

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...

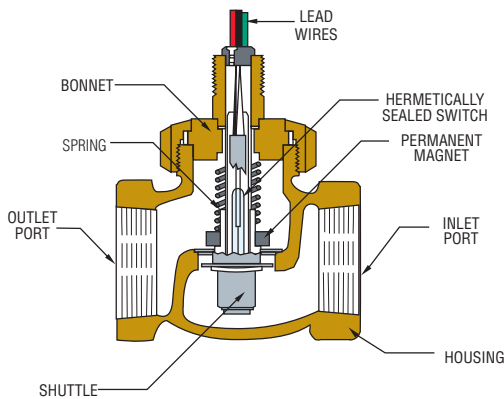
- Heat Exchangers • Semiconductor Manufacturing Equipment
- Induction Furnaces • Radio Transmitters

Assure efficient operation of process systems, including...

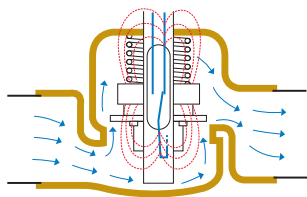
- Water Filtration and Reverse Osmosis • Chlorinators • De-icers
- Sterilizers • Evaporators

Design Data

General Operating Principle (FS-200 Series Shown)



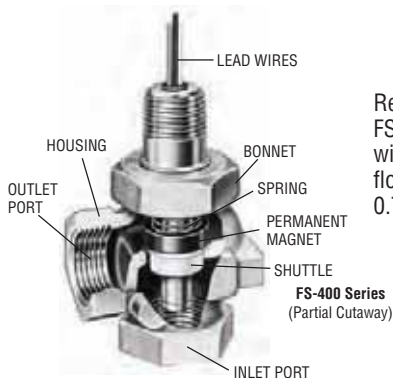
As liquid flow increases to the actuation setting, a magnet-equipped shuttle is displaced. When displaced by fluid flow, this shuttle actuates a hermetically sealed, SPDT or SPST reed switch within the unit stem. A compression spring or gravity provides shuttle return when flow decreases.



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

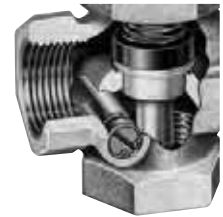


Replace an ordinary 90° pipe joint with an FS-400 Series switch to monitor liquid flow with 1% repeatability. A choice of seven flow rate actuation settings ranging from 0.75 GPM to 10.0 GPM are offered.

Adjustable Versions



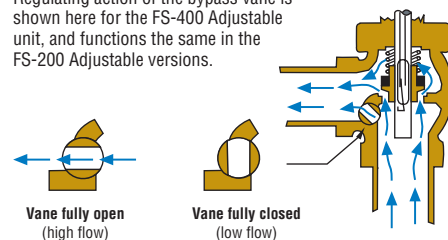
FS-200 Adjustable
(Partial view)



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.



FS-200 Series – General Purpose, Straight-Through Flow Path



Flow Rate Settings: Fixed: 0.5 GPM to 100.0 GPM
Adjustable: 1.0 GPM to 15.0 GPM

Port Size: 1" NPT to 2" NPT

Primary Construction Material: Bronze or Stainless Steel

Setting Type: Fixed or Adjustable

The FS-200 Series offers accurate flow detection, with 1% repeatability, over a broad range of flow settings and port sizes. Its durable construction delivers long-life reliability in either water or oil. Generous flow paths keep pressure drop low. These switches are ideal for detection of improper flow rates in high volume lubrication, cooling or process systems.

FS-200 Adjustable Series switches offer the same accuracy and are as rugged as those with fixed settings, but provide one additional feature: external adjustability. With these versatile switches your choice of flow settings is diverse within a given range. An ordinary, flat-blade screwdriver is all that's required for the actuation adjustment.

Specifications

Wetted Materials	
Housing	
FS-200	Bronze or 316 Stainless Steel
FS-200 Adjustable	Bronze
Shuttle	Teflon®
Bonnet	Bronze or Stainless Steel
Spring	316 Stainless Steel
Other Wetted Parts	Viton®, Ceramic
Pressure Rating	
Operating	400 PSIG (27.6 bar) @ 100°F (37.8°C)
Proof	800 PSIG (55.2 bar) @ 100°F (37.8°C)
Operating Temperature	
FS-200	-20°F to +300°F (-29°C to +148.9°C)
FS-200 Adjustable	-20°F to +200°F (-29°C to +93.3°C)
Repeatability	1% Maximum Deviation
Set Point Accuracy	±10%
Set Point Differential	15% Maximum
Switch*	SPDT, 20 VA
Electrical Termination	No. 18 AWG, 24" L., Polymeric Lead Wires Red NC, Black Common, Orange NO

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

FS-200 Series



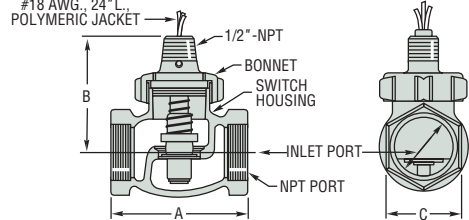
U.L. Recognized
File No. E31926
CSA Listed —
File No. LR30200
and LR22666
FM Approved —
File No. 0A8A3.AE
and 1H3A2.AX

FS-200 Adjustable



U.L. Recognized
File No. E31926
CSA Listed —
File No. LR22666
FM Approved —
File No. 0Q2A8.AE

Dimensions



Model	Port Size NPT	A inch (mm)	B inch (mm)	C Hex inch (mm)
FS-200 and FS-200 Adjustable	1"	3-1/4 (82.6)	3 (76.2)	1-25/32 (45.2)
	1-1/4"	4 (101.6)	3-3/16 (80.9)	2-3/16 (55.5)
	1-1/4" ss	4-1/2 (114.3)	3-3/16 (80.9)	2-3/16 (55.5)
	1-1/2"	4-1/2 (114.3)	3-1/2 (88.9)	2-1/2 (63.5)
	2"	5-3/8 (136.5)	4 (101.6)	3-3/32 (78.5)

Notes:

- Adjustable versions available in 1 inch port sizes only.
- Standard calibration is in water with units in a horizontal position.
- Viscosity changes will affect setpoints. Typically, as viscosity increases setpoints will decrease.
- Consult Gems for special applications.

How To Order – Standard Models

Specify Part Number for the FS-200 Series based on desired housing material, port size and flow setting, or based on flow setting range for FS-200 Adjustable versions.

FS-200 Series

Port Size NPT	Flow Setting GPM	Part Numbers		Port Size NPT	Flow Setting GPM	Part Numbers	
		Bronze	Stainless Steel			Bronze	Stainless Steel
1"	0.5	27051	27059	1-1/2"	1.5	27085	27093
	1	27052	27060		3	27086	27094
	2	27053	27061		5	27087	27095
	3	27054	27062		7.5	27088	27096
	4	27055	27063		10	27089	27097
	5	27056	27064		15	27090	27098
	6	27057	27065		20	27091	27099
	8	27058	27066		30	27092	27100
1-1/4"	1	27067	27076	2"	2	27101	27109
	2	27068	27077		4	27102	27110
	4	27069	27078		5	27103	27111
	6	27070	27079		10	27104	27112
	8	27071	27080		15	27105	27113
	10	27072	27081		25	27106	27114
	12	27073	27082		35	27107	27115
	16	27074	27083		50	27108	27116
20	27075	27084					

FS-200 Adjustable

Port Size NPT	Flow Setting Adjustment Range GPM	Part Numbers
1"	1.0-6.0	26615
	5.0-15.0	26616
	2.0-8.0	26838

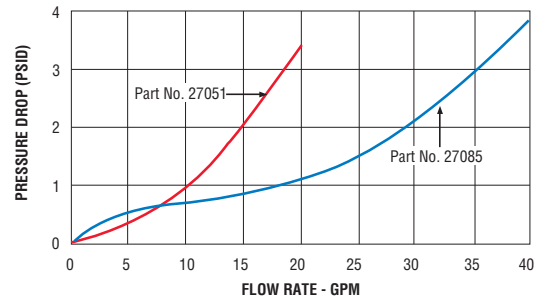
Notes:

- Flow settings for fixed versions are calibrated using water at +70°F on increasing flow, with units in a horizontal position (lead wires up). Consult factory regarding special flow setting calibration, or liquids other than water. Temperature changes will slightly affect the flow settings listed. Oil flow settings will vary with viscosity.
- Adjustable units that are set to customer specification are subject to GEMS test stand accuracy.
- Use of 150 micron filtration is recommended.
- Minimum 5 PSI line pressure required.

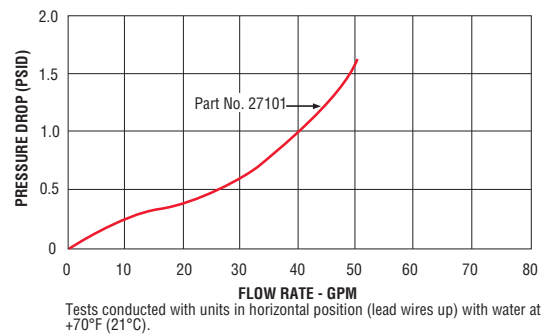
⚡ – Stock Items.

Pressure Drop - Typical

1" NPT and 1-1/2" NPT Ports



2" NPT Ports



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

FS-200 Series Flow Switches are U.L. Approved for Class I, Division 2, Groups A, B, C, D hazardous areas.



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

For Remote Alarms – See Page E-30

- Adjustable Volume
- Indoor Outdoor
- Solid-State



**Junction box alternatives
 for
 flow and level switch units**



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



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