

Specifications

Medium Type	<input type="checkbox"/> water, <input type="checkbox"/> oil
Flow Rate	<input type="checkbox"/> 0.01...1.5 m/s, <input type="checkbox"/> 0.02...3 m/s
Output	relay 3A/250VAC with NO/NC contact
Output Hysteresis	≤ 10% of reading
Output Delay	2 s
Response Time	max. 15 s
Power Supply	24 VDC ± 10%
Process Temperature	0...100 °C (32...212 °F)
Process Pressure	up to 25 bar (362 PSI)
Ambient Temperature	-10...65 °C (14...149 °F)
Process Connection	<input type="checkbox"/> G1", <input type="checkbox"/> 1" NPT
Probe Operating Length mm
Wetted Parts	304 stainless steel (1.4301)
Housing	aluminum
Protection	<input type="checkbox"/> IP65, <input type="checkbox"/> IP68

Warranty and Support

.....
serial number

.....
manufacturing date

QC check mark(passed)
(stamp)

BASI Instrument AB
Torget 2
SE-275 66 VOLLSJÖ, SWEDEN
tel: +46 (0)40 88009
fax: +46 (0)40 929877
e-mail: sales@basi.se

Warranty

BASI Instrument AB warrants this product to be free from defects in materials and workmanship for 1 year. If your unit is found to be defective within that time, we will promptly repair or replace it. This warranty does not cover accidental damage, wear or tear, or consequential or incidental loss. This warranty does not cover any defects caused by wrong transportation, storage, installation, or operating (see 'Specifications').

Technical support

In the unlikely event that you encounter a problem with your BASI device, please call your local dealer or contact directly our support team.

QD-8.2.4-WC

v4-06.09

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THERMAL FLOW SWITCH

BFS100

OPERATION MANUAL



Please read this Operation Manual before mounting and operating!
Save the Manual for future references!

Operating

Set-point adjustment

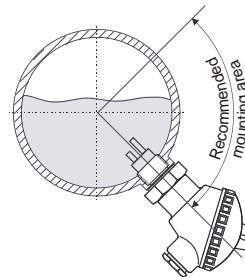
- ◆ Adjust the system flow to the value at which the set-point is desired. Wait 5 seconds and check the output state by the 'REL' LED (lights green at output ON).
- ◆ If the output is ON, increase the rotary switch value with one (turn once clockwise), wait 5 seconds and check the output state. Repeat this step until the output goes OFF.
- ◆ If the output is OFF, decrease the rotary switch value with one (turn once counterclockwise), wait 5 seconds and check the output state. Repeat this step until the output goes ON.
- ◆ During normal operation, the response time of the flow switch is maximum 15 seconds.



Important notes:

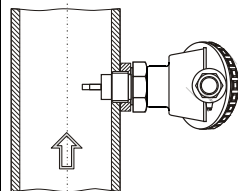
- ◆ The BFS100 flow switch has a highly non-linear characteristic. It results on high sensitivity at small flow rates and low sensitivity at high flow rates!
- ◆ Please note that, when crossing the set-point, the output reacts with static and dynamic delay (formed by the microcontroller program) as follows:
 - switching hysteresis: ≤ 10% of reading
 - output delay time: 2 seconds

Mounting



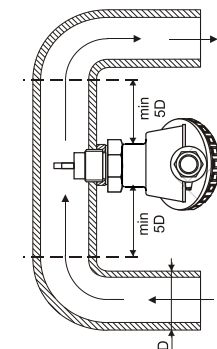
Mounting on horizontal pipes

- ◆ It is recommended to install the unit on the side quarter of the pipe cross section as shown on the figure.
- ◆ Do not mount the unit on the top of the pipe because air pockets and bubbles can cause false switching.
- ◆ Do not mount the unit on the pipe bottom because sediments can insulate the electrodes from the liquid.
- ◆ When threading the unit, fix its end position so that the angle between the electrode plane and the flow direction stays 90 degrees!



Mounting on vertical pipes

When threading the unit, fix its end position so that the angle between the electrode plane and the flow direction stays 90 degrees!



Mounting on curved pipes

Allow at least 5 pipe diameters straight-run both upstream and downstream of the flow switch. This ensures a uniform flow profile (minimum turbulence) for optimal measuring accuracy.



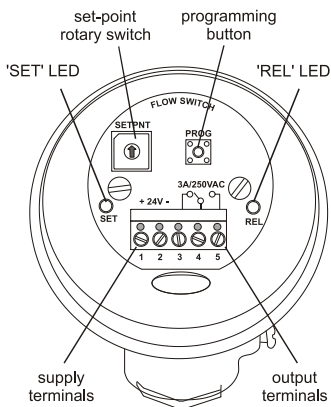
Important notes:

- ◆ Strictly observe the perpendicularity of electrode plane and flow direction!
- ◆ Use a proper sealant (we recommend Teflon® tape) and always check for leaks prior to system start-up!
- ◆ Never use the housing to thread the unit! Always use only an appropriately sized wrench!
- ◆ Never over-tighten the unit!

Overview

Operating flow range (water)
Vs.
Pipe diameter

Pipe ID	Range [l/min]	Range [GPM]
¾"	0.4...34	0.1...8.9
1"	0.6...53	0.16...14
1¼"	0.8...76	0.2...20
1½"	1.5...130	0.4...35
2"	2.2...210	0.6...55
3"	6...530	1.6...140
4"	9.1...830	2.4...220
6"	21...1900	5.6...500
8"	38...3400	10...900
10"	60...5300	16...1400
12"	83...7500	22...2000
16"	151...13600	40...3600
20"	234...21100	62...5600



General principles

The BFS100 flow switch is designed to operate with low viscosity, non-viscous, or dirty liquids with moderate flow rates. BFS100 utilizes the well-known principle of thermal dispersion. It is based on the measurement of temperature difference deviation due to the flow rate by the means of two temperature sensors immersed in the controlled medium. An output relay switches when the flow rate reaches the set-point value. The microcontroller design allows simple user calibration.



Please note that flow in pipes is non-uniform across the pipe cross section, and approaches zero at the pipe walls. In practice, the installation probe depth, the internal pipe diameter, and the flow profile of the liquid in the pipe can produce significant deviations from the ranges in the table!

Controls

To reach the unit's terminals, controls, and indicators, unscrew the protection head cover.

Operating

Diagnostics and troubleshooting

The BFS100 flow switch continuously self-checks the sensing electrodes and microcontroller systems. Any fault in these parts, including during the calibration procedure, will be signed and proceed as follows:

- ◆ The green LED blinks
Incorrect calibration.
Perform a new calibration procedure.
- ◆ The two LEDs blink subsequently
Measurement or memory problem.
Contact BASI for recalibration.
- ◆ Both LEDs blink at once
Sensor broken or defective.
Contact BASI for repair.

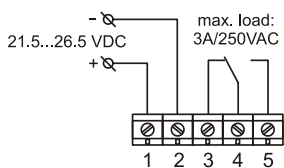
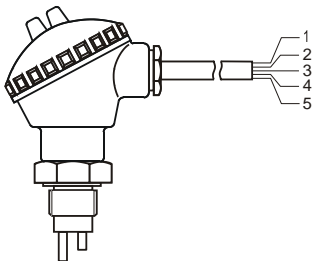
Waste Disposal



Do not dispose of electronic devices together with household waste material!

If disposed of within European Union, this product should be treated and recycled in accordance with the laws of your jurisdiction implementing the WEEE Directive 2002/96 on the Waste Electrical and Electronic Equipment.

Wiring



Cable selection

- ◆ Use only one flexible cable with 4 or 5 multi-core wires (depending on used contacts).
- ◆ In order to ensure IP65 protection class, always use cable with outer diameter 5.5...6.5 mm. Other cable diameters require changing cable gland rubber sealing.

Wiring diagram

- ◆ Connect the relay output and the power supply via the respective unit terminals as shown on the left figure and on the unit PCB.
- ◆ Strictly observe the supply voltage requirements and relay contact specifications given in 'Specifications'.

Operating



Important notes:

- ◆ During the calibration procedure, the output may switch ON/OFF several times! To avoid false operation of your control circuit, we recommend connecting the relay just after finishing the calibration!
- ◆ BFS100 has a temperature compensation circuit built-in. Even though, significant changes of liquid temperature can cause false switching. To avoid this, we recommend performing a new calibration of the unit!

Zero calibration

- ◆ Ensure that the fluid system is in no-flow condition and the preheating procedure has already passed.
- ◆ Turn the set-point rotary switch in position '0'.
- ◆ Press and hold the programming button until the 'SET' LED starts blinking red. Release the button.
- ◆ When the 'SET' LED stops blinking, the zero flow calibration is complete. This may take approximately 5 to 60 seconds.

Span calibration

- ◆ Adjust the system flow to a STABLE rate.
- ◆ Turn the set-point rotary switch in position, approximately matching the flow rate (e.g. '5' – for 50% of the range).



Keep in mind that the characteristic is highly non-linear and positions from '2' to '4' may be used ONLY with flow rates below 2...3 cm/s!

- ◆ Press and hold the programming button until the 'SET' LED starts blinking red. Release the button.
- ◆ When the 'SET' LED stops blinking, the span flow calibration is complete. This may take approximately 5 to 60 seconds.

Operating

Preheating (performed at power-on)



BFS100 must be installed and its electrodes – completely immersed in the fluid!

- ◆ Turn the power supply on.
- ◆ The preheating starts at each power-on and stops after approximately 45 seconds, when a certain temperature difference between the electrodes is reached.
- ◆ During preheating, the 'SET' LED blinks red and the relay output is always OFF.