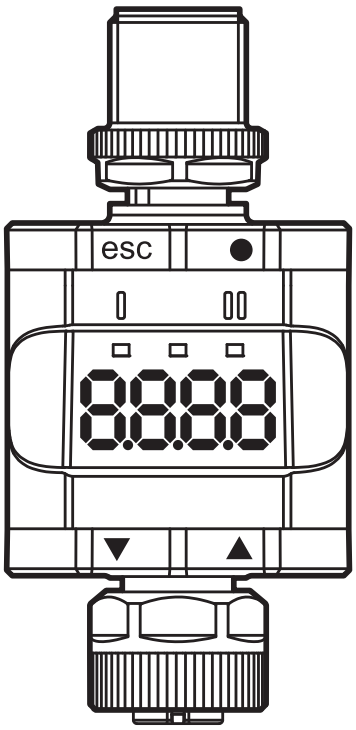
Operating instructions
Analogue limit display

DP2200

UK



80235112 / 00 12 / 2017

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1 Preliminary note

This document applies to the threshold display DP2200. Keep this document during the entire duration of use of the device.

⚠ WARNING

Adhere to the warning notes and safety instructions (→ 2 Safety instructions).

1.1 Symbols and warnings used

▶ Instructions

> Reaction, result

[…] Designation of keys, buttons or indications

→ Cross-reference

Important note
Non-compliance may result in malfunction or interference.

Information
Supplementary note.

⚠ WARNING

Warning of serious personal injury.
Death or serious irreversible injuries may result.

2 Safety instructions

2.1 General

Adhere to the operating instructions. Non-observance of the instructions, operation which is not in accordance with use as prescribed below, wrong installation or incorrect handling can affect the safety of operators and machinery.

The installation and connection must comply with the applicable national and international standards. Responsibility lies with the person installing the device.

The system installer is responsible for the safety of the system into which the device is integrated.

2.2 Target group

The device must be installed, connected and put into operation by a qualified electrician.

2.3 Electrical connection

Disconnect the device externally before handling it.

Make sure that the external voltage is generated and supplied according to the requirements for safety extra-low voltage (SELV) since this voltage is supplied without further measures to the connected sensors.

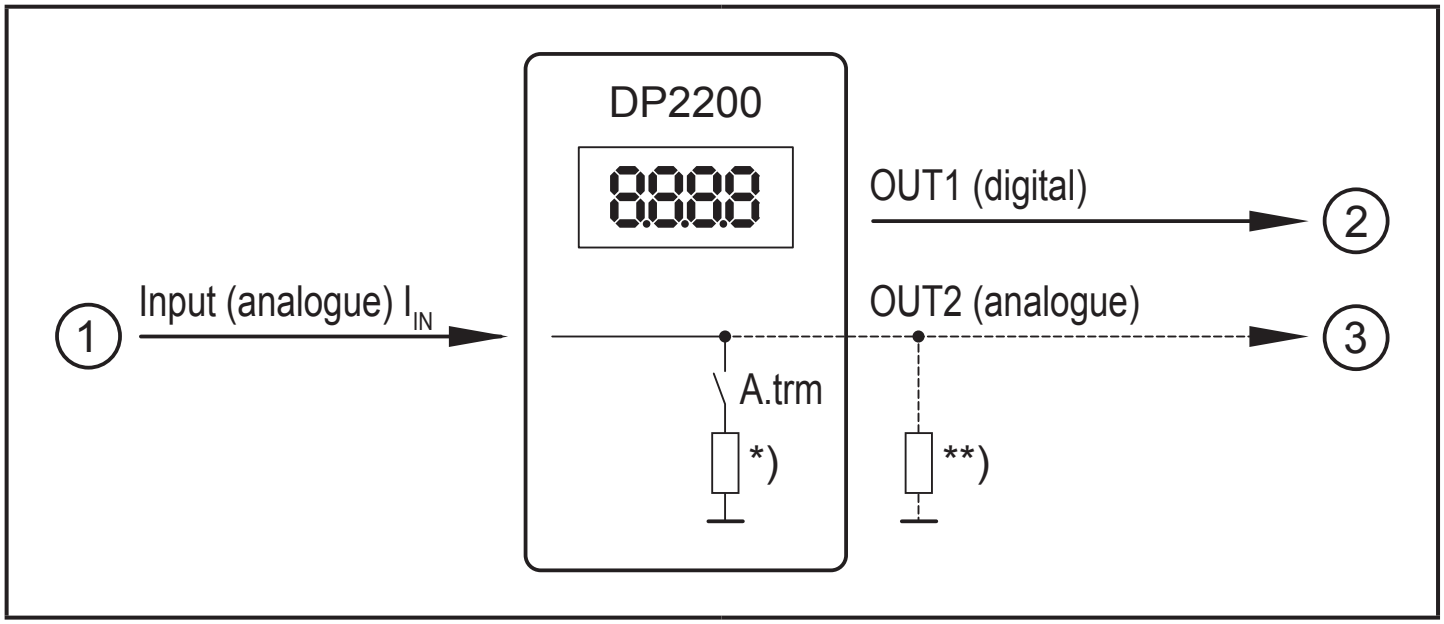
The wiring of all signals in connection with the SELV circuit of the device must also comply with the SELV criteria (safety extra-low voltage, safe electrical isolation from other electric circuits).

If the externally supplied or internally generated SELV voltage is externally grounded, the responsibility lies with the user in accordance with the applicable national installation regulations. All statements in these operating instructions refer to the unit the SELV voltage of which is not grounded.

The consumption of current which exceeds the value given in the technical data is not allowed.

3 Functions and features

3.1 Block diagram



Inputs/outputs of the device

1: IN (analogue input I_{IN})
2: OUT1 (digital output)
3: OUT2 (analogue output $I_{OUT} = I_{IN}$)

A.trm = analogue termination OUT2
*) switchable internal load
**) external load (optional)

The current loop of the analogue input must be terminated. Only one load may be connected, either an internal or an external load.
(→ 8.4.2 A.trm – analogue termination for OUT2)
(→ 12 Fault correction)

3.2 General application and functionality

The device is used for the evaluation of an analogue signal (4...20 mA) from a connected sensor or another device with analogue output (4...20 mA). The device has one analogue current input and two outputs: output 1 (digital) and optionally output 2 (analogue current output).

The device is intended for indoor use only.
Observe the operating conditions (→ 11 Technical data).

There are basically two modes in which the device can be operated:

- As stand-alone device
  The device compares the measured current value with the set parameters and switches its output according to the selected parameters. This mode is without IO-Link functionality. The parameters can, however, also be set with an IO-Link tool.

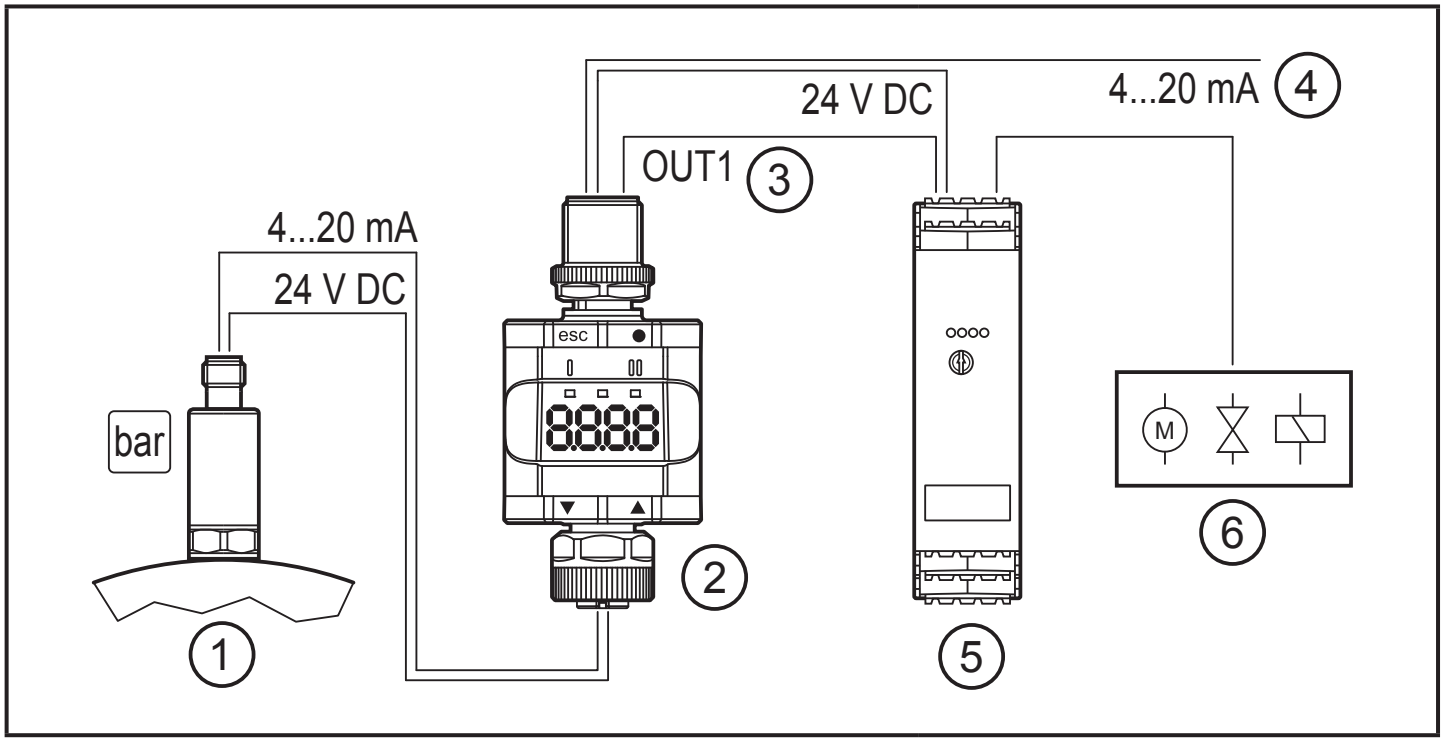
- As IO-Link device
  The device operates as an "analogue/IO-Link converter".
  The evaluation of the measured current value depends on the parameters which are set with IO-Link tools or a PLC via IO-Link communication or directly on the device.

In some points parameter setting via IO-Link tools or PLC is different from parameter setting via the menu (→ 8 Parameters).

3.3 Use as a stand-alone device without IO-Link

The device compares the measured current value with the set parameters and switches its output according to the selected function (→ 7 Operation).

The measured value is shown on the alphanumerical display. The displayed value can be scaled by the user (2-point scaling).



Application example without IO-Link master

1: Sensor with analogue output (e.g. pressure sensor)
2: Threshold display
3: Digital output
4: Looping through an analogue input signal
5: Control monitor
6: Relay output for switching electric motors, valves etc.

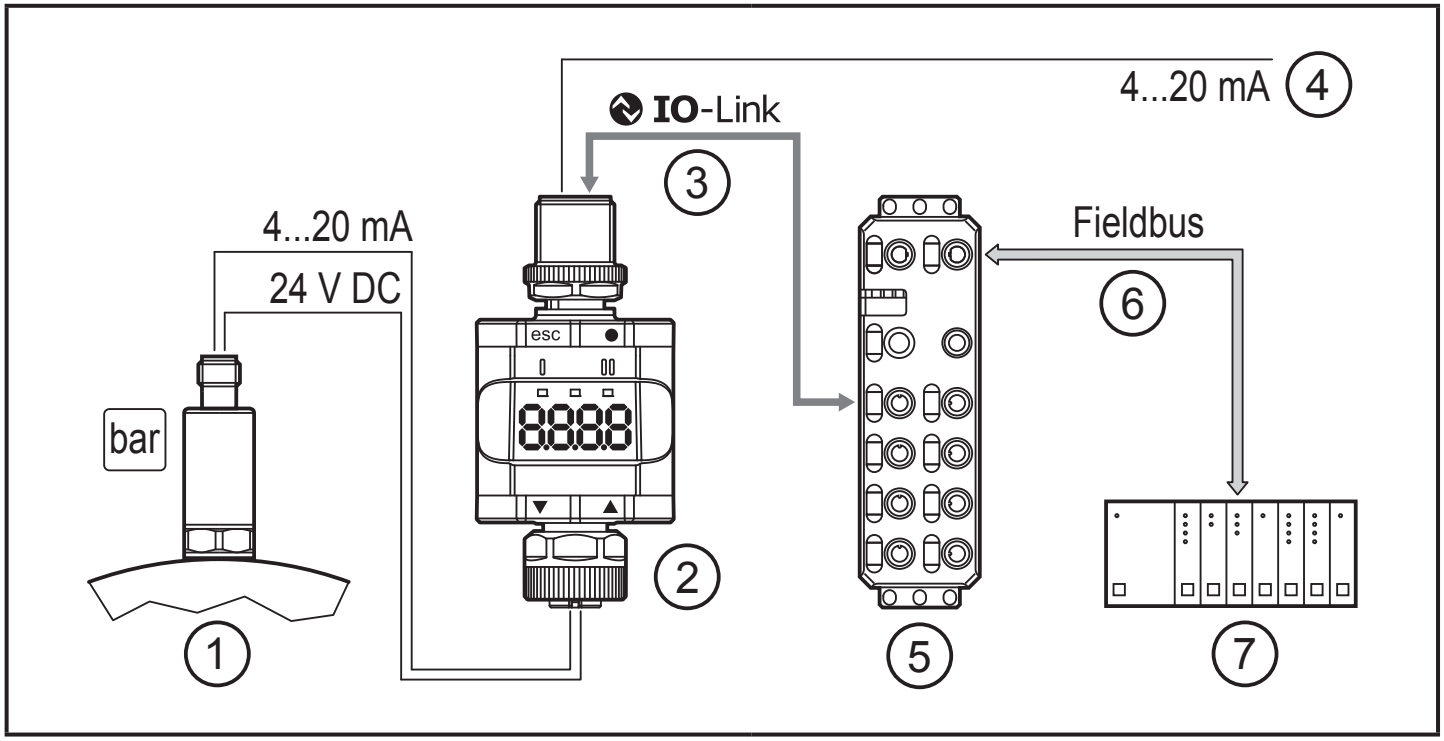
3.4 Application as an IO-Link device

3.4.1 General information

The device has an IO-Link communication interface which requires an IO-Link-capable module (IO-Link master).

The IO-Link interface allows direct access to the process and diagnostic data and enables setting of the parameters of the unit during operation.

It is possible to set parameters via a point-to-point connection. You will find further information about IO-Link and all necessary information about the required IO-Link hardware and software at:
www.ifm.com/de/io-link.



Application example with IO-Link master

1: Analogue sensor (e.g. pressure sensor)
2: Threshold display
3: Fully bidirectional IO-Link communication
   - Remote display: reading and displaying the measured current
   - Remote parameter setting: reading and changing the parameter setting.
4: Looping through an analogue input signal
5: IO-Link master
6: Fieldbus (e.g. Profibus, Profinet etc.)
7: PLC

3.4.2 Functionality

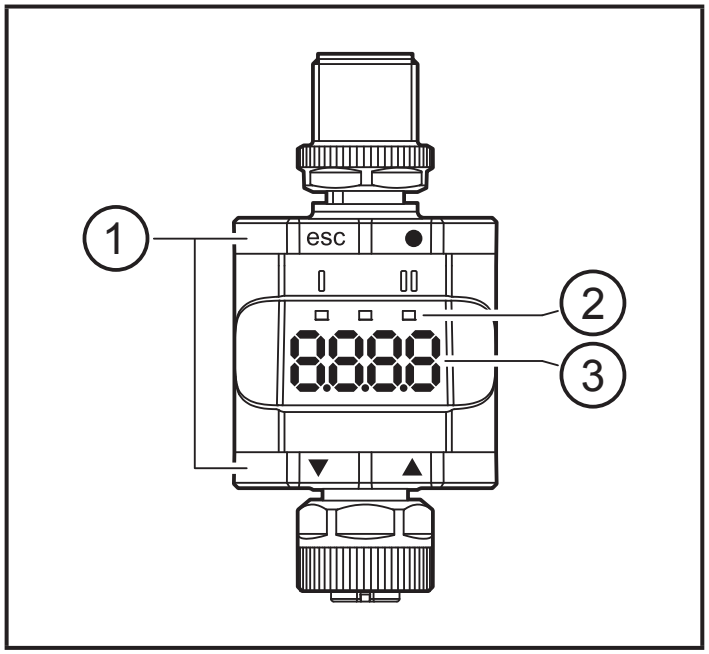
In the IO-Link SIO mode, the device has the same functionality as a stand-alone device. The measured value is also displayed.

Additionally, the device converts the measured current and transmits the value via IO-Link connection to the PLC.

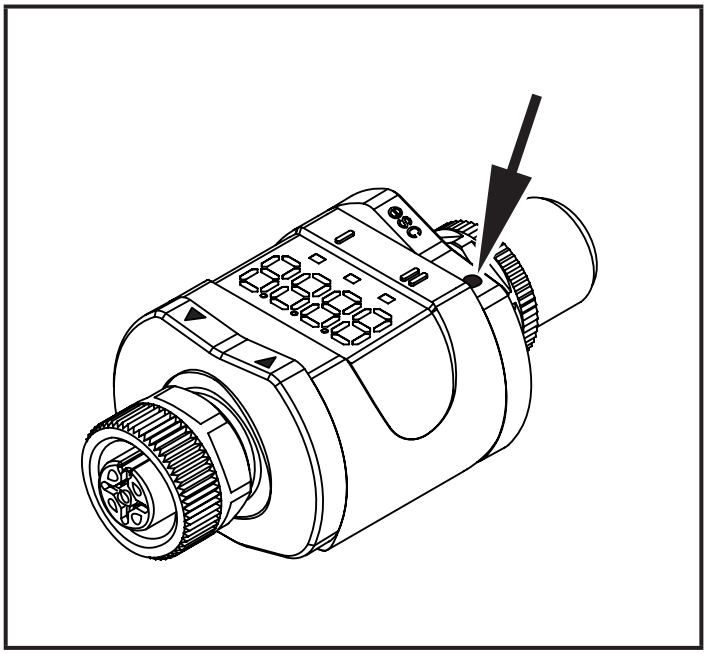
3.4.3 IO Device Description (IODD)

You will find the IODDs necessary for the configuration of the IO-Link device and detailed information about process data structure, diagnostic information and parameter addresses at:
www.ifm.com

4 Operating and display elements



1: Push rings (pushbuttons)
2: LEDs
3: Display



Here the Enter button is shown pressed, as an example [●].

4.1 Push rings (buttons)

▶ To execute an [esc], [●], [▼] or [▲] command, press the corresponding corner of a push ring.

Button		Function
[esc]	Escape	Return to the previous menu. Exit parameter setting without saving the new value.
[●]	Enter	Enter menu mode (→ 8.2 Menu structure). Selection of the parameter and acknowledgement of a parameter value.
[▼]	Down	Selection of a parameter. Setting a parameter value (scrolling by holding down, incrementally by pressing repeatedly).
[▲]	Up	

When [▼] or [▲] is pressed during the operating mode for 1 second, the unit is displayed. The displayed unit depends on the parameter C.uni (→ 8.5).

To ensure correct operation of the push rings (buttons), do not install or place the device directly on a metal surface.
For the installation use the mounting clip (→ 5 Installation).

4.2 LEDs

LED		Colour	Status	Description
I	OUT1	yellow	on	Output 1 switched.
Power		green	on	Voltage supply OK. Device in operating mode.
			off	Device in programming mode.
II	-	-	-	Without function

Error signals and diagnostics (→ 12 Fault correction)

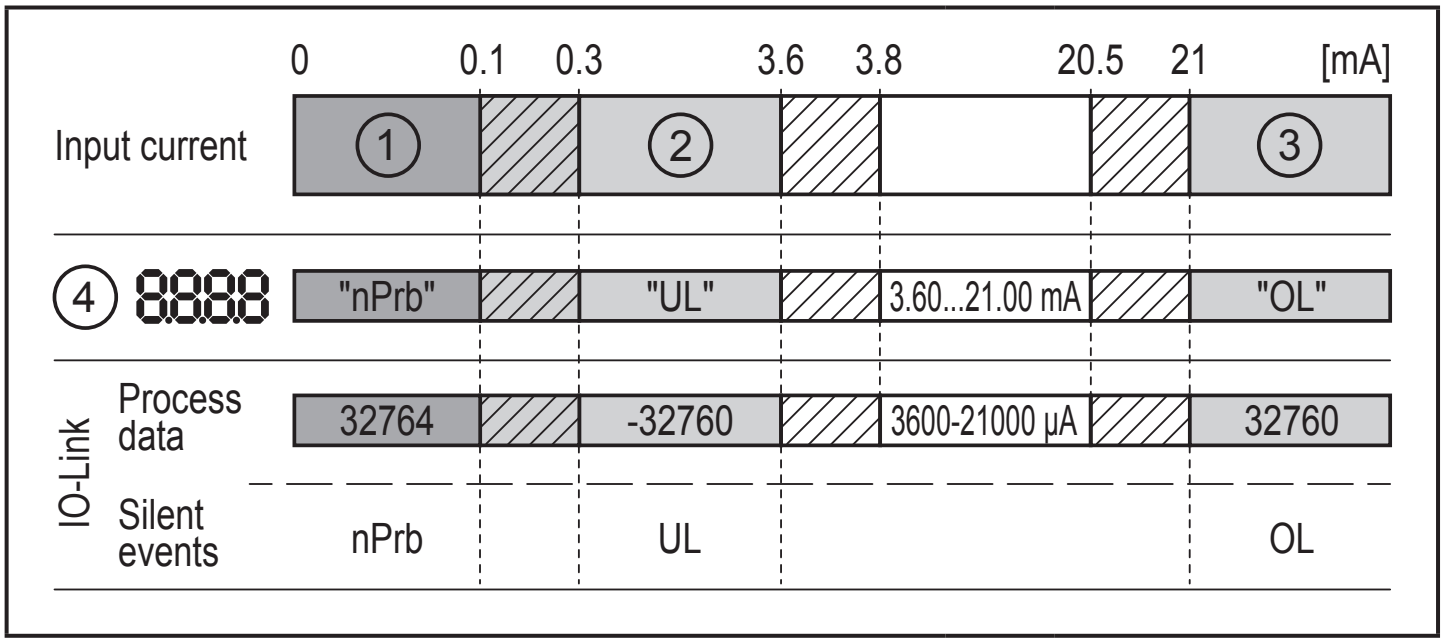
4.3 Display

Colour	Description
Red/green	7-segment LED display, 4 digits, with colour change.

Error signals and diagnostics (→ 12 Fault correction)

In the operating mode the input current value is displayed. The scaling depends on the parameter ScAL (→ 8.4.5).

4.3.1 Representation of the measured current value

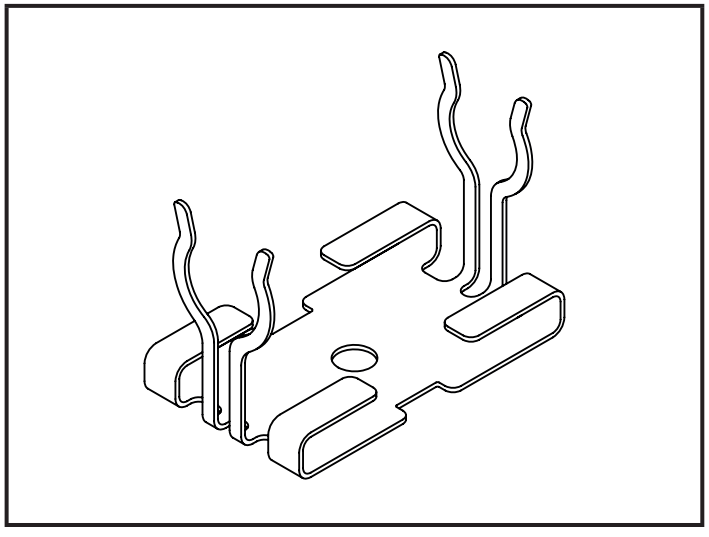


1: No measured data
2: Input current below the range (-)
3: Input current above the range (+)
4: Displayed message or displayed value.
The input current is displayed here without scaling.

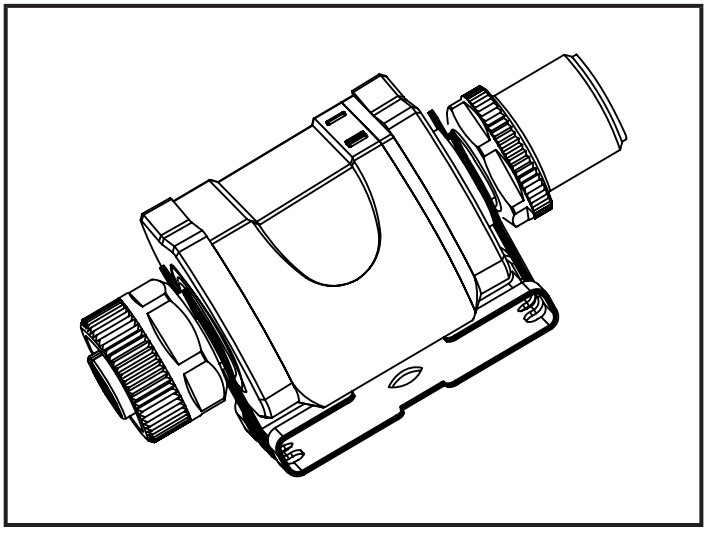
nPrb: No sensor
UL: Process value too low
OL: Process value too high
▨ Hysteresis range

5 Installation

If required, the device can be fixed with a mounting clip.



Mounting clip (fasten with M4 screw or cable ties)



Mounting clip with display attached

The mounting clip is not supplied with the device.

More information about the available accessories at:
www.ifm.com

6 Electrical connection

⚠ WARNING

The device 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 SELV, PELV.

⚠ WARNING

UK

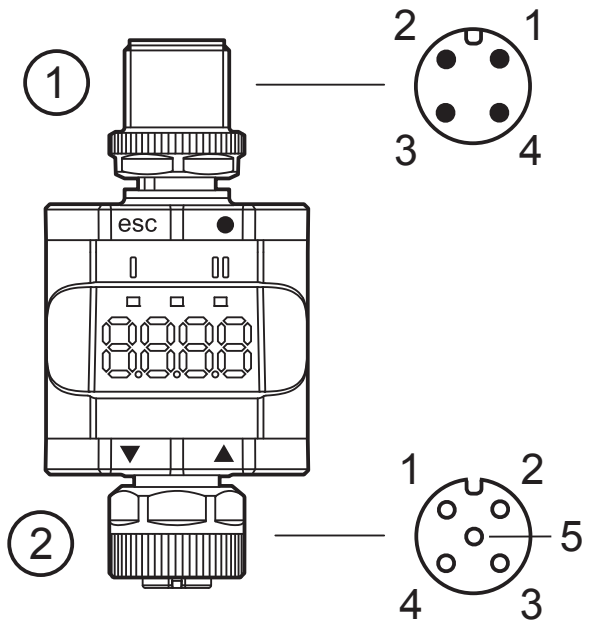
▶ Protect the supply voltage.

Potential	M12 connector (1)	Fuse
L+ / supply voltage	pin 1	≤ 2 A time-lag

▶ Alternatively supply the device via a limited energy circuit according to IEC 61010-1.

▶ Disconnect power.

▶ Connect the device according to the table below.



Pin	4-pole M12 connector (1)
1	L+ / supply voltage
2	OUT2: analogue output
3	L- / supply voltage
4	OUT1: digital output (SIO) / IO-Link

Pin	5-pole M12 socket (2)
1	L+ / sensor supply
2	Analogue input (4...20 mA)
3	L- / sensor supply
4	Not used
5	Not used

1: Evaluation side
2: Sensor side

Always use the intended connection cables to connect sensors or other devices with the device.

See also application examples (→ 3 Functions and features)

To ensure the protection rating fully tighten the screws of the used M12 connectors. Protection rating (→ 11 Technical data).

6.1 Maximum length of the connection cables

Without IO-Link on either side: 30 m.
With IO-link communication on the master side: 20 m.

All cables must be provided with a strain relief min. 200 mm behind the connectors.

7 Operation

After power on, the device is in the operating mode (SIO). It carries out its measurement and evaluation functions and provides output signals according to the set parameters (→ 8 Parameters).

7.1 Functions output 1

OUT1 (connector, pin 4):
- Digital output (status according to the set switching function)
- IO-Link interface

Selectable switching functions:
- Hysteresis functions, normally open / normally closed (→ 8.3.1)
- Window functions, normally open / normally closed (→ 8.3.2)

OUT1 changes its status if the input signal is above or below the set switching limits. First the set point SP1 is set, then the reset point rP1 (→ 8.3.1).

The hysteresis defined remains even if SP1 is changed again. Changing the parameter rP1 also changes the hysteresis.

The width of the window can be set by means of the difference between FH1/FL1.
FH1 = upper value
FL1 = lower value

7.2 Functions output 2

OUT2 (connector, pin 2):
- Analogue output (looping through the analogue input signal).

8 Parameters

8.1 General

Irrespective of the operating mode (stand-alone device/SIO or IO-Link device) there are two options to set the parameters of the device:

- directly on the device via the menu
- or via an IO-Link tool.

Access via an IO-Link tool has a higher priority than parameter setting via the menu.

Some parameters can only be set via the IO-link interface (→ 8.5 Parameters via IO-Link).

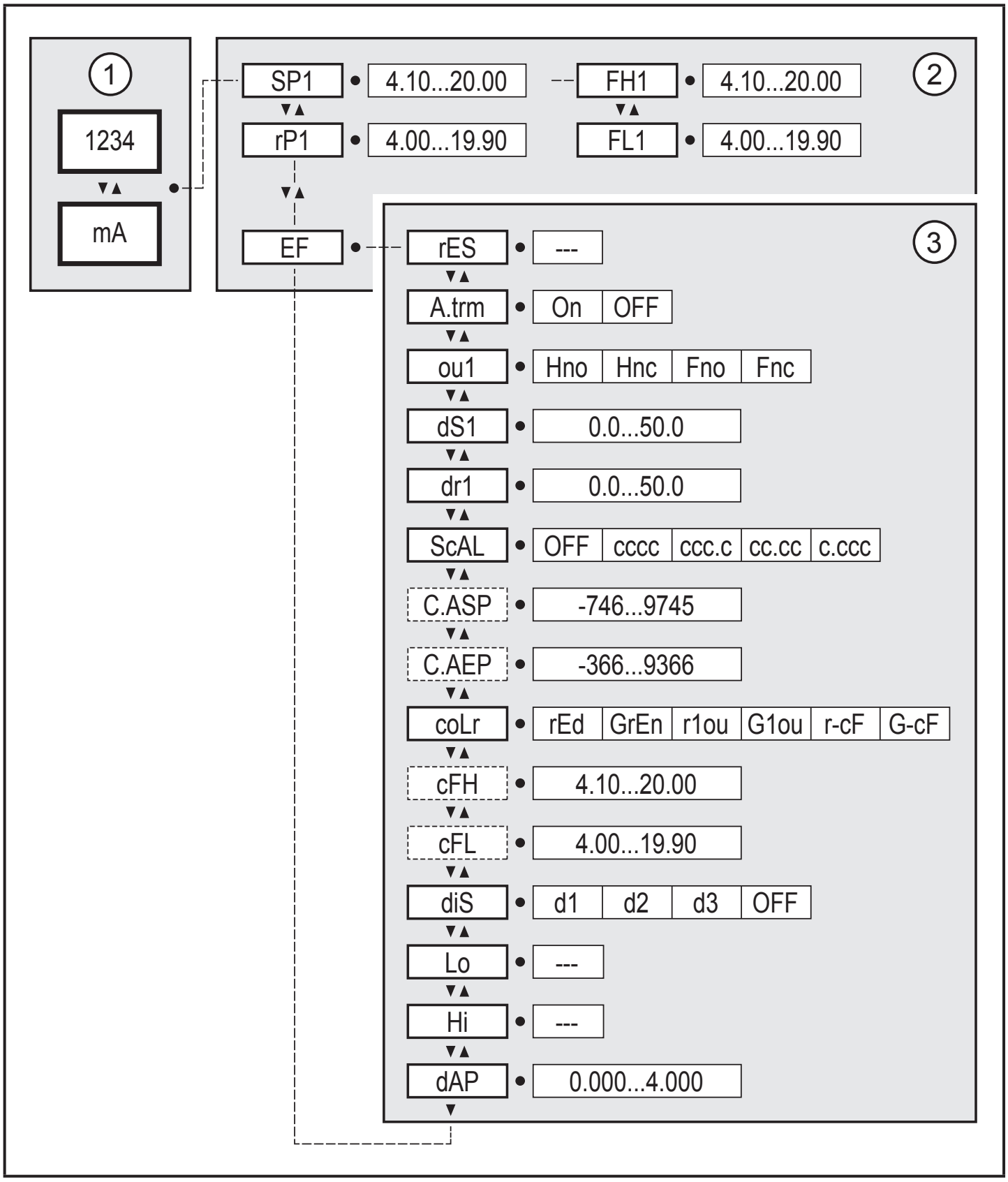
If the device was locked via IO-link, it can also only be unlocked via the IO-Link interface (→ 8.5.2 S.Loc – software locking).

The scaling parameter ScAL only influences the display and not the transferred process data or the actual switching threshold values.

Via IO-Link the current value is always transferred in µA (→ 4.3.1 Representation of the measured current value). The switching thresholds can be set in steps of 0.01 mA.

If a scaling is set, the menu settings of the switching thresholds (SP, rP etc.) are also scaled. Via IO-Link, however, the settings continue to be displayed and executed in steps of 0.01 mA (resolution 14 bits).

8.2 Menu structure



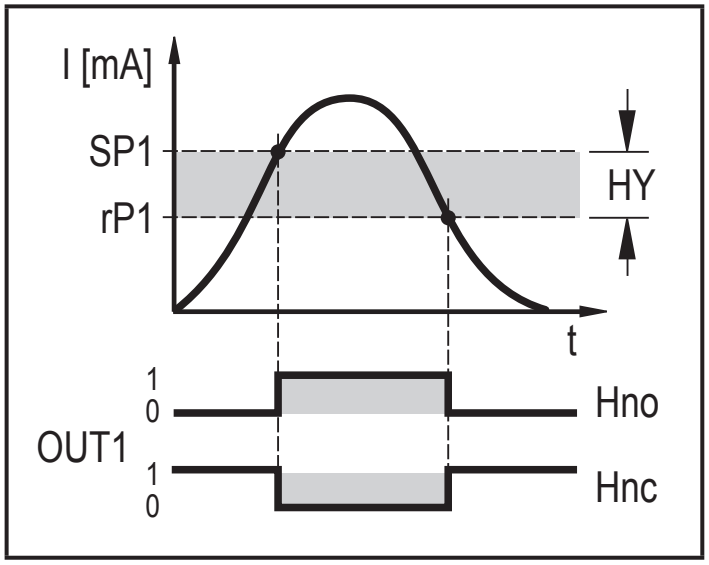
1: Operating mode (→ 7)
2: Main menu (→ 8.3)
3: Extended functions (→ 8.4)

Parameter list and factory settings (→ 14)

8.3 Parameters of the main menu

8.3.1 SP1/rP1 – set point/reset point OUT1

Upper/lower limit for measuring current at which OUT1 switches with hysteresis setting. Only displayed if the hysteresis function [Hno] or [Hnc] is set in [ou1].



SP: Set point
rP: Reset point
HY: Hysteresis
Hno: Hysteresis function normally open
Hnc: Hysteresis function normally closed

Hysteresis functions

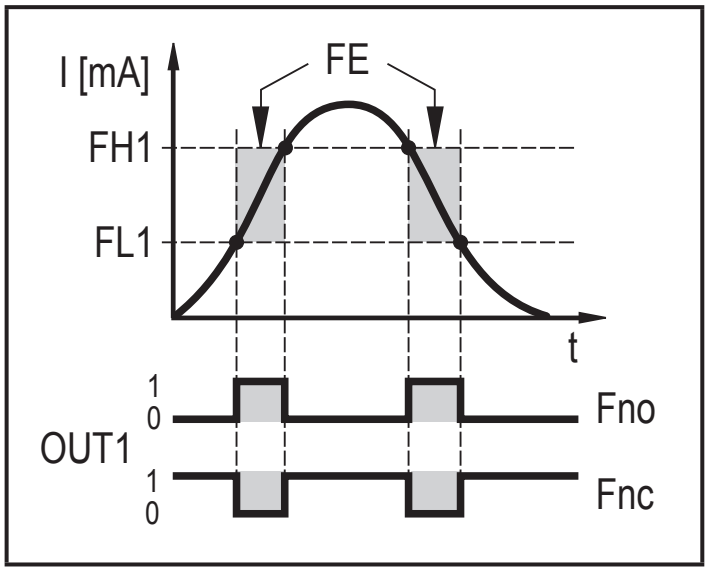
- ▶ Select [SP1] and set the value at which output OUT1 is set.
- ▶ Select [rP1] and set the value at which output OUT1 is reset.

[rP1] is always lower than [SP1]. The device only accepts values which are lower than the value for [SP1].

[rP1] follows the changes of [SP1] and keeps the set hysteresis.

8.3.2 FH1/FL1 – min/max switching limits for window function

Upper/lower limit for measuring current at which OUT1 switches within the window setting. The parameters are only displayed if the window function [Fno] or [Fnc] is set in [ou1].



FH: Window upper value
FL: Window lower value
FE: Window
Fno: Window function normally open
Fnc: Window function normally closed

Window functions

▶ Select [FH1] and set the upper limit value.
▶ Select [FL1] and set the lower limit.

[FL1] is always lower than [FH1]. The device only accepts values which are lower than the value for [FH1].

[FL1] follows the changes of [FH1] and keeps the set hysteresis.

8.3.3 EF – extended functions

The parameter opens the extended functions menu.
(→ 9.3.3 Change from the main menu to the extended functions menu)

8.4 Parameters of the extended functions (EF)

8.4.1 rES – restore factory setting

Resets all parameters to the factory setting (→ 14).

▶ Select [rES].
▶ Press [●].
▶ Press and hold [▲] or [▼] until [----] is displayed.
▶ Briefly press [●].

8.4.2 A.trm – analogue termination for OUT2

- [OFF] = OUT2 is externally connected, e.g. to the analogue input of another device.
- [On] = OUT2 is not connected and the current path is terminated internally.

Note the following for proper current measurement and evaluation:
If the internal analogue termination is set to [On], output OUT2 must not be connected.

8.4.3 ou1 – output function for OUT1

Switching signal for the current limits.
See also (→ 8.3.1) and (→ 8.3.2).

- [Hno] = hysteresis function / normally open
- [Hnc] = hysteresis function / normally closed
- [Fno] = window function / normally open
- [Fnc] = window function / normally closed

8.4.4 dS1/dr1 – switching delay/switch-off delay for OUT1

Value: 0.0...50.0 s (0.0 = delay time is not active)

8.4.5 ScAL – scaling of the displayed value

The setting acts like a multiplier for the parameters [C.ASP/C.AEP].

- [OFF] = measured current value is not scaled.
- [cccc] = scaling without decimal place (x 0001).
- [ccc.c] = scaling with 1 decimal place (x 000.1).
- [cc.cc] = scaling with 2 decimal places (x 00.01).
- [c.ccc] = scaling with 3 decimal places (x 0.001).

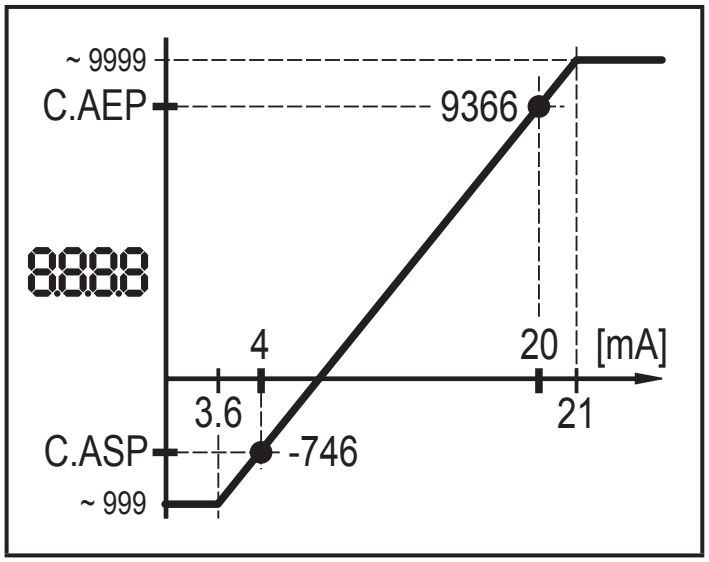
8.4.6 C.ASP/C.AEP - customer-specific analogue start/end point

Settings for scaled display values.
The parameters are only displayed when [ScAL] is set to [cccc], [ccc.c], [cc.cc] or [c.ccc].
C.ASP value: -746 ... 9745 corresponds to 4 mA.
C.AEP value: -366 ... 9366 corresponds to 20 mA.

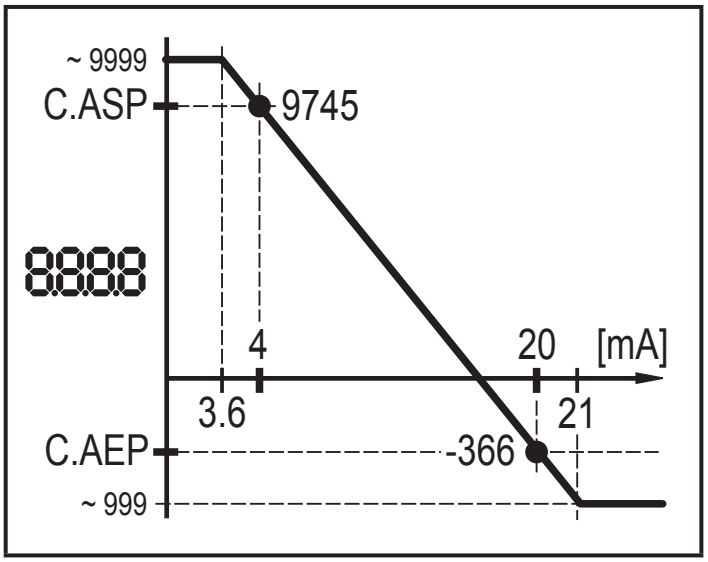
If a scaling is set via [ScAL], the C.AEP value also has to be adapted accordingly:

With [ScAL] = [ccc.c] → C.AEP value x 10
With [ScAL] = [cc.cc] → C.AEP value x 100
With [ScAL] = [c.ccc] → C.AEP value x 1000

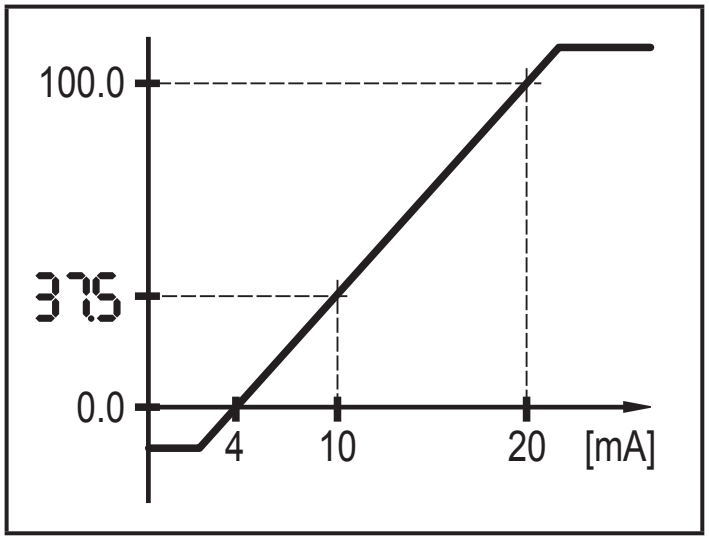
All displayed current values are interpolated based on a 2-point approximation ([SP1]+[rP1], [FH1]+[FL1], [cFH]+[cFL], [Lo]+[Hi]).
IO-Link process data and parameters are not influenced by scaling.



C.ASP = min. value
C.AEP = max. value



C.ASP = max. value
C.AEP = min. value



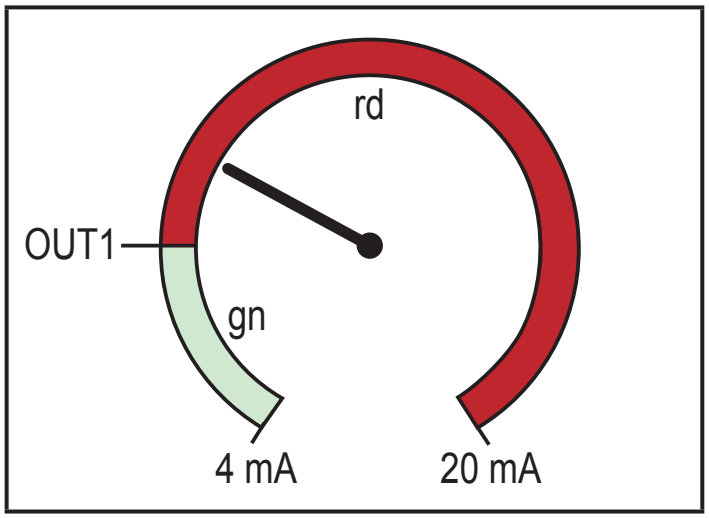
Example with scaled display value

Menu setting example	
ScAL	ccc.c
C.ASP	0.0
C.AEP	100.0
Input	10 mA
Display	37.5

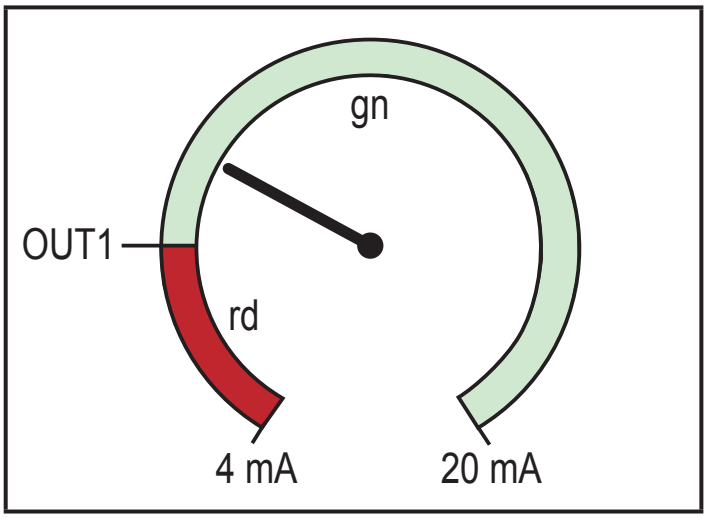
8.4.7 coLr – display colours and colour changes

Assignment of the display colours "red" and "green" within the measuring range.

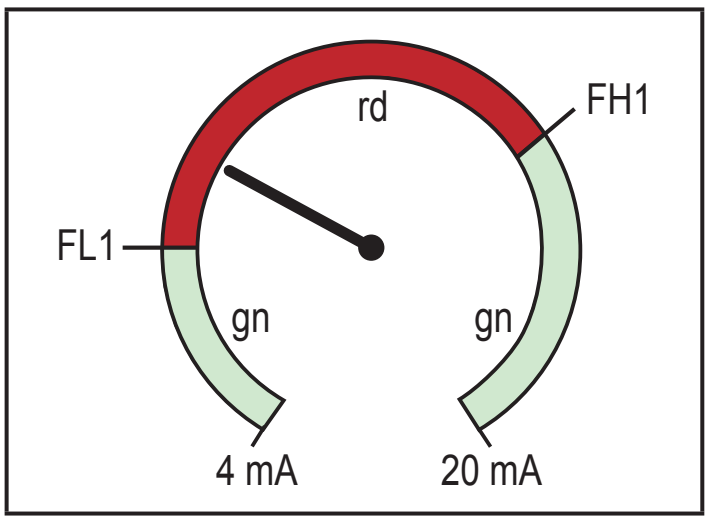
- [rEd] = continously red (independent of the measured value).
- [GrEn] = continously green (independent of the measured value).
- [r1ou] = red when OUT1 switches.
- [G1ou] = green when OUT1 switches.



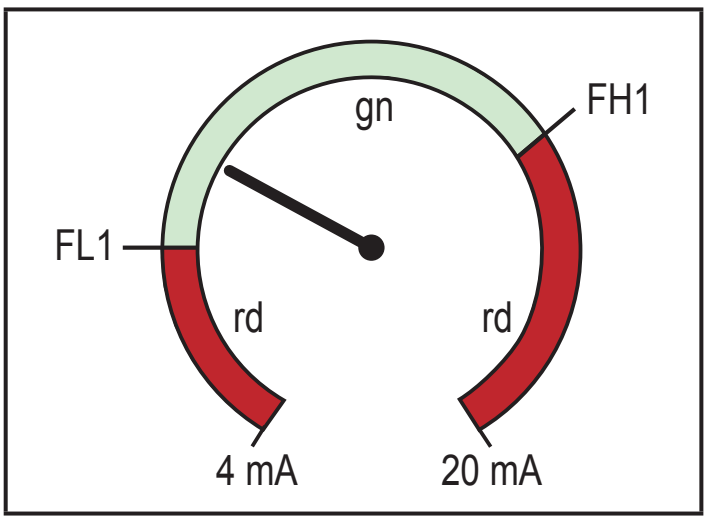
Hysteresis function with [r1ou]



Hysteresis function with [G1ou]



Window function with [r1ou]



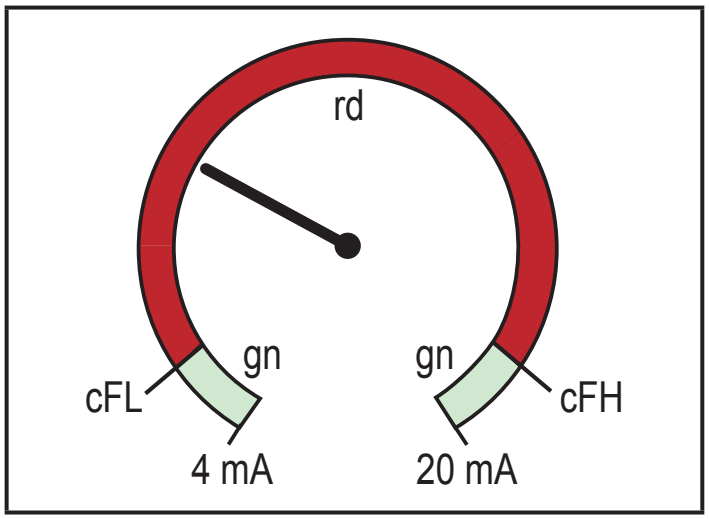
Window function with [G1ou]

- [r-cF] = red when the measured value is between the values [cFL] and [cFH].
- [G-cF] = green when the measured value is between the values [cFL] and [cFH].

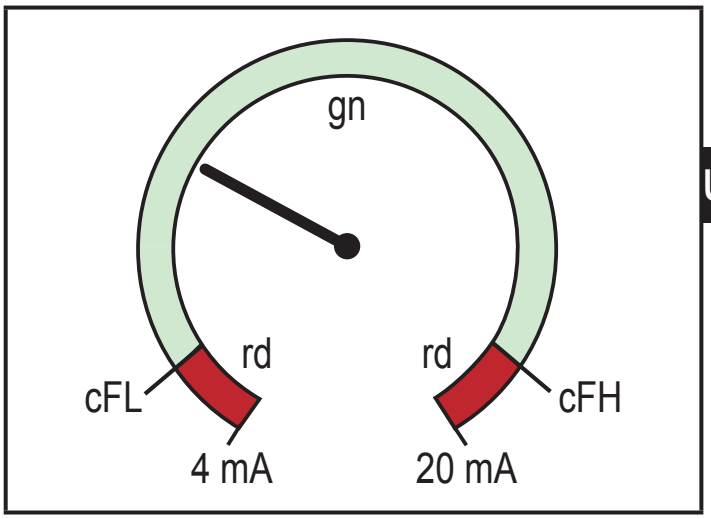
8.4.8 cFH/cFL – upper/lower value for colour change

If [coLr] is set to [r-cF] or [G-cF]:

▶ Select [cFH] and set the upper limit.
Setting range corresponds to the measured values. The lowest setting value is [cFL].
▶ Select [cFL] and set the lower limit.
Setting range corresponds to the measured values. The highest setting value is [cFH].



Function [r-cF]



Function [G-cF]

For b/w printouts: gn = green, rd = red

8.4.9 diS – refresh rate of the displayed value

- [OFF] = the measured value display is deactivated in the operating mode.
- [d1] = update of the measured values every 50 ms.
- [d2] = update of the measured values every 200 ms.
- [d3] = update of the measured values every 600 ms.

Even with an unsteady current value, [d1] provides optimum readability.

8.4.10 Lo/Hi – min/max measured input values

- [Lo] = minimum measured value
- [Hi] = maximum measured value

Delete memory:
▶ Select [HI] or [Lo].
▶ Press and hold [▲] or [▼] until [----] is displayed.
▶ Briefly press [●].

8.4.11 dAP – damping

Damping of the measured analogue value.
Setting also influences the set point, the IO-Link process data and the display.

Value: 0.000...4.000 s (T value: 63 %).
At 0.000 damping is not active.

8.5 Parameters via IO-Link

The following functions or parameters are only available via IO-Link tools.

8.5.1 C.uni – customer-specific unit

Customer-specific unit with max. 4 characters.

8.5.2 S.Loc – software locking

Value: ON/OFF
The device is locked for local menu settings.

Unlocking only via IO-Link.

8.5.3 Application-specific tag

Customer-specific application description, max. 32 characters long.
Value: “ *** ” / can be freely defined by the customer

8.5.4 Reset [Hi] and [Lo] memory

Reset of both memories: [Hi] and [Lo].

9 Parameter setting

During parameter setting the device remains in the operating mode.
It continues its monitoring functions with the existing parameters until the parameter setting has been completed.

9.1 Parameter setting in general

Each parameter setting consists of 6 steps:

Step		Button
1	Change from operating mode to parameter setting mode.	[●]
2	Select the requested parameter [SP1], [rP1] etc.	[▼] or [▲]
3	Change to the programming mode of the parameter.	[●]
4	Select or change the parameter value.	[▼] or [▼] > 2 s
5	Acknowledge the set parameter value.	[●]
6	Return to the operating mode.	[esc]

9.2 Programming example [ou1] – output function for OUT1

Step		Display
1	Change from operating mode to parameter setting mode.	
	▶ Press [●] to get to the menu. > The first parameter is displayed.	
2	Select the requested parameter, here [ou1].	
	▶ Press [▼] until [EF] is displayed. ▶ Press [●] to get to the extended functions menu. > The first parameter of the extended functions is displayed.	 
	▶ Press [▼] until the requested parameter [ou1] is displayed.	
3	Change to the programming mode of the parameter.	
	▶ Press [●] to change to the programming mode. > The currently set parameter value is displayed.	

4	Select or change the parameter value (here e.g. [Fnc]).
▶ Press [▼] or [▲] for min. 2 s. > The currently set parameter value flashes (here e.g. [Hno]). > After 2 s.: - value is changed continuously by keeping the button pressed. - value is changed incrementally by pressing the button once. Numerical values (→ 9.3.4)	 
5	Acknowledge the set parameter value.
▶ Briefly press [●]. > The parameter is displayed again. > The new setting value is saved.	
Setting of other parameters: ▶ Press [▼] or [▲] until the requested parameter is displayed.	
6	Return to the operating mode.
▶ Press [esc]. - Press [▼] or [▲] several times until the current measured value is displayed. - Or wait for the timeout function (approx. 30 s). > The device is again in the operating mode. > The current value is displayed.	

9.3 Notes on programming

9.3.1 Lock / unlock

The device can be locked electronically to prevent unauthorised setting.
Set parameter values and settings can be displayed but not changed.

To lock the device:
▶ Make sure that the device is in the normal operating mode.
▶ Press [esc] + [▲] simultaneously for 10 s.
> [Loc] is displayed.
> Device is locked.
> [Loc] is briefly displayed if you try to change parameter values.

For unlocking:
▶ Press [esc] + [▲] simultaneously for 10 s.
> [uLoc] is displayed.

On delivery the device is not locked.

Customer locking
If [C.Loc] is displayed when an attempt is made to modify a parameter value, an IO-Link communication is active (temporary locking).

Software locking
If [S.Loc] is displayed, the sensor is permanently locked via software. This locking can only be removed with an IO-Link parameter setting software.

9.3.2 Timeout

If no button is pressed for 30 s during parameter setting, the device returns to the operating mode with the unchanged value.

9.3.3 Change from the main menu to the extended functions menu

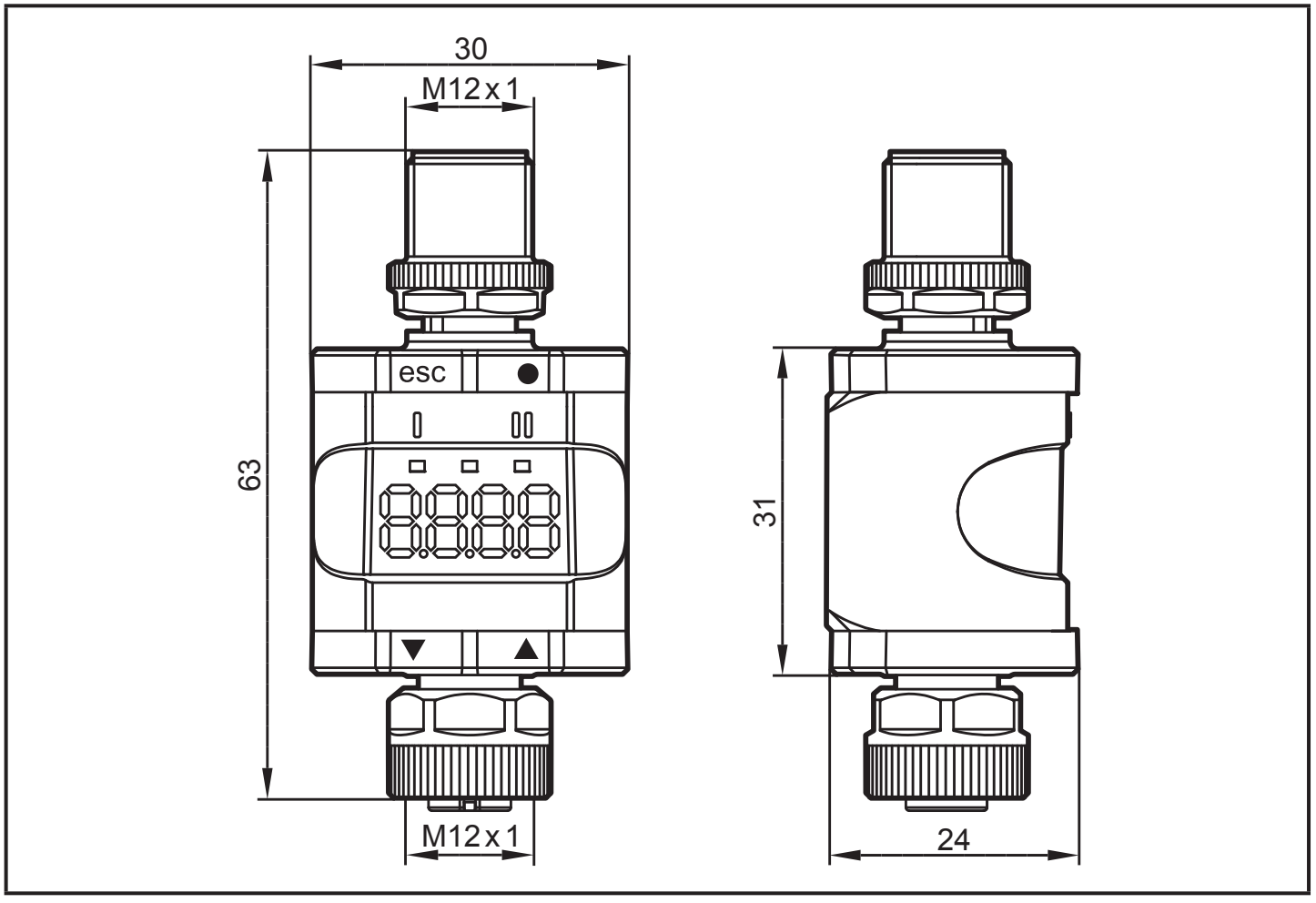
► Press [●] to get to the menu.
► Press [▲] or [▼] until [EF] is displayed.
► Press [●].
> The first parameter of the extended functions menu is displayed ([rES]).

9.3.4 Numerical entries with [▼] or [▲]

► Press [▲] or [▼] for minimum 2 s.
> After 2 s:
- value is changed continuously by keeping the button pressed.
- value is changed incrementally by pressing the button once.

Value is incrementally reduced with [▼] and increased with [▲].

10 Scale drawing



Dimensions [mm]

11 Technical data

Operating voltage DC	[V]	18...30
Nominal voltage DC	[V]	24
Power consumption	[W]	≤ 1
Auxiliary supply for sensor	[V]	from the operating voltage
Current for sensor	[mA]	≤ 800
Sensor type		sensor with analogue current output: 4…20 mA 2-wire or 3-wire sensor
Accuracy	[% FS]	0.5
Protection rating		IP 67 *
Ambient temperature	[°C]	-25…60 **
Storage temperature	[°C]	-25…70

Max. perm. relative humidity	[%]	90 (31 °C) linearly decreasing to 50 (40 °C) non condensing
Maximum operating altitude	[m]	2000 above sea level
Permissible air pressure	[hPa]	750...1060
Connectors		M12 connector, 4-pole M12 socket, 5-pole

*) With screwed and firmly tightened M12 connectors
(→ 6 Electrical connection)

**) For IO-Link operating mode and turned off display: -25...70 °C

11.1 IO-Link device

Transmission type		COM2 (38.4 kbaud)
IO-Link revision		1.1
SDCI standard		IEC 61131-9
IO-Link device ID		610 d / 00 02 62 h
SIO mode		yes
Input load current at input C/Q to V0 (ILL)	[mA]	50
Required master port type		A
Process data analogue		IN: 1
Process data binary		IN: 1
Min. process cycle time	[ms]	3.2

11.2 Approvals/standards

EC declarations of conformity, approvals etc. can be downloaded at:
www.ifm.com

11.2.1 Reference to UL

The electrical supply must only be made via SELV/PELV circuits.
Supply of the device to limited energy according to chapter 9.4 UL 61010-1.
The external circuits have to be isolated as required by figure 102 in UL 61010-2-201.

The device is designed to be safe at least under the following conditions:

- Indoor use
- Altitude up to 2000 m
- Maximum relative humidity 90% RH, non-condensing
- Pollution degree 3
- For connecting the device and the IO-Link devices use UL certificated cables of
- category CYJV 2/7/8 having suitable ratings.
- IP class was not evaluated by UL.
- No special treatment is needed during cleaning the device.

12 Fault correction

Display	LED		Error	Fault correction
	I	Power		
OFF	○	○	Supply voltage too low.	Check/correct the supply voltage (→ 6) and (→ 11).
SC1	✱	--	Excessive current at switching output OUT1.	Check switching output OUT1 for short-circuit or excessive current. Remove the fault.
C.Loc	--	--	Parameter setting via pushbuttons locked due to active IO-Link transmission.	Wait until parameter setting via IO-Link is finished.
S.Loc	--	--	Parameter setting via pushbuttons disabled by software.	Unlocking only possible via IO-Link interface/IO-Link parameter setting software.
Loc	--	--	Parameter setting via pushbuttons disabled.	Unlock buttons (→ 9.3.1).
OL	--	●	Process value too high (measured current > 21 mA).	Check connected sensor and current range (→ 4.3.1).
UL	--	●	Process value too low (measured current < 3.6 mA).	Check the setting for internal or external analogue termination for OUT2 (→ 8.4.2).
nPrb	--	●	No sensor connected to the analogue input.	

Legend:

○ off
● on
✱ flashing
-- any

13 Maintenance, repair, disposal

13.1 Maintenance

The device is maintenance-free.

13.2 Cleaning the housing surface

▶ Disconnect the device.
▶ Clean the device from dirt using a soft, chemically untreated and dry cloth.

Micro-fibre cloths without chemical additives are recommended.

13.3 Repair

The device must only be repaired by the manufacturer.

▶ Observe the safety instructions.

13.4 Disposal

▶ Dispose of the device in accordance with the national environmental regulations.

14 Parameter list and factory settings

Parameter		Factory settings	User settings
SP1/FH1	Set point OUT1	6.00	
rP1/FL1	Reset point OUT1	5.00	
A.trm	Analogue termination OUT2	On	☐ OFF ☐ On
ou1	Output function OUT1	Hno	☐ Hno ☐ Hnc ☐ Fno ☐ Fnc
dS1	Switching delay OUT1	0.0 s	
dr1	Switch-off delay OUT1	0.0 s	
ScAL	Scaling value	OFF	☐ OFF ☐ cccc ☐ ccc.c ☐ cc.cc ☐ c.ccc
C.ASP	Customised analogue start point	----	
C.AEP	Customised analogue end point	----	
C.uni *	Customised unit	mA	
coLr	Colour display	rEd	☐ rEd ☐ GrEn ☐ r1ou ☐ G1ou ☐ r-cF ☐ G-cF
cFH	Colour change, upper limit value	20.00	
cFL	Colour change, lower limit value	4.00	
diS	Display refresh rate	d2 (200 ms)	☐ OFF ☐ d1 (50 ms) ☐ d2 (200 ms) ☐ d3 (600 ms)
Lo	Lower measured input value	----	
Hi	Upper measured input value	----	
dAP	Damping of the measured analogue value	0.060 s (= 60 ms)	

*) can only be configured via IO-Link and parameter setting software (→ 8.5)