

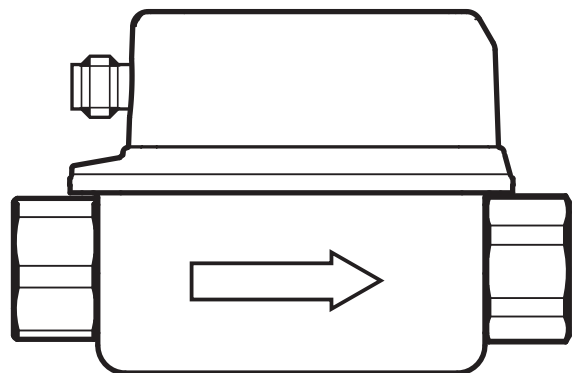


Operating instructions
Vortex flow meter

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1 Safety instructions

- Please read this document prior to set-up of the unit. Ensure that the product is suitable for your application without any restrictions.
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property can occur.
- Improper or non-intended use may lead to malfunctions of the unit or to unwanted effects in your application. That is why installation, electrical connection, set-up, operation and maintenance of the unit must only be carried out by qualified personnel authorised by the machine operator.
- In order to guarantee the correct condition of the device for the operating time it is necessary to use the device only for media to which the wetted materials are sufficiently resistant (→ Technical data).
- The responsibility whether the measurement devices are suitable for the respective application lies with the operator. The manufacturer assumes no liability for consequences of misuse by the operator. Improper installation and use of the units result in a loss of the warranty claims.

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CAUTION

For medium temperatures above 50 °C (122 °F) some parts of the housing can heat up to over 65 °C (149 °F). Risk of burns.

- ▶ In this case do not touch the unit.
- ▶ Protect the housing against contact with flammable substances and unintentional contact.
- ▶ Do not press the pushbuttons manually; instead use another object (e.g. ballpoint pen).

2 Functions and features

The unit monitors water-based fluids (water, deionised water, cooling water). It detects the two process categories volumetric flow and medium temperature.



Pressure Equipment Directive (PED):

The units comply with the Pressure Equipment Directive and are designed and manufactured for group 2 fluids in accordance with the sound engineering practice. Use of group 1 fluids on request.

3 Function

- The unit detects the volumetric flow quantity based on the Vortex measuring principle.
- It features an IO-Link interface.
- The unit displays the current flow and temperature. It generates 2 output signals according to the parameter setting:

OUT1/IO-Link: 2 selection options

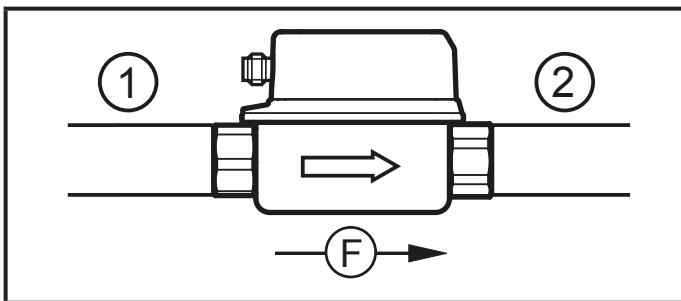
- switching signal for volumetric flow quantity limit value
- or frequency signal for volumetric flow quantity

OUT2: 4 selection options

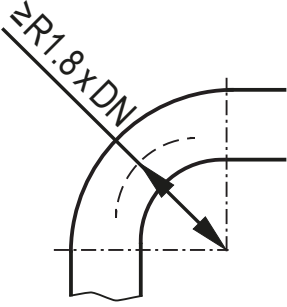
- switching signal for volumetric flow quantity limit value
- or switching signal for temperature limit value
- or frequency signal for volumetric flow quantity
- or frequency signal for temperature

4 Installation

- ▶ Flow in the direction of the arrow. Observe the installation direction.
- ▶ Make sure that pipe and sensor have the same internal diameter.
- ▶ Avoid deposits, accumulated gas and air in the pipe system. Install the unit so that the measuring pipe is always completely filled with medium.
- ▶ Install in front of or in a rising pipe.
- ▶ Recommended tightening torque: 30 Nm
- ▶ Avoid disturbances on the inlet and outlet side. To do so, provide for the following inlet and outlet pipe lengths:



DN = nominal width of the pipe
R = radius

Disturbance	Inlet pipe length (1)	Outlet pipe length (2)
Non-ideal bend	$\geq 5 \times \text{DN}$	$\geq 1 \times \text{DN}$
Ideal bend 	$\geq 0.5 \times \text{DN}$	
Multiple bends (2 x 90°)	$\geq 15 \times \text{DN}$	
Reduction of internal pipe diameter	$\geq 15 \times \text{DN}$	$\geq 15 \times \text{DN}$
Valve or pump	$\geq 25 \times \text{DN}$	

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- ▶ Mount the unit in a way that no mechanical forces are exerted on the pipe. To do so, use angle brackets if required.
 - For direct installation, fix the unit on the surface using 4 self-tapping screws M4 DIN 7500. Maximum insertion depth in the housing: 5.5 mm.
 - For installation using the fixing element: ifm mounting accessories at www.ifm.com.
- ▶ Avoid the following installation positions:
 - Directly in front of a falling pipe.
 - In a falling pipe.
 - At the highest point of the pipe system.
 - Directly in front of the spout of the pipe.
 - On the suction side of a pump.

5 Electrical connection

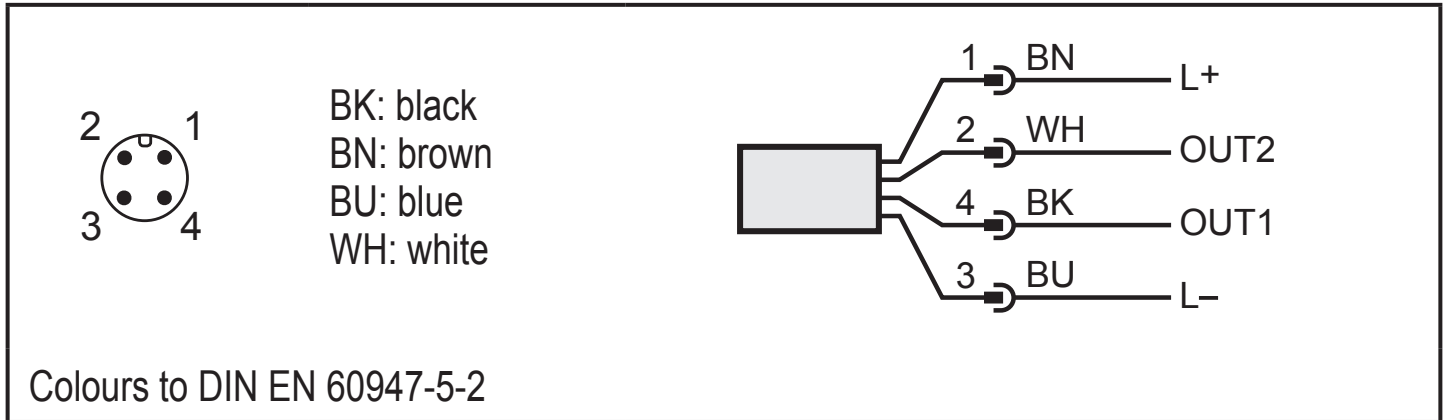


The unit must be connected by a qualified electrician.

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

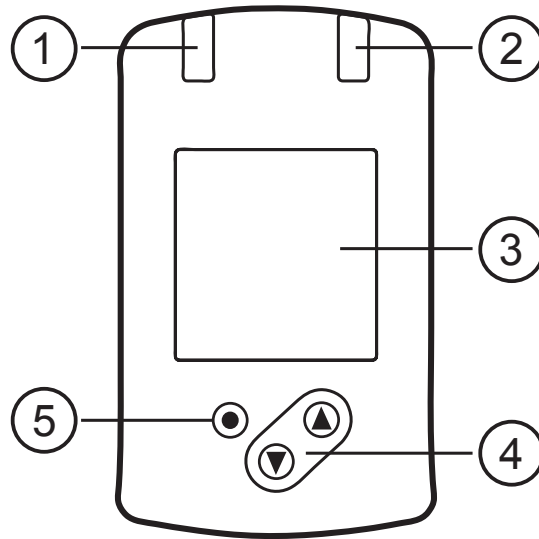
Voltage supply according to EN 50178, SELV, PELV.

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



Pin 1	L+
Pin 3	L-
Pin 4 (OUT1)	<ul style="list-style-type: none"> • Switching signal: limit values for volumetric flow • Frequency signal for volumetric flow quantity • IO-Link
Pin 2 (OUT2)	<ul style="list-style-type: none"> • Switching signal: limit values for volumetric flow • Switching signal: limit values for temperature • Frequency signal for volumetric flow quantity • Frequency signal for temperature

6 Operating and display elements



1 and 2: switching status LEDs

- LED 1 = switching status OUT1 (lights when output 1 is switched)
- LED 2 = switching status OUT2 (lights when output 2 is switched)

3: TFT display

- Display of current process values (volumetric flow quantity, temperature)
- Display of the parameters and parameter values

4: Buttons [▲] and [▼]

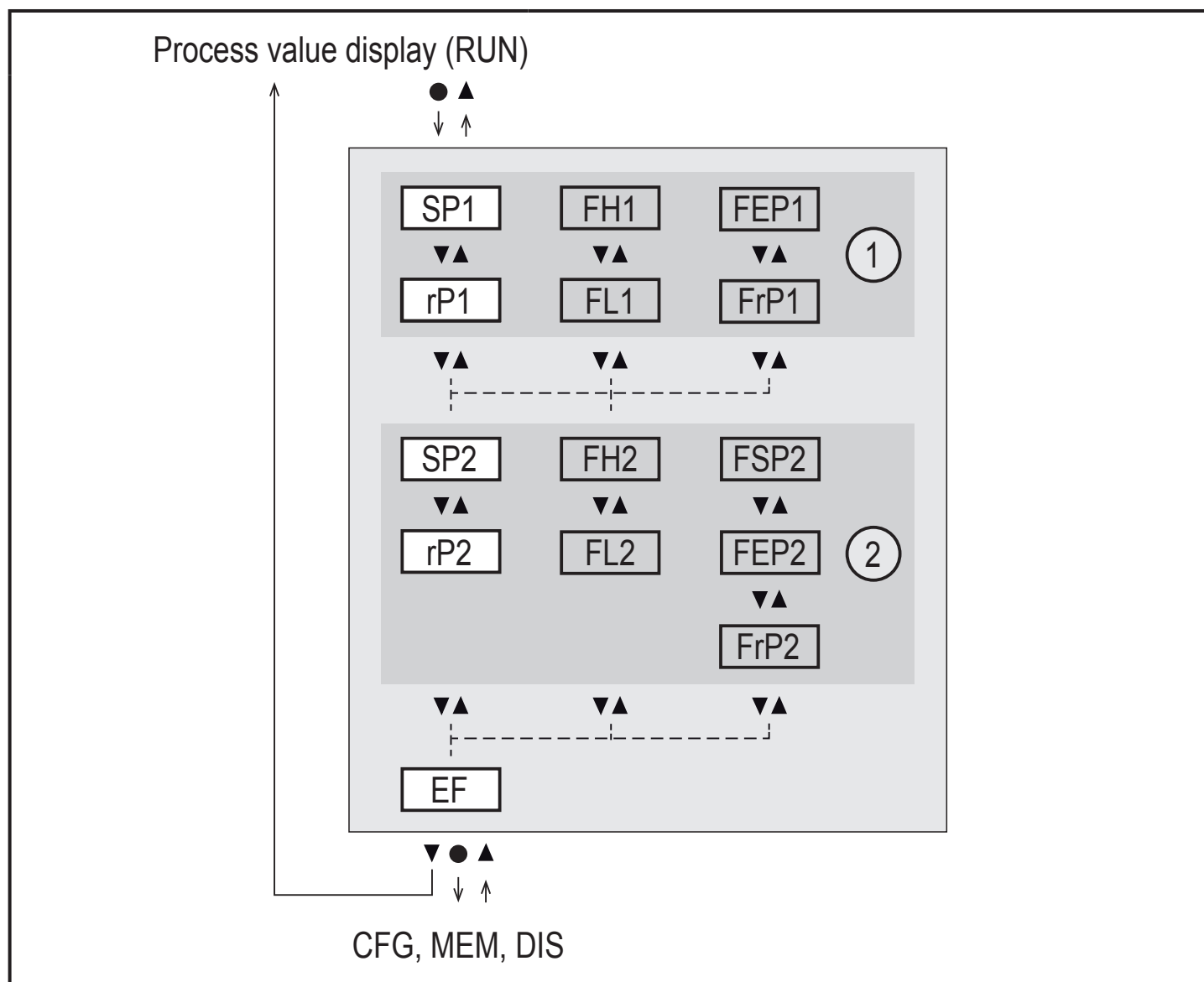
- Select parameters
- Change parameter values (hold button pressed)
- Change of the process value display in the normal operating mode (Run mode)
- Locking / unlocking (press buttons simultaneously > 10 seconds)

5: Button [●] = Enter

- Change from RUN mode to the main menu
- Change to setting mode
- Acknowledgement of the set parameter value

7 Menu

7.1 Main menu



1: Output functions ou1 (→ 7.2.1)

2: Output functions ou2 (→ 7.2.1)

 The parameters are only displayed when selected at ou1 / ou2.

7.1.1 Explanation main menu

Switching output with hysteresis function	
SP1	Set point 1 = upper limit value at which OUT1 switches.
rP1	Reset point 1 = lower limit value at which OUT1 switches off.
SP2	Set point 2 = upper limit value at which OUT2 switches.
rP2	Reset point 2 = lower limit value at which OUT2 switches off.

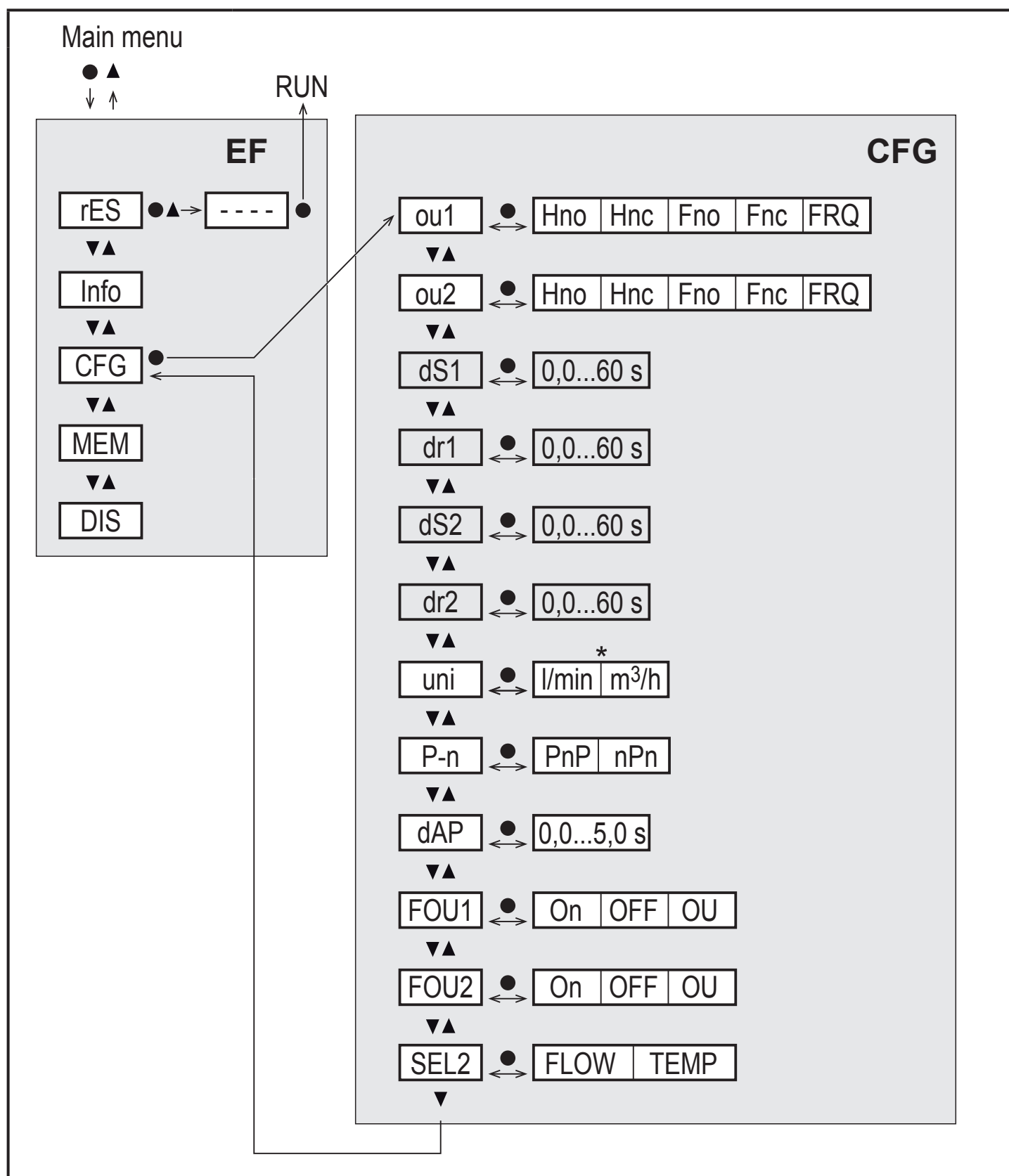
Switching output with window function	
FH1	Set point 1 = upper limit value at which OUT1 switches.
FL1	Reset point 1 = lower limit value at which OUT1 switches.
FH2	Set point 2 = upper limit value at which OUT2 switches.
FL2	Reset point 2 = lower limit value at which OUT2 switches.

Frequency output	
FEP1	Process value end point on OUT1.
FrP1	Frequency at process value end point (FEP1) on OUT1.
FSP2	Process value start point on OUT2 (only if SEL2 = TEMP).
FEP2	Process value end point on OUT2.
FrP2	Frequency at process value end point (FEP2) on OUT2.

Extended functions	
EF	Opening of the lower menu level.

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7.2 Extended functions – basic settings



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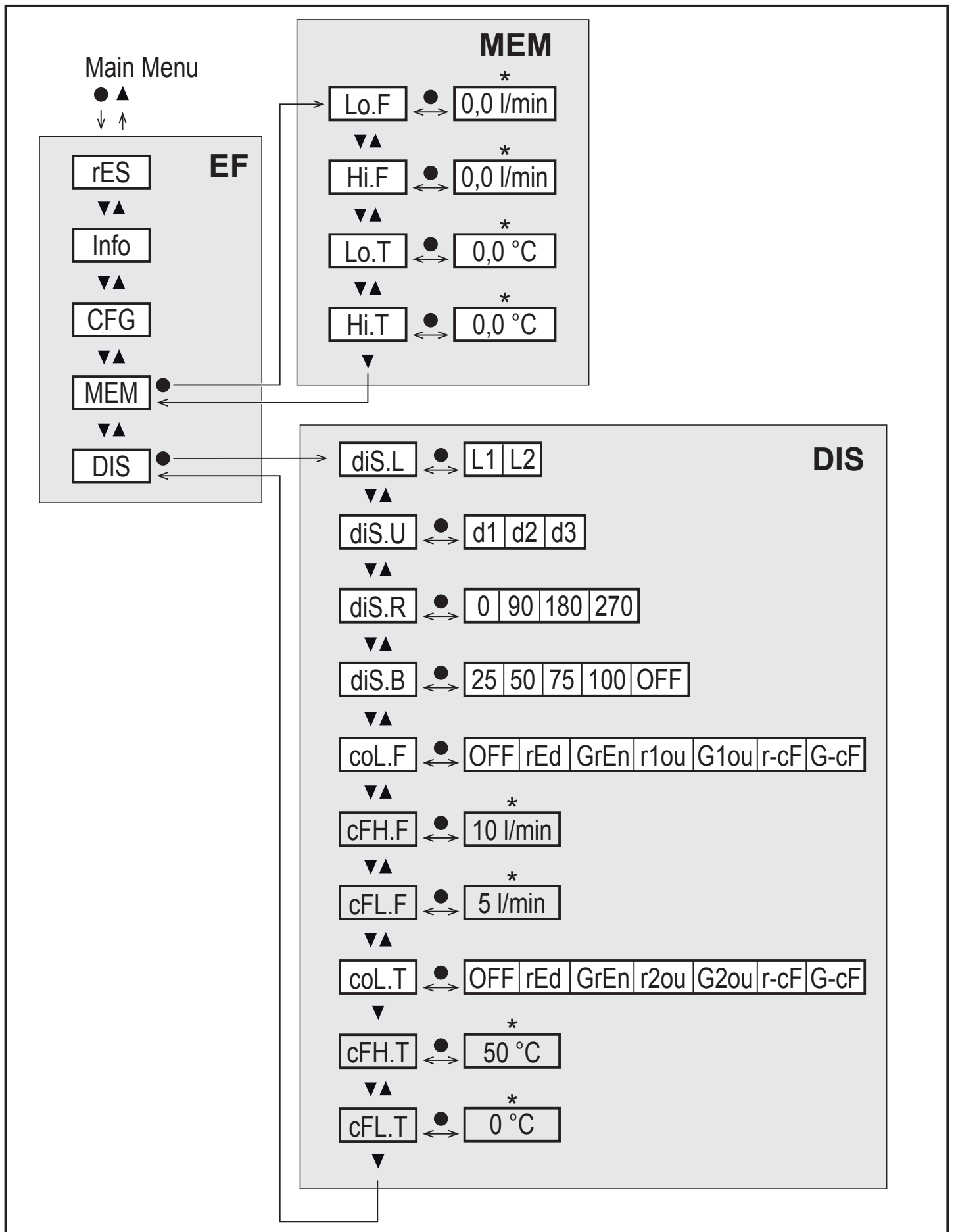
[Grey box] The parameters are only displayed when oux = Hno, Hnc, Fno, Fnc.

rES	Restoring the factory settings
Info	Device information
CFG	Submenu basic settings
MEM	Submenu min/max memory
DIS	Submenu display settings

7.2.1 Explanation basic settings (CFG)

ou1	Output function OUT1 • Flow: Hno, Hnc, Fno, Fnc, FRQ	
ou2	Output function OUT2 • Flow: Hno, Hnc, Fno, Fnc, FRQ • Temperature: Hno, Hnc, Fno, Fnc, FRQ	
Hno	Hysteresis function normally open	
Hnc	Hysteresis function normally closed	
Fno	Window function normally open	
Fnc	Window function normally closed	
FRQ	Frequency output	
dS1	Switching delay on OUT1 in seconds	Only in case of oux = Hno, Hnc, Fno, Fnc
dr1	Switch-off delay on OUT1 in seconds	
dS2	Switching delay on OUT2 in seconds	
dr2	Switch-off delay on OUT2 in seconds	
uni	Standard unit of measurement for volumetric flow	
P-n	Output logic: pnp / npn	
dAP	Measured value damping in seconds (only for volumetric flow)	
FOU1	Behaviour of output OUT1 in case of an error	
FOU2	Behaviour of output OUT2 in case of an error	
SEL2	Standard measured variable for evaluation by OUT2: Volumetric flow quantity or medium temperature	

7.3 Extended functions – min / max memory – display



 The parameters are only displayed when selected r-cF oder G-cF.

7.3.1 Explanation min/max memory (MEM)

Lo.F	Minimum value of the flow measured in the process
Hi.F	Maximum value of the flow measured in the process
Lo.T	Minimum value of the temperature measured in the process
Hi.T	Maximum value of the temperature measured in the process

7.3.2 Explanation display function (DIS)

diS.L	Standard layout of the display(L1: flow or L2: flow and temperature)	
diS.U	Update rate of display	
diS.R	Display rotation	
diS.B	Display brightness	
coL.F	Colour configuration volumetric flow	
coL.T	Colour configuration temperature	
OFF	No colour change	
rEd	Process value always red, irrespective of the output function	
GrEn	Process value always green, irrespective of the output function	
r1ou / r2ou	Process value red in case of switched output OUT1 / OUT2	
G1ou / G2ou	Process value green in case of switched output OUT1 / OUT2	
r-cF	Display red if measured value between limit values cFL...cFH, irrespective of the output function	
G-cF	Display green if measured value between limit values cFL...cFH, irrespective of the output function	
cFH.F	Upper limit value for colour change flow	Only if r-cF or G-cF is selected.
cFL.F	Lower limit value for colour change flow	
cFH.T	Upper limit value for colour change temperature	
cFL.T	Lower limit value for colour change temperature	

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8 Parameter setting

Parameters can be set before installation and set-up of the unit 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.



The parameters can also be set via the IO-Link interface.

8.1 Parameter setting in general

1. Change from RUN mode to the main menu	[●]
2. Selection of the requested parameter	[▲] or [▼]
3. Change to setting mode	[●]
4. Modification of the parameter value	[▲] or [▼] > 1 s
5. Acknowledgement of the set parameter value	[●]
6. Return to the RUN mode	> 30 seconds (timeout) or press [▲] + [▼] simultaneously until the RUN mode is reached.

9 Factory setting

Parameter	Factory setting	User setting
SP1 (FLOW)	20 % *	
rP1 (FLOW)	18.5 % *	
FH1 (FLOW)	20 % *	
FL1 (FLOW)	18.5 % *	
FEP1 (FLOW)	100 % *	
FrP1 (FLOW)	100 Hz	
SP2 (FLOW, TEMP)	40 % *	
rP2 (FLOW, TEMP)	38.5 % *	
FH2 (FLOW, TEMP)	40 % *	
FL2 (FLOW, TEMP)	38.5 % *	
FSP2 (TEMP)	0 % *	
FEP2 (FLOW, TEMP)	100 % *	
FrP2 (FLOW, TEMP)	100 Hz	
ou1 (FLOW)	Hno	
ou2 (FLOW, TEMP)	Hno	

Parameter	Factory setting	User setting
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	

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MEW = final value of the measuring range

MAW = initial value of the measuring range

* The percentage values refer to the final value of the measuring range.