

Operating instructions Flow monitor

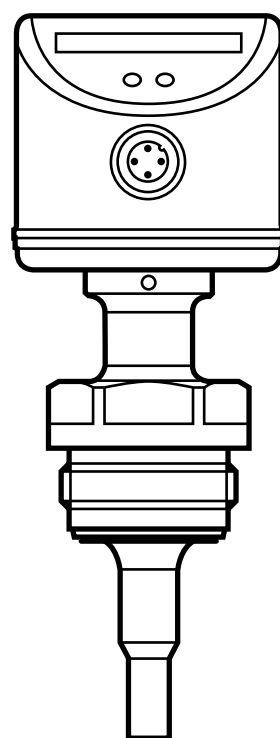
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1 Preliminary note



You will find technical data, approvals and further information using the QR code on the unit / packaging or at www.ifm.com.

1.1 Symbols used

- Instruction
- > Reaction, result
- Cross-reference
-  Important note
Non-compliance may result in malfunction or interference.
-  LED lights green
-  LED lights orange
-  LED lights red
-  LED flashes

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2 Safety instructions

- The device described is a subcomponent for integration into a system.
 - The manufacturer is responsible for the safety of the system.
 - The system manufacturer undertakes to perform a risk assessment and to create a documentation in accordance with legal and normative requirements to be provided to the operator and user of the system. This documentation must contain all necessary information and safety instructions for the operator, the user and, if applicable, for any service personnel authorised by the manufacturer of the system.
- Read this document before setting up the product and keep it during the entire service life.
- The product must be suitable for the corresponding applications and environmental conditions without any restrictions.
- Only use the product for its intended purpose (→ Functions and features).
- Only use the product for permissible media (→ Technical data).

- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
- The manufacturer assumes no liability or warranty for any consequences caused by tampering with the product or incorrect use by the operator.
- Installation, electrical connection, set-up, operation and maintenance of the product must be carried out by qualified personnel authorised by the machine operator.
- Protect units and cables against damage.

3 Functions and features

3.1 Application area

The unit monitors the flow in liquid and gaseous media.

For use in general or hygienic applications in the food and beverage industry.

3.2 Operating principle flow monitoring

- The unit detects the flow speed to the calorimetric measuring principle and switches the output:
 - output closed if medium is flowing / output open if no medium is flowing.

This applies to the unit on delivery: output = normally open. If necessary, you can change the output to normally closed operation (→ 8.2). Afterwards the following applies: output open if medium is flowing.
- If the flow speed increases, the switching status changes when the switch point is reached.
- If the flow speed falls again, the switching status changes when the value "SP minus hysteresis" is reached.

The hysteresis changes with the flow speed and it is essentially influenced by the set monitoring range.

It is 2...5 cm/s for the setting 5...100 cm/s (= factory setting), it increases with higher flow speeds.
- The typical response time of the unit is 1...10 s. It can be influenced by the setting of the switch point:
 - Low switch point = quick reaction with rising flow.
 - High switch point = quick reaction with falling flow.

4 Installation



- Ensure that the system is free of pressure during installation.
- Ensure that no media can leak at the mounting location during installation.

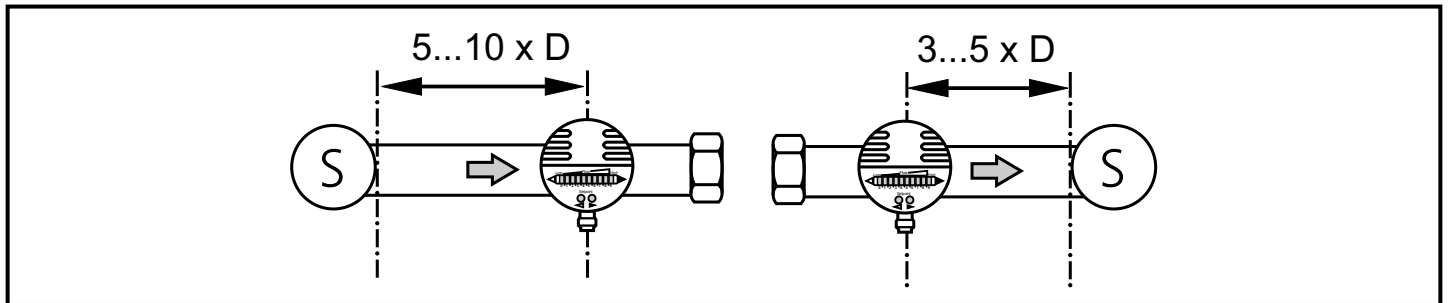
4.1 Installation location

<p>General</p> <ul style="list-style-type: none"> • The sensor tip is to be completely surrounded by the medium. • Immersion depth of the probe: minimum 12 mm. 		
<p>Recommended</p> <ul style="list-style-type: none"> • For horizontal pipes: mounting from the side. • For vertical pipes: mounting in the rising pipe. 		
<p>Conditionally possible</p> <ul style="list-style-type: none"> • Horizontal pipe /mounting from the bottom: if the pipe is free from build-up. • Horizontal pipe /mounting from the top: if the pipe is completely filled with medium. 		
<p>To avoid</p> <ul style="list-style-type: none"> • The sensor tip must not be in contact with the pipe wall. • Do not mount in downpipes that are open at the bottom! 		

4.2 Interference in the pipe system

Components integrated in the pipes, bends, valves, reductions, etc. lead to turbulence of the medium. This affects the function of the unit.

Recommendation: Adhere to the distances between sensor and sources of interference:



D = pipe diameter; S = sources of interference

4.3 Installation procedure

The unit can be fixed to different process connections.

- Insert the unit with process adapter into the process connection and tighten using a spanner.



Information about available adapters at www.ifm.com.

- Observe the instructions of the adapter.
- Use a lubricating paste which is suitable and approved for the application.
- Recommended tightening torque 35 Nm.

4.3.1 Installation using an adapter with sealing ring (hygiene-compliant)

Order no. E332xx / E333xx.

- To meet the hygiene regulations use a process adapter with leakage port.

The adapters are supplied with EPDM O-ring (order no. E30054).

More sealing rings are available as accessories:

- FKM O-ring (order no. E30123)
- PEEK sealing ring (order no. E30124). The PEEK sealing ring is long-term stable and maintenance-free. When you replace the PEEK sealing ring or change from a PEEK sealing ring to an O-ring the process adapter also needs to be replaced with a new equivalent adapter.

4.3.2 Installation using a welding adapter with sealing ring (hygiene-compliant)

- ▶ To meet the hygiene regulations use a process adapter with leakage port.
- ▶ Make sure that the process adapter does not warp during welding.

The adapter is supplied with EPDM O-ring (order no. E30054.

Another sealing ring is available as accessory:

- FKM O-ring (order no. E30123).

4.3.3 Installation using a process adapter with metal-to-metal seal

Order no. E337xx / E338xx

A long-term stable and maintenance-free fitting without bug traps in the metal-to-metal seal is only valid for once-only mounting.

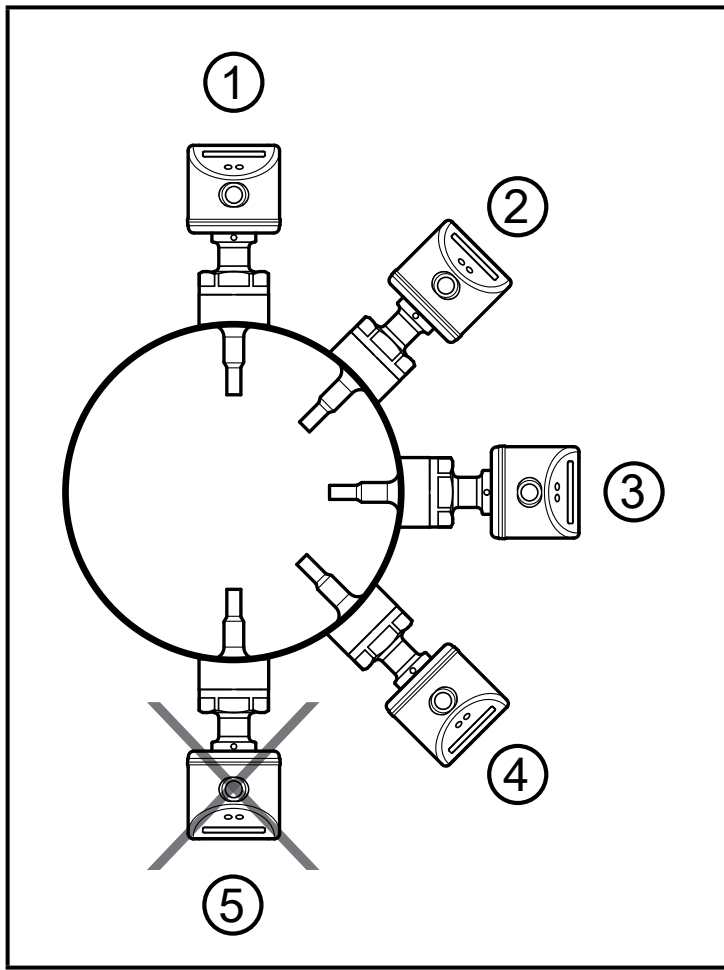
If the sealing has to be installed several times, use a new adapter.

4.3.4 Installation to G 1 flange

The process is sealed with the sealing ring at the back of the sensor.

The sealing area at the flange must be flush with the tapped hole and have a surface characteristic of min. Rz = 6.3.

4.4 Use in hygienic areas to 3-A



The following applies to units with 3-A certification:

- ▶ Only use adapters with 3-A certification for the process connection.
- ▶ Do not install the unit at the lowest point of the pipe or tank (→ position 5) in order that the medium can run off the area of the measuring element.
- ▶ Assure 3A compliant integration.
- ▶ Use self-draining installation.



The unit is not suitable for systems that have to meet the criteria of E9.2 / 63-04 of the 3-A standard.

4.5 Use in hygienic areas to EHEDG



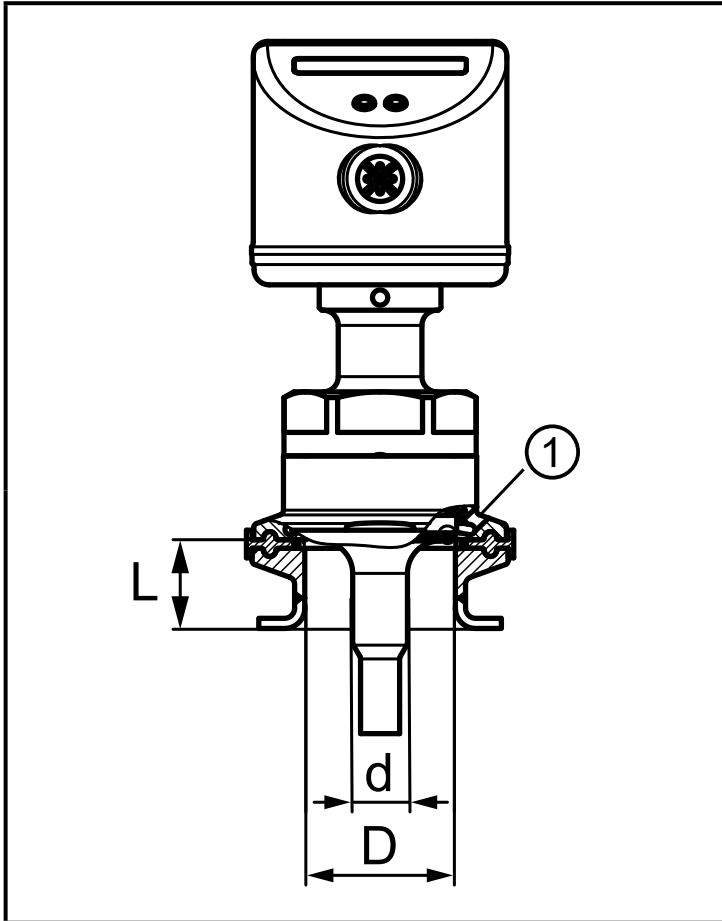
The sensor is suited for CIP (cleaning in process) when installed correctly.

- ▶ Observe the application limits (temperature and material resistance) according to the data sheet.
- ▶ Make sure that the sensor is integrated into the system according to EHEDG.
- ▶ Use self-draining installation.
- ▶ Only use process adapters permitted according to EHEDG with special seals required by the EHEDG position paper.



The gasket of the system interface must not be in contact with the sealing point of the sensor.

- ▶ In case of structures in a tank, the installation must be flush mount. If not possible then direct water jet cleaning and cleaning of dead spaces must be possible.
- ▶ Leakage ports must be clearly visible and must be installed facing downwards for vertical pipes.
- ▶ To avoid dead space adhere to the dimensions: $L < (D - d)$.



1: leakage port

5 Electrical connection

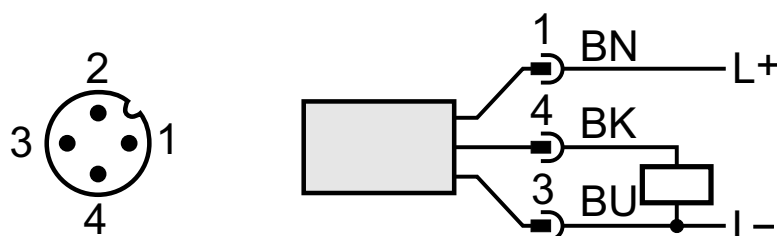


The unit must be connected by a qualified electrician.

The national and international regulations for the installation of electrical equipment must be adhered to.

Voltage supply to EN 50178, SELV, PELV.

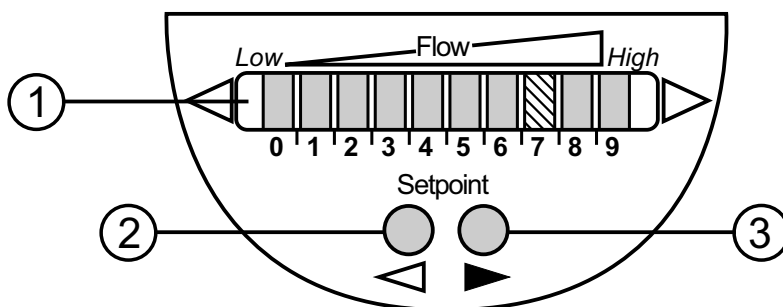
- ▶ Disconnect power.
- ▶ Connect the unit as follows:



Core colours of ifm sockets:

1 = BN (brown), 3 = BU (blue), 4 = BK (black)

6 Operating and display elements



1: operation display

- The green LEDs indicate the current flow (LEDs 0 to 9 represent the range between minimum flow and maximum flow).
- A lighting LED indicates the position of the switch point (orange = output closed, red = output open).

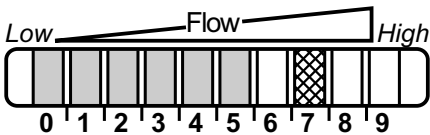
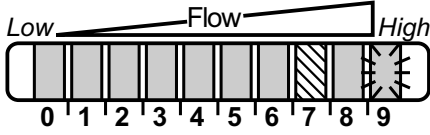
2, 3: setting buttons for adjustment and configuration

7 Set-up and settings for water

(For media other than water → 8.1: low-flow adjustment).

- ▶ Switch on the supply voltage.
- > All LEDs light and go out again step by step. During this time the output is closed (if configured as normally open). The unit is in the operating mode.
- ▶ Let the normal flow circulate in the installation.
- ▶ Check the display and determine further actions.

1		<p>The factory setting is suitable for the application.</p> <ul style="list-style-type: none"> ▶ No further settings are required.
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2		<p>Your normal flow is below the representation range of the display.</p> <p>2 setting options:</p> <ul style="list-style-type: none"> ▶ Changing the switch point (→ 7.1). ▶ Carry out high flow adjustment (→ 7.2).
3		<p>Your normal flow exceeds the representation range of the display (LED 9 flashes).</p> <ul style="list-style-type: none"> ▶ Carry out high flow adjustment (→ 7.2).

You can restore the factory setting any time. (→ 8.3).

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7.1 Change the switch point (optional)

For the factory setting the switch point is at LED 7. A change makes sense in the following cases:

- the display shows example 2.
- the flow fluctuates much or pulsates.
- A faster response time of the unit is requested (low switch point = fast response with rising flow, high switch point = fast response with falling flow).

Proceed as follows:

- ▶ Briefly press the pushbutton ◀ or ▶.
- > The switch point LED flashes.
- ▶ Press ◀ or ▶ as often as required. Each press of the pushbutton shifts the LED by one position in the indicated direction.

Note: If no pushbutton is pressed for 2 s, the unit returns to the operating mode with the newly set value.

7.2 High-flow adjustment (optional)

The unit determines the existing flow as normal flow and adapts the display representation (all LEDs except the switch point LED light green).

Proceed as follows:

- ▶ Let the normal flow circulate in the installation.
- ▶ Press the pushbutton ▶ and keep it pressed.
- > LED 9 lights, after approx. 5 s it flashes.
- ▶ Release the button.

The unit is now adapted to your flow conditions. It returns to the operating mode, the display should now show example 1.

The adjustment has failed if all LEDs are flashing red instead. Possible reasons / remedy
→ chapter 9.

Note: The adjustment affects the switch point: It is increased proportionally (maximum up to LED 7).


8 Additional settings (optional)

8.1 Low-flow adjustment

If the unit is used in media other than water, you should additionally adapt the unit to the minimum flow.

Attention: The following adjustment must only be carried out after the high-flow adjustment.

Proceed as follows:


- ▶ Let the minimum flow circulate in the installation or ensure flow standstill.
- ▶ Press the pushbutton  and keep it pressed.
- > LED 0 lights, after approx. 5 s it flashes.
- ▶ Release the button. The unit adopts the new value and returns to the operating mode.



The adjustment has failed if all LEDs are flashing red instead. Possible causes / solution (→ 9 Error during adjustment).


8.2 Configure the switching output

The unit is delivered as normally open. In case of need you can change the output to normally closed:

- ▶ Press the pushbutton  for at least 15 s.
- > LED 0 lights, after approx. 5 s it flashes.
- > After 10 s the current setting is displayed: LEDs 5...9 light orange (= output normally open).
- > After approx. 15 s LEDs 0...4 flash orange.
- ▶ Release the button. The output is changed to normally closed operation.

For a new changeover: repeat the operation.

8.3 Restore the factory setting (reset)

- ▶ Press the pushbutton  for at least 15 s.
- > LED 9 lights, after approx. 5 s it flashes.
- > After approx. 15 s LEDs 0...9 flash orange.

- ▶ Release the button. All settings are reset to the factory setting:
 - operating area: 5 ...100 cm/s for water
 - set point: LED 7
 - output function: NO
 - not locked.

8.4 Lock / unlock the unit

The unit can be locked electronically to prevent unintentional settings.

- ▶ Press both setting buttons simultaneously for 10 s in the operating mode.
- > The indication goes out, the unit locks or unlocks.

On delivery: not locked.

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9 Error during adjustment

If no adjustment is possible, all LEDs flash red. The unit then returns to the operating mode with unchanged values.

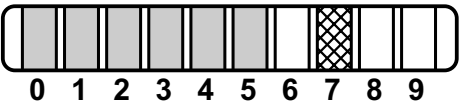
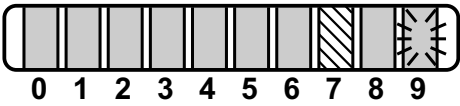
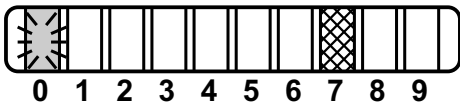
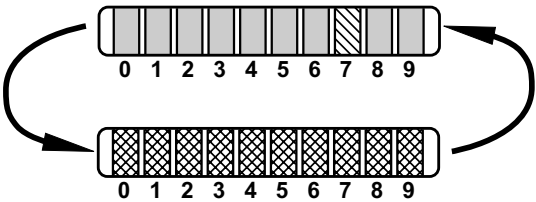
Possible cause / aid:

Error during installation.	▶ Read chapter 4 Installation. Check whether all requirements have been met.
The difference between maximum flow and minimum flow is too small.	▶ Increase the flow difference and carry out the adjustment again.
The sequence high flow /low flow adjustment was not adhered to.	▶ Carry out the two adjustment operations again in the right sequence.

10 Operation

After every power on all LEDs light and go out again step by step (during this time the output is closed if configured as normally open). Then the unit is ready for operation.

In case of power failure or interruption of the operating voltage all settings remain.

Operation indication	
	<p>Green LED bar: current flow within the display range.</p> <p>Indication of the switch point (SP):</p> <ul style="list-style-type: none"> - LED (orange: output closed. - LED red: output open.
	<p>LED 9 flashes: current flow above the display range.</p>
	<p>LED 0 flashes: current flow far below the display range.</p>
Interference indicators	
	<p>Short circuit at the switching output: The operating indicator and red LEDs flash alternately.</p> <p>If the short circuit has been rectified, the unit immediately passes into the normal operating state. The current operating state is displayed.</p>
<p>Display OFF (no LED lights):</p>	<p>Operating voltage too low (< 19 V) or failed. Ensure a correct voltage supply.</p>

11 Maintenance

Recommended maintenance:

- ▶ Check the sensor tip for build-up from time to time.
- ▶ Clean it using a soft cloth. Stubborn build-up (e.g. lime) can be removed using a common vinegar cleaning agent.