pm 2\%$  of full scale is established against a flow standard with a certified accuracy of  $\pm 0.25\%$ . Calibration is traceable to a NIST reference. Linearity is better than  $\pm 0.5\%$ .

## Flow switching is fail-safe

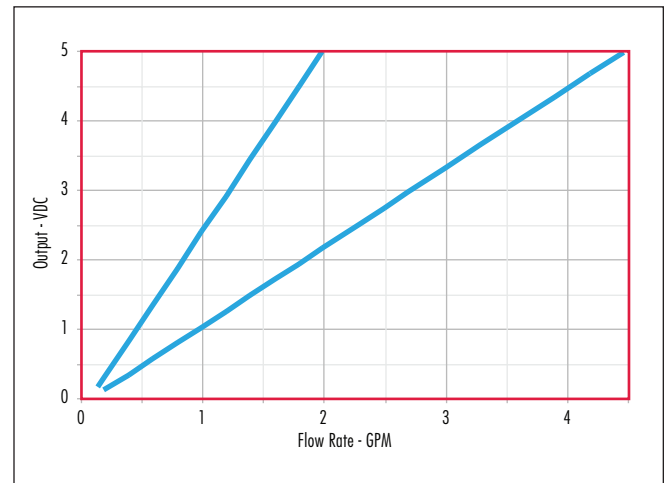
The Proteus flow sensor's active design combats particle build-up that can jam other types of flow sensors: because the rotor spins constantly, it cleans itself of most buildup. In the unlikely event that an object in the line does interfere with the rotor, the rotor stops turning, and the switch goes to the alarm condition.

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

For assistance in selecting the flow meter that is best-suited to your flow-control task, please contact Proteus Applications Support at [tech@proteusind.com](mailto:tech@proteusind.com) or (650) 964-4163.

## Accurate flow outputs

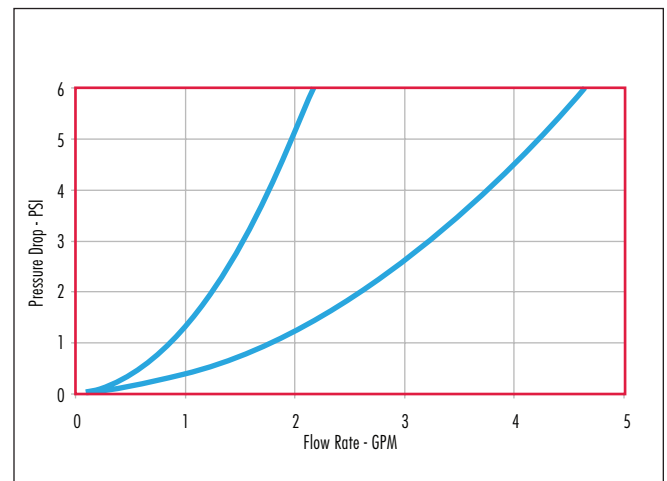
The remarkably linear response of the Proteus flow sensor is transformed to an accurate flow measurement by our calibration process. Flow output is normally calibrated to 5.00 VDC for the maximum rated flow of each sensor. Custom calibrations are available.



Typical flow response of 500 Series sensors

## Use pressure drop curves to size your sensor

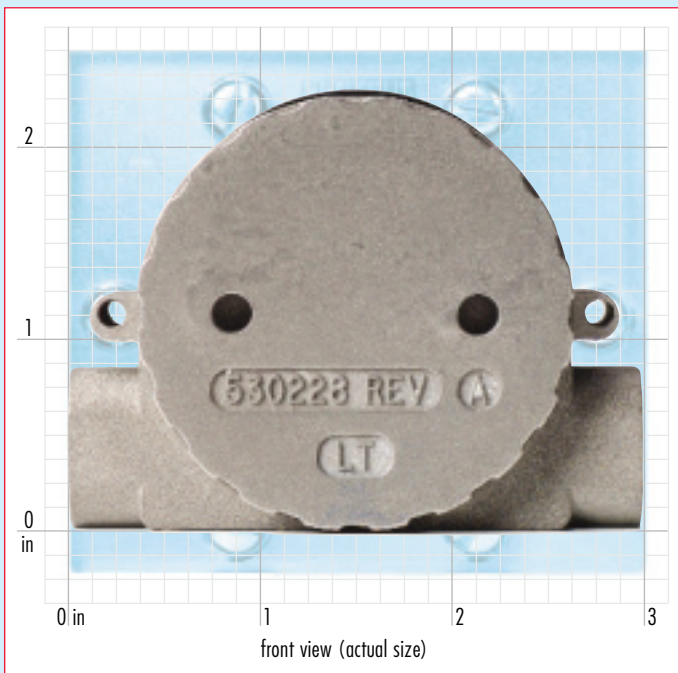
We suggest that you select a sensor for which your nominal flow rate is about half of the sensor's full scale. In this region, pressure drop is low, yet the accuracy and response of the meter are still amazingly reproducible. The performance of all 500 Series sensors has been established with our traceable standards.



Pressure drop vs. flow rate of 500 Series sensors

## Upgrade now!

Now you can increase the capability of your instrumentation by adding switching and metering functions in the space previously occupied by only a switch. You achieve enhanced flow control and the service advantages of an accurate flow meter.



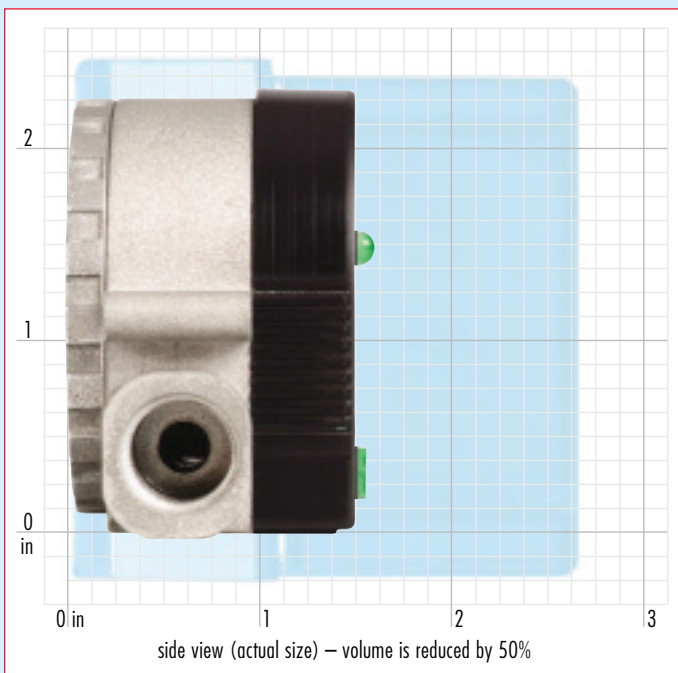
### Compact design makes retrofitting easy!

500 Series units are completely retrofitable to your current system. They are mounted in the same manner as your existing Proteus flow switches, so you don't have to change your design.

### Wide temperature range for leading-edge applications

The 500 Series can operate from -40 to 140 °C.\* Flow response is remarkably constant across a 50 °C range with appropriate liquids. All materials used in the 500 Series flow sensors are compatible with water, water-glycol mixes, Golden<sup>®</sup>, Fluorinert<sup>™</sup>, and other advanced heat-transfer fluids required by new process technologies.

\*Thermal isolation of the electronics is required above 85 °C and below dew point. Contact Applications Support for assistance.



### LED provides instant status information

Like a traffic signal, the green, amber and red lights indicate flow status. Flow problems are instantly detectable. An optional LED display can be mounted at your control panel if required.

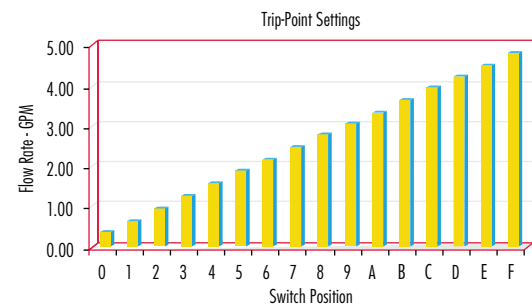
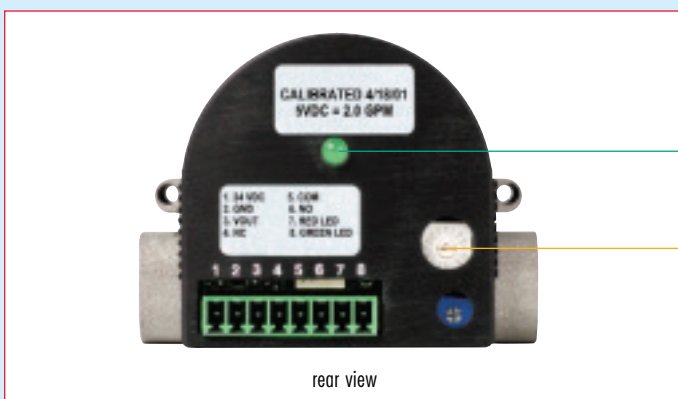
#### LED Color Flow Rate

Red	Less than flow rate at selected trip point
Amber	Between 1 x and 1.15 x flow rate at selected trip point
Green	Greater than 1.15 x flow rate at selected trip point

### Trip point is user-selectable

The trip point is set by adjusting a 16-position switch; a potentiometer provides fine-tuning between positions. This feature allows you to change trip-point settings predictably, accurately, and reproducibly, without the use of complex instrumentation.

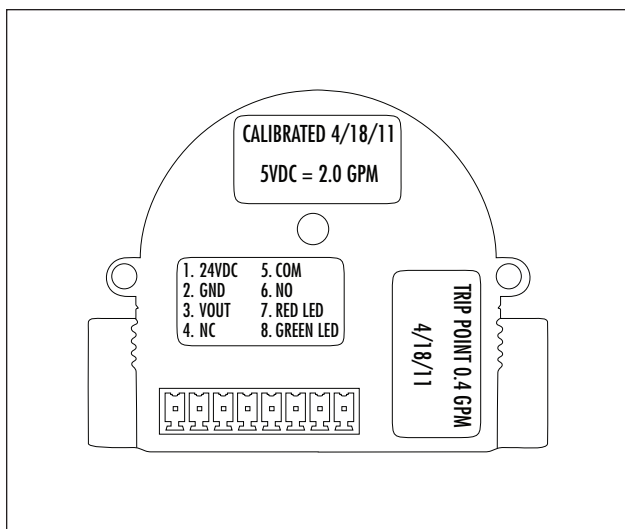
Note: The presence of elbows or devices other than straight fittings installed at the inlet may affect the actual trip-point setting.



## Proteus: Your customization experts

Proteus is an established ISO-9001-registered manufacturing company located in the heart of Silicon Valley. Our lean manufacturing processes and customization expertise place us in the forefront of our industry. We are accustomed to tight schedules and precision requirements—and to getting it right, the first time and every time.

Your 500 Series metering flow switches arrive ready for integration into your system. You can rest assured that the fittings are properly positioned, your devices are leak-tight and they will function to your requirements. We design according to your needs in collaboration with your engineers. Your cables are already installed and your device has been tested end-to-end. Trip points and output voltages are calibrated to your exact specifications. Precise calibrations are assured by NIST-traceable references. Our experts do the work for you.



## Need a specialized flow sensor?

We'll create one for you. Our diverse list of customization options include hoses, tubing, face-seal connections, scaled panel meters for direct display of flow rates, fitting of special cables and labeling with your part numbers and operating parameters. We welcome your inquiries. Contact us for immediate assistance in fulfilling your specialized requirements.

Specifications		
<b>Connections</b>	<b>Flow Range*</b>	<b>Model Number</b>
1/4" FNPT	0.95–9.5 LPM / 0.25–2.5 GPM	0504SN2
1/4" FNPT	1.1–17 LPM / 0.3–4.5 GPM	0504SN4
9/16-18 SAE	0.95–9.5 LPM / 0.25–2.5 GPM	0504SA2
9/16-18 SAE	1.1–17 LPM / 0.3–4.5 GPM	0504SA4
<small>*Listed flow ranges are for water at 25°C / 77°F.</small>		
<b>Liquid Operating Limits</b>		
<b>Temperature</b>	-40 to 140 °C / -40 to 284 °F Electronics must be thermally isolated from flow sensor at temperatures above 85 °C and below dew point. Contact Applications Support for more information.	
<b>Pressure</b>	1724 kPa / 250 psi Burst pressure (5:1): 8618 kPa / 1250 psi	
<b>Kinematic Viscosity</b>	To 120 centistokes	
<b>Wetted Materials</b>		
Flow Sensor Body	SCS13 (Cast 304) Stainless Steel	
Faceplate	SCS13 (Cast 304) Stainless Steel	
Sealing O-ring	Viton®	
Rotor	Black Kynar®	
Rotor Shaft	316 Stainless Steel	
<b>Meter Performance</b>		
Calibrated Voltage Output	0–5 VDC for the maximum rated flow for each sensor type	
Accuracy	± 2% of full scale. Improved accuracy and linearity performance over smaller flow ranges can be achieved by specialized NIST-traceable calibration procedures	
Linearity	Better than ± 1% from 10 to 100% of nominal full scale	
Repeatability	Better than ± 0.5% above 10% of nominal full scale	
<b>Switch Performance</b>		
Trip Point Selection	16-position switch changes trip point in steps of 5.88% of nominal full scale, with fine adjustment between steps.	
Hysteresis	< 5% of actual flow rate	
Switch	Relay Closure	
Relay Rating	SPDT 48 VDC, 1.0 A	
<b>Electrical</b>		
Power Requirements	24 VDC ± 10%, 40 mA	
Electrical Connection	Plug type EDZ1550/8 with screw-fastening of 8 conductors up to #16 gauge.	
Remote Electronics	Optional mounting locates electronics up to 30 ft from flow sensor. Required for operation above 85 °C and below dew point.	
Certification	CE conformity, RoHS and REACH compliance	
Flow Certification	Standard products are provided with certificates of compliance. Specialized calibration certificates are optionally available.	
Digital Display	Optional panel-mounted DVMS display flow rate in LPM or GPM on 3½ digits	



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