



Operating instructions  
Mechatronic flow sensor

**GB**

**SBY2xx**  
**SBG2xx**  
**SBN2xx**

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# 1 Preliminary note



You will find instructions, technical data, approvals and further information using the QR code on the unit / packaging or at [www.ifm.com](http://www.ifm.com).

## 1.1 Symbols used

- ✓ Requirement
- ▶ Instructions
- ▷ Reaction, result
- [...] Designation of keys, buttons or indications
- Cross-reference
-  Important note  
Non-compliance may result in malfunction or interference.
-  Information  
Supplementary note

## 1.2 Warnings used

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	<b>ATTENTION</b> Warning of damage to property
	<b>CAUTION</b> Warning of personal injury ▷ Slight reversible injuries may result.

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## 2 Safety instructions

- The unit described is a subcomponent for integration into a system.
  - The system architect is responsible for the safety of the system.
  - The system architect undertakes to perform a risk assessment and to create 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 architect 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 (→ Intended use).
- Only use the product for permissible media.
- 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 Intended use

The unit monitors liquid media (water, glycol solutions, industrial oils, coolants).

It detects the process categories volume flow (volumetric flow quantity/time) and medium temperature.

---

**ATTENTION**

Frost formation of the medium.

▷ The sensor may be damaged.

▶ Ensure that the medium in the sensor does not freeze during operation and transport.

---

## 4 Function

- The unit detects the flow rate according to the principle of differential pressure by means of a permanent magnet and a measuring cell.
- As additional process value the unit detects the medium temperature.
- The unit can be operated in SIO mode (standard input-output ) or in IO-Link mode.
- The unit displays the current process values.
- The unit generates two output signals according to the parameter setting.

### 4.1 Output OUT1 selection options

- Switching signal flow
- Switching signal temperature
- Frequency signal flow
- Frequency signal temperature
- IO-Link

### 4.2 Output OUT2 selection options

- Switching signal flow
- Switching signal temperature
- Analogue signal flow
- Analogue signal temperature

### 4.3 Switching output

OUTx changes its switching status if it is above or below the set switching limits. Hysteresis or window function can be selected.

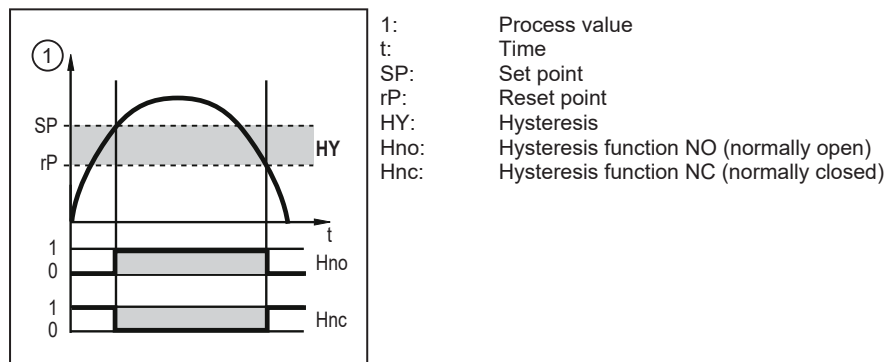



Fig. 1: Hysteresis function

 When the hysteresis function is set, the set point [SP] and the reset point [rP] are defined. The rP value must be lower than the SP value. The distance between SP and rP is at least 0.6 % of the final value of the measuring range (= hysteresis). If only the set point is changed, the reset point is changed automatically; the difference remains constant.

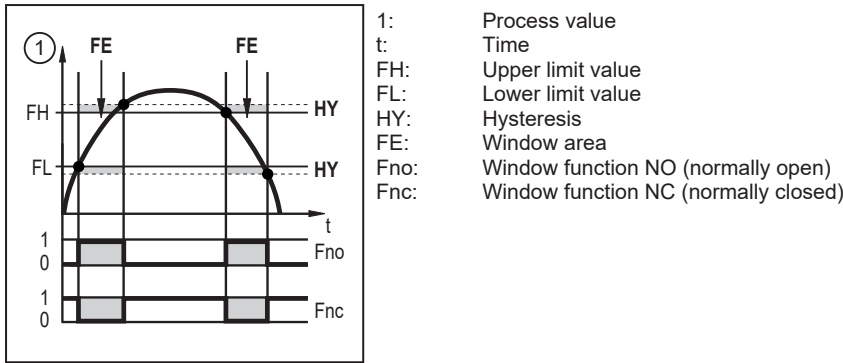



Fig. 2: Window function

 When set to the window function the upper limit value [FH] and the lower limit value [FL] are defined. The distance between FH and FL is at least 0.6 % of the final value of the measuring range. FH and FL have a fixed hysteresis of 0.25 % of the final value of the measuring range. This helps keep the switching status of the output stable if the flow rate varies slightly.

The switching signal in case of a fault can be set via the parameter [FOU].

### 4.4 Analogue output

The unit provides an analogue signal of 4...20 mA proportional to the process value.

If the measured value is outside the measuring range or in the event of an internal error, the current signal indicated in the following figure is provided.

For measured values outside the display range or in case of a fault, messages are displayed (UL, OL, Err).

The analogue signal in case of a fault can be set via the parameter [FOU].

#### 4.4.1 Volumetric flow monitoring

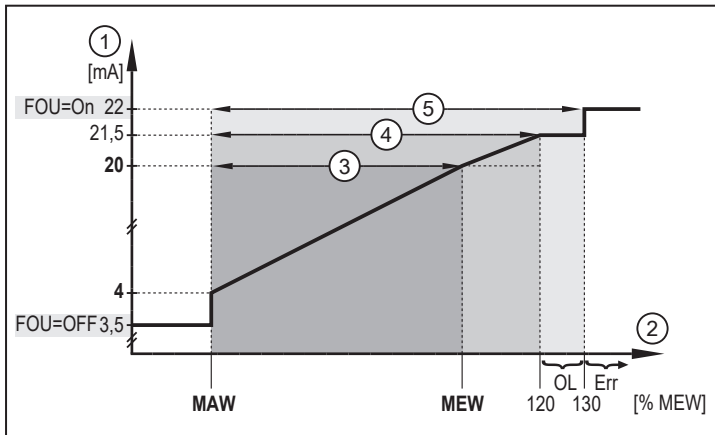


Fig. 3: Characteristics of the analogue output according to the standard IEC 60947-5-7, flow rate

- |                    |                                           |
|--------------------|-------------------------------------------|
| 1: Analogue signal | MAW: Initial value of the measuring range |
| 2: Flow            | MEW: Final value of the measuring range   |
| 3: Measuring range | OL: Above the display range               |
| 4: Display range   | Err: Error state                          |
| 5: Detection zone  |                                           |



### 4.4.2 Temperature monitoring

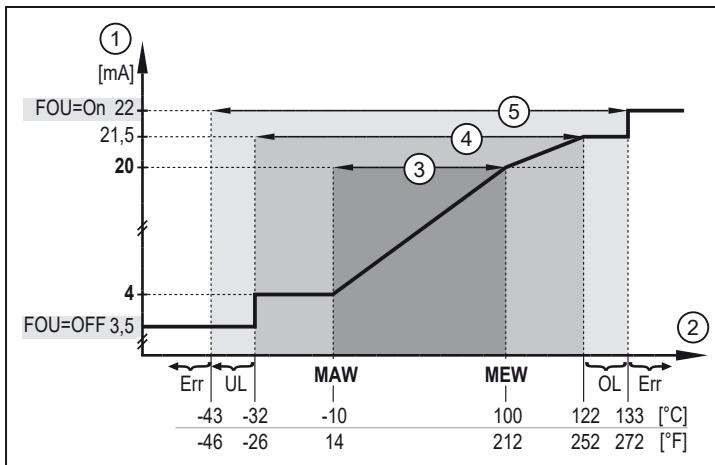


Fig. 4: Characteristics of the analogue output according to the standard IEC 6094752, temperature

- |                    |                                           |
|--------------------|-------------------------------------------|
| 1: Analogue signal | MAW: Initial value of the measuring range |
| 2: Temperature     | MEW: Final value of the measuring range   |
| 3: Measuring range | OL: Above the display range               |
| 4: Display range   | UL: Below the display range               |
| 5: Detection zone  | Err: Error state                          |

### 4.5 Frequency output

The unit provides a frequency signal proportional to the process value.

The frequency signal is scalable:

- [FrPx] defines the frequency signal in Hz that is provided when the upper measured value (MEW or FEPx) is reached.

The measuring range is scalable:

- [FSPx] defines the lower measured value from which a frequency signal is provided.
  - FSPx is only available for temperature measurement.
- [FEPx] defines the upper measured value at which the output signal has the frequency set under FrPx.



Minimum distance between FSPx and FEPx:  
 6.5 % of the final value of the measuring range (flow rate measurement).  
 20 % of the final value of the measuring range (temperature measurement).

If the measured value is outside the measuring range or in the event of an internal error, the frequency signal indicated in the following figure is provided.

For measured values outside the display range or in case of a fault, messages are displayed (UL, OL, Err).

The frequency signal in case of a fault can be set via the parameter [FOU].

### 4.5.1 Volumetric flow monitoring

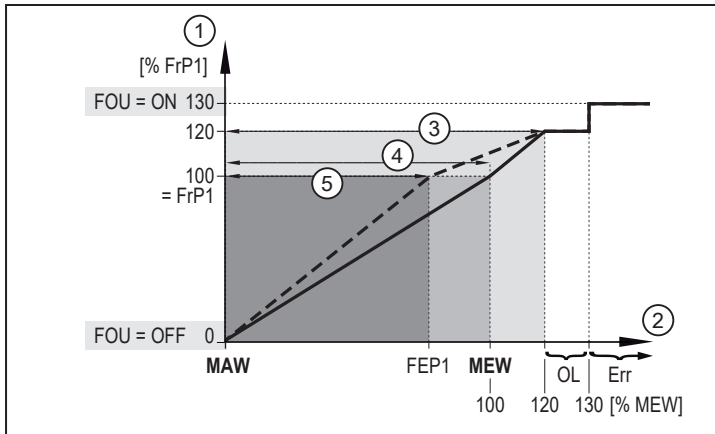


Fig. 5: Output characteristic frequency output, flow rate

- |                           |                                                      |
|---------------------------|------------------------------------------------------|
| 1: Frequency signal       | MAW: Initial value of the measuring range            |
| 2: Flow                   | MEW: Final value of the measuring range              |
| 3: Display range          | FEP1: Frequency end point                            |
| 4: Measuring range        | FRP1: Frequency signal (Hz) for upper measured value |
| 5: Scaled measuring range | OL: Above the display range                          |
|                           | Err: Error                                           |

### 4.5.2 Temperature monitoring

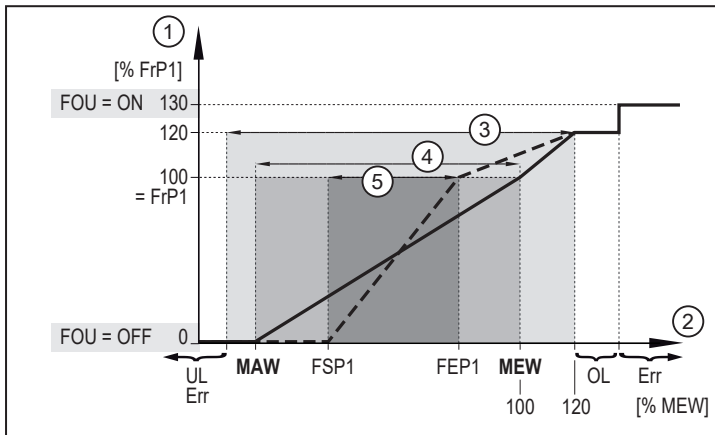


Fig. 6: Output characteristics frequency output, temperature

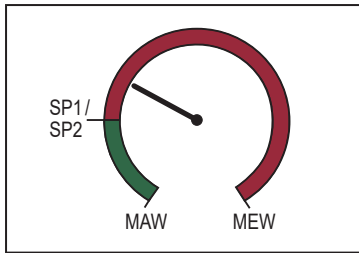
- |                           |                                                      |
|---------------------------|------------------------------------------------------|
| 1: Frequency signal       | FSP1: Frequency start point                          |
| 2: Temperature            | FEP1: Frequency end point                            |
| 3: Display range          | FRP1: Frequency signal (Hz) for upper measured value |
| 4: Measuring range        | MAW: Initial value of the measuring range            |
| 5: Scaled measuring range | MEW: Final value of the measuring range              |
| Err: Error                | OL: Above the display range                          |

## 4.6 Display colour setting

The colour of the characters in the display can be set via the parameter [coLr]. With the set parameters rED (red) and GrEn (green), the display is permanently set to one colour. If the parameters rxou and Gxou are set, the colour of the characters changes depending on the process value:

	OUT1	OUT2	Colour change to...
Parameter setting	r1ou	r2ou	Red
	G1ou	G2ou	Green

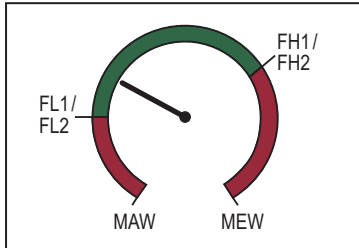
When the hysteresis function is set, the colour changes if the process value is above the set point:



MAW: Initial value of the measuring range  
 MEW: Final value of the measuring range  
 SPx: Switch point

Fig. 7: Hysteresis function, [coLr] = rxou

When the window function is set, the colour changes if the process value is within the window section:



MAW: Initial value of the measuring range  
 MEW: Final value of the measuring range  
 FLx: Lower limit of the window section  
 FHx: Upper limit of the window section

Fig. 8: Window function, [coLr] = Gxou

## 4.7 IO-Link

IO-Link is an internationally standardised IO technology (IEC 61131-9) for communicating with sensors and actuators.



General information about IO-Link can be found at [io-link.ifm](http://io-link.ifm).



IO Device Description (IODD) with all parameters and process data of the unit can be found at [documentation.ifm.com](http://documentation.ifm.com).

In the factory setting the unit is in SIO mode (standard input-output). When connected to an IO-Link master, the unit automatically switches to IO-Link mode.

IO-Link offers the following advantages:

- Noise-immune transmission of all process values.
- Parameter setting during operation or point-to-point at the desk.
- Detection of connected units.
- Freely definable parameters to identify the units in the plant.
- Additional parameter and diagnostic functions (events) compared to the SIO mode.
- Data storage: Automatic transfer of parameters when a unit is replaced.
- Logging of parameter sets, process values and events.

## 5 Mounting



### CAUTION

During installation or in case of a fault (e.g. housing damage) media under high pressure or hot media can leak from the system.

- ▷ Risk of injury caused by pressure or burns.
- ▶ Ensure that the system is free of pressure during installation.
- ▶ Ensure that no media can leak at the mounting location during installation.
- ▶ Equip the unit with suitable protection (e.g. cover) to avoid hazard to personnel from leaking media.

### 5.1 Process connection

- ▶ Avoid major changes of cross section on the inlet side.
- ▶ Fit the unit in the pipe in accordance with the flow direction (arrow) and tighten at the spanner flats.



Do not clamp the housing in a vice.

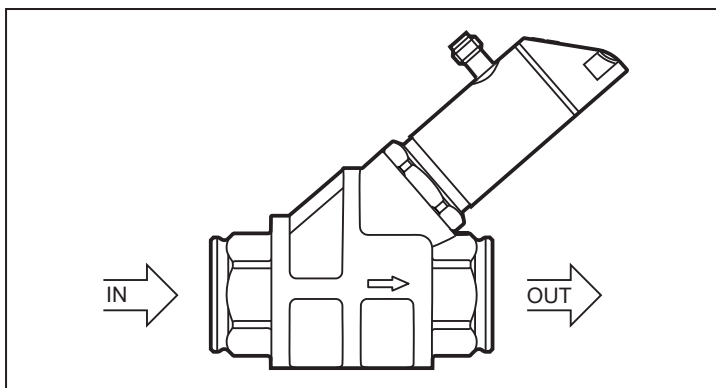


Fig. 9: Process connection

IN: inlet  
OUT: outlet



Calming sections on the sensor's inlet or outlet side are not necessary.



The sensor can also prevent backflow.



The sensor head can be rotated by 360°.

### 5.2 Interference

- ▶ The following minimum distances must be adhered to:

Distance between the sensor and ferromagnetic materials	≥ 30 mm *
Distance between the sensor and constant / alternating fields	≥ 500 mm
Distance between the sensor axes for side-by-side installation	≥ 50 mm

\* The pipe may consist of ferromagnetic material.

### 5.3 Mounting accessories

- ▶ If necessary, fasten the unit on the mounting plate (not supplied) from underneath.

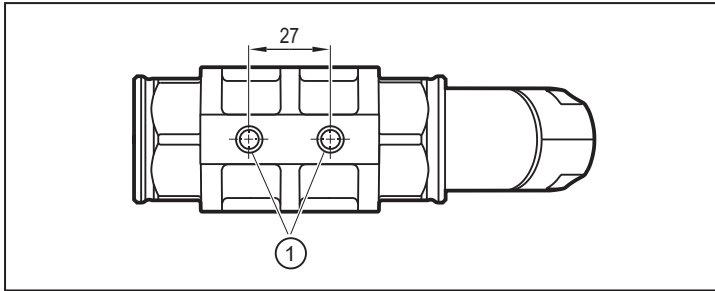


Fig. 10: Installation with mounting plate

1: threaded hole M8 (depth 6 mm) on the bottom side of the unit



Information about available accessories at [www.ifm.com](http://www.ifm.com)

### 5.4 Installation in case of medium containing dirt

- ▶ Use a 200-micron filter in front of the inlet (IN).
- ▶ Install sensor horizontally.
- ▶ Adhere to the inclination angle to the horizontal axis:

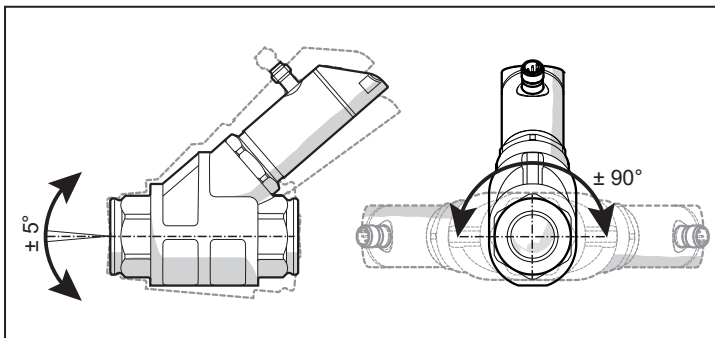


Fig. 11: Alignment in case of medium containing dirt



In clean medium, installation in vertical pipes is also possible.



Information about available filters at [www.ifm.com](http://www.ifm.com).

## 6 Electrical connection



The device must be connected by a qualified electrician.

Observe the national and international regulations for the installation of electrical equipment.

Voltage supply according to EN 50178, SELV, PELV.

► Disconnect power.

► Connect the unit as follows:

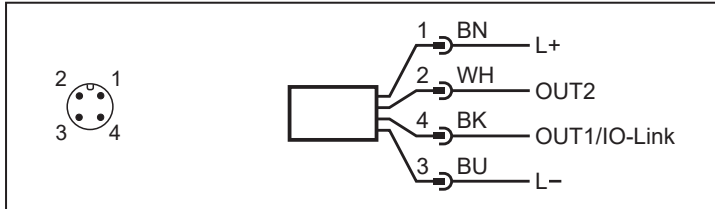


Fig. 12: Wiring diagram (colours to DIN EN 60947-5-2)

BK: black  
BU: blue

BN: brown  
WH: white

Pin	Assignment
1	L+
3	L-
4 (OUT1)	<ul style="list-style-type: none"> <li>Switching signal flow</li> <li>Switching signal temperature</li> <li>Frequency signal flow</li> <li>Frequency signal temperature</li> <li>IO-Link</li> </ul>
2 (OUT2)	<ul style="list-style-type: none"> <li>Switching signal flow</li> <li>Switching signal temperature</li> <li>Analogue signal flow</li> <li>Analogue signal temperature</li> </ul>

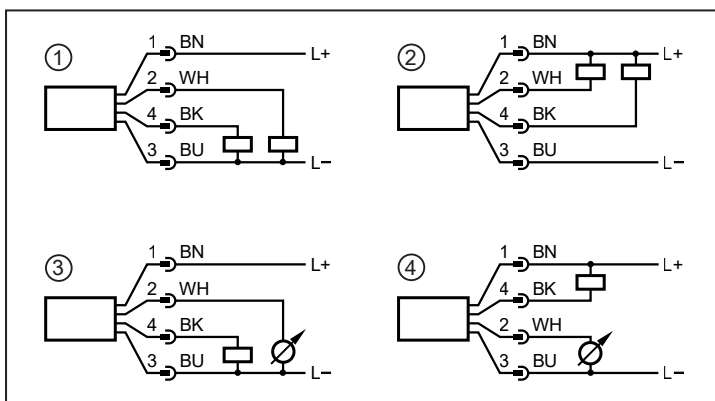
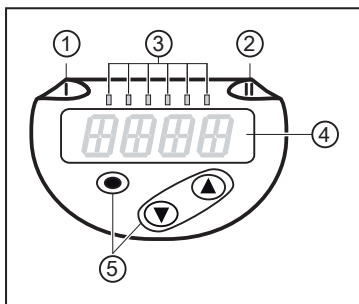


Fig. 13: Circuit examples

- 1: 2 x positive switching
- 2: 2 x negative switching
- 3: 1 x positive switching / 1 x analogue
- 4: 1 x negative switching / 1 x analogue

## 7 Operating and display elements



- 1: Switching status LED for OUT1
- 2: Switching status LED for OUT2
- 3: Process value in the indicated unit of measurement \*
- 4: 4-digit alphanumeric display
- 5: Keys for changing views and parameter setting

Fig. 14: Operating and display elements

\* l/min; m<sup>3</sup>/h; SBN2xx: gpm; gph

## 8 Menu

The figures in which the menus are displayed show the parameters that can be set on the unit by key input. These parameters and other functions are also available via the IO-Link interface.

### 8.1 Menu overview

Use the operating keys to navigate from the process value display to the main menu and from there to the submenus.

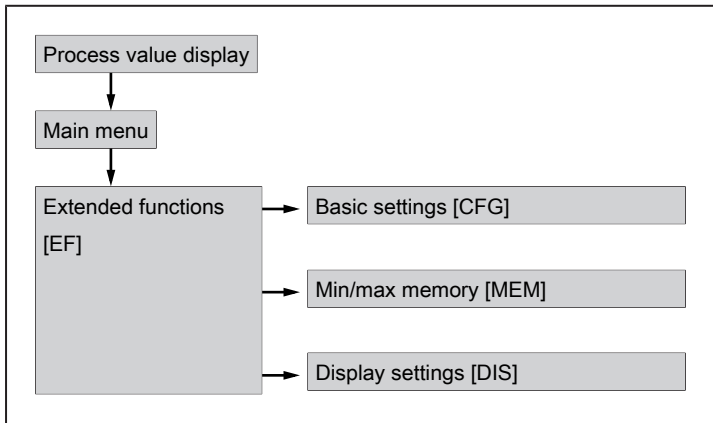


Fig. 15: Menu overview

### 8.2 Main menu and submenus



The displayed parameters change when the factory setting is changed. The following menu displays show the maximum available parameters.

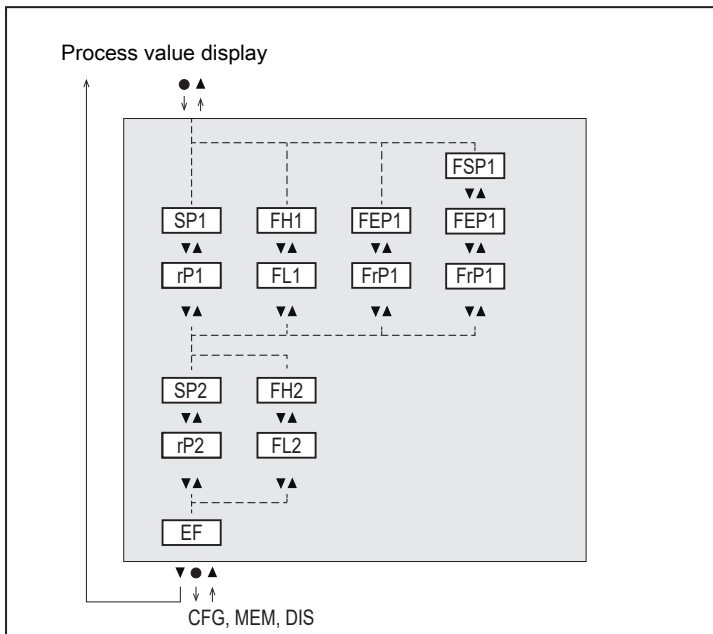


Fig. 16: Main menu



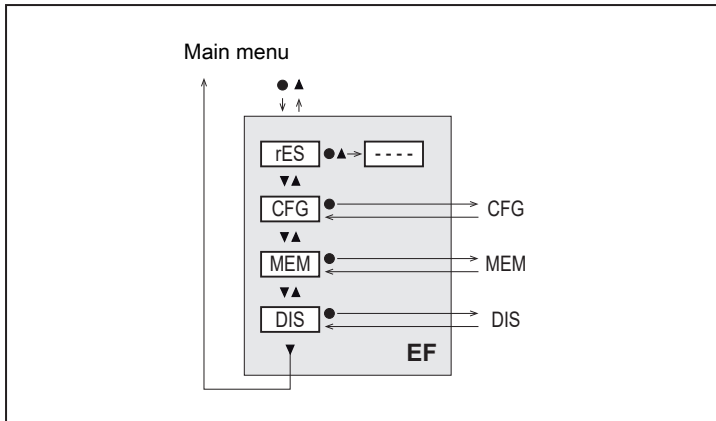


Fig. 17: Extended functions [EF] menu

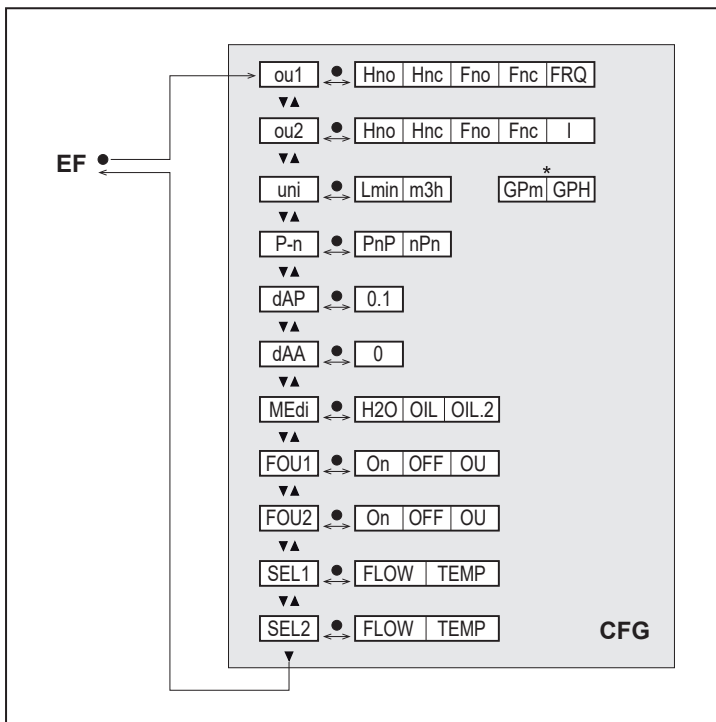


Fig. 18: Basic settings [CFG] menu

\* For SBN2xx units

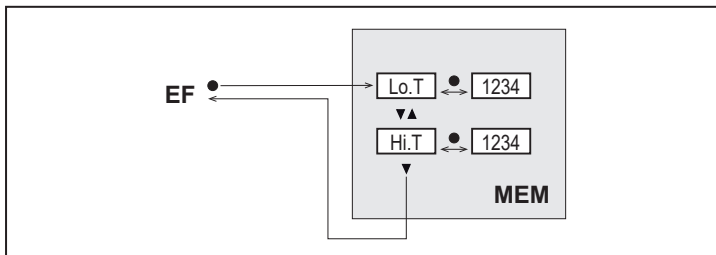


Fig. 19: Min/max memory [MEM] menu

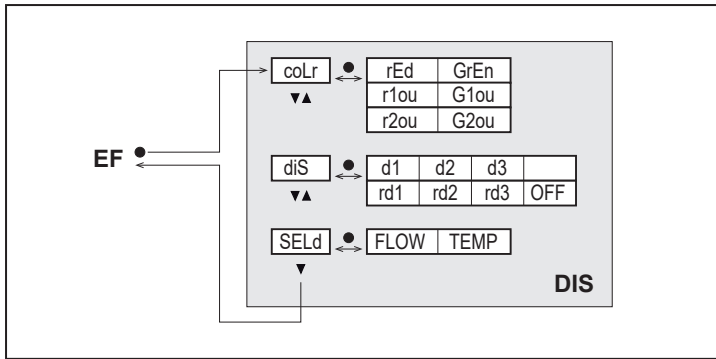


Fig. 20: Display settings [DIS] menu

## 9 Set-up

After power on and expiry of the power-on delay time, the unit is in the normal operating mode. It carries out its measurement and evaluation functions and generates output signals according to the set parameters.

During the power-on delay time the outputs are switched as programmed:

- OFF with normally open function (Hno / Fno)
- OFF with normally closed function (Hnc / Fnc)
- OFF for frequency output (FRQ)
- 0 mA for current output (I)



When an IO-Link master is connected, the unit automatically switches from SIO mode (standard input-output) to IO-Link mode.

## 10 Parameter setting

The parameters can be set via the IO-Link interface or via the keys on the unit.

Parameters can be set before installation or during operation.



If you change parameters during operation, this will influence the function of the plant.

- ▶ Ensure that there will be no malfunctions in your plant.

During parameter setting the unit remains in the operating mode. It continues to monitor with the existing parameter until the parameter setting has been completed.

### 10.1 Parameter setting via IO-Link

For parameter setting via the IO-Link interface, you need suitable parameter setting software and the IO Device Description (IODD) for the unit.

- IODD, parameter setting software and information on IO-Link at [io-link.ifm](http://io-link.ifm.com).
- Notes on parameter setting → Manual of the parameter setting software.
- List of all available parameters in the PDF "IO-Link interface description" at [documentation.ifm.com](http://documentation.ifm.com).

Via IO-Link, all parameters can be set that are also accessible via the keys on the unit. In addition, the functions described below are available.

#### 10.1.1 Identification



Information about the unit is provided via the IODD. In addition, customer-specific descriptions for identification can be assigned to the unit via IO-Link.

##### 10.1.1.1 Application Specific Tag

- Customer-specific application description.
- Maximum length 32 characters and freely definable.

#### 10.1.2 Parameters




The unit is configured via the parameters. The parameters described below are only available via the IO-Link interface.

##### 10.1.2.1 Access locks to the units: Local parameter setting

- [Open]: The unit can be adjusted using the keys on the unit.
- [Blocked]: The keys on the unit are locked so that settings on the unit and unlocking can only be made via IO-Link.

## 10.2 Parameter setting via the unit keys




**CAUTION**

If the medium temperature is above 50 °C (122 °F), parts of the housing can increase in temperature to over 65 °C (149 °F).


- ▷ Risk of burns
- ▶ Do not touch the device with your hands.
- ▶ Use another object (e.g. a ballpoint pen) to carry out settings on the unit.

### 10.2.1 Parameter setting in general

Intention	Action
Change from the process value display to the main menu	[●]
Change to the submenu	Use [▼] to navigate to the submenu (e.g. EF), then [●]
Select the requested parameter	[▲] or [▼]
Change to the setting mode	[●]
Modification of the parameter value	[▲] or [▼] > 1 s
Apply the set parameter	[●]
Exit parameter setting without saving	[▲] and [▼]
Return to the next higher menu level (repeat several times to reach process value display)	[▲] and [▼]
Return to the process value display	> 30 seconds (timeout)

 The unit keys can only be locked via the IO-Link interface. Unlocking is then only possible via IO-Link.

### 10.2.2 Presets

 Before setting the parameters, first check the following default settings and change them if necessary:


- [SEL1]: Process value for OUT1
- [SEL2]: Process value for OUT2
- [uni]: Standard unit of measurement for flow

#### 10.2.2.1 Process value for OUTx

- ▶ Select the CFG menu.
- ▶ Select [SELx] and set the process value for output x:
  - FLOW: Flow
  - TEMP: Temperature

#### 10.2.2.2 Standard unit of measurement

- ▶ Select the CFG menu.
- ▶ Select [uni] and set the unit of measurement for the flow: l/min, m<sup>3</sup>/h (SBN2xx: gpm, gph).

 The selectable units depend on the respective device.

## 10.2.3 Setting the output functions



The parameters for flow monitoring and temperature monitoring are set in the same way. The prerequisite is that the process value for OUTx has first been defined via [SELx].

### 10.2.3.1 Limit monitoring OUTx / hysteresis function

- ▶ Select the CFG menu.
- ▶ Select [oux] and set the switching signal:
  - Hno: hysteresis function / normally open
  - Hnc: hysteresis function / normally closed
- ▶ Select the main menu.
- ▶ Select [SPx] and set the measured value at which the output switches.
- ▶ Select [rPx] and set the measured value at which the output switches off.

### 10.2.3.2 Limit monitoring OUTx / window function

- ▶ Select the CFG menu.
- ▶ Select [oux] and set the switching signal:
  - Fno: window function / normally open
  - Fnc: window function / normally closed
- ▶ Select the main menu.
- ▶ Select [FHx] and set the upper limit of the window section.
- ▶ Select [FLx] and set the lower limit of the window section.

### 10.2.3.3 Frequency signal OUT1

- ▶ Select the CFG menu.
- ▶ Select [ou1] and set FRQ.
- ▶ Select the main menu.
- ▶ Select [FSP1] and set the lower temperature value at which 0 Hz is provided.



FSP1 is only available for temperature measurement.

- ▶ Select [FEP1] and set the upper measured value at which the maximum frequency is provided.
- ▶ Select [FrP1] and set the maximum frequency in Hz.

### 10.2.3.4 Analogue signal OUT2

- ▶ Select the CFG menu.
- ▶ Select [ou2] and set the function:
  - l: flow-proportional current signal 4...20 mA.

## 10.2.4 User settings (optional)

### 10.2.4.1 Standard display

- ▶ Select the DIS menu.
- ▶ Select [SEld] and set the standard unit of measurement:
  - FLOW: The display shows the current process value for flow rate.
  - TEMP: The display shows the current process value for temperature.

- ▶ Select [diS] and set the update rate and orientation of the display:
  - d1, d2, d3: update of the measured values every 50, 200, 600 ms.
  - rd1, rd2, rd3: display as with d1, d2, d3; rotated by 180°.
  - OFF: The process value display is deactivated in the RUN mode.



The LEDs remain active even if the display is deactivated. Error messages are displayed even if the display is deactivated.

#### 10.2.4.2 Display colour setting

- ▶ Select the DIS menu.
- ▶ Select [coLr] and define the colour of the characters in the process value display:
  - rEd: red
  - GrEn: green
  - rxou: colour change from green to red
  - Gxou: colour change from red to green

#### 10.2.4.3 Medium

- ▶ Select the CFG menu.
- ▶ Select [MEdi] and set the medium:
  - H2O: Water
  - OIL: → Technical data sheet at [documentation.ifm.com](https://documentation.ifm.com)
  - OIL2: → Technical data sheet at [documentation.ifm.com](https://documentation.ifm.com)

#### 10.2.4.4 Output logic

- ▶ Select the CFG menu.
- ▶ Select [P-n] and set PnP or nPn.

#### 10.2.4.5 Measured value damping for switching output

- ▶ Select the CFG menu.
- ▶ Select [dAP] and set the damping constant in seconds ( $\tau$  value 63 %).

#### 10.2.4.6 Measured value damping for analogue output

- ▶ Select the CFG menu.
- ▶ Select [dAA] and set the damping constant in seconds ( $\tau$  value 63 %).

#### 10.2.4.7 Error behaviour of the outputs

- ▶ Select the CFG menu.
- ▶ Select [FOUx] and set the error behaviour for OUTx:
  - Switching output
    - On: Output switches ON in case of a fault.
    - OFF: Output switches OFF in case of a fault.
    - OU: Output switches irrespective of the error as defined with the parameters.
  - Analogue output
    - On: The analogue signal goes to 22 mA.
    - OFF: The analogue signal goes to 3.5 mA.

- OU: The analogue signal still corresponds to the measured value.
- Frequency output
  - On: The frequency signal goes to 130 % of FrPx.
  - OFF: The frequency signal goes to 0 Hz.
  - OU: The frequency signal still corresponds to the measured value.

#### 10.2.4.8 Lock / unlock

The unit can be locked electronically to prevent unintentional settings. Factory setting: not locked.

##### Locking:

- ▶ Make sure that the unit is in the normal operating mode.
- ▶ Press [▲] and [▼] simultaneously for 10 s until [Loc] displayed.

##### Unlocking:

- ▶ Make sure that the unit is in the normal operating mode.
- ▶ Press [▲] and [▼] simultaneously for 10 s until [uLoc] is displayed.

#### 10.2.4.9 Factory reset

- ▶ Select the EF menu.
- ▶ Select [rES].
- ▶ Briefly press [●].
- ▶ Keep [▼] or [▲] pressed.
  - ▷ [----] is displayed.
- ▶ Briefly press [●].
- ▷ The unit carries out a reboot.



We recommend documenting your own settings in the chapter Factory setting before carrying out a reset.

### 10.2.5 Diagnostic functions

#### 10.2.5.1 Reading minimum values / maximum values

- ▶ Select the MEM menu.
- ▶ Select [Lo.T] or [Hi.T] to display the highest or lowest process value measured:
  - Lo.T = Minimum temperature value
  - Hi.T = Maximum temperature value

Delete memory:

- ▶ Select [Lo.T] or [Hi.T].
- ▶ Briefly press [●].
- ▶ Keep [▲] and [▼] pressed.
  - ▷ [----] is displayed.
- ▶ Briefly press [●].



It makes sense to delete the memories as soon as the unit operates under normal operating conditions for the first time.



## 11 Operation

### 11.1 Process value display

It is possible to switch between different process value indications during operation:

- ▶ Press [▲] or [▼].
- ▷ The display changes between the standard indication with set standard unit of measurement and other views.
- ▷ After 30 s, the unit returns to the standard display.

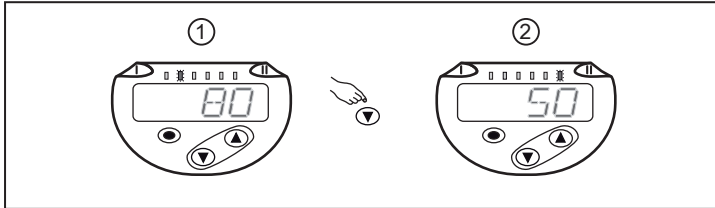


Fig. 21: Process value display

- 1: Standard display as set under [SELd] and [uni].  
Example: [SELd] = FLOW and [uni] = m<sup>3</sup>/h
- 2: Further view. The LED indicates in which unit the current process value is displayed.  
Example: temperature in °C.

### 11.2 Reading the parameter setting

- ▶ Briefly press [●].
- ▶ Press [▼] to select the parameter.
- ▶ Briefly press [●].
- ▷ The currently set value is displayed for 30 s. Then the unit returns to the process value display.

## 12 Troubleshooting

The unit has many self-diagnostic options. It monitors itself automatically during operation.

Warnings and error states are displayed even if the display is switched off. Error indications are also available via IO-Link.

The status signals are classified according to NAMUR recommendation NE107.

If several diagnostic events occur simultaneously, only the diagnostic message of the event with the highest priority is displayed.

If the measured temperature value fails, the process value for flow rate is still available.



Additional diagnostic functions are available via IO-Link → IO-Link interface description at [documentation.ifm.com](http://documentation.ifm.com).

### 12.1 Error messages

Display	Problem/remedy
Err	Unit faulty / malfunction ▶ Replace the unit.
None Display	<ul style="list-style-type: none"> <li>• Supply voltage too low ▶ Check the supply voltage.</li> <li>• Display switched off ▶ Check whether setting diS = OFF and change setting if necessary.</li> </ul>
Loc	Setting keys on the unit locked, parameter change rejected. ▶ Unlock the unit using the unit keys.
C.Loc	Setting buttons on the unit temporarily locked, parameter setting via IO-Link communication active. ▶ Finish parameter setting via IO-Link communication.
S.Loc	Setting keys locked via parameter setting software, parameter change rejected. ▶ Unlock the unit via IO-Link interface using the parameter setting software.
UL	<ul style="list-style-type: none"> <li>• Value below the minimum value of the temperature display range: temperature value between -32...-43 °C (-26...-46 °F). ▶ Check the temperature range.</li> </ul>
OL	<ul style="list-style-type: none"> <li>• Temperature display range exceeded: temperature value between 122...133 °C (252...272 °F). ▶ Check the temperature range.</li> <li>• Flow display range exceeded: flow rate between 120...130 % of the final value of the measuring range. ▶ Adjust the flow range.</li> </ul>
SC1	Switching status LED for OUT1 flashing: short circuit OUT1. ▶ Check switching output OU1 for short circuit or excessive current.
SC2	Switching status LED for OUT2 flashing: short circuit OUT2. ▶ Check switching output OUT2 for short circuit or excessive current.
SC	Switching status LEDs for OUT1 and OUT2 flashing: short circuit OUT1 and OUT2. ▶ Check switching outputs OUT1 and OUT2 for short-circuit or excessive current.

## 13 Maintenance, repair and disposal

The operation of the unit is maintenance-free.

Only the manufacturer is allowed to repair the unit.

- ▶ After use dispose of the device in an environmentally friendly way in accordance with the applicable national regulations.

**GB**

### 13.1 Cleaning the device

If measurement errors occur because of an insufficient filtration cleaning may be required:

- ▶ Unscrew sensor head.
- ▶ Remove float and spring.
- ▶ Clean the inside of the float, spring and housing, e.g. by means of compressed air.
- ▶ Before re-assembly check O-ring for damage. If necessary, replace and grease.
- ▶ After cleaning install components again.
- ▶ Tighten sensor head with a tightening torque of 20 Nm.
- ▶ To restore the measurement accuracy, press the float until you feel a mechanical stop using something non-magnetic, e.g. a finger and hold for at least 2 seconds.

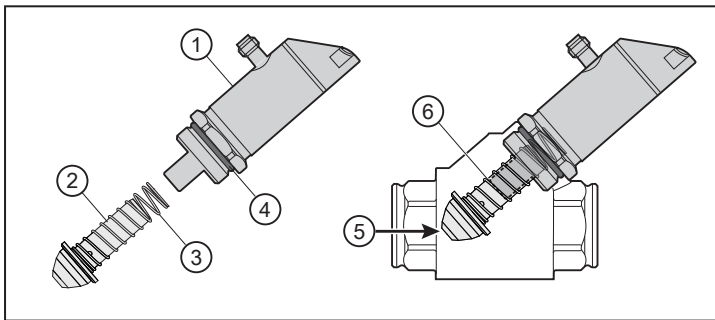


Fig. 22: Cleaning the sensor

1: sensor head  
3: spring  
5: non-magnetic tool

2: float  
4: O-ring  
6: mechanical stop

## 14 Factory settings

Parameter	Factory setting	User setting
SP1 / FH1 (FLOW)	20 %	
rP1 / FL1 (FLOW)	19 %	
SP1 / FH1 (TEMP)	12 °C (54 °F)	
rP1 / FL1 (TEMP)	11 °C (52 °F)	
FrP1 (FLOW)	10 %	
FrP1 (TEMP)	10 %	
FSP1 (TEMP)	-10 °C (14 °F)	
FEP1 (TEMP)	100 °C (212 °F)	
FEP1 (FLOW)	100 %	
SP2 / FH2 (FLOW)	40 %	
rP2 / FL2 (FLOW)	39 %	
SP2 / FH2 (TEMP)	34 °C (94 °F)	
rP2 / FL2 (TEMP)	33 °C (92 °F)	
ou1	Hno	
ou2	l	
uni	l/min (gal/min)	
P-n	PnP	
dAP (FLOW)	0.1	
dAA (FLOW)	0	
Medl	H2O	
FOU1	ou	
FOU2	ou	
SEL1	FLOW	
SEL2	FLOW	
coLr	rEd	
diS	d2	
SELd	FLOW	