FS-400 Series – General Purpose, 90° Flow Path

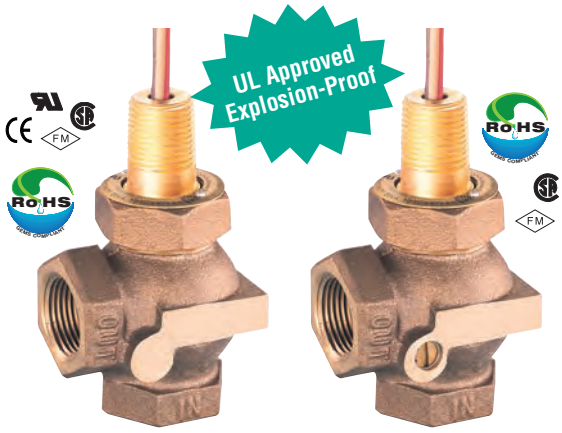
Flow Rate Settings: Fixed Version: 0.75 GPM to 10.0 GPM
Adjustable Version: 0.75 GPM to 14.0 GPM

Port Size: 3/4″

Primary Construction Material: Bronze

Setting Type: Fixed or Adjustable

Provides accurate flow detection in water and oil with 1% repeatability. Flow settings on the adjustable version can be easily changed without disassembly. A shuttle by-pass vane inside the housing is controlled externally using an ordinary flat-blade screwdriver. These switches are ruggedly constructed of non-corrosive materials and resist shock and vibration. Suitable for triggering alarms on interlocking shutdown circuitry when flow rate is improper to protect bearings, gears and cooling systems.



FS-400 Series

U.L. Recognized — File No. E31926
CSA Listed — LR30200 and LR22666
FM Approved — File No. 0A8A3.AE and 1H3A2.AX

FS-400 Adjustable

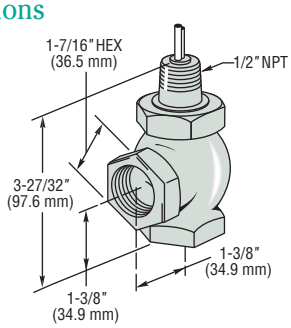
CSA Listed — File No. LR22666
FM Approved — File No. 0A8A3.AE

Specification

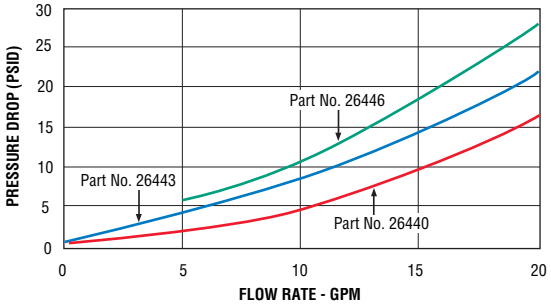
Wetted Materials	
Housing	Bronze
Shuttle	Delrin®
Spring	316 Stainless Steel
O-Ring	Viton®
Other Wetted Parts	Ceramic
Pressure Rating, Maximum Operating	400 PSI (27.6 bar) @ 100°F (+37.8°C)
Proof	800 PSI (55.2 bar) @ 100°F (+37.8°C)
Operating Temperature	-20°F to +180°F (-29°C to +82.2°C)
Repeatability	1% Maximum Deviation
Set Point Accuracy	±10%
Set Point Differential	15% Maximum
Switch*	SPDT, 20 VA
Inlet/Outlet Ports	3/4″ NPT
Electrical Termination	No. 18 AWG, 24″ L., Polymeric Lead Wires

*See "Electrical Data" on Page X-5 for more information.

Dimensions



Pressure Drop - Typical



Tests conducted with units in vertical position (lead wires up) with water at +70°F (21°C).

How To Order – Standard Models

Specify Part Number based on flow settings for the FS-400 Series, based on flow setting range for the FS-400 Adjustable version.

FS-400 Series

NPT	Flow Setting GPM	Part Numbers
3/4″	0.75	**26440** ⚡
	1.5	**26441** ⚡
	2.0	**26442**
	2.5	**26443** ⚡
	5.0	**26444**
	7.5	**26445**
	10.0	**26446**

FS-400 Adjustable

NPT	Flow Setting GPM	Part Numbers
3/4″	0.75-4.0	**26600** ⚡
	2.0-8.0	**26601** ⚡
	7.0-14.0	**26602** ⚡

Notes:
1. Flow settings for Fixed Version are calibrated using water at +70°F on increasing flow, with units in a vertical position (lead wires up). Temperature changes will slightly affect the flow settings listed.
2. Adjustable units that are set to customer specifications are subject to GEMS test stand accuracy.
3. Use of 150 micron filtration is recommended.
4. Minimum 5 PSI line pressure required.

⚡ – Stock Items.

FS-400 switches are U.L. Approved for Class I, Division 2, Groups A, B, C, D hazardous areas.

Available with FM-approved, explosion-proof junction box for Class I, Division 1, Group D hazardous locations. Units must be assembled completely at GEMS.
U.L. Approved — File No. E183854

Shuttle Type Switches – For Moderate to High Liquid Flow Rates

- Models for flow rate settings from .5 GPM to 100.0 GPM
- Rugged housings with port sizes ranging from 3/4˝ NPT to 3˝ NPT
- Efficient flow paths assure low line pressure drop at full flow

Typical Applications

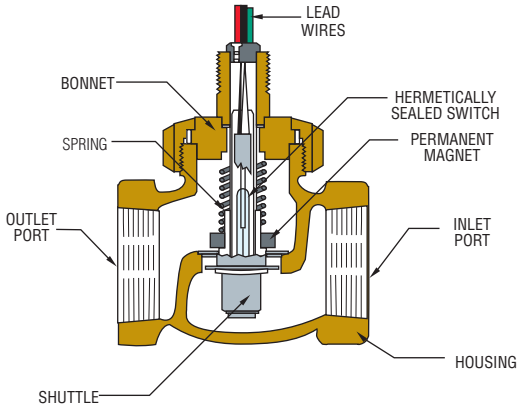
Protect bearings or gears from loss of lubricant flow. Can reduce maintenance costs on…
• Oil separators • Fuel Systems • Pumps • Compressors • Presses

Provide instant, automatic shutdown if coolant flow falls off in electronics or machinery, such as…
• Heat Exchangers • Semiconductor Manufacturing Equipment
• Induction Furnaces • Radio Transmitters

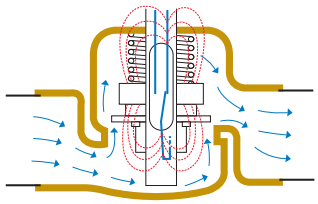
Assure efficient operation of process systems, including…
• Water Filtration and Reverse Osmosis • Chlorinators • De-icers
• Sterilizers • Evaporators

Design Data

General Operating Principle (FS-200 Series Shown)



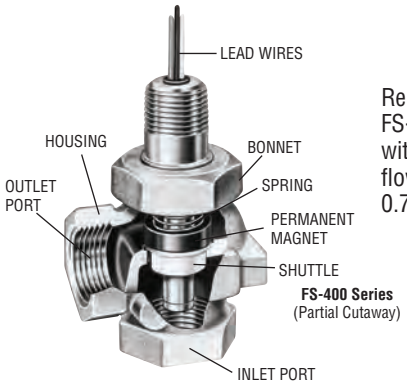
As liquid flow increases to the actuation setting, a magnet-equipped shuttle is displaced. When displaced by fluid flow, this shuttle actuates a hermetically sealed, SPDT or SPST reed switch within the unit stem. A compression spring or gravity provides shuttle return when flow decreases.



This reed switch, when actuated, can be used to operate remote alarms or indicators, or may be integrated into automatic system controls.

Typical flow diagram showing switch actuated.

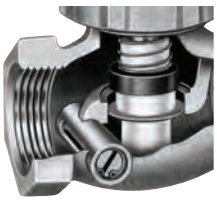
90° Flow Path Versions



FS-400 Series
(Partial Cutaway)

Replace an ordinary 90° pipe joint with an FS-400 Series switch to monitor liquid flow with 1% repeatability. A choice of seven flow rate actuation settings ranging from 0.75 GPM to 10.0 GPM are offered.

Adjustable Versions

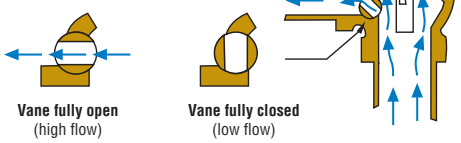


FS-200 Adjustable
(Partial view)

FS-400 Adjustable
(Partial view)

Adjustable versions of the FS-200 and FS-400 Flow Switches incorporate an internal adjustable bypass vane which is controlled externally using an ordinary, flat-blade screwdriver. As the bypass vane is rotated to its open position, an increasing amount of liquid is allowed to bypass the shuttle assembly, resulting in the need for a higher rate of flow to actuate the switch; closing the adjustable bypass vane results in switch actuation at lower flow rates. Switch actuation can be set from 0.75 GPM to 15 GPM.

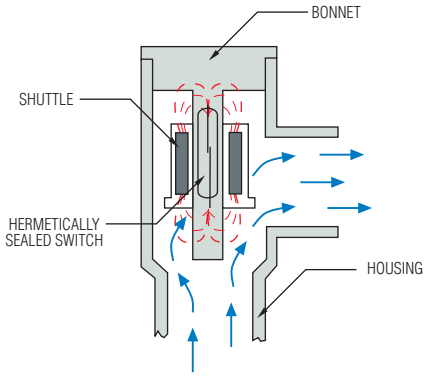
Regulating action of the bypass vane is shown here for the FS-400 Adjustable unit, and functions the same in the FS-200 Adjustable versions.



Vane fully open
(high flow)

Vane fully closed
(low flow)

All Plastic, Transparent Versions

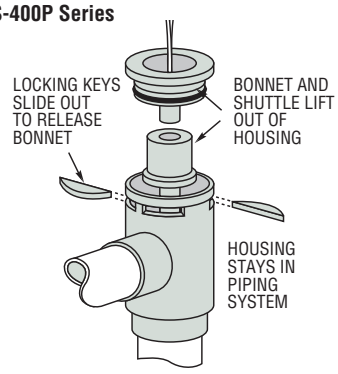


The FS-400P Series is an inexpensive alternative for plastic piping systems. Units are available in clear PVC housings. The clear version, with a bright red shuttle, provides highly visible affirmation of flow status. Low-cost, all PVC versions are for use in systems where liquid pressures are below 120 PSIG and temperatures do not exceed 120°F. An easily removed, one-piece bonnet and shuttle assembly for quick clean-out is featured.

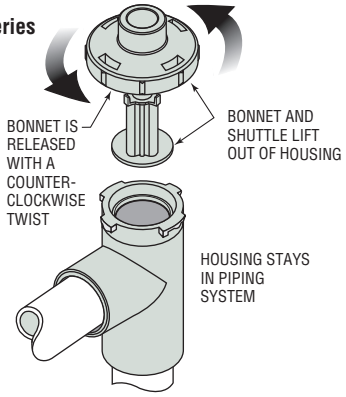
Typical Bonnet and Shuttle Removal

While a slight accumulation of foreign material within shuttle type units will not affect operation, 150 micron filtration is suggested. Any sizable amount of contamination should be removed. Removing the bonnet nut on FS-200, and FS-400 Series units allows the shuttle assembly to be removed for cleaning without disturbing the installation. Sliding keys on the FS-400P are removed, or the bonnet is twisted on the FS-500, for the one-piece bonnet/shuttle to be lifted out of its housing. Consult the factory for replacement parts. Damaged electrical components must be replaced at the factory.

FS-400P Series



FS-500 Series



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Control Components
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www.ccezy.com.au

Junction box alternatives for flow and level switch units

Small size housings for max 32V, IP65 rating, ¼ and ½" connections internal terminal strip Dims: 60mm dia x 80 mm high		
Aluminium Small 32V IP65	**JB-ALS-32V-65-1** (1/4") **JB-ALS-32V-65-2** (1/2") Painted aluminium case M16 NPB cable gland supplied	
Stainless Small 32V IP65	**JB-SSS-32V-65-2** Full 316SS case M16 SS cable gland supplied	
Medium size housings for max 32V, IP65 rating, 1/2" connection internal terminal strip on SS bracket Dims: 70mm dia x 75 mm high		
Aluminium Medium 32V IP65	**JB-ALM-32V-65-2** Painted aluminium case M20 cable entry (no gland)	
Stainless Medium 32V IP65	**JB-SSM-32V-65-2** Full 316SS case M20 SS cable gland supplied	
Large size housings for max 250V, IP65 rating, 1/2" connection Painted earth terminals both inside and outside housing. Cover locking screw internal terminal strip on SS bracket Dims: 82mm dia x 94 mm high		
Aluminium Large 240V IP65	**JB-ALL-240V-65-2** Painted aluminium case M20 cable entry (no gland)	
Stainless Large 240V IP65	**JB-SSL-240V-65-2** Full 316SS case M20 SS cable gland supplied	

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Junction box alternatives
for
flow and level switch units

FS-200 with JB-ALL-240V-65-2

FS-550 with JB-SSL-240V-65-2

Typical Gems flow switch fitted with large 240V junction box

Typical Gems level sensors with junction box fitted