

## BF 系列流量开关使用说明

### 1. 应用

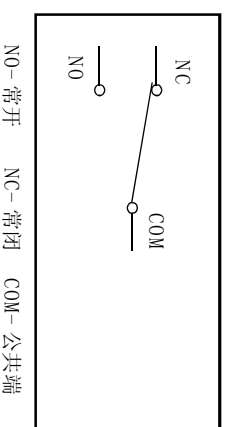
本产品为单刀双掷 (SPDT) 的流量开关，一般用于空气调节，供水设备方面的液体流量检测，通过（水、乙烯、乙二醇或其它非危害性液体）流量变化给出状态信号，典型应用在需要有连锁作用或“断流”保护的场所。

### 2. 电气产品参数

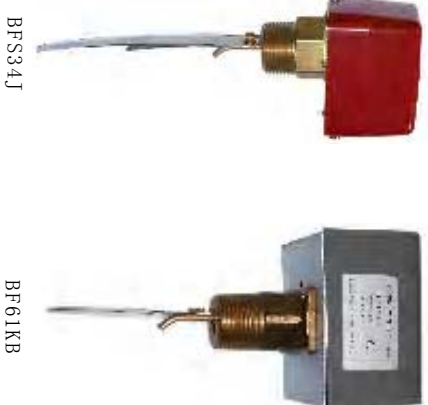
开关接点额定值：250VAC, 15A  
最大工作压力：1MPa/2MPa。  
接头尺寸：1" NPT  
介质温度范围：0℃~60℃  
介质最高温度：100℃

### 3. 接线

将外壳盖卸下后即可看到接线端子及流量调节旋钮，见图1。



NO-常开 NC-常闭 COM-公共端



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### 4. 标准安装与调节

- (1)、为使开关能灵敏感应流量变化，流向叶片不得与管道接触，也不得与管道中任何截流装置接触，调整见图2。
- (2)、开关出厂时已设定在约为最小流量值。
- (3)、流量开关只能安装在水平管路上。
- (4)、管路内水流方向应与流量开关上标识的方向一致，见图3。

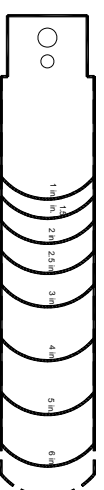


图2 叶片调整图



图1 接线及设定调节位置图

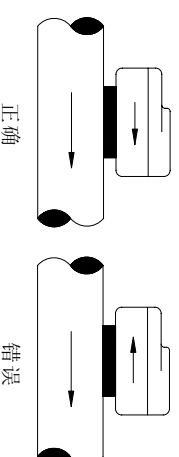


图3

- (5)、流量开关一定要安装到一段直线管道上，其两边至少有5倍管径的直线行程（见图4）。

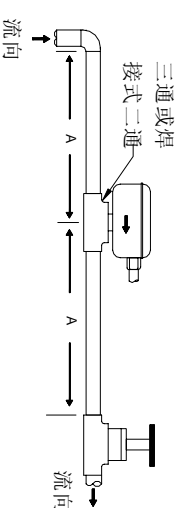
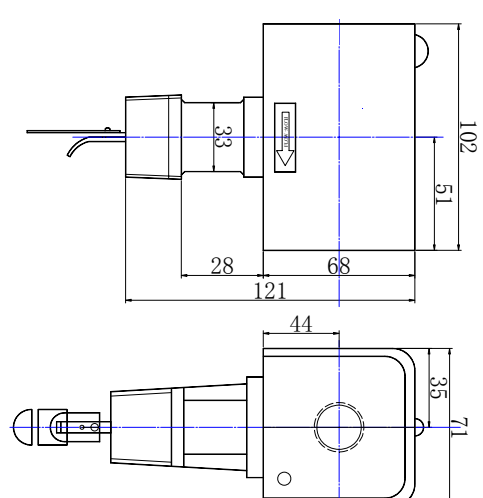


图4

图中 尺寸“A”是从最近的弯头、阀或其它管道节流器处算起至少5倍的管径。产品安装时，其接线端子应在易于接线的位置。



BF61KB 外形尺寸图

### 5. 调节流量开关复位步骤

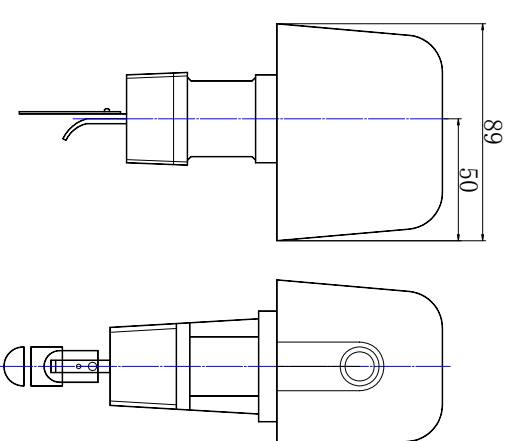
当流量开关动作后不能复位时：

- 1、取下流量开关的外壳。
- 2、通过按动主杠杆数次来检查流量开关动作。一旦发现杠杆回复时没有“咔嚓”声，顺时针旋转调节螺丝直到回复时有“咔嚓”声。

注意：接线及调节流量开关时断开电源。

### 6. 特别说明

由于产品不断改进，本说明书电气连接图仅供参考，详细的电气接线图印于产品本身。



BFS34J 外形尺寸图

## BF Serie Liquid Flow Switch

The Liquid Flow Switches Are Single-Pole, Double-Throw (SPDT) flow switches that are used in liquid lines carrying water, ethylene glycol, or other liquids not classified as hazardous. They can be wired to energize one device and de-energize another device powered from the same source when liquid flow either exceeds or drops below the set flow rate.

### Note

The Flow Switch cannot be used where the liquid in the pipes will drop below the liquid's freezing point, causing an internal freeze-up.

### Warning

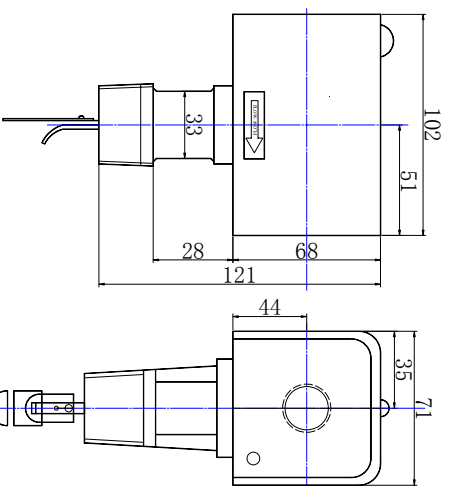
The Liquid Flow Switches are designed for use only as operating controls. Where an operating control failure would result in personal injury and/or



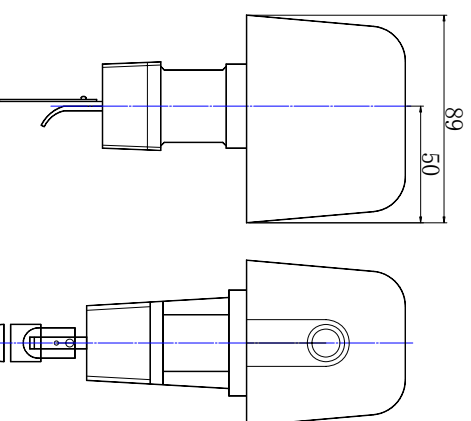
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loss of property, it is the responsibility of the installer to add devices (safety, limit controls) or systems (alarm, supervisory systems) that protect against or warn of control failure.



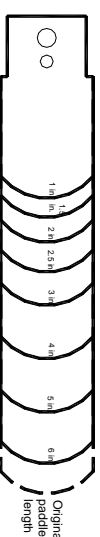
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Dimensions(mm)

### Installation



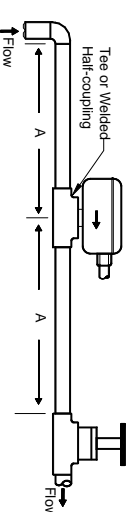
Trimming Template for the ExtraPaddle

### Warning

To allow the switch to detect changes in the flow condition, the paddle must not touch the pipe or any restrictions in the pipe.

- The Liquid Flow Switches comes with a 3-piece paddle (1in., 2in. and 3in. segments) installed. Each piece is removable. Adjust the paddle to the size of the pipe in which it will be installed. For 1in., 2in. or 3in. pipe, use the paddle segments as supplied.

- Mount the Liquid Flow Switches in a section of pipe where there is a straight run of at least five pipe diameters on each side of the flow switch.



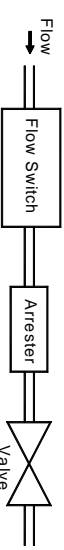
Dimension "A" must be at least five pipe diameters from the nearest elbow, valve, or other pipe restriction.

Typical Installation

- The switch should be mounted so the terminals or wire leads are easily accessible for wiring.

### Note

These flow switches must not be subjected to water hammer. If a fast-closing valve is located downstream of the flow switch, a suitable water hammer arrester must be used.



Arrester Location Schematic

- Mount the flow switch in a standard 1in. x 1in. x 1in. tee for 1in. pipe installation. Use a reducing tee for larger size of pipe to keep the flow switch close to the pipe and provide adequate paddle length in the flow stream.

### CAUTION

Equipment damage hazard.

To avoid damaging the switch do not tighten the switch to the tee by grasping the switch enclosure. Use only the wrench flats provided.

- Screw the flow switch in position so the flat of the paddle is at a right angle to the flow. The arrow on the side of the case must point in direction of the flow.

- The Liquid Flow Switches may be mounted in a horizontal pipe line or a vertical pipe line with upward liquid flow. It is not recommended for installations where flow is downward. When mounted in a vertical pipe line with upward flow, the switch will trip at a slightly higher flow than shown in Table 1 due to the effect of gravity on the switch mechanism.

### Wiring

#### ⚠ WARNING Shock hazard.

To avoid possible electric shock or damage to the equipment, disconnect the power supply before the wiring connections or adjustments are made.

Make all wiring connections using copper conductors only.

Install all wiring in accordance with the National Electric Code and local regulations.

## Adjustments

### ⚠ CAUTION Improper operation hazard.

The switch is factory set at approximately the minimum flow rate(see Table1). Do not set lower than the factory setting as this may result in the switch failing to return to a 'no flow' position.

### ⚠ CAUTION Equipment damage hazard.

Sealed settings(screws marked with black paint) are not intended to be changed. Adjustment attempts may damage the control or cause loss of calibration, voiding the warranty.

To adjust the setting of the flow switch

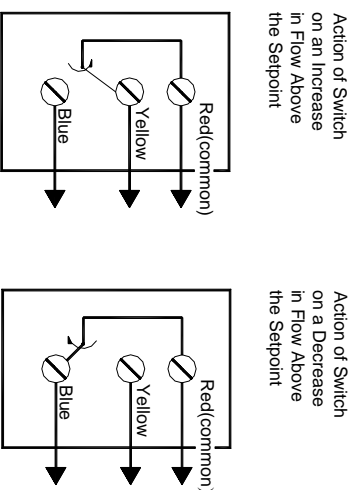
- 1.Remove the Liquid Flow Switches cover.
- 2.For higher flow rates, turn the adjusting screw clockwise. To lower the flow rate after it has been raised from the factory setting, turn the adjusting screw counter clockwise.
- 3.Check to see that the flow switch is not set lower than the factory setting by depressing the main lever numerous times. If the lever fails to "click" upon return at any time, turn the adjusting screw clockwise until the lever clicks upon return every time.

## Checkout Procedure

The circuit between the red and the yellow leads (terminals) will close when sufficient liquid flows through the pipe to trip the Liquid Flow Switches (see Tabel 1). A low flow indicator light or signal,

when used, will activate when the liquid flow decreases or ceases.

Before leaving the installation, observe at least three complete operating cycles to be sure that the and the Liquid Flow Switches system to which it is connected are functioning correctly.



Range Adjustment  
Switch Action

Table1 Typical Flow Rates

GPM(m3/hr) Required to Actuate Switch										
Pipe Seze(in.)	1	1-1/4	1-2/1	2	2-1/2	3	4*	5*	6*	8*
Pipe Seze(in.)	Flow	4.2	5.8	7.5	13.7	18.0	27.5	65.0	125.0	190.0
	Increase R to Y	(1.0)	(1.3)	(1.7)	(3.1)	(4.1)	(6.2)	(14.8)	(28.4)	(43.1)
Minimum Adjustm-	Closes**							37.0+	57.0+	74.0+
	Flow							(8.4)	(12.9)	(16.8)
Adjustm-	Decrease R to B	2.5	3.7	5.0	9.5	12.5	19.0	50.0	101.0	158.0
	Closes**	(0.6)	(0.8)	(1.1)	(2.2)	(2.8)	(4.3)	(11.4)	(22.9)	(35.9)
	Flow							27.0+	41.0+	54.0+
	Increase R to Y							(6.1)	(9.3)	(12.3)
Maximum Adjustm-	Closes**							245.0	375.0	760.0
	Flow							(55.6)	(85.2)	(172.6)
Adjustm-	Decrease R to B	8.8	1.3	19.2	29.0	34.5	53.0	128.0	245.0	375.0
	Closes**	(2.0)	(3.0)	(4.4)	(6.6)	(7.8)	(12.0)	(29.1)	(55.6)	(85.2)
	Flow							81.0+	118.0+	144.0+
	Increase R to Y							(18.4)	(26.8)	(32.7)
Maximum Adjustm-	Closes**							122.0	235.0	360.0
	Flow							(27.7)	(53.4)	(81.8)
Adjustm-	Decrease R to B	8.5	12.5	18.0	27.0	32.0	50.0	127.0	235.0	360.0
	Closes**	(1.9)	(2.8)	(4.1)	(6.1)	(7.3)	(11.4)	(27.7)	(53.4)	(81.8)
	Flow							76.0+	111.0+	135.0+
	Increase R to Y							(17.3)	(25.2)	(30.7)

\* Flow rates for these sizes are calculated.

+GPM figures are for a switch with a 6in. paddle. For 4in. and 5in. line pipe, the 6in. paddle is trimmed to a 4in. and 5in. length, respectively.

\*\* For switching action, refer to Switch Action.

## Specifications

Product	The Liquid Flow Switches		
Maximum Liquid Pressure	150psig(1034kpa)		
Minimum Liquid Temperature	32°F(0°C)		
Maximum Liquid Temperature	250°F(121°C)		
Electrical Ratings	120V/AC	208V/AC	240V/AC 277V/AC
Horsepower	1	1	1
Full Load Amperes	16.0	8.8	8.0
Loaded Rotor Amperes	96.0	52.8	48.0
Non-inductive Amperes	16.0	16.0	16.0
Pilot Duty	125VA at 24/277VAC		

Wiring Connection Screw Type Terminals

Pipe Connector 1 in. 1-1/2 NPT Threads

Conduit Connection One 7/8 in. (22mm) Hole for 1/2 in. Conduit with 1-3/32 in. (28mm) knockout Ring for 3/4 in. conduit.