



Operating instructions
Current loop display
DX1041

GB

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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 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).
- 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.
- Replace damaged units, otherwise the technical data and safety will be impaired.
- Observe applicable documents.

3 Intended use

The device displays an analogue current signal.

The device is intended for panel mounting. The fixing elements supplied are suited for a wall thickness up to 6 mm.

4 Function

This device measures an analogue current signal and indicates the current value. The measured value can be shifted, scaled or linearized via the available parameters. This allows conversion to a different unit of measurement, which is then displayed.

Operation and parameter setting are carried out via three front keys.

5 Installation

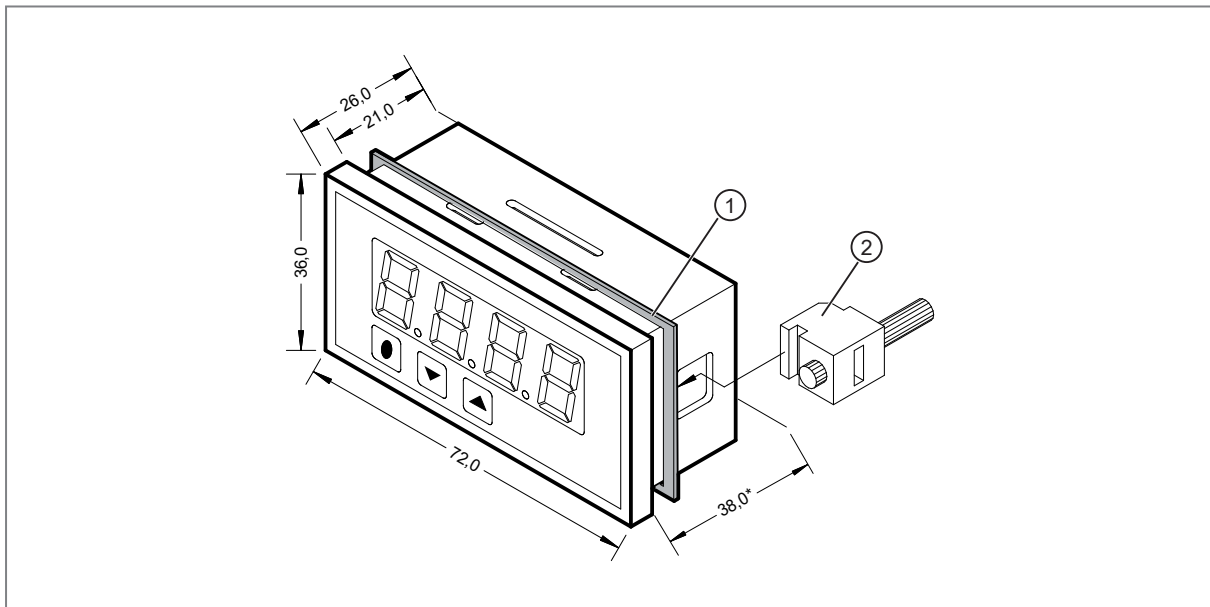


Fig. 1: Installation

1: sealing

2: fixing element

*Installation depth including connection terminal



The fixing elements supplied are suited for a wall thickness up to 6 mm.

- ▶ Make a panel cut-out (68 x 33 mm).
- ▶ Remove the fixing elements from the device.
- ▶ Insert the device into the panel cut-out.
- ▶ Check the seal to make sure it fits securely.
- ▶ Reinsert the fixing elements into the device and tighten the 2 clamping screws by hand. Then use a screwdriver to tighten them another half a turn.
Maximum tightening torque: 0.1 Nm

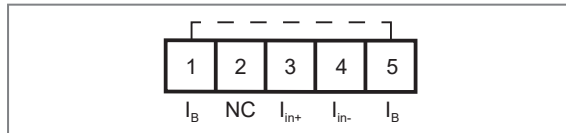
6 Electrical connection



The unit must be connected by a qualified electrician.

- ▶ Observe the national and international regulations for the installation of electrical equipment.
- ▶ Disconnect power.
- ▶ Connect the unit as follows:

6.1 Wiring



NC: not used

Fig. 2: Wiring

Pin 1 and pin 5 are internally linked.

- ▶ Connect the current input I_{in+} to the analogue current output of the sensor.
- ▶ Either connect I_{in-} to the analogue current input of another device to pass on the current signal, or to L- of the sensor.

The device measures the current flowing between I_{in+} and I_{in-} .

6.2 Connection examples

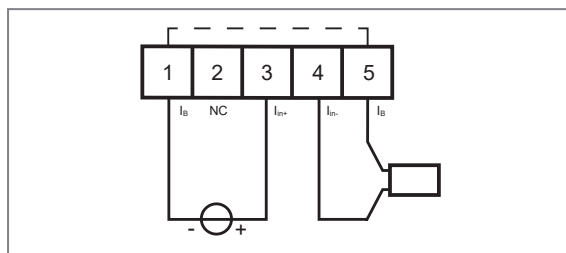


Fig. 3: 2-wire transmitter

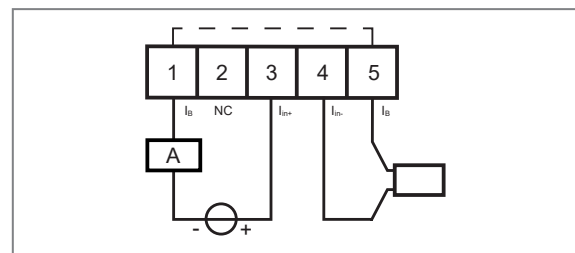


Fig. 4: 2-wire transmitter with transfer of the current signal to another device

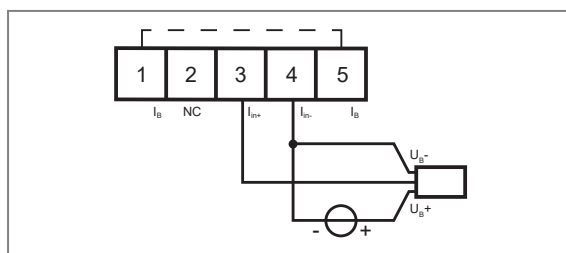


Fig. 5: 3-wire sensor

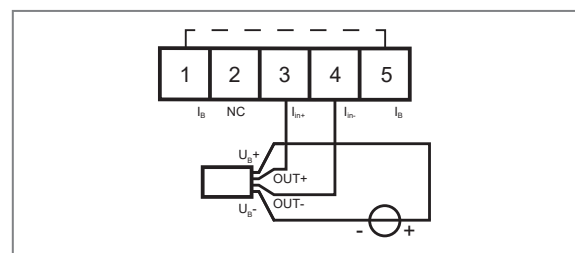


Fig. 6: 4-wire sensor



The voltage source is only used to supply the sensor.
The display is supplied from the analogue signal.

7 Operating and display elements

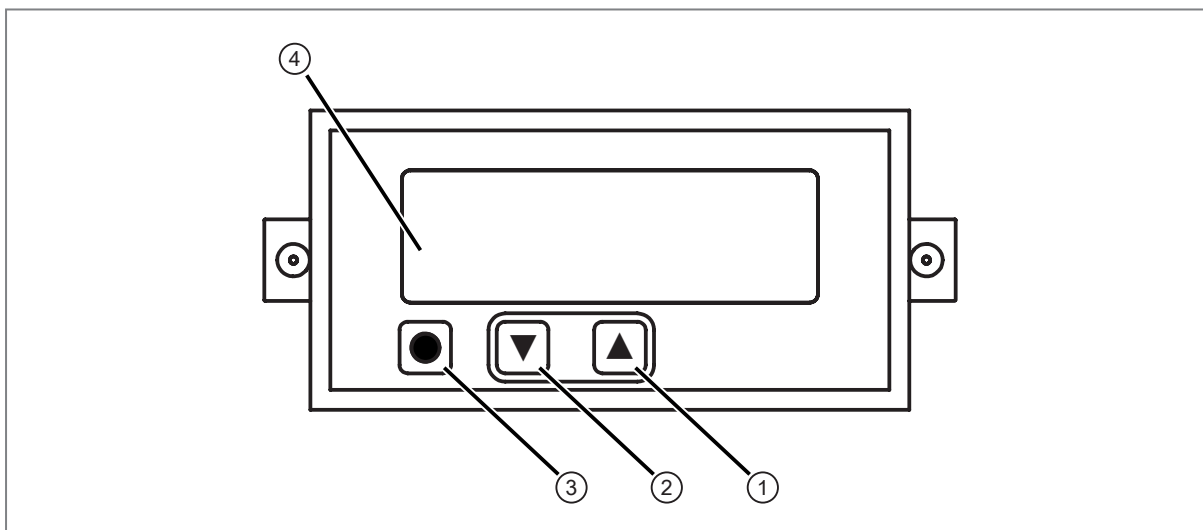
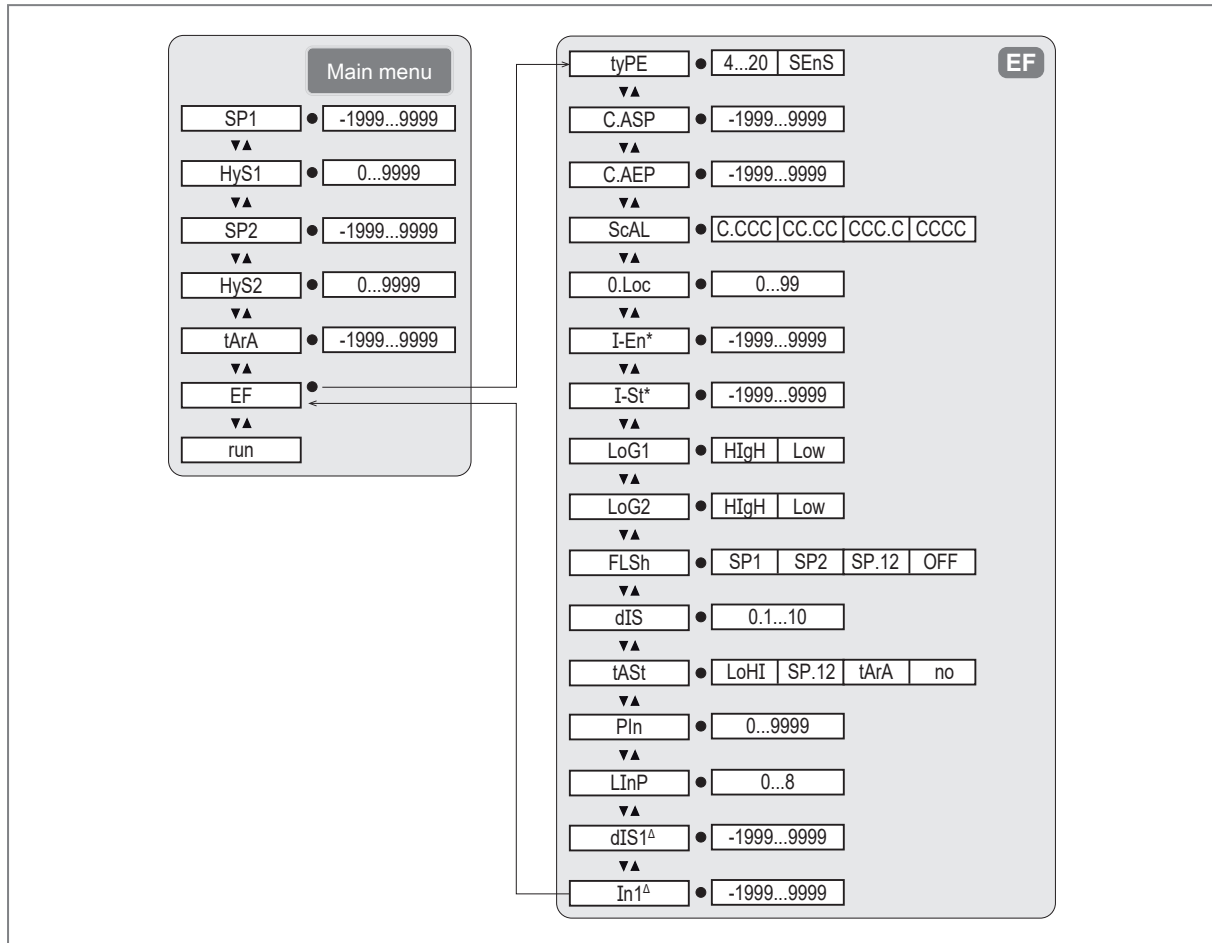


Fig. 7: Operating and display elements

- 1: [▲] key
- 2: [▼] key
- 3: [●] key
- 4: Display

8 Menu

Press the operating key [●] > 1 s to navigate from the process value display to the main menu and from there to the submenus. See also [Parameter setting \(→ 11\)](#).



* Only if [tyPE] = 4...20.

^Δ Only if [LInP] > 0.

If [LInP] > 1, the parameters [dIS2] / [InP2] etc. up to max. [dIS8] / [InP8] also exist.

Press [run] to exit the menu and return from the parameter setting mode to the operating mode.

9 Parameter setting

Parameters can be set before installation or during operation.



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

Parameter setting process in general:

Intention		Action
Change from the operating to the parameter setting mode		[●] > 1 s
Select the requested parameter		Press [▼] / [▲] to navigate to the parameter (e.g. "SP1"), then press [●] < 1 s.
Modify the parameter value	Select parameter value	Press [▼] / [▲] to navigate to the parameter value (e.g. "CCC.C"). Press [●] < 1 s to save the value.
	Enter numerical value	Press [●] < 1 s to jump to the desired position. Change the value using [▼] / [▲]. After the 4th digit, press [●] again to save the value. The 4th digit (left) can be negative for some parameters.
Cancel input		Press [▼] and [▲] simultaneously. The parameter value is reset to the value before the entry.
Return to the operating mode		> 30 seconds (timeout) OR Press [▼] and [▲] simultaneously. OR Select the [run] menu item.

9.1 Parameters of the main menu

9.1.1 SP1 / SP2

Threshold for the switch point. When the switch point is exceeded or not reached, the device signals an alarm by a flashing of the displayed value.

Whether exceeding or not reaching the switch point triggers the alarm is defined separately for [SP1] and [SP2] via the parameters [LoG1] and [LoG2].

With the parameter [FLSh], the alarm (flashing display) can be activated/deactivated separately for both switch points.

► Select [SP1] and enter the limit value (display value) for the alarm:

- -1999...9999

► Select [SP2] and enter the limit value (display value) for the alarm:

- -1999...9999

9.1.2 HyS1 / HyS2

Hysteresis for deactivating the alarm. The configured value is an absolute value that is deducted from the display value.

Example:

SP1 = 1000; HyS1 = 200; LoG1 = HlgH → The alarm is activated at a display value ≥ 1000 and deactivated at a display value < 800 .

► Select [HyS1] and set the desired value of the hysteresis for SP1:

- 0...9999

► Select [HyS2] and set the desired value of the hysteresis for SP2:

- 0...9999

9.1.3 tArA

Parameter for setting the zero point shift.

The configured value is added to the linearized value. In this way, the characteristic line can be shifted by the selected amount.

► Select [tArA] and enter the desired value of the zero point shift:

- -1999...9999



During operation, this parameter can be taught by simultaneously pressing the [▼] + [▲] keys >1 s. For this, the parameter [tASt] must be set to [tArA].

9.1.4 EF — extended functions

The parameter opens the extended functions menu.

9.2 Parameters of the extended functions (EF)

9.2.1 tyPE

Parameters for calibrating the measuring input.

The following variants are possible:

- [4...20]: factory calibration without sensor signal
- [SEnS]: calibration with applied sensor signal



Calibration makes it possible to assign the current analogue input value as [I-St] or [I-En] to the set [C.ASP] or [C.AEP].

Example: A distance sensor (4...20 mA) is to determine the drilling depth. Max. drilling depth: 80 mm

✓ [tyPE] [SEnS] is selected.

► Bring the drill to the surface of the workpiece (0 mm drilling depth).

► Select [C.ASP].

► Enter 0 as [C.ASP].

► Select [CAL] and confirm with [•].

▷ The device assigns the display value 0 to the analogue input value.

► Move the tool 80 mm further (80 mm drilling depth).

► Select [C.AEP].

► Enter 80 as [C.AEP].

► Select [CAL] and confirm with [•].

▷ The device assigns the display value 80 to the analogue input value.

▷ In the operating mode, the device calculates the drilling depth from the analogue input value and displays it in mm.

9.2.2 C.ASP

The value the device displays at the analogue input value [I-St].

By default, this parameter is set to the initial value of the measuring range of 4 mA. This value can be adjusted.

- Select [C.ASP] and set the initial value of the measuring range (display value):
 - -1999...9999

9.2.3 C.AEP

The value the device displays at the analogue input value [I-En].

By default, this parameter is set to the final value of the measuring range of 20 mA. This value can be adjusted.

- Select [C.AEP] and set the final value of the measuring range (display value):
 - -1999...9999

9.2.4 ScAL

Parameter for scaling the displayed value.

- Select [ScAL] and set the position of the decimal point in the display:
 - C.CCC
 - CC.CC
 - CCC.C
 - CCCC

9.2.5 0.Loc

Setting of the zero point steadying

With this parameter it is possible to preselect a value range around the zero point for which the display shows a zero.

Example:

If [0.Loc] = 10, the device displays a zero in a value range of -10...10. Values below this are displayed from -11; values above this from 11.

- Select [0.Loc] and set the desired value for zero point steadying:
 - 0...99

9.2.6 I-En

End of the measuring range

This parameter defines the current value at the measurement input at which the device displays the value of [C.AEP].

- Select [I-En] and enter the current value for the end of the measuring range:
 - -1999...9999



This parameter is only available with [tyPE] = [4...20].

9.2.7 I-St

Start of the measuring range

This parameter defines the current value at the measurement input at which the device displays the value of [C.ASP].

- Select [l-St] and enter the current value for the start of the measuring range:
- -1999...9999



This parameter is only available with [tyPE] = [4...20].

9.2.8 LoG1 / LoG2

This parameter determines whether exceeding or not reaching the switch point triggers an alarm.

- Select [LoG1] and set when the alarm for SP1 should be active:
 - HlgH: if SP1 is exceeded
 - Low: if SP1 is not reached
- Select [LoG2] and set when the alarm for SP2 should be active:
 - HlgH: if SP2 is exceeded
 - Low: if SP2 is not reached

9.2.9 FLSh

This parameter determines at which alarm the display flashes.

- Select [FLSh] and set when the display flashes:
 - SP1: display flashes in case of threshold violation SP1
 - SP2: display flashes in case of threshold violation SP2
 - SP.12: display flashes both in case of threshold violation SP1 and in case of threshold violation SP2
 - OFF: display does not flash

9.2.10 dIS

Refresh rate of the displayed measured value

- Select [dIS] and set the desired value in seconds:
 - 0.1...10



The display moves up in increments of 0.1 up to 1 second and in increments of 1.0 from 1 second.

9.2.11 tASt

Configuration of the [▼] / [▲] keys for functions during operation

- Select [tASt] and set the desired function for the keys:
 - LoHl: Min/max value display
 During operation, the minimum values can be displayed via the [▼] key and the maximum values via the [▲] key. These values are then displayed for 5 seconds. Then the display returns to normal operation.
 If the device is restarted and by simultaneously pressing the [▼] + [▲] keys, the stored min/max values are deleted.
 - SP.12: Switch point correction
 During operation, the values of SP1 and SP2 can be corrected with the [▼] / [▲] keys.

- **tArA:** Teaching of zero point shift
During operation, the display can be tared to zero with the current display value by simultaneously pressing the [▼] + [▲] keys >1 s. This zero point shift is permanently stored. The device confirms correct taring by showing [0000] in the display.
- **no:** During operation, the [▼] / [▲] keys have no function.

9.2.12 PIn

With this parameter you can set the code for removing the parameter setting lock. By default, the code is 1-2-3-4.

► Select [PIn] and set the desired code:

- 0...9999



By changing to the operating mode with [run] and selecting [Loc], the parameter setting lock becomes active.

9.2.13 LInP

In addition to the start and end values, up to 8 further linearization points can be defined to linearize non-linear sensor values. The parameter [LInP] sets the number of these linearization points.

According to the number set here, the device displays the additional parameters [dIS1] and [In1], [dIS2] and [In2], etc. Using these parameters, the respective linearization points are defined. The device only displays these parameters for the configured number of linearization points in [LInP].

► Select [LInP] and enter the desired number of linearization points:

- 0...8

9.2.14 dISx

This parameter sets the display value for the corresponding analogue value of the relevant linearization point.

► Select [dISx] and set the desired display value:

- -1999...9999

9.2.15 Inx

This parameter sets the analogue value for the corresponding display value of the relevant linearization point.

► Select [Inx] and set the desired analogue value:

- -1999...9999

9.3 Restore factory settings

In order to put the device into a defined basic state, it is possible to perform a reset and restore the factory settings as follows:

► Switch off the loop current of the device.

► With the [●] key pressed, switch on the loop current (between 3.8 mA and 20 mA) and keep the [●] key pressed until the device displays [----].

As a result, the device is returned to the original settings it had when it left the factory.

All application-related settings are lost.

▷ The factory settings are restored.

10 Operation

After switching the system on, the device displays the software version for 3 seconds. Then the device switches into operating mode. Display indications correspond to the parameter setting.

Alarms are optically indicated by flashing of the 7-segment display. A display overflow is indicated by [OL], a display underflow by [UL].

In operating mode, the [▲] / [▼] keys can be used to perform various functions. These depend on the [tASt] parameter setting:

[tASt] parameter setting	Key	Function
LoHI (Min/Max value display)	[▲]	Display maximum value
	[▼]	Display minimum value
	[▲] + [▼]	Reset displayed maximum/minimum value
SP.12 (Switch point correction)	[▲] >1 s	Change upper limit value
	[▼] >1 s	Change lower limit value
	[▲] + [▼]	No function
tArA (Teaching of zero point shift)	[▲]	No function
	[▼]	No function
	[▲] + [▼] >1 s	Tare display to zero
no	[▲] / [▼]	No function of the [▲] / [▼] keys

11 Troubleshooting

Error	Cause	Troubleshooting
The display indicates [OL] (permanent overflow)	The measured value at the input is too high.	Check the measuring circuit.
	With a selected input with a low sensor signal, it is only connected on one side or the input is open.	Check the measuring circuit and settings.
	Not all of the activated linearization points are configured.	Check if the relevant parameters are set correctly.
Display indicates [UL] (permanent underflow)	The measured value at the input is too small.	Check the measuring circuit.
	With a selected input with a low sensor signal, it is only connected on one side or the input is open.	Check the measuring circuit and settings.
	Not all of the activated linearization points are configured.	Check if the relevant parameters are set correctly.
	The wrong input type is selected. (Only temperature measurements and 4...20 mA display this error message).	Check that the correct input type is selected.
	Incorrect wiring	Check the wiring, contacts and connections.
The word [HELP] lights up in the display	Error in the configuration memory	Restore the factory settings and newly configure the device.
The parameters for parameter setting of the input are not available	The programming lock is activated.	Enter the correct code.
[Err1] lights up in the display		Please contact the manufacturer.
[Err2] lights up in the display	Loop current < 3.5 mA	Check the measuring circuit.
The device does not respond as expected	Current parameterization of the device is not known.	Restore the factory settings and newly configure the device.

12 Maintenance, repair and disposal

Cleaning the unit:

- ▶ Disconnect the unit from the voltage supply.
- ▶ Clean the unit from dirt using a soft, chemically untreated and dry micro-fibre cloth.

The unit is maintenance-free.

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

13 Factory settings

Parameter	Factory settings	User settings
SP1	800	-1999...9999
HyS1	0	0...9999
SP2	1200	-1999...9999
HyS2	0	0...9999
tArA	0	-1999...9999
tyPE	SEnS	• 4...20 • SEnS
C.ASP	400	-1999...9999
C.AEP	2000	-1999...9999
ScAL	CC.CC	• C.CCC • CC.CC • CCC.C • CCCC
0.Loc	0	0...99
I-En	20.00	-1999...9999
I-St	04.00	-1999...9999
LoG1	HlgH	• HlgH • Low
LoG2	HlgH	• HlgH • Low
FLSh	OFF	• SP1 • SP2 • SP.12 • OFF
dIS	1.0	0.1...10
tASt	no	• LoHI • SP.12 • tArA • no
PIn	1234	0...9999
LInP	0	0...8
dISx		-1999...9999
Inx		-1999...9999