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Section 1  Introduction
800 Series Metering Flow Switches have been created to provide a more effective monitoring and control capability for applications in which liquid flow rates from 0.05 to 50 GPM (0.2 to 190 LPM) must be monitored and controlled over extended temperature and pressure ranges.

Many capabilities required for extreme operating conditions have been incorporated in the basic product, allowing the size-reduced metering flow switches to be used in situations in which specialized products were previously required.

The 800 Series Metering Flow Switches have been developed from Proteus’ experience in satisfying the needs of thousands of demanding users in widely diverse applications since 1978.

Section 2  Features and Functions
• **Flow ranges from 0.05 to 50 GPM, 0.2 to 190 LPM.**
  Eight flow ranges are provided in the 800 Series in brass, polypropylene or stainless steel. NPT and SAE connections are available.

Proteus 500 Series Metering Flow Switches formed in stainless steel provide similar measurement and control capabilities for flow rates up to 4.5 GPM. The 500 Series devices occupy less space than 800 Series units, and as standard are capable of operating to 250 psi (690 kPa).

• **Calibrated 0-5VDC output**
  800 Series switching flow meters are calibrated to provide a 5 VDC output at the maximum flow rate of each version. Actual flow rate in your circuit can be determined by attaching a voltmeter. An optional scaleable digital voltmeter can be calibrated to provide a direct local display of flow rate.

• **Compact design**

![Figure 1: Outline of 800 Series](image-url)
The depth of the flow sensor bodies changes with connection size. 0816XXX bodies are taller and wider than the example shown above.

Detailed drawings for any version of can be obtained by calling (650) 964-4163 and asking for Technical Support or by e-mail at tech@proteusind.com.

- **Compact design is easily retrofittable**
  - Mechanical and electrical interfaces are identical to those of hundreds of thousands of Proteus 24VDC flow switches and flow meters already in use.
  - The 800 Series is completely retrofittable in place of existing Proteus flow switches.
  - The distance between the 800 Series pipe or fitting connections is identical to those of previous Proteus flow sensors.

- **Stainless Steel faceplate extends operating range**
  - Adding stainless steel or brass faceplates permits brass and stainless steel versions of the 800 Series to be operated over the range of -40 to 140 °C and to 250 psi (1720 kPa).
  - A Viton® O-ring provides the liquid seal. Other materials are optionally available for enhanced chemical compatibility with specialized coolants.

- **Trip point is user selectable.**

![Figure 2: Rear view of 800 Series Metering Flow Switch](image)

Tri-color LED

16-position switch

Fine adjust potentiometer
Trip points are selected by adjusting a 16-position switch as shown in Table 1. This feature provides the ability to change trip point settings predictably, accurately and reproducibly without the use of complex instrumentation.

See Section 7 for instructions on selecting trip points.

- **Optional potentiometer provides fine tuning capability**

  If your trip point must be set with finer control than is provided by the 16-position switch a potentiometer provides the adjustment you need. This potentiometer can be adjusted from 7 o’clock to 5 o’clock positions. Refer to Section 7 for instructions on selecting trip points.

### Note

Elbows and other devices that induce swirling motion in the flowing liquid that are installed within a distance of approximately 10 x the ID of the inlet port reduce the linear velocity of liquid through the flow sensor.

When such devices are present the actual flow rate through the flow sensor may be HIGHER than is suggested in Table 1.

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Switch Position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>0804BN03</td>
<td>0.01</td>
</tr>
<tr>
<td>0804PN03</td>
<td>0.18</td>
</tr>
<tr>
<td>0804SN03</td>
<td>0.36</td>
</tr>
<tr>
<td>0804BN2</td>
<td>0.89</td>
</tr>
<tr>
<td>0804PN2</td>
<td>0.98</td>
</tr>
<tr>
<td>0804SN2</td>
<td>1.6</td>
</tr>
</tbody>
</table>

Table 1: Flow Rate in GPM at selected Switch Positions with straight connection to inlet port and fine adjustment potentiometer in the 12 o’clock position.
• **LED provides instant status information.**
  
  Like a traffic signal, the green, amber and red lights indicate flow status so that problems are easily detected. Green, amber and red lights provide instant indication of the status the flow switch and the flow rate. An additional LED monitor can be remotely mounted at your control panel.
  
  - If the three-color LED is ON you know that 24VDC power is being delivered to the flow switch and the flow switch is functional.
  
  - The color of the LED changes depending on the ratio of the actual flow rate to the Trip Point

<table>
<thead>
<tr>
<th>LED Color</th>
<th>Flow Rate Status</th>
<th>Example Trip Point 10 GPM</th>
<th>Relay State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Greater than 1.15 x flow rate at selected trip point</td>
<td>Actual Flow &gt; 11.5 GPM</td>
<td>Closed</td>
</tr>
<tr>
<td>Amber</td>
<td>Between 1x and 1.15 x flow rate at selected trip point</td>
<td>10 &lt; Actual Flow &lt; 11.5 GPM</td>
<td>Closed</td>
</tr>
<tr>
<td>Red</td>
<td>Less than flow rate at selected trip point</td>
<td>Actual Flow &lt; 10 GPM</td>
<td>Open</td>
</tr>
</tbody>
</table>

• **Multiple outputs provide control flexibility**

  Electrical interfacing of the 800 Series units is effected through an 8-pin connector that provides a range of control options while delivering 24VDC power. See Section 6, Installation for connection details.

<table>
<thead>
<tr>
<th>Connector Position 800</th>
<th>Function</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power input</td>
<td>24 VDC ± 10%</td>
</tr>
<tr>
<td>2</td>
<td>Ground connection for power &amp; output signals</td>
<td>Should be connected to a valid system ground</td>
</tr>
<tr>
<td>3</td>
<td>Output Voltage</td>
<td>Calibrated to provide 5 VDC at the maximum flow rate</td>
</tr>
<tr>
<td>4</td>
<td>Normally Closed relay contact</td>
<td>Connects to NC contact of relay.</td>
</tr>
<tr>
<td>5</td>
<td>Common relay contact</td>
<td>Connects to Common contact of relay</td>
</tr>
<tr>
<td>6</td>
<td>Normally Open relay contact</td>
<td>Connects to NO contact of relay</td>
</tr>
<tr>
<td>7</td>
<td>Red LED anode</td>
<td>Connections for a remote tri-color LED indicator. Common cathode of tri-color LED should be connected to ground</td>
</tr>
<tr>
<td>8</td>
<td>Green LED anode</td>
<td></td>
</tr>
</tbody>
</table>
Section 3  How the flow sensor 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 electronics to a voltage that is proportional to the linear velocity at which the liquid flows through the meter.

Switching

The measured output voltage is continuously 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 ± 2% of full scale is established against a flow standard with a certified accuracy of ± 0.5%. Calibration is traceable to a NIST reference. Linearity is better than ± 0.5%.
Section 4 Specifications and performance

The most current information on the performance capability of these sensors is accessible at the Proteus web site at www.proteusind.com.

<table>
<thead>
<tr>
<th>Flow Ranges</th>
<th>Connection</th>
<th>Part Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPM</td>
<td>LPM</td>
<td>¾&quot; NPT</td>
</tr>
<tr>
<td>0.05 – 0.3</td>
<td>0.2 – 1.2</td>
<td>0804BN03</td>
</tr>
<tr>
<td>0.15 – 2.0</td>
<td>0.6 – 7.6</td>
<td>0804BN2</td>
</tr>
<tr>
<td>0.3 – 4.5</td>
<td>1.2 – 17</td>
<td>0804BN4</td>
</tr>
<tr>
<td>0.3 – 4.5</td>
<td>1.2 – 17</td>
<td>0804SA4</td>
</tr>
<tr>
<td>0.8 – 10</td>
<td>3 – 38</td>
<td>0806BN10</td>
</tr>
<tr>
<td>0.8 – 10</td>
<td>3 – 38</td>
<td>0806SA10</td>
</tr>
<tr>
<td>1 – 15</td>
<td>3.8 – 56</td>
<td>0808BN15</td>
</tr>
<tr>
<td>1.3 – 19</td>
<td>5 – 72</td>
<td>0812BN19</td>
</tr>
<tr>
<td>1.5 – 25</td>
<td>6 – 95</td>
<td>0816N25</td>
</tr>
<tr>
<td>3 – 50</td>
<td>11 - 190</td>
<td>0816BN50</td>
</tr>
<tr>
<td>3 – 50</td>
<td>11 – 190</td>
<td>0816SN26</td>
</tr>
</tbody>
</table>

Liquid operating Limits

Temperature: -40 to 100°C (-40 to 212 °F) with standard polysulfone faceplate. -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.

Pressure: 1720 kPa 250 psi

Kinematic Viscosity: To 120 centistokes

Wetted Materials

Flow Sensor Body: 304 Stainless Steel
Faceplate: 316 Stainless Steel
Sealing O-ring: Viton® (Other materials are available.)
Rotor: Carbon fiber-filled Nylon
Rotor Shaft: 316 Stainless Steel (Other materials are available.)

Meter Performance

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
Reproducibility: Better than ± 0.5% above 10% of nominal full scale

Switch Performance

Trip Point Selection: 16 position changes trip points in steps of 6% of nominal full scale with fine adjustment between steps.
Hysteresis / Dead Band: < 5% of actual flow rate
Switch type: Relay Closure
Relay rating: SPDT 48 VDC, 1.0 A

Electrical

Power Requirements: 24 VDC, 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.

Flow Certification: Standard products are provided with certificates of compliance. Specialized calibration certificates are optionally available.
Digital Display: Optional panel mounted displays flow rate GPM or LPM on 3½ digits.
Section 5  Product certifications

800 Series Metering Flow Switches are CE marked for compliance with the EU Directive 89/336/EEC for Electromagnetic Compatibility.

800 Series Metering Flow Switches have been Safety Certified by RWTUV as a low voltage, Class III device.

Section 6  Installation

CAUTION!
It is generally undesirable to mount any plumbing connections directly over electronic controls or instruments.

WARNING!
If the 800 Series flow sensor is mounted in a vertical pipeline, any leakage from the topmost connection could enter the unit and cause permanent damage to the electronics.

For applications where there is condensation, moisture, dampness, or dripping water, please contact Proteus Technical Support for other product recommendations.

Pipe or tubing mounting

If rigid piping or tubing is used, the 800 Series metering flow switch may be supported by direct connection to the pipe or tubing.

Panel mounting

To mount the sensor behind a panel, two of the faceplate securing screws will need to be replaced with longer screws to compensate for the thickness of the panel. Ensure that the screws are not so long that they will touch the bottom of the tapped hole, or rip through the back of a plastic body if over-tightened.

Evenly space up to six holes for 8-32 screws on a 2.5” circle. Using the two holes on the horizontal plane is usually sufficient to support smaller flow sensors and all plastic sensors. If you wish the rotor to be visible, cut a 1¾” diameter hole with the same center.

1. Remove screws holding the faceplate to the sensor body.
2. Place the sensor behind the panel and insert the longer screws you have selected.
3. Secure the screws in the body with a torque of ~ 10 in-lb. (Finger tight with a flat-blade screwdriver.).

Figure 3: Layout for panel mounting
Note
Dimensioned drawings illustrating the 800 Series Metering Flow Switches are available as PDF files on our web site at www.proteusind.com.

Plumbing Connections

Note
Before connecting a sensor into your fluid line, verify that the normal flow rates expected in that line are within the operating range of the sensor.

Extended use above the rated maximum flow rate of the sensor will reduce its useable life.

CAUTION
Do NOT use anaerobic pipe sealants such as LOCTITE brand sealants or SWAK with the 800 Series metering flow switches fitted with a clear polysulfone faceplate.

The aggressive chemical nature of these materials can cause cracking of the polysulfone faceplate.

Use Teflon (PTFE) tape or PTFE-based liquid sealants to provide leak-tight and lubricated junctions at all connection points.

Real-Tuff and Hercules are two of many suitable brands of PTFE-based sealants.

Note
It is recommended that connections to the stainless steel flow sensor be made with stainless steel or materials of similarly chemical inertness to minimize potential corrosion damage.

Note
The flow response of the sensor, and thus its calibration may be dependent on the internal diameter (ID) of an incoming pipe, or the ID of a tube connection.

If the ID of your pipe or tube fitting where it connects to the inlet port is LESS than the value shown in Table 2, calibration values may be invalid.

Appropriate calibration procedures can be applied to allow the 800 Series flow sensor to be used with pipes and connections with ID’s smaller than those shown in Table 2. Contact Proteus for assistance.
### Table 2: Minimum ID of pipe or connection for calibrations to be valid.

<table>
<thead>
<tr>
<th>Model #</th>
<th>Flow Range GPM</th>
<th>Flow Range LPM</th>
<th>Orifice ID inches</th>
<th>Orifice ID mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>080XN03</td>
<td>0.05 – 0.3</td>
<td>0.2 – 1.2</td>
<td>0.063</td>
<td></td>
</tr>
<tr>
<td>0804XN2</td>
<td>0.1 – 2.0</td>
<td>0.6 – 7.5</td>
<td>0.188</td>
<td>4.8</td>
</tr>
<tr>
<td>0804SA2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0804XN4</td>
<td>0.3 – 4.5</td>
<td>1.2 – 17.0</td>
<td>0.270</td>
<td>6.9</td>
</tr>
<tr>
<td>0804SA4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0806XN10</td>
<td>0.8 – 10</td>
<td>3 – 38</td>
<td>0.370</td>
<td>9.4</td>
</tr>
<tr>
<td>0806SA10</td>
<td>0.8 – 10</td>
<td>3 – 38</td>
<td>0.400</td>
<td>10.1</td>
</tr>
<tr>
<td>0808XN15</td>
<td>1 – 15</td>
<td>3.8 – 56</td>
<td>0.460</td>
<td>11.7</td>
</tr>
<tr>
<td>0812XN19</td>
<td>1.3 – 19</td>
<td>5 – 72</td>
<td>0.610</td>
<td>15.5</td>
</tr>
<tr>
<td>0812SA19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0812SA25</td>
<td>1.5 – 25</td>
<td>6 – 95</td>
<td>0.610</td>
<td>15.5</td>
</tr>
<tr>
<td>0816XN50</td>
<td>3 – 50</td>
<td>11 – 190</td>
<td>0.870</td>
<td>22.1</td>
</tr>
<tr>
<td>0816SA50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note**

The flow response of 800 Series sensors and thus their calibration may be dependent on the form of the device attached to the inlet connection and other closely located up-stream devices.

Elbows, T-pieces, valves and filters located immediately up-stream from the flow sensor can introduce swirling motion to the liquid flow. The swirling motion reduces the linear velocity of the flow stream.

We recommend that a straight run of pipe of more than 10 x pipe ID be used between the flow sensor and any up-stream devices to minimize these effects.

Appropriate calibration procedures must be used to provide an accurate flow measurement with elbows or T-pieces that must be attached directly to the inlet connection.

The 800 Series sensor is typically unaffected by the form or proximity of devices on its downstream side.

**Sensor Orientation**

For the best results, 800 Series sensors should be mounted with the faceplate in the vertical plane.

Mounting the device with the flow connections uppermost can help eliminate entrained air from your system.

**Flow Direction**

The 800 Series Metering Flow Switch is not sensitive to flow direction. Flow can be introduced to the sensor from either side.

**NPT pipe thread connections**

Pipe threads seal by making metal-to-metal contact between male and female components. Consequently, they are particularly prone to the damaging effects of galling, which occurs when two surfaces move against each other under pressure. When installing pipe threads it is essential to use a high quality lubricating and sealing material.
• Use Teflon tape or a PTFE-based liquid sealant to provide lubrication for the junction and a leak-tight connection at both input and output connections. Real-Tuff and Hercules are two of many suitable brands of PTFE-based sealants.

• Do not over-tighten the connection. Refer to instructions for installation of the mating fittings for information on torque requirements.

• Leak testing of all connections in your flow circuit is recommended. Pressurizing the system with air and external testing with a dilute soap solution can help identify leaking connections.

SAE straight thread connections

With these connectors, an O-ring makes the seal while the threads hold the connecting assembly in place. Straight thread connections should receive a small amount of high-pressure lubricant before installation to prevent galling.

Non-adjustable fittings

1. Bring the non-adjustable fitting into firm contact with the face of the port, using a wrench.

2. Check to be certain that the O-ring fits easily into the non-threaded receiving area of the port, and is not pinched.

Adjustable fittings

1. Ensure that the locknut is positioned so the back-up washer is in contact with the beginning of the threads farthest from the end of the fitting.

2. Screw the fitting into the port until the back-up washer contacts the sealing face.

3. Check to be certain that the O-ring fits easily into the non-threaded receiving area of the port, and is not pinched or damaged.

4. Unscrew the fitting a maximum of one turn to position it in the desired direction.

5. Tighten the locknut firmly against the back-up washer so the fitting assembly is held securely in place.

Filtering

Your circulating fluid may contain particles. While not essential to the operation of the flow sensor, it is good practice to filter your fluid. A 100-micron filter is often used to remove rust and other particles from the fluid. This can increase the lifetime of pumps and other fluid system components as well as reducing wear in the sensor.
Fluid Temperature Range & Remote Mounting Electronics

If fluid temperatures will be outside the range of 0 - 85°C, the electronics package must be mounted remotely from the sensor.

Remote mounting requires customized changes to the sensors.

Please contact Proteus Applications Support for additional information.

Electrical Connections

Note

Only personnel familiar with the electrical circuit and control functions of the system in which the sensor is to be included should perform installation of this product.

Electrical inputs and outputs are provided at a single eight-pin socket. An 8-pin connector providing screw fastening of up to #16 gauge conductors is provided with the 800 Series metering flow switch.

Replacement 8-pin connectors can be obtained from Proteus, P/N 440157 or from electrical distributors, On-Shore Technology P/N EDZ1550/8, or Digi-Key P/N ED1966-ND.

See Section 9 for installation of Digital Display units.
Section 7 Selecting Trip Points

Adjustment of trip points in steps of 6% of the rated full scale is made with a 16-step switch and a single turn potentiometer accessed through the cover of the electronics.

Tool Required: A fine flat screwdriver

1. Identify the Part Number of the 800 Series metering flow switch being adjusted. This is noted on the product label.
2. Select the Trip Point Flow chart that applies to your metering flow switch.
3. Look across the row to identify the flow rate that is immediately higher than your required trip point.
4. Look up the column with the selected trip point flow rate to identify the required switch position.

Figure 4: Trip point adjustment controls for 800 Series

5. Check that the indicator of the fine adjustment potentiometer is pointed towards the 12 o’clock position. If necessary, use the screwdriver to turn the fine adjustment potentiometer so that the indicator is pointed towards the 12 o’clock position.
6. Peel away the protective label covering the 16-step switch and the fine adjustment potentiometer.
7. Check that the indicator of the fine adjustment potentiometer is pointed towards
8. With the screwdriver, turn the 16-step switch so that its indicating arrow points towards the selected position switch position.

Turning the switch CLOCKWISE selects a HIGHER trip point.
Turning the switch ANTI-CLOCKWISE selects a LOWER trip point.

9. Adjust the position of the fine potentiometer as required.

When the potentiometer is turned clockwise the trip point is INCREASED.
When the potentiometer is turned fully counter-clockwise the trip point is DECREASED.
10. Replace the protective label. Write the selected trip point on the label.
Section 8  Measuring Flow Rate

The voltage output by the 800 Series metering flow switches allows the flow rate of the liquid passing through the device to be estimated.

While the flow response curves of the 800 Series metering flow switches are extremely linear, they do NOT pass through zero, requiring the use of a linear regression formula or calibration graphs to derive the actual flow rate from the measured output voltage.

Calibration curves and derived look-up tables obtained from measurement of multiple sensors are shown below.

The equations under each graph may be used with PLC or other control devices to obtain a more accurate measure of flow.

Section 9  Digital Displays

Digital display units

Digital panel display meters are available to provide a direct local display of flow rate in selected engineering units. Each unit has a 3½ digit LCD display with 0.6-inch high digits and a DIP switch-selectable decimal point. The digital display unit requires 4 mA at 9 to 28VDC.

<table>
<thead>
<tr>
<th>Flow Range – GPM</th>
<th>Part Number</th>
<th>Flow Range - LPM</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05 – 0.3</td>
<td>0G804D03</td>
<td>0.2 – 1.2</td>
<td>0L804D1</td>
</tr>
<tr>
<td>0.2 – 2.0</td>
<td>0G804D2</td>
<td>0.6 – 7.6</td>
<td>0L804D7</td>
</tr>
<tr>
<td>0.3 – 4.5</td>
<td>0G804D4</td>
<td>1.2 – 17</td>
<td>0L804D17</td>
</tr>
<tr>
<td>0.8 – 10</td>
<td>0G806D10</td>
<td>3 – 38</td>
<td>0L806D38</td>
</tr>
<tr>
<td>1.0 – 15</td>
<td>0G808D15</td>
<td>4 – 56</td>
<td>0L808D56</td>
</tr>
<tr>
<td>1.3 – 19</td>
<td>0G812D19</td>
<td>5 – 72</td>
<td>0L812D72</td>
</tr>
<tr>
<td>3 – 50</td>
<td>0G816D50</td>
<td>11 – 190</td>
<td>0L816D190</td>
</tr>
</tbody>
</table>

Table 3: Part Numbers and flow ranges for Digital Displays for the 800 Series

Note

Switches and potentiometers have been set to fit the range of your devices. Changing these settings may invalidate the calibration!

Connecting the Digital Display Unit
The electrical connections are made via screw-clamp terminals located on the back of the Digital Display unit.

![Digital Display Unit](image)

**Figure 6: Rear view of Digital Display Unit**

**Note**

When wiring the unit check the wiring label on the back of the flow meter to ensure that you connect to the proper terminals.

**Connection instructions:**

1. Strip connecting wire leaving approximately ¼” bare wire exposed. Stranded wire should be tinned with solder.

2. Insert the wire into the screw-clamp terminal and tighten the wire until the wire is clamped tightly. Each terminal will accept up to two #14 AWG wires.

![Wiring Connections](image)

**Figure 7: Wiring connections for Digital Display**
Section 10  Cleaning and Maintenance

Maintenance of the 800 Series Metering flow switch is normally limited to cleaning the chamber in which the rotor spins and an annual recalibration.

Cleaning the 800 Series flow sensor

The frequency of cleaning will vary with the type and cleanliness of the liquid being run through the flow meter. In most cases, annual cleaning immediately prior to recalibration is sufficient.

Tools required:

- Wrenches to disconnect the flow meter from your flow circuit.
- A flat screw driver.
- Soft cleaning cloth
- Alcohol, water or a dilute detergent solution.

<table>
<thead>
<tr>
<th>Cleaning the 800 Series Flow Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Turn OFF the liquid flow in your flow circuit and remove the 800 Series sensor from your system. Place the sensor on a clean surface.</td>
</tr>
<tr>
<td>2. Remove the 6 screws securing the faceplate.</td>
</tr>
<tr>
<td>3. Remove the faceplate from the flow meter.</td>
</tr>
<tr>
<td>Cleaning the 800 Series Flow Sensor</td>
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<td>-----------------------------------</td>
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<tr>
<td><strong>4.</strong> Remove the rotor and stainless steel shaft from the flow cavity.</td>
</tr>
<tr>
<td>Remove the O-ring from the faceplate</td>
</tr>
<tr>
<td><strong>5.</strong> Using a soft cloth dampened with water, alcohol or a light detergent solution, clean debris and dirt from the rotor, the stainless steel shaft, the inside surfaces of faceplate and the surfaces of the flow cavity</td>
</tr>
<tr>
<td><strong>6.</strong> Inspect the bearing surface of the rotor.</td>
</tr>
<tr>
<td>If the bearing surface is worn or not round, replace the rotor.</td>
</tr>
<tr>
<td>Inspect the stainless steel shaft.</td>
</tr>
<tr>
<td>If the shaft shows signs of scoring or other wear, replace the shaft or the whole faceplate assembly.</td>
</tr>
<tr>
<td><strong>7.</strong> Inspect the O-ring to ensure that it is not brittle, cracked or otherwise damaged.</td>
</tr>
<tr>
<td>If necessary replace with a #132 O-ring of a material compatible with the liquid being passed through the flow meter.</td>
</tr>
<tr>
<td>Position the O-ring on the inner rim of the faceplate.</td>
</tr>
<tr>
<td><strong>8.</strong> Place the rotor in the flow cavity.</td>
</tr>
<tr>
<td>Position the shaft (or the faceplate) to locate the shaft in the rotor.</td>
</tr>
</tbody>
</table>
Cleaning the 800 Series Flow Sensor

9. Position the faceplate so that the holes in the faceplate are aligned with the screw holes in the front of the flow sensor body.

   Replace the 6 securing screws.

   Tighten the screws to a torque of 40 in-lbs (hand tighten with a normal screwdriver).

11. Install the flow meter in your system.

   Turn on liquid flow and check for leaks at the faceplate and connecting ports.

   Tighten all connections as required to eliminate leaks.

Section 11 Calibration & Recalibration

Note

800 Series sensors are calibrated at Proteus with water at temperatures ranging from 22 to 28°C.

Changes in fluid type can alter the calibrated response of the sensor. Large changes in liquid temperature can alter the calibrated response of the sensor.

Please contact Proteus Technical Support if a specialized calibration is needed.

Note

As described in the Plumbing Connections section on page 10, the response of the 800 Series flow sensor may be affected by the way in which the sensor is connected to your system.

The 800 Series metering flow switch has been calibrated during manufacture to provide an output of 5.0 VDC for the full scale limit of the flow meter, with straight pipe connections.

Customized calibration procedures can be performed to change the flow rate corresponding to 5.0 VDC, for fluids other than water and with connections with internal diameters less than those used in the flow sensors. (See Table 2, page 10).

Recalibration

The calibration of the 800 metering flow switch should be checked at 12-month intervals, and recalibrated as required. Re-calibration may be accomplished in either of two ways:
Calibration by Proteus

To obtain a price quotation and a Return Material Authorization number for recalibration of your flow meter, contact sales@proteusind.com or call (650) 964-4163.

When received at Proteus, your flow meter will:

1. Have its output measured and recorded in the as-received state.
2. The rotor, stainless steel shaft and sealing O-ring will be replaced.
3. The flow cavity will be cleaned and the device reassembled.
4. The unit will be recalibrated to its original specification against reference standards whose calibrations are statistically controlled against NIST-traceable standards.
5. A new calibration certificate will be issued.
6. A new calibration label will be attached to the flow meter.

Direct calibration against NIST-traceable standards is optionally available.

Calibration by another laboratory

The calibrating laboratory will issue certificates and labels identifying the calibration status of your metering flow switch.

Please advise your selected calibration laboratory to contact Proteus for calibration instructions.

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800 Series electronics are sensitive to Electro Static Discharge. There is normally no need to open the electronics case, but if it is opened, proper ESD precautions should be taken.

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