FS-925 Series – General Purpose

Flow Rate Settings:
- Liquids: 0.1 GPM to 1.5 GPM
- Air/Gases: See Flow Settings at right

FS-926 Series – Low Flow

Port Size: 1/4” NPT
Primary Construction Material: Brass or Stainless Steel
Setting Type: Fixed
Flow Rate Settings:
- Liquids: 50-300 cc/min.
- Air/Gases: See Flow Settings at right

These two series of precision-calibrated switches provide reliable and consistent performance; repeatability is within 1%. FS-925 and FS-926 units are factory preset for actuation at specified flow rates.

These switches provide accurate detection of excessive or insufficient flow rates in such applications as: protecting against loss of fluid flow in hydraulic systems, assuring proper coolant flow in semiconductor processing equipment, monitoring high pressure lubrication systems, and ensuring proper air flow in water/waste systems.

Specifications

Wetted Materials
- Housing: Brass or 316 Stainless Steel
- Piston: In Brass Housing – Polysulfone for water; Brass for oil or air
  - Stainless Steel Housing: 316 Stainless Steel
- Low Flow Piston (FS-926): Same as Housing
- Spring: 316 Stainless Steel
- O-Ring: Viton®
- Other Wetted Parts: Epoxy

Pressure Rating
- Operating, Maximum: 1000 PSIG (69 bar)
- Proof: 2500 PSIG (172 bar)
- Burst: 5000 PSIG (345 bar)

Operating Temperature
- With Brass or S.S. Piston: -20°F to +300°F (-29°C to +148.9°C)
- With Polysulfone Piston: -20°F to +225°F (-29°C to +107.2°C)

Repeatability: 1% Maximum Deviation
Set Point Accuracy: ±10%
Set Point Differential: 15% Maximum
Switch*: SPDT, 20 VA
Inlet/Outlet Ports: 1/4” NPT
Electrical Termination: No. 18 AWG, 24” L., Polymeric Lead Wires

Both the FS-925 and FS-926 use a spring-loaded piston to detect positive flow with great precision. They act upon direct fluid flow and will not show “false-positive” flow indication as can happen with sensors using indirect sensing methods such as pressure measurement. The FS-926 incorporates an additional lap-fitted piston for very low flows; see below.

Dimensions

Double Piston Detects Minute Flow – FS-926

An additional, lap-fitted piston is used in Gems FS-926 Series to accurately detect low-flow rates. Calibration is determined by one or more metering holes in the end of the low-flow piston, which regulate bypass flow, and therefore the actuation setting.

When metered bypass flow is exceeded, the resultant pressure differential displaces the low-flow piston, moving the magnet carrier piston to actuate the reed switch. Two large bypass holes in the piston skirt are exposed after actuation to maintain low pressure drop.
Flow Settings, Air (Typical)
Dependent on operating line pressure. Examples of set point ranges at a given line pressure are shown below.

<table>
<thead>
<tr>
<th>Line Pressure</th>
<th>Actuation Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS-925</td>
<td>FS-926</td>
</tr>
<tr>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>5 PSIG (Minimum)</td>
<td>0.5 SCFM</td>
</tr>
<tr>
<td>100 PSIG</td>
<td>1.5 SCFM</td>
</tr>
</tbody>
</table>

Minimum 5 PSI line pressure required.

Gas Calibration
Water flow units should not be used for air/gas applications: Gas flow units have a special dash-pot piston for reliable operation. Gas calibration is dependent upon line pressure, switch orientation, and the specific type of gas. The calibrated flow set point is subject to change with fluctuations in line pressure.

How To Order – Standard Models – Water Calibration
Specify Part Number based on desired housing material and flow setting.

**Liquids other than water:** Special calibration is available from GEMS for media other than water. Please consult factory with your requirements, including housing material (brass or stainless steel), flow media, operating pressure, flow set point and liquid viscosity (SSU). A lot charge will be applied for special calibrations.

**Gas flow:** Consult factory for available calibrations. Specify: Housing material (brass or stainless steel), gas type, mounting orientation, operating pressure and actuation setting (SCFM or SCFH) and normal flow rate. A lot charge will be applied for special calibrations.

FS-925 Series – General Purpose

<table>
<thead>
<tr>
<th>Flow Setting GPM, ±10%</th>
<th>Part Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Brass</td>
</tr>
<tr>
<td>0.10</td>
<td>26914</td>
</tr>
<tr>
<td>0.25</td>
<td>26915</td>
</tr>
<tr>
<td>0.50</td>
<td>26916</td>
</tr>
<tr>
<td>0.75</td>
<td>26917</td>
</tr>
<tr>
<td>1.00</td>
<td>26918</td>
</tr>
<tr>
<td>1.50</td>
<td>26919</td>
</tr>
</tbody>
</table>

FS-926 Series – Low Flow

<table>
<thead>
<tr>
<th>Flow Setting cc/Min. ±10%</th>
<th>Part Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Brass Material</td>
</tr>
<tr>
<td>50</td>
<td>26938</td>
</tr>
<tr>
<td>100</td>
<td>26939</td>
</tr>
<tr>
<td>150</td>
<td>26941</td>
</tr>
<tr>
<td>200</td>
<td>26942</td>
</tr>
<tr>
<td>250</td>
<td>26943</td>
</tr>
<tr>
<td>300</td>
<td>26944</td>
</tr>
</tbody>
</table>

Notes:
1. Flow settings are calibrated using water @ +70°F on increasing flow, with units in a vertical position (lead wires up). Consult factory regarding special flow setting calibration.
2. Temperature changes will slightly affect the standard water or gas flow settings listed. Oil flow settings will vary with viscosity.
3. Use of 50 micron filtration is recommended.

Gas Flow Switches
Piston Type Switches – For Low Flow Rates in Liquids and Gases

- Models for liquid flow rates as low as 50 cc/min. and gas flow rates as low as 2 SCFH
- Small, compact housings with port sizes from 1/4” NPT
- Precision built for superior accuracy

Typical Applications
Protect your expensive electronic equipment from coolant flow failure on...
- Laser Heads • Welders • Power Supplies • High Speed Spindles • X-Ray Tubes
- Semiconductor Equipment
Assure proper lubrication flow to critical bearings or gears to prevent system downtime on...
- Presses • Rotating Equipment • Conveyors • Machine Tools • Robotics
Ensure system integrity in processing and dispensing equipment on...
- Water Purifications and Filtering • X-Ray film Processing
- Beverage dispensing • Chemical additives • Gas sampling • Distilling

Design Data
General Operating Principles

A piston, encapsulating a permanent magnet, is positioned in the flow path within the unit housing. When displaced by the pressure differential from fluid flow, this piston magnetically actuates a hermetically sealed reed switch (SPST or SPDT, depending on the series) within the unit. The piston metering land diameter precisely sets the actuation point by regulating bypass clearance. A stainless steel spring provides positive piston return as flow decreases. The reed switch, when actuated, can be used to operate remote alarms or indicators. Or, it may be integrated into automatic system controls.

Low-Flow Switches

An additional, lap-fitting piston is used in GEMS FS-926 Series to accurately detect low-flow rates. Calibration is determined by one or more metering holes in the top of the low-flow piston, which regulates bypass flow, and therefore the actuation setting. When metered bypass flow is exceeded, the resultant pressure differential displaces the low-flow piston, moving the magnet carrier piston to actuate the reed switch. Two large bypass holes in the piston skirt are exposed after actuation to maintain low pressure drop.

Externally Adjustable Switches

The FS-10798 Series offers infinite flow settings from 0.5 to 20 GPM. Versions suitable for gas flow monitoring are also available.
Viscosity Compensating Switches

When temperatures of viscous fluids change, so do their flow properties. With viscosity lowered by increasing temperature, a greater flow is generally required to create actuation pressure differential. A unique patented piston within GEMS FS-930 Series switches accommodates these changes in fluid viscosity while maintaining accurate switch actuation. Units can detect flow rates with 20% accuracy for liquid viscosities between 40 to 1000 SSU.

Low Pressure Drop Switches

The key to the excellent flow qualities of the FS-150 and FS-380 Series switches is the dual diameter internal bore. At flow rates below the actuation point, the fluid passes around the piston and metering disc within the “metering bore.” As fluid flow increases past the actuation point, the metering disc enters the “flow bypass bore” where the increased diameter provides generous flow paths. The result is a low pressure drop for high flow rates and less susceptibility to fouling.

Typical Piston and Spring Removal

Accumulation of foreign debris should periodically be removed from these switches. GEMS’ designs provide for easy piston and spring removal for this occasional cleaning. Recommended cleaning procedures are provided in the Instruction Bulletin shipped with each unit. 150 micron filtration is recommended for the FS-150 Series; 100 micron for FS-380, 50 micron filtration is recommended for all other piston type switches.

NOTE: All air/gas Flow Switches are factory calibrated using a special piston. Water calibrated units are not recommended for air/gas applications.