GB

Operating instructions
Vortex flow meter
SVxxx0

11654936 / 00 10 / 2024

Contents

1 Preliminary note

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

Warnings indicate the possibility of personal injury and damage to property. This enables safe product handling. Warnings are graded as follows:

WARNING

Warning of serious personal injury

▷ If the warning is not observed, fatal and serious injuries are possible.

CAUTION

Warning of minor to moderate personal injury

▷ If the warning is not observed, minor to moderate injuries are possible.

ATTENTION

Warning of damage to property

▷ If the warning is not observed, damage to property is possible.

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.
- Store the product in its original packaging.

2.1 Cybersecurity

Installation

The device is suitable for operation in a secure environment according to IEC 62443-1-1.

The device was designed for operation behind a firewall.

▶ Carry out a risk assessment of the system according to IEC 62443-1-1.

▶ Take measures to ensure physical security.

Operation

▶ Observe the security functions described in the product documentation and the recommendations for their use.

Maintenance

▶ Back up system configuration and system data in accordance with your company’s change management processes.

Decommissioning

▶ Ensure that no sensitive information can fall into unauthorised hands.

▶ Always reset the system settings to the factory settings before decommissioning the device.

3 Intended use

The unit monitors liquid media.

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

3.1 Application area

- Water
- Non-conductive water
- Cooling water

Pressure Equipment Directive (PED):
The units comply with the Pressure Equipment Directive and are designed for stable gases of fluid group 2 and manufactured in accordance with the sound engineering practice.
Use of media from group 1 fluids on request.

4 Function

- The device detects flow based on the Vortex measuring principle.
- As additional process value the unit detects the medium temperature.
- The unit displays the current process values.
- The unit can be operated in SIO mode (standard input-output) or in IO-Link mode.
- The unit generates two output signals according to the parameter setting.

4.1 Options for output OUT1

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

4.2 Output OUT2 selection options

- Switching signal flow
- Switching signal temperature
- Frequency signal flow
- Frequency signal temperature

4.3 IO-Link

IO-Link is a communication system for connecting intelligent sensors and actuators to automation systems. IO-Link is standardised in the IEC 61131-9 standard.

General information on IO-Link at io-link.ifm

Input Output Device Description (IODD) with all parameters, process data and detailed descriptions of the device at documentation.ifm.com

IO-Link offers the following advantages:

- Interference-free transmission of all data and process values
- Parameter setting in the running process or presetting outside the application
- Parameters for identifying the connected devices in the system
- Additional parameters and diagnostic functions
- Automatic backup and restore of parameter sets in case of device replacement (data storage)
- Logging of parameter sets, process values and events
- Device description file (IODD - Input Output Device Description) for easy project planning
- Standardised electrical connection
- Remote maintenance

5 Installation

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.

▶ Protect the housing against contact with flammable substances and unintentional contact.

▶ Ensure that the system is free of pressure during installation.

▶ Ensure that no media can leak at the mounting location during installation.

▶ Fit the device in the pipe in accordance with the flow direction (arrow on the device).

Recommended tightening torque: 30 Nm.

▶ Avoid deposits, accumulated gas and air in the pipe system.

▶ Install the unit so that the measuring pipe is always completely filled.

▶ Install in front of or in a rising pipe.

▶ For direct installation, fix the device on the housing bottom using 4 M4 DIN 7985 lens screws. Maximum housing insertion depth: 5.5 mm.

▶ Mount the device in a way that no mechanical forces are exerted on the pipe. To do so, use angle brackets if required.

Information about available accessories at www.ifm.com

5.1 Interference

Structures in the pipe, bends, valves, reducing pieces and the like affect the function of the unit.

▶ Adhere to the distances between sensor and interference.

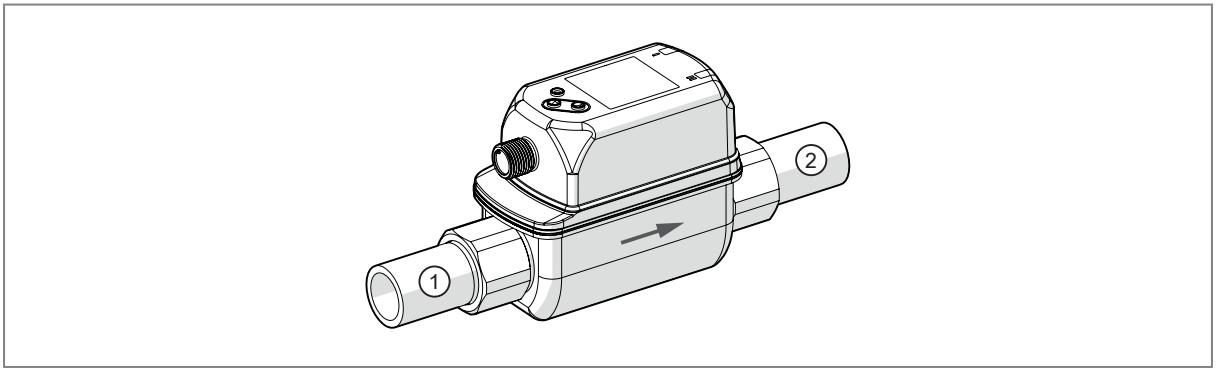
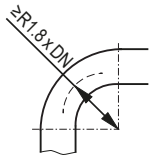


Fig. 1: Inlet pipe length (1) and outlet pipe length (2), direction of flow (arrow)

Disturbance	Inlet pipe length (1)	Outlet pipe length (2)
Non-ideal bend	≥ 5 x DN	≥ 1 x DN
Ideal bend 	≥ 0.5 x DN	
Multiple bends (2 x 90°)	≥ 15 x DN	

Disturbance	Inlet pipe length (1)	Outlet pipe length (2)
Reduction of the internal pipe diameter	≥ 15 x DN	≥ 15 x DN
Valve or pump	≥ 25 x DN	

Tab. 1: Distances for inlet and outlet pipe lengths; DN = nominal width of the pipe, R = radius

5.2 Non recommended installation position

- Directly in front of a falling pipe.
- In a falling pipe.
- Directly in front of the spout of a pipe.
- Directly in front of a valve.
- On the suction side of a pump.
- At the highest point of the pipe system.

6 Electrical connection

The unit must be connected by a qualified electrician.

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

Voltage supply according to SELV, PELV.

▶ Disconnect power.

▶ Connect the unit as follows:

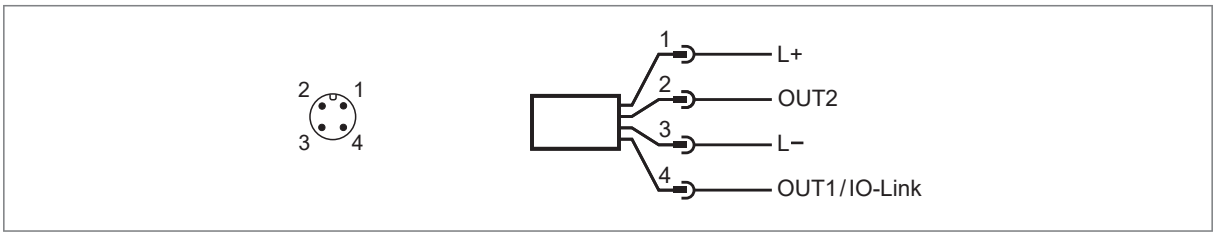


Fig. 2: Wiring diagram

Pin	Assignment
1	L+
3	L-
4 (OUT1)	• Switching signal flow • Frequency signal flow • IO-Link
2 (OUT2/InD)	• Switching signal flow • Switching signal temperature • Frequency signal flow • Frequency signal temperature

Circuit examples:

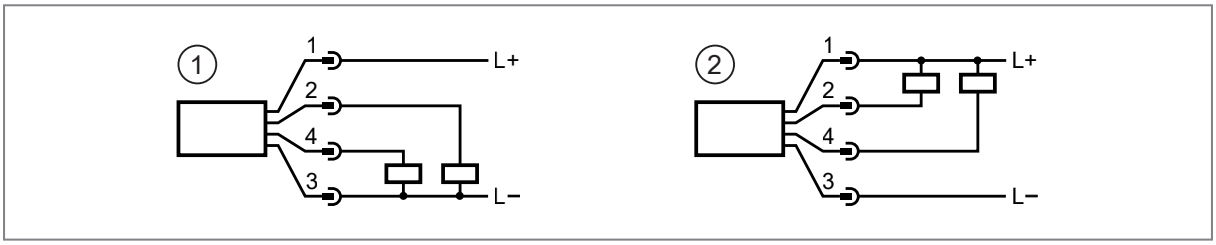


Fig. 3: Output polarity setting via the parameter [P-n]

1: 2 x positive switching
2: 2 x negative switching

7 Operating and display elements

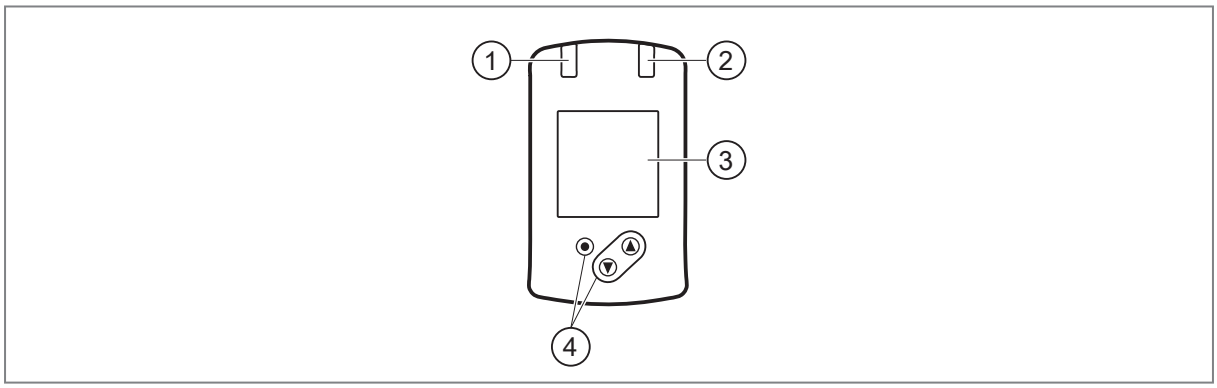


Fig. 4: Operating and display elements

1: Switching status LED for OUT1
2: Switching status LED for OUT2
3: TFT display
4: Keys for changing the displays and parameter setting

Switching between display screens:

The device keys can be used to switch between two process value displays during operation:

▶ Press [▲] or [▼] until the required display appears.

▷ The display switches between the views.

▷ After 30 s, the device returns to the standard display.

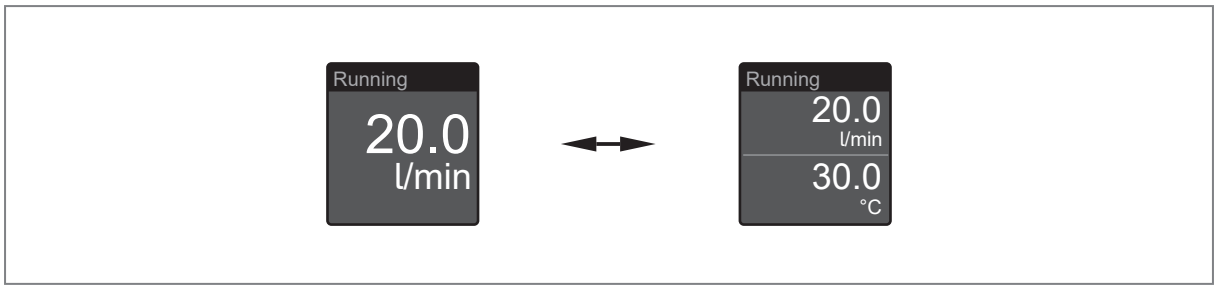


Fig. 5: Process value display: Standard display as set under [diS.L] and [uni] or other view.

Reading the parameter setting:

▶ Briefly press [●].

▶ Press [▼] to select the parameter.

▶ Briefly press [●].

▷ Currently set value, explanations and possible setting ranges are displayed for 30 s. Then the device returns to the process value display.

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.

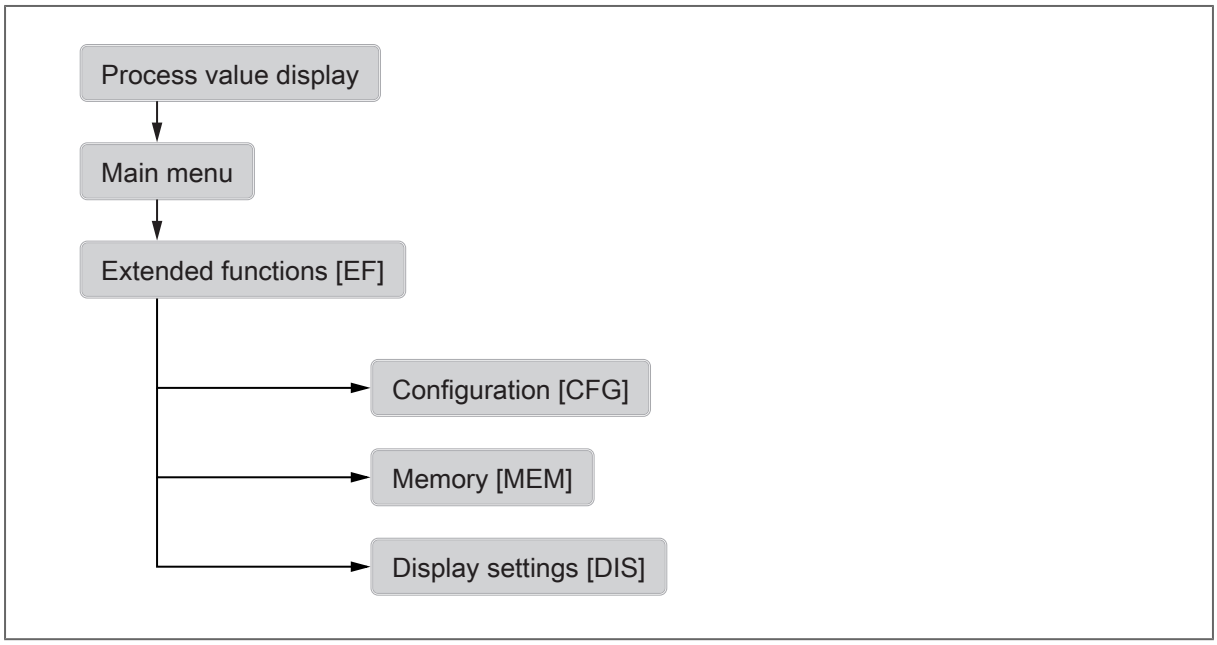
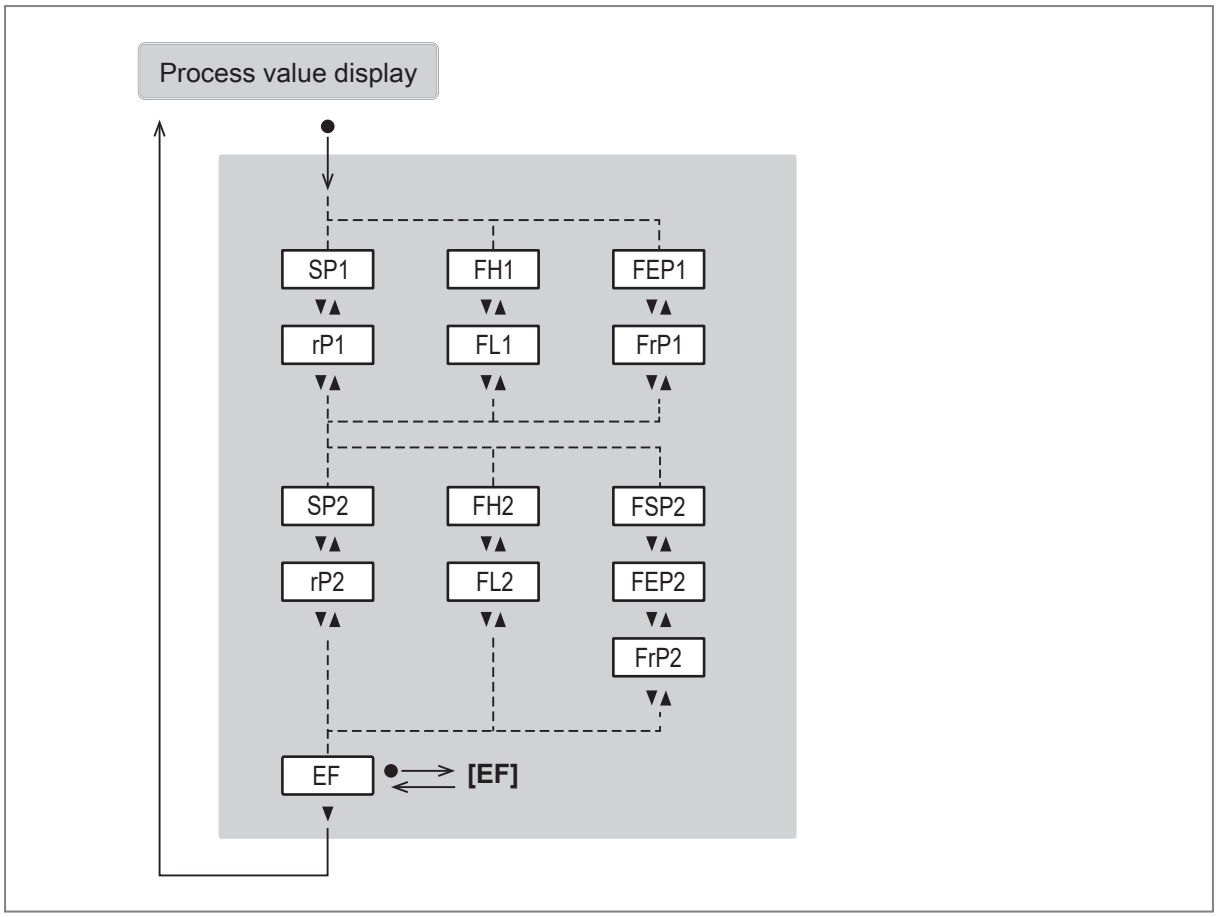


Fig. 6: menu overview

8.1 Main menu and submenus

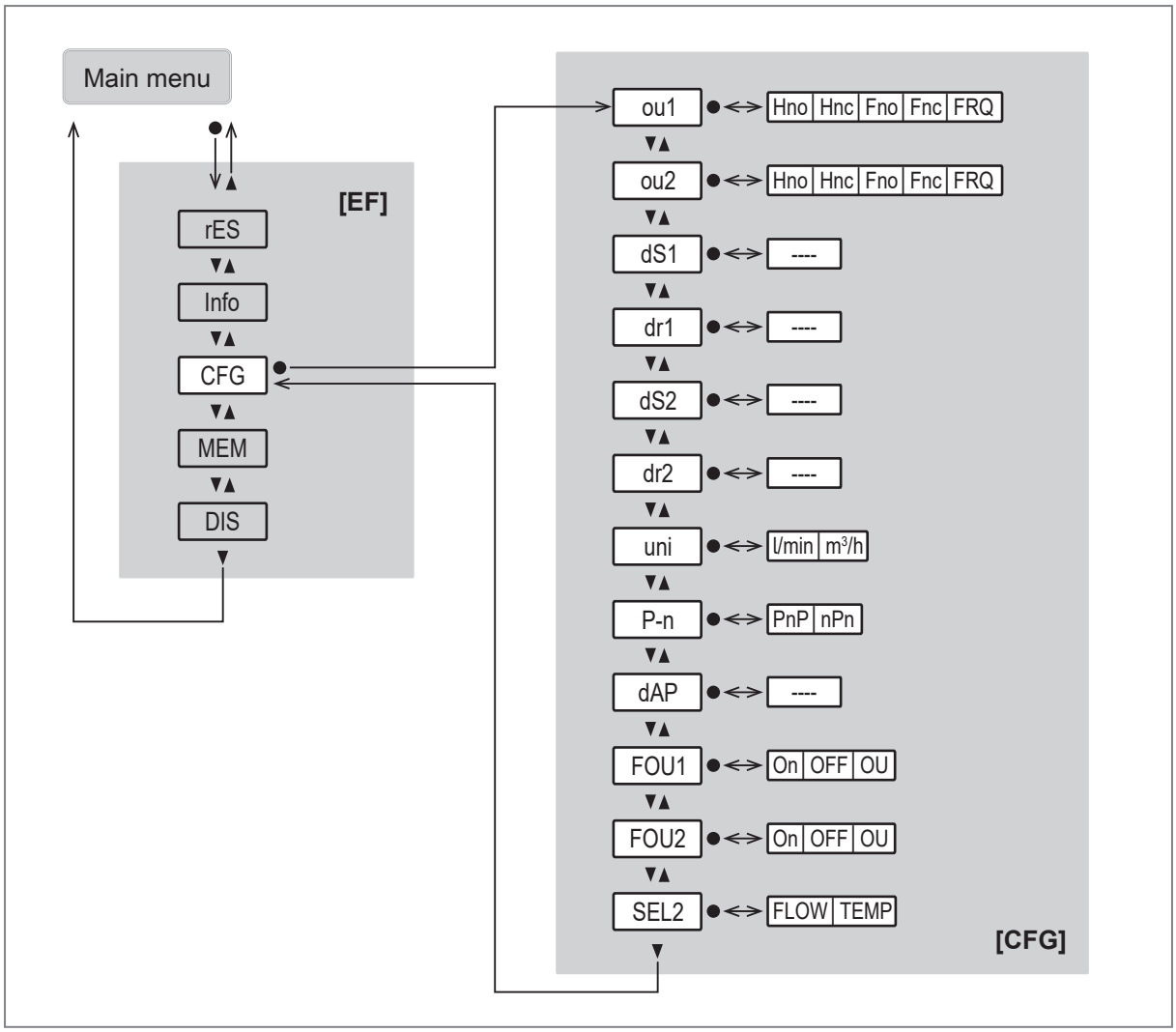
The displayed parameters change when the factory setting is changed. The following menu displays show the maximum available parameters.

Main menu:



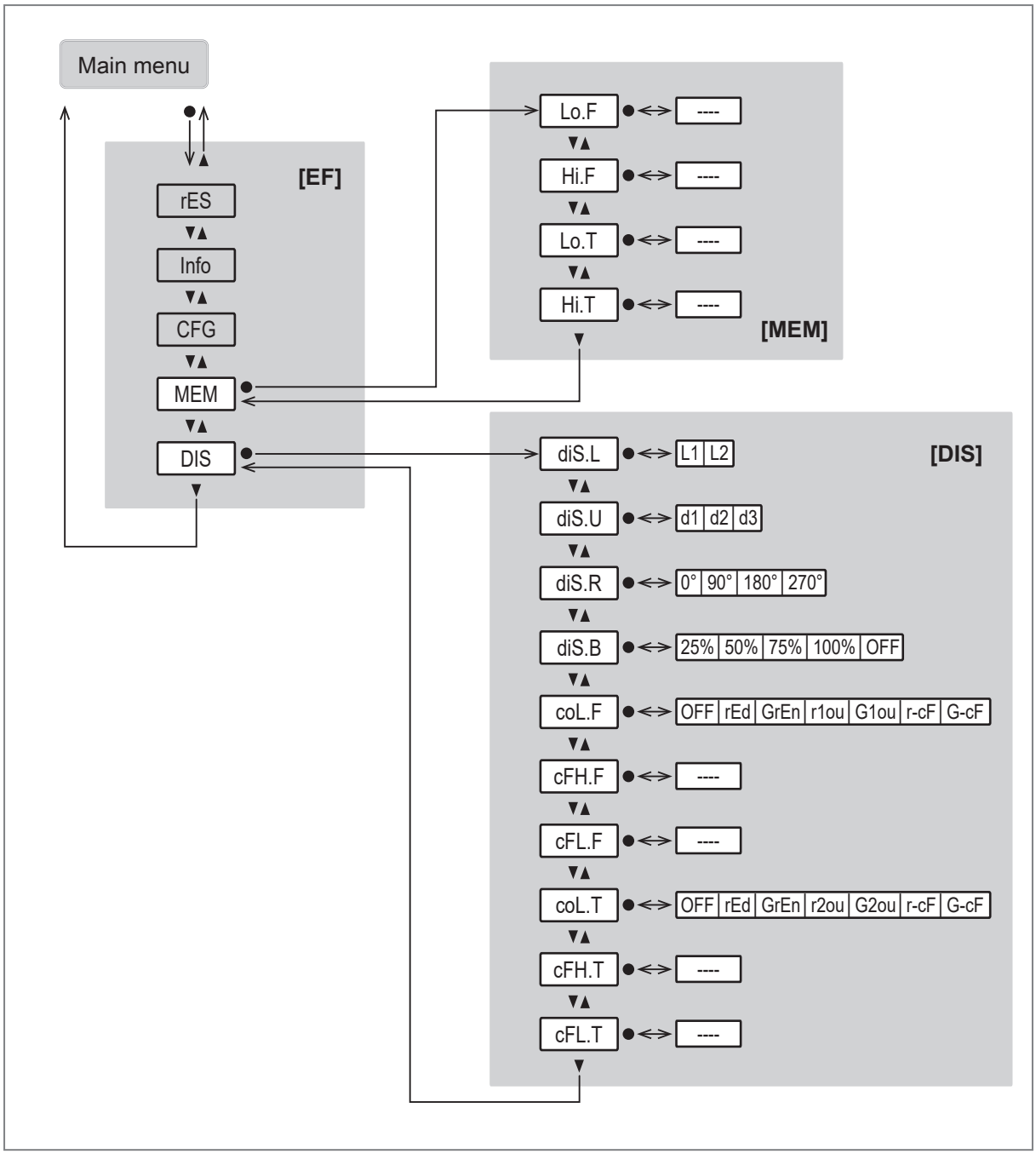
Parameter	Explanation
SPx	Switch point for switching output OUTx with hysteresis function
rPx	Reset point for switching output OUTx with hysteresis function
FHx	Upper limit for switching signal OUTx with window function
FLx	Lower limit for switching signal OUTx with window function
FSP2	Frequency start point for OUT2 = Lower measured value from which a frequency signal is provided (only for temperature measurement).
FEPx	Frequency end point for OUTx = Upper measured value at which the frequency signal set under FrPx is output.
FrPx	Frequency signal that is output when the upper measured value (MEW or FEPx) is reached.

Extended functions [EF] and configuration [CFG] menus:



Parameter	Explanation
rES	Reset to factory settings
Info	Display of the device information
CFG	Change to the submenu CFG (basic settings)
MEM	Change to the MEM (memory) submenu
DIS	Change to the DIS (display) submenu.
oux	Output configuration for output OUTx (e.g. switching output with hysteresis function)
dSx	Switch-on delay for switching output OUTx in seconds
drx	Switch-off delay for switching output OUTx in seconds
uni	Standard unit of measurement for flow
P-n	Output polarity for the switching outputs
dAP	Damping constant in seconds (63 % rise time τ).
FOUx	Behaviour of output OUTx in case of an error
SEL2	Process value for output OUT2

Memory [MEM] and display [DIS] menus:



Parameter	Explanation
Lo.F	Lowest flow value measured
Hi.F	Highest flow value measured
Lo.T	Minimum measured temperature value
Hi.T	Maximum temperature value measured
diS.L	Display layout
diS.U	Update rate of the display
diS.R	Orientation of the display
diS.B	Brightness of the display
coL.F	Font colour for flow
cFH.F	Upper limit value for colour change (flow)

Parameter	Explanation
cFL.F	Lower limit value for colour change (flow)
col.T	Font colour for temperature
cFH.T	Upper limit value for colour change (temperature)
cFL.T	Lower limit value for colour change (temperature)

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 in the following status according to the set parameters:

- ON with normally open function (Hno / Fno)
- OFF with normally closed function (Hnc / Fnc)
- OFF for frequency output (FRQ)

10 Parameter setting

Parameter setting can be carried out via the IO-Link interface or via the operating elements 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.

Depending on the parameter setting, the parameters available in the menu may change.

10.1 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.

Parameter setting process in general:

Intent	Action
Change from the process value display to the main menu	[●]
Change to the submenu	Use [▼] to navigate to the sub-menu (e.g. EF), then [●]
Selection of the desired parameter	▲ or [▼]
Change to setting mode	[●]
Changing the parameter value	▲ or [▼] > 1 s
Acceptance of the set parameter	[●]
Exit parameter setting without saving	[▲] + [▼]
Return to next higher menu (Repeat several times to reach process value display)	[▲] + [▼]
Return to the process value display	> 30 seconds (timeout)

10.1.1 Lock / unlock

The unit can be locked electronically to prevent unauthorised setting.

This lock prevents the settings from being changed via the keys on the unit.

Factory setting: not locked.

10.1.1.1 Parameter setting via unit keys: lock / unlock

Locking:

▶ Make sure that the unit is in the normal operating mode.

▶ Press[▲] and [▼] simultaneously for 10 seconds until the progress bar in the title bar has reached the end.

▷ The device is locked for parameter setting via the device keys. When trying to change a parameter value, the symbol appears in the display.

The locking can only be removed via the device keys. Changing the parameter setting is still possible via the IO-Link interface.

Unlocking:

▶ Make sure that the unit is in the normal operating mode.

▶ Press[▲] and [▼] simultaneously for 10 seconds until the progress bar in the title bar has reached the end.

▷ The locking of the device keys is removed.

10.2 Parameter setting via IO-Link

The device parameters can be set via the IO-Link interface in the following ways, for example:

- Parameter setting via a suitable parameter setting software, e.g. ifm moneo|configure
- Parameter setting via a PLC
- Parameter setting via an IIoT application

Requirements for parameter setting via the IO-Link interface:

✓ The Input Output Device Description (IODD) for the device in case of parameter setting via a parameter setting software, see documentation.ifm.com

✓ The IO-Link interface description (PDF) for the device in case of parameter setting via a PLC or IIoT application, see documentation.ifm.com

✓ An IO-Link master

▶ Connect the IO-Link master to the parameter setting software, the PLC or the IIoT application.

▶ Connect the device to a suitable free port of the IO-Link master.

▶ Set the port of the IO-Link master to the IO-Link operating mode.

▷ The device changes to the IO-Link mode.

▶ Change the parameter settings in the software.

▶ Write the parameter settings to the device.

Support for system integration and parameter setting via IO-Link:

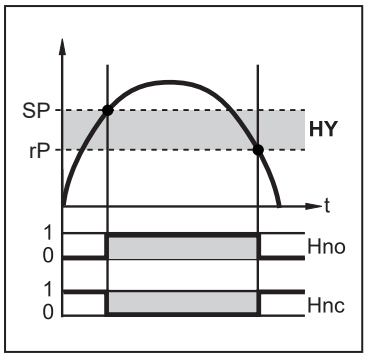
→ Manual of the parameter setting software (e.g. moneo)

→ Explanations and startup packages at ifm.com/cnt/io-link-system-integration.

10.3 Output configuration

10.3.1 Switching output

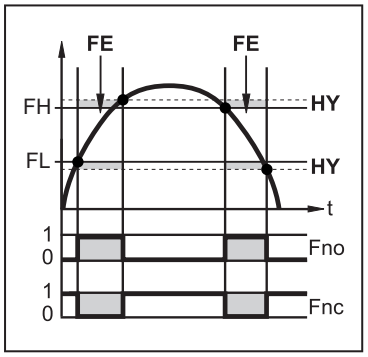
OUTx changes its switching status if it is above or below the set switching limits. Hysteresis or window function can be selected.



SP: Set point
rP: Reset point
HY: Hysteresis
Hno: Hysteresis function NO (normally open)
Hnc: Hysteresis function NC (normally closed)
t: Time

Fig. 7: Hysteresis function

When the hysteresis function is set, the switch point [SP] and the reset point [rP] are defined. [rP] must have a lower value than [SP]. If only the switch point is changed, the reset point is changed automatically; the difference remains constant.



FH: Upper limit value
FL: Lower limit value
HY: Hysteresis
FE: Window
Fno: Window function NO (normally open)
Fnc: Window function NC (normally closed)
t: Time

Fig. 8: Window function

When set to the window function, the upper limit value [FH] and the lower limit value [FL] are defined. [FH] and [FL] have a fixed hysteresis of 0.25 % of the final value of the measuring range (MEW). This keeps the switching status of the output stable if the flow varies slightly.

10.3.1.1 Parameter setting via the device keys: Switching signal

✓ The standard unit of measurement is selected: [EF] > [CFG] > [uni]

✓ Only for OUT2: The process value is selected: [EF] > [CFG] > [SEL2].

▶ Go to [EF] > [CFG] to configure the output OUTx.

Hysteresis function:

▶ Select [oux] and set the switching signal: [Hno] or [Hnc].

▶ Call up 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 back.

Window function:

▶ Select [oux] and set the switching signal: [Fno] or [Fnc].

▶ Call up the [main menu].

▶ Select [FHx] and set the upper limit of the window.

▶ Select [FLx] and set the lower limit of the window.

10.3.2 Frequency signal

The device 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 is reached.

The measuring range is scalable:

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

[FSPx] is only available for temperature measurement. Minimum difference between [FSPx] and [FEPx] = 20 % of the final value of the measuring range.

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).

Frequency signal for flow:

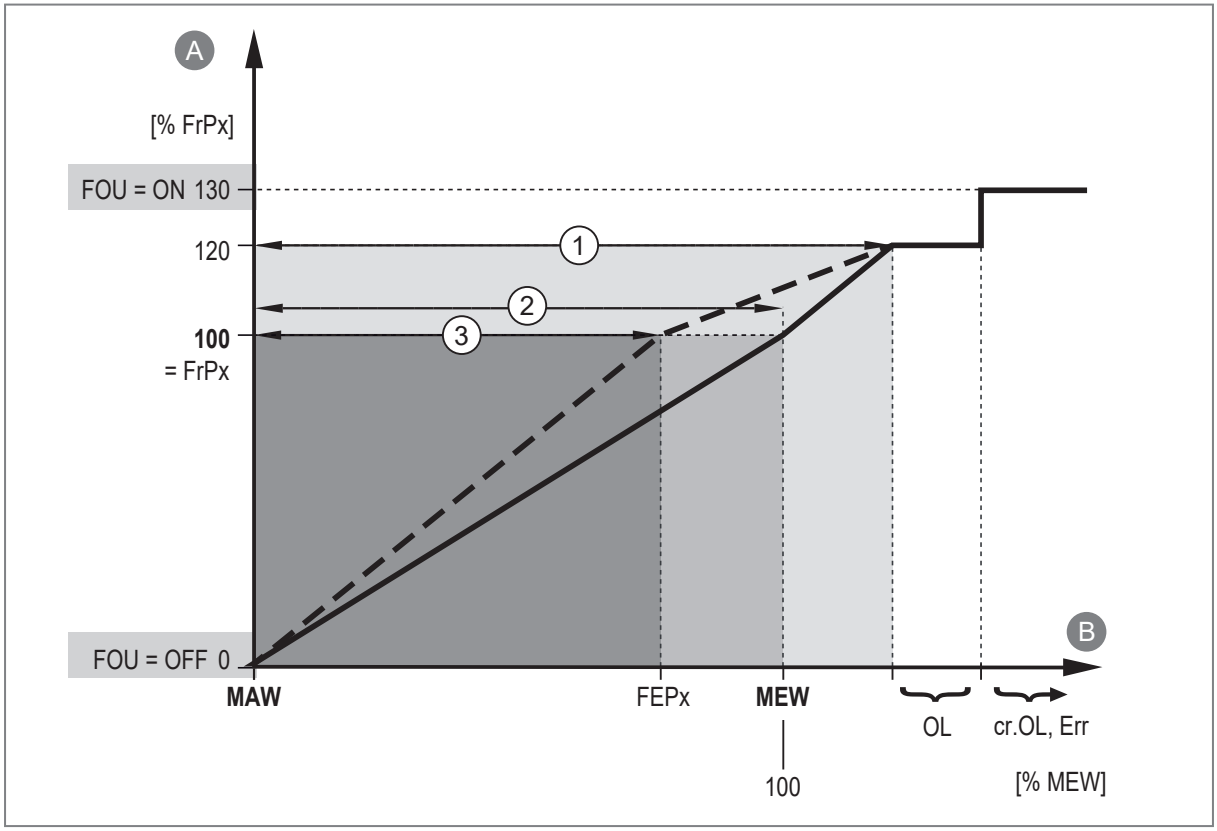


Fig. 9: Output characteristic of the frequency output, flow

A:	Frequency signal	MAW:	Initial value of the measuring range
B:	Flow	MEW:	Final value of the measuring range
1:	Display range	FEPx:	Frequency end point
2:	Measuring range	FrPx:	Frequency signal (Hz) for upper measured value
3:	Scaled measuring range	OL:	Above the display range
Err:	Error	cr.OL:	Critically above the display range

Frequency signal for temperature:

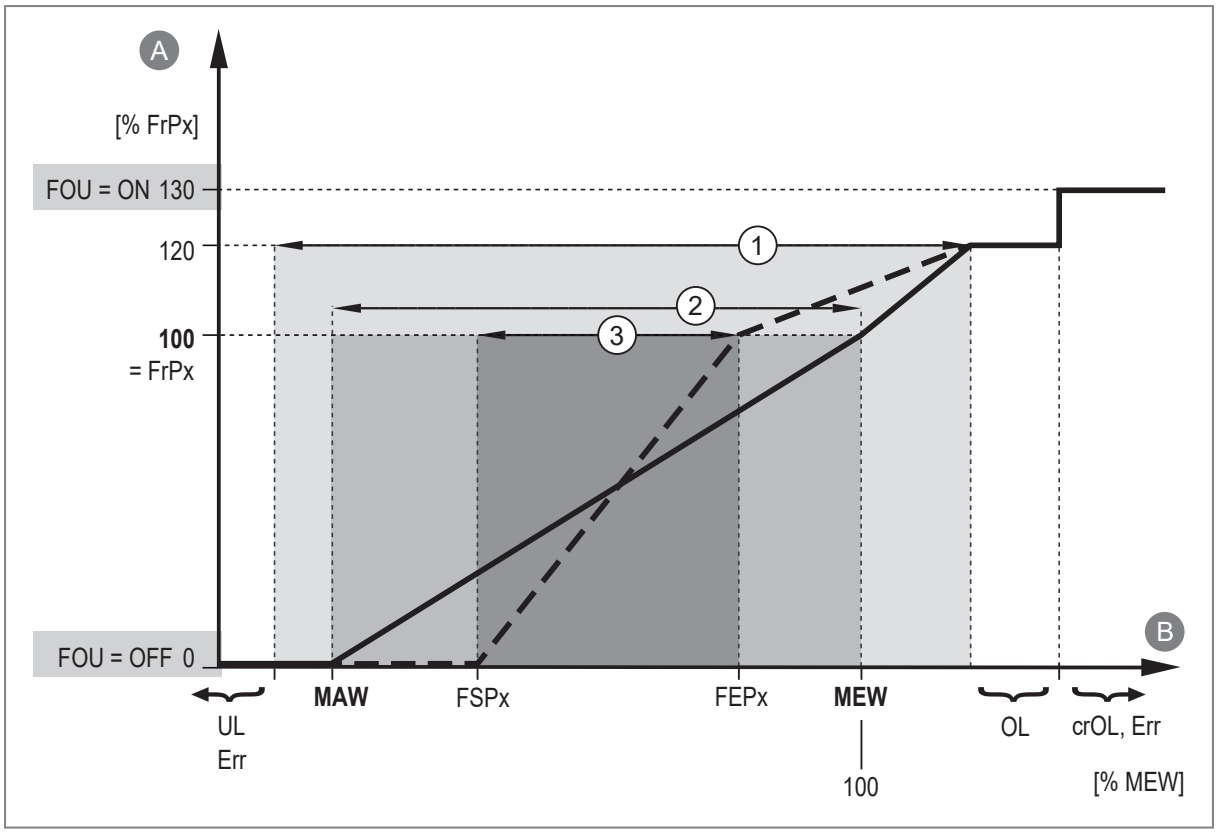


Fig. 10: Output characteristics of the frequency output, temperature

A:	Frequency signal	MAW:	Initial value of the measuring range
B:	Temperature	MEW:	Final value of the measuring range
1:	Display range	FSPx:	Frequency start point
2:	Measuring range	FEPx:	Frequency end point
3:	Scaled measuring range	FrPx:	Frequency signal (Hz) for upper measured value
Err:	Error	cr.OL:	Critically above the display range
OL:	Above the display range	cr.UL:	Critically below the display range
UL:	Below the display range		

10.3.2.1 Parameter setting via unit keys: Frequency signal

✓ The standard unit of measurement is selected: [EF] > [CFG] > [uni]

✓ Only for OUT2: The process value is selected: [EF] > [CFG] > [SEL2].

▶ Go to [EF] > [CFG] to configure the output OUTx.

▶ Select [oux] and set [FRQ].

▶ Call up the [main menu].

▶ Select [FEPx] and set the upper measured value at which the frequency set under [FrPx] (= 100 %) is output.

▶ Select [FrPx] and set the frequency for the upper measured value in Hz.

▶ Select [FSP2] and set the lower measured value at which 0 Hz is provided.

[FSP2] is only available for temperature measurement at OUT2.

10.4 User settings

The parameters described below are set as follows:

▶ Call up the menu [EF] > [CFG].

10.4.1 Switching delay

The switching output can be set to switch and reset with a delay time.

- [dSx]: Switch-on delay for switching output OUTx in seconds.
- [drx]: Switch-off delay for switching output OUTx in seconds.

10.4.2 Standard unit of measurement

A unit of measurement can be selected with which the process value is shown in the display by default. All further parameter settings are based on this unit.

- [uni] for flow: l/min m^3/h

10.4.3 Output polarity of the switching outputs

The output polarity is set via the parameter [P-n].

- [PnP]: The switching output is positive switching.
- [nPn]: The switching output is negative switching.

10.4.4 Damping

The set damping constant stabilises the output signals. Abrupt changes in the physical process values are smoothed out.

This concerns the outputs, the display and the process value transmission via the IO-Link interface.

The damping constant is added to the response time of the sensor (→ Technical data).

The UL and OL signals are defined under consideration of the damping time.

Measured value damping only has an effect on the process value pressure.

- [dAP] = damping time for switching signal, display and IO-Link signal (63% rise time)

10.4.5 Error behaviour of the outputs

The response of the OUTx output in case of a fault can be set via the parameter [FOUx]. Depending on the selected output function, the following signals are provided in case of a fault:

- Switching signal:
  - On: The output switches ON in case of a fault.
  - OFF: The output switches OFF in case of a fault.
  - OU: The output switches irrespective of the fault as defined with the parameters.
- Frequency signal:
  - 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.

10.4.6 Process value for OUT2

The process value to be output via OUT2 can be selected using the parameter [SEL2].

No selection is possible for the OUT1 output. OUT1 is only for monitoring flow.

Selectable values:

- [FLOW]: Flow
- [TEMP]: Temperature

▶ Select the process value before configuring further parameters for OUT2.

10.5 Display settings

The presentation in the display can be adjusted via various parameters. The parameters described below are set as follows:

▶ Call up the menu [EF] > [DIS].

10.5.1 Display layout

The standard display can be set via the parameter [diS.L].

Selectable values:

- L1: current process value for flow
- L2: current process value for flow and temperature

10.5.2 Display update rate

The update rate of the display can be set via the parameter [diS.U].

Selectable values:

- d1: fast
- d2: medium
- d3: slow

10.5.3 Display rotation

Use the parameter [diS.R] to rotate the text in the display clockwise for better readability.

Selectable values:

- 0° (not rotated)
- 90°
- 180°
- 270°

10.5.4 Display brightness

The display brightness can be set via the parameter [diS.B].

Selectable values:

- 25%
- 50%
- 75%
- 100%

- OFF: energy-saving mode. the display is switched off in the operating mode.
  Display activation by pressing any key. After 30 s of inactivity, the display is switched off again.

In case of warnings or error messages and in case of optical localisation, the display will come back on even with the setting [OFF].

10.5.5 Display colour setting

The font colour in the display can be set via the parameter [coL.x].

- [coL.F]: font colour for flow
- [coL.T]: font colour for temperature

The colour can be defined individually for each process value using the following parameter settings.

Permanent colour selection

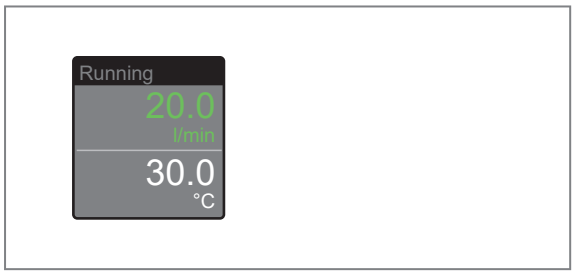


Fig. 11: Example: [coL.F] = [GrEn]; [coL.T] = [OFF]

The font colour is permanently set to one colour:

[coL.F] =	[coL.T] =	Font colour
[rEd]		Red
[GrEn]		Green
[OFF]		White

Colour change depending on the limit values of the switching output

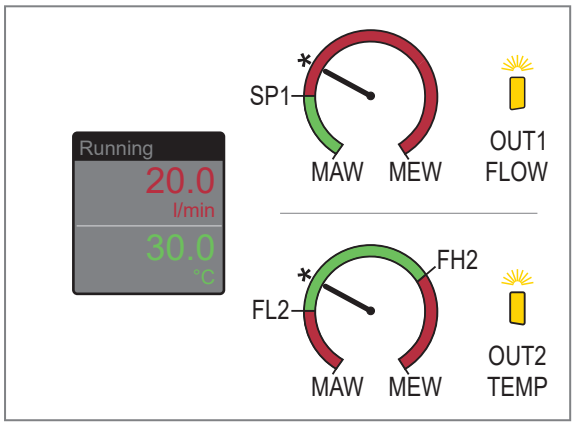


Fig. 12: Example: [coL.F] = [r1ou]; [coL.T] = [G2ou]

If the measured value* is above the switch point [SPx] or within the limits of [FLx]…[FHx], the following applies depending on the parameter selection:

[coL.F] =	[coL.T] =	Font colour
[r1ou]	[r2ou]	Red
[G1ou]	[G2ou]	Green

Setting of the limit values [SPx], [FLx], [FHx]: Switching output (→ 🗋 18).

Colour change depending on freely definable limit values

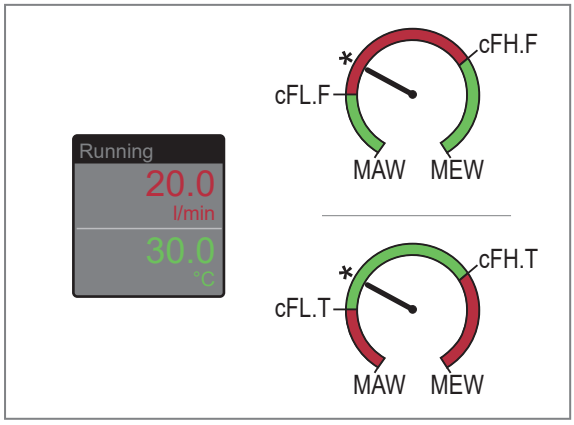


Fig. 13: Example: [coL.F] = [r-cF]; [coL.T] = [G-cF]

If the measured value* is within the limits of [cFL.x]…[cFH.x], the following applies depending on the parameter selection:

[coL.F] =	[coL.T] =	Font colour
[r-cF]		Red
[G-cF]		Green

The limit values of the window range can be freely selected within the measuring range and are independent of the output function:

- Flow: [cFL.F] = lower limit value; [cFH.F] = upper limit value
- Temperature: [cFL.T] = lower limit value; [cFH.T] = upper limit value

The [cFL.x] and [cFH.x] parameters will only appear in the menu if the [r-cF] or [G-cF] setting has been selected for [coL.x].

10.6 Diagnosis

10.6.1 Memory

The unit stores the maximum and minimum measured process values.

The current value can be read from the unit's display or via the IO-Link interface.

Selectable values:

- [Lo.F]: Minimum value memory for volumetric flow
- [Hi.F]: Maximum value memory for volumetric flow
- [Lo.T]: Minimum value memory for temperature
- [Hi.T]: Maximum value memory for temperature

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

10.6.1.1 Parameter setting via unit keys: Memory

Show memory:

▶ Go to the [EF] > [MEM] menu.

▶ Select [Lo.x] or [Hi.x] to show the highest or lowest process value measured.

Clear memory:

▶ Go to the [EF] > [MEM] menu.

▶ Select [Lo.x] or [Hi.x].

▶ Keep [▲] or [▼] pressed.

▷ [----] is displayed.

▶ Briefly press [●].

10.7 Device reset

The unit can be reset to factory settings.

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

10.7.1 Parameter setting via unit keys: Device reset

▶ Select the [EF] menu.

▶ Select [rES].

▶ Keep [▲] or [▼] pressed.

▷ [----] is displayed.

▶ Briefly press [●].

▷ The device carries out a reboot.

11 Troubleshooting

The device provides self-diagnostic options. It monitors itself automatically during operation.

Warnings and error states are displayed even if the display is switched off.

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

Additional diagnostic functions are available via IO-Link → IO-Link interface description at documentation.ifm.com.

11.1 Warning messages

Indication	Problem/remedy
[Locked via key]	Setting keys on the device locked, parameter change rejected. ▶ Unlock the device using the device keys.
[Locked via communication]	Setting keys on the device temporarily locked, parameter setting via IO-Link communication active. ▶ Finish parameter setting via IO-Link communication.
[Locked via system]	Setting keys locked via parameter setting software, parameter change rejected. ▶ Unlock the device via IO-Link interface using the parameter setting software.
UL	Below the display range. Temperature value < -20 % MEW. ▶ Check the measuring range.
OL	Above the display range. Flow or temperature value > 120 % MEW. ▶ Check the measuring range.
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.

11.2 Error messages

Indication	Problem/remedy
Display off	Supply voltage too low. ▶ Check the supply voltage. Display switched off. ▶ Check whether [diS] = OFF is set and change setting if necessary.
Err	Device faulty / malfunction. ▶ Replace the device.
PARA	Parameter setting outside the valid range. ▶ Check parameter setting.
cr.UL	Below the detection range. Temperature value < -30 % MEW. ▶ Check the measuring range.
cr.OL	Above the measuring range. Flow or temperature value > 130 % MEW. ▶ Check the measuring range.

12 Factory setting

Parameter		Factory setting	User settings
SP1	(FLOW)	20 % MEW	
rP1	(FLOW)	18.5 % MEW	
FH1	(FLOW)	20 % MEW	
FL1	(FLOW)	18.5 % MEW	
FEP1	(FLOW)	100 % MEW	
FrP1	(FLOW)	100 Hz	
SP2	(FLOW, TEMP)	40 % MEW	
rP2	(FLOW, TEMP)	38.5 % MEW	
FH2	(FLOW, TEMP)	40 % MEW	
FL2	(FLOW, TEMP)	38.5 % MEW	
FSP2	(TEMP)	0 % MEW	
FEP2	(FLOW, TEMP)	100 % MEW	
FrP2	(FLOW, TEMP)	100 Hz	
ou1	(FLOW)	Hno	
ou2	(FLOW, TEMP)	Hno	
FOU1	(FLOW)	OFF	
FOU2	(FLOW, TEMP)	OFF	
SEL2	(FLOW, TEMP)	FLOW	
coL.F	(FLOW)	OFF	
col.T	(TEMP)	OFF	
dS1		0 s	
dR1		0 s	
dS2		0 s	
dR2		0 s	
uni		l/min (SVx6xx: gpm)	
P-n		PnP	
dAP		0.6 s	
diS.L		L2	
diS.U		d2	
diS.R		0	
diS.B		75 %	
cFH.F		MEW	
cFL.F		MAW	
cFH.T		MEW	
cFL.T		MAW	

MEW = final value of the measuring range

MAW = initial value of the measuring range