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71647951
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Valid as of version
01.06.zz (Device firmware)

Special Documentation
Proline Promass 500

Custody transfer
Meter for gas
According to the German Weights and Measures Ordinance
HART

Endress+Hauser
People for Process Automation

Table of contents

1 About this document

1.1 Document function

This manual is Special Documentation that describes the use of the device in custody transfer measurement.

NOTICE

When installing:

▶ Follow the Operating Instructions for the device.

1.2 Using this document

1.2.1 Information on the document structure

For additional information regarding the arrangement of the parameters, along with a short description, according to the **Operation** menu, **Setup** menu, **Diagnostics** menu and the operating concept, see the Operating Instructions, "Supplementary device documentation" section

1.3 Symbols used

1.3.1 Symbols for certain types of information

Symbol	Meaning
	Tip Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
▶	Notice or individual step to be observed
1., 2., 3...	Series of steps
	Result of a step

1.3.2 Symbols in graphics

Symbol	Meaning
1, 2, 3, ...	Item numbers
1 →, 2 →, 3 →, etc.	Series of steps of individual, consecutive images
1., 2., 3., ...	Series of steps within an image

Symbol	Meaning
A, B, C, ...	Views
A-A, B-B, C-C, ...	Sections

1.4 Documentation

This manual is Special Documentation. It is not a substitute for the Operating Instructions supplied with the device.

For detailed information, refer to the Operating Instructions and other documentation on the CD-ROM provided or visit "www.endress.com/deviceviewer".

The Special Documentation is an integral part of the following Operating Instructions:

Measuring device	Documentation code
Promass F 500	BA01529D
Promass O 500	BA01532D
Promass Q 500	BA01534D
Promass X 500	BA01536D

2 Basic safety instructions

2.1 Requirements for the personnel

The personnel for installation, commissioning, diagnostics and maintenance must fulfill the following requirements:

- Trained, qualified specialists must have a relevant qualification for this specific function and task.
- Are authorized by the plant owner/operator.
- Are familiar with federal/national regulations.
- Before starting work, read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- Follow instructions and comply with basic conditions.

The operating personnel must fulfill the following requirements:

- Are instructed and authorized according to the requirements of the task by the facility's owner-operator.
- Follow the instructions in this manual.

3 Product description

The measuring device is optionally tested in accordance with OIML R137 (www.oiml.org) and has a type-examination certificate according to the German Measuring Instruments Directive (MID) from 25 July 2013 and the German Measurement and Calibration Regulation (MessEV) from 11 December 2014 for service subject to legal metrological control ("custody transfer") for gas meters.

The device is used with a legally controlled totalizer on the local display and optionally with a legally controlled output.

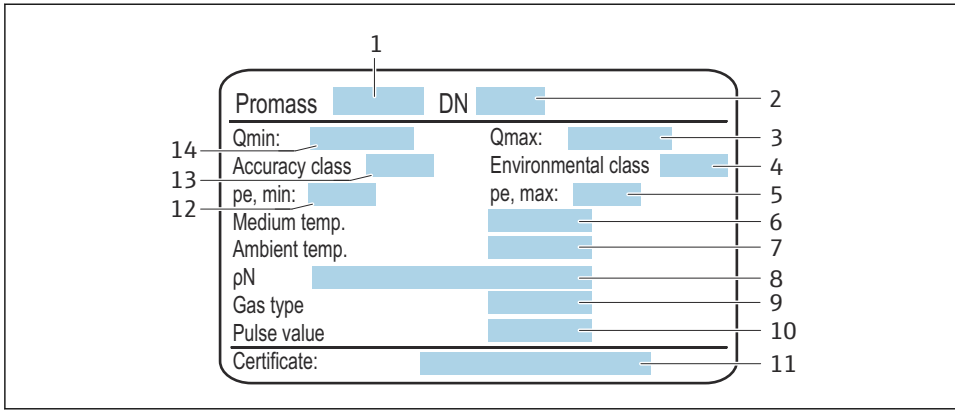
Measuring devices subject to legal metrology controls are protected against tampering by means of an electronic lock with Authorized user login and password and optional sealing of the transmitter or sensor. This electronic lock and optional seal may be unlocked or broken only by an authorized representative of the responsible authority for legal metrology controls. Operator seals are not subject to legal controls.

The corresponding Declaration of Conformity for the measuring device - as per the German Measurement and Calibration Regulation (MessEV) - was drawn up based on modules B+D:

- Module B: Type-examination in accordance with OIML R137: 2012
- Module D: Declaration of type conformity based on quality assurance of the production process.

4 Product identification

Measuring devices for use subject to legal metrology controls are supplied with the relevant marking.



1 Sensor nameplate, subject to mandatory verification

1 *Name of the sensor*
2 *Nominal diameter of sensor*
3 *Maximum permanent flowrate Qmax*
4 *Permitted environmental classes*
5 *Maximum medium pressure*
6 *Temperature of medium*
7 *Ambient temperature*
8 *Reference density at reference temperature and reference pressure*
9 *Medium type*
10 *Pulse value of pulse output*
11 *Number of certificate*
12 *Minimum medium pressure*
13 *Accuracy class*
14 *Minimum permanent flowrate Qmin*

5 Operation and commissioning

5.1 Operating conditions

Please refer to the relevant type-examination certificates for the operating conditions.

- An entry is generated in the custody transfer logbook each time the power supply is interrupted. Only interrupt the power supply if this is absolutely necessary. → 25
- Shielded signal cables must be used for operation.

	Promass F	Promass O	Promass X	Promass Q
Ambient temperature range	−40 to +55 °C (−40 to 131 °F)			
Gas temperature range	−40 to +55 °C (−40 to 131 °F)			
Maximum working pressure bar	100 bar (1 450 psi)	258 bar (3 741 psi)	100 bar (1 450 psi)	100 bar (1 450 psi)

5.1.1 Measuring ranges

Promass F

DN		Minimum flow Q_{min} [kg/h]	Maximum flow Q_{max} [kg/h]	Minimum density permitted at minimum medium pressure $\rho_{e,min}$[kg/m³]
[mm]	[in]			
8	⅜	3.6	22.5 × $\rho_{pe,min}$ 1)	0.9
15	½	12	60 × $\rho_{pe,min}$	1.0
25	1	30	200 × $\rho_{pe,min}$	0.8
40	1½	135	400 × $\rho_{pe,min}$	1.7
50	2	210	600 × $\rho_{pe,min}$	1.8
80	3	550	1200 × $\rho_{pe,min}$	2.3
100	4	1260	2000 × $\rho_{pe,min}$	3.2
150	6	1860	3000 × $\rho_{pe,min}$	3.1
250	10	5100	8000 × $\rho_{pe,min}$	3.2

1) density at minimum medium pressure.

Promass O

DN		Minimum flow Q_{min} [kg/h]	Maximum flow Q_{max} [kg/h]	Minimum density permitted at minimum medium pressure $\rho_{e,min}$[kg/m³]
[mm]	[in]			
80	3	550	1200 × $\rho_{pe,min}$	2.3
100	4	1260	2000 × $\rho_{pe,min}$	3.2
150	6	1860	3000 × $\rho_{pe,min}$	3.1
250	10	5100	8000 × $\rho_{pe,min}$	3.2

Promass X

DN		Minimum flow Q_{min} [kg/h]	Maximum flow Q_{max} [kg/h]	Minimum density permitted at minimum medium pressure $\rho_{e,min}$[kg/m³]
[mm]	[in]			
350	14	10200	16000 × $\rho_{pe,min}$	3.2

Promass Q

DN		Minimum flow Q_{min} [kg/h]	Maximum flow Q_{max} [kg/h]	Minimum density permitted at minimum medium pressure $\rho_{e,min}$[kg/m³]
[mm]	[in]			
25	1	24	253 × $\rho_{pe,min}$	0.48
50	2	86	860 × $\rho_{pe,min}$	0.5
80	3	293	2057 × $\rho_{pe,min}$	0.73
100	4	755	5208 × $\rho_{pe,min}$	0.73
150	6	1058	7054 × $\rho_{pe,min}$	0.75
200	8	1600	10416 × $\rho_{pe,min}$	0.77
250	10	3295	17812 × $\rho_{pe,min}$	0.93

5.2 As-delivered state

Measuring devices supplied in accordance with a type-examination certificate as per the German Measurement and Calibration Regulation (MessEV) are delivered with custody transfer measurement enabled and thus electronically and mechanically locked. Changes to the measuring device's custody transfer-related configuration may only be made by specially qualified Endress+Hauser service technicians or by authorized representatives of the local authority responsible for legal metrology controls.

In its condition as supplied to the customer, the parameters for custody transfer have been set to the standard values.

Custody transfer parameters	Value
Custody transfer mode	On
Custody transfer counter	1
Timestamp last custody transfer	Activation at the factory

5.3 Installation

If possible, Promass Coriolis gas meters should be de-energized when installing. The measuring system must be appropriately equipped with a gate valve. This ensures that, if necessary, a zero flow can be achieved for the purpose of checking or adjusting the zero point. The gate valve does not need to be locked.

The Promass Coriolis gas meter must be operated in conjunction with an uninterruptible power supply (emergency power supply in accordance with EN 60654-2).

5.3.1 Zero adjustment

Following installation of the device, a zero adjustment must be performed and the zero point determined must be entered. The device must not be in custody transfer mode during this process.

Disable the custody transfer mode → 16

For optimum measuring performance at very low flow rates (permitted Q_{min} → 8), zero adjustment must be performed at least five times.

The average between the minimum and maximum measured zero point must be saved in the measuring device. For this, the measured zero point of the device is noted down after every successful zero adjustment and the procedure is repeated five times.

The current device zero point can be read in the **Zero point** parameter:
Expert menu → **Sensor** submenu → **Calibration** submenu → **Zero point** parameter

Preparing to perform a zero adjustment

1. The zero adjustment must be performed under operating conditions.
2. Run the system until the operating conditions have been reached. This usually takes five minutes at maximum flow.
3. Stop the flow (v = 0 m/s).
4. Check the shut-off valves for leaks.
5. Check the necessary process pressure.

Zero adjustment via local operation

Performing the zero adjustment

1. Under Setup → Advanced setup → Sensor adjustment start the **Zero adjustment** wizard.
2. Confirm the process conditions with ☑.
3. If Done is indicated for the performance of the zero adjustment in the **Status** parameter, press ☑ to confirm.
4. Read the status in the **Reliability of measured zero point** parameter.
   ↳ The following steps depend on the status in the **Reliability of measured zero point** parameter.

Status of **Reliability of measured zero point** parameter: Not done or Uncertain

1. Exit zero adjustment: Use ☑ to navigate to the end of the wizard.
   ↳ Check the requirements for zero adjustment → 10.
2. Repeat zero adjustment → 10.

Status of **Reliability of measured zero point** parameter: Good

1. Select E to call up the **Additional information** parameter.
2. Select **Show** option and press E to confirm.

3. Press ☑ to confirm.
4. Make a note of the measured zero point.
5. Press ☑ to confirm.
6. Select ☑ to confirm the **Keep current zero point** option.
7. Quit the wizard with ☑.
8. Following the zero adjustment, apply a mechanical load on the sensor (e.g.: open the housing cover of the display module and close it again).
9. Repeat the zero adjustment until you have determined and noted down five measured zero points → 🖹 10.
10. When five measured zero points have been determined: calculate the average of the measured zero points and enter this value → 🖹 11.

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Calculating and entering the average of the measured zero points

1. Calculate the average of the five measured zero points that you have noted down.
2. Enter the calculated average up to the first decimal place: Expert → Sensor → Calibration → Zero point.
3. Confirm your entry.
   ↳ The new zero point is saved in the device.

For custody transfer service, the device must be set to the custody transfer mode after the zero adjustment.

Zero adjustment via web server

Performing the zero adjustment

1. Under Setup → Advanced setup → Sensor adjustment start the **Zero adjustment** wizard.
2. Confirm the **Requirements** tab by selecting **Next**.
   ↳ The **Progress** tab opens.
3. If the **Progress** tab shows Done for the **Status** parameter of the performance of zero adjustment, select **Next** to confirm the **Progress** tab.
   ↳ The **Result** tab opens.
4. In the **Result** tab, read the status in the **Reliability of measured zero point** parameter.
   ↳ The following steps depend on the status in the **Reliability of measured zero point** parameter.

Status of **Reliability of measured zero point** parameter: Not done or Uncertain

1. Select **Cancel** to quit the zero adjustment.
   ↳ Check the requirements for zero adjustment → 🖹 10.
2. Repeat zero adjustment → 🖹 11.

Status of **Reliability of measured zero point** parameter: Good

1. Set the **Additional information** parameter to **Show** option.
2. Make a note of the measured zero point.
3. Confirm the **Result** tab by selecting **Next**.
   ↳ The **Adjustment** tab opens.
4. In the **Adjustment** tab, select the **Keep current zero point** action and select **Next** to confirm.
5. Select **Stop** to close the zero adjustment wizard.
6. Following the zero adjustment, apply a mechanical load on the sensor (e.g.: open the housing cover of the display module and close it again).
7. Repeat the zero adjustment until you have determined and noted down five measured zero points → 🖹 11.
8. When five measured zero points have been determined: calculate the average of the measured zero points and enter this value → 🖹 12

Calculating and entering the average of the measured zero points

1. Calculate the average of the five measured zero points that you have noted down.
2. Enter the calculated average up to the first decimal place: Expert → Sensor → Calibration → Zero point.
3. Confirm your entry.
   ↳ The new zero point is saved in the device.

For custody transfer service, the device must be set to the custody transfer mode after the zero adjustment.

5.4 Custody transfer

National rules or regulations must be observed when performing custody transfer.

An **authorized user login** is available: EH000 with password 177801. This **authorized user login** is the non-personalized factory login and enables the activation and deactivation of the custody transfer mode. Settings made using this login must be documented and personalized by the system operator. In addition, the responsible weights and measures services must be informed of these changes.

The locking status of the device can be read under: Operation → Locking status

5.4.1 Outputs/inputs relevant for custody transfer

For devices with the Hart current output on the I/O-1 module, the custody transfer-related outputs are the local display, the double-pulse output for totalizing the flow, the switch output and the PFS module (pulse/frequency/switch output).

Local display

The local display can be configured as required outside the custody transfer mode. As soon as the custody transfer mode is enabled, it is not possible to edit the local display, apart from the value for display 3. The value displayed for value 4 is overwritten and the custody transfer counter is displayed. A padlock symbol is displayed in the top right-hand corner in the custody transfer mode.

Dual-pulse output

If the approved dual-pulse output is to be used, this must be indicated by specifying the relevant code when ordering. It cannot be used with two PFS modules at a later stage.

PFS output

The PFS can be configured as a pulse, frequency or switch output. Pulse can only be used as an output for custody transfer if the custody transfer lock is set to "all parameters". In the case of both custody transfer locks, the switch output is disabled in the custody transfer mode and approved for transmission of the device status and flow direction, and for limit value monitoring.

Switch output

The switch output is approved for transmission of the device status and flow direction, and for limit value monitoring.

5.4.2 Authorized user login

To change the measuring device to the Custody transfer mode, the non-personalized, **authorized user login** (factory login) can be used. However, the use of a personalized, **authorized user login** with associated **password** is recommended. This is available only to national market surveillance and authorized persons from the relevant centers. This **authorized user login** is comparable to a personalized sealing pliers and is used to uniquely identify the person / authority who has locked or unlocked the measuring device for custody transfer measurement.

To create an **authorized user login** with **password**, please contact your E+H sales center.

To create the **Authorized user login** parameter with **password**, the following data are required.

Required data	Example
Applicant type	▪ System operator ▪ Market surveillance ▪ Approval center ▪ Endress+Hauser employee
First name	John
Surname	Smith
Company	ABC Company
Department	ABC Department

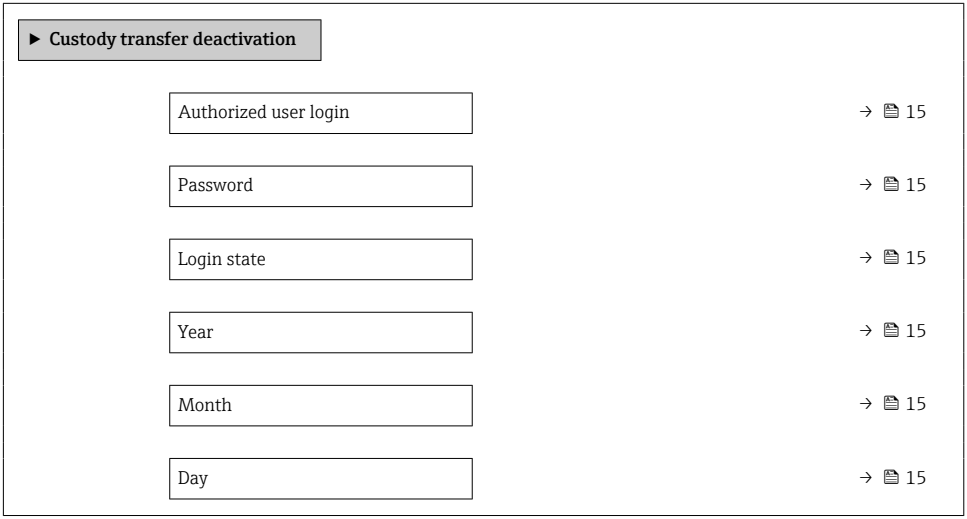
Required data	Example
Address	Any Street 1
Country	Anywhere
City/Town	Anytown
ZIP code	123456
Telephone	123456
E-mail address	John.Smith@sample.com

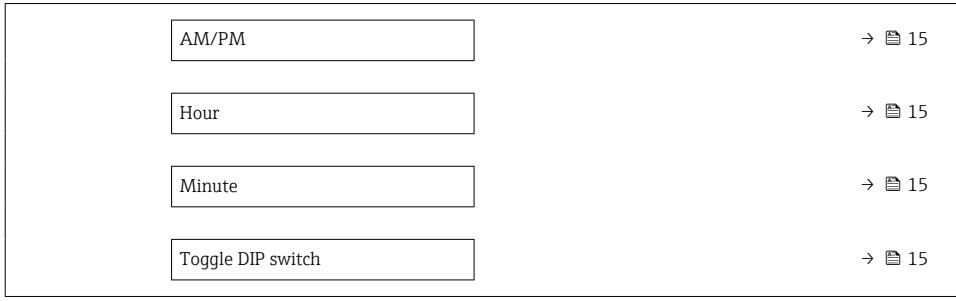
- The **Authorized user login** parameter consists of five characters comprising two letters and three digits.
- For each **Authorized user login** parameter comprising five characters, a **password** is generated.
- When changes are made, the **Authorized user login** parameter is saved in the Custody transfer logbook.

5.4.3 Parameter description for Custody transfer deactivation

An **authorized user login** is available: EH000 with password 177801. This **authorized user login** is the non-personalized factory login and enables the activation and deactivation of the custody transfer mode. Settings made using this login must be documented and personalized by the system operator. In addition, the responsible weights and measures services must be informed of these changes.

Navigation
"Setup" menu → Advanced setup → Custody transfer deactivation





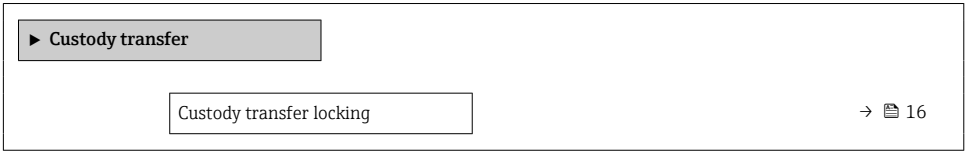
Parameter overview with brief description

Parameter	Description	User entry / User interface / Selection	Factory setting
Authorized user login	Enter a specified authorized user login.	Authorized user login	EH000
Password	Enter a specified password.	0 to 999 999	177 801
Login state	Display login status.	▪ Logged in ▪ Logged out	Logged out
Year	Enter the year.	9 to 99	10
Month	Enter the month.	▪ January ▪ February ▪ March ▪ April ▪ May ▪ June ▪ July ▪ August ▪ September ▪ October ▪ November ▪ December	January
Day	Enter the day.	1 to 31 d	1 d
AM/PM	Select AM/PM.	▪ AM ▪ PM	AM
Hour	Enter the hour.	0 to 23 h	12 h
Minute	Enter the minutes.	0 to 59 min	0 min
Toggle DIP switch	Display the DIP switch status.	▪ Off ▪ On	Off

5.4.4 Determining parameters locked in Custody transfer

Select the preferred write protection option for custody transfer mode.

Navigation
"Custody transfer" submenu → Custody transfer locking



Parameter overview with brief description

Parameter	Description	Selection	Factory setting
Custody transfer locking	Indicate whether all parameters or only parameters relevant to custody transfer should be write-protected.	▪ Defined parameters ▪ All parameters	Defined parameters

5.4.5 Disabling Custody transfer mode

The measuring device can be taken out of Custody transfer mode at any time.

If the **authorized user login** and **password** are entered via the display module, perform the following steps in the order indicated. If the **authorized user login** and **password** are entered via the web server, the device must first be opened and connected to the service interface.

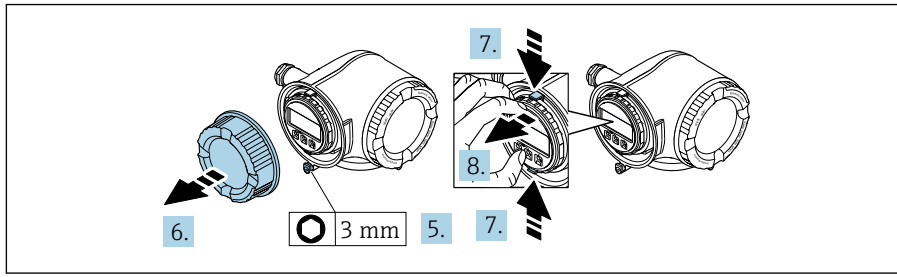
The procedure does not have a time limit.

Use a suitable tool - preferably one with a non-metal tip - to switch the DIP switch.

Opening the measuring device and disabling custody transfer mode

1. Break the optional sealing.
2. Enter the **Authorized user login** parameter and **Password** parameter in the menu → 19.
3. Enter the time and date information.
4. Disconnect the power supply to the device.

5.



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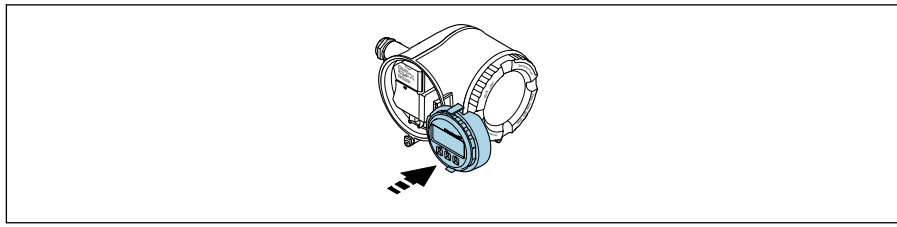
Release the securing clamp and unscrew the cover of the connection compartment.

6. Squeeze the tabs of the display module holder together.

7. Remove the display module holder.

8.



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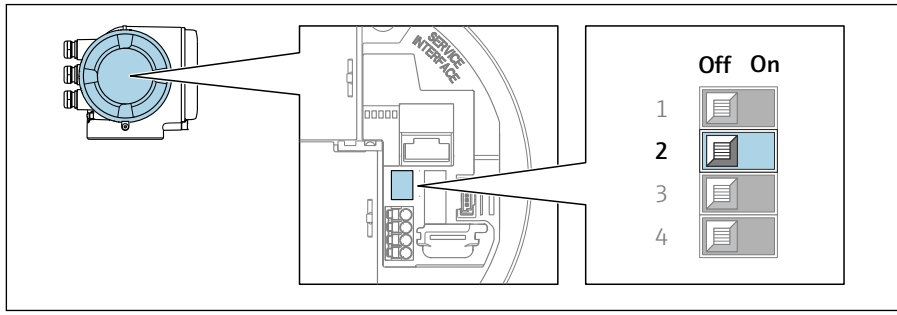
Attach the display module to the edge of the electronics compartment.

9.



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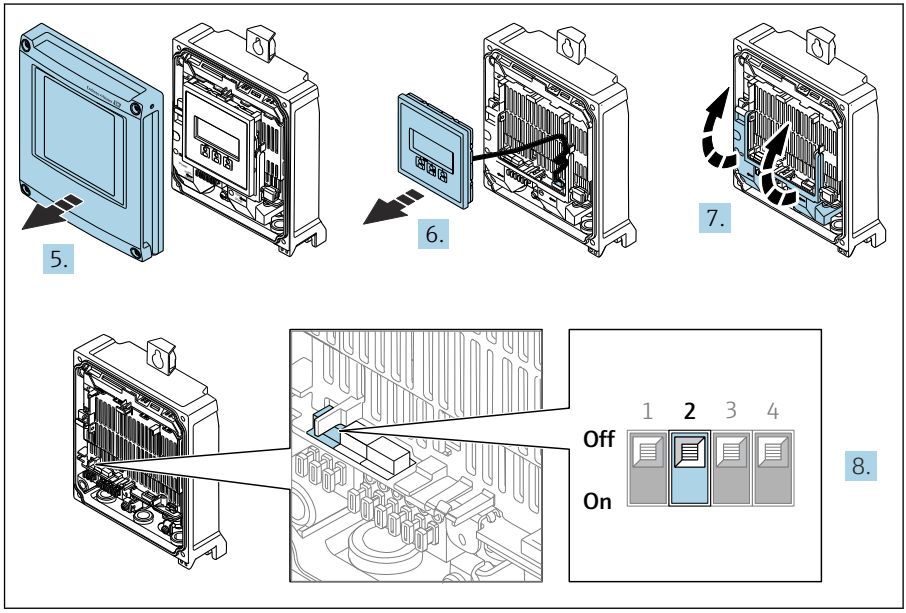
Set **DIP switch 2** to the **Off** position.

↳ If the measuring device was correctly unlocked using the **Authorized user login** parameter, **password** and **DIP switch 2**, the padlock symbol disappears from the display and the internal Custody transfer counter is incremented. In addition, an entry with Timestamp (operating hours) is generated in the logbook. An entry is also recorded in the event logbook. When the device is in an unlocked state, all parameters can be edited.

10. Reverse the procedure to close the measuring device.

11. Reestablish the power supply.

Opening the measuring device and disabling custody transfer mode for Promass 500 digital

1. Break the optional sealing.
2. Enter the **Authorized user login** parameter and **Password** parameter in the menu → 19.
3. Enter the time and date information.
4. Disconnect the power supply to the device.
5. 

   Unscrew the cover of the transmitter.
6. Remove the display module.
7. Fold up the cover.
8. Set **DIP switch 2** to the **Off** position.
   ↳ If the measuring device was correctly unlocked using the **Authorized user login** parameter, **password** and **DIP switch 2**, the padlock symbol disappears from the display and the internal Custody transfer counter is incremented. In addition, an entry with Timestamp (operating hours) is generated in the logbook. An entry is also recorded in the event logbook. When the device is in an unlocked state, all parameters can be edited.
9. Reverse the procedure to close the measuring device.

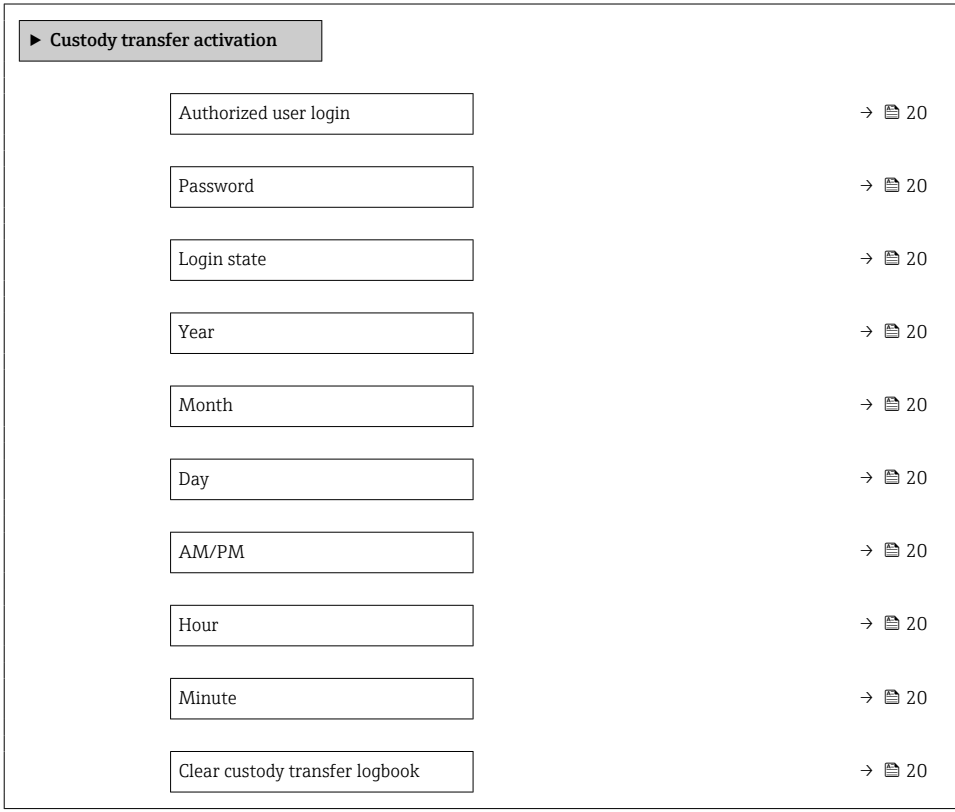
10. Reestablish the power supply.

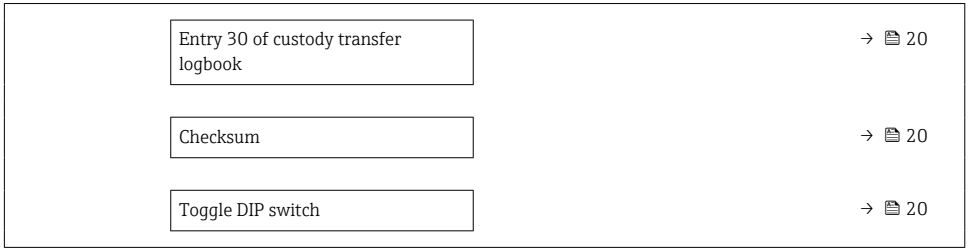
Once Custody transfer mode has been disabled or the seal (subject to legal metrology controls) has been broken, the measuring device may no longer be used in custody transfer applications. If the measuring device is to be used again in custody transfer, the measuring device must be put into circulation again.

5.4.6 Parameter description for Custody transfer activation

An **authorized user login** is available: EH000 with password 177801. This **authorized user login** is the non-personalized factory login and enables the activation and deactivation of the custody transfer mode. Settings made using this login must be documented and personalized by the system operator. In addition, the responsible weights and measures services must be informed of these changes.

Navigation
"Setup" menu → Advanced setup → Custody transfer activation





Parameter overview with brief description

Parameter	Description	User entry / User interface / Selection	Factory setting
Authorized user login	Enter a specified authorized user login.	Authorized user login	EH000
Password	Enter a specified password.	0 to 999 999	177 801
Login state	Display login status.	▪ Logged in ▪ Logged out	Logged out
Year	Enter the year.	9 to 99	10
Month	Enter the month.	▪ January ▪ February ▪ March ▪ April ▪ May ▪ June ▪ July ▪ August ▪ September ▪ October ▪ November ▪ December	January
Day	Enter the day.	1 to 31 d	1 d
AM/PM	Select AM/PM.	▪ AM ▪ PM	AM
Hour	Enter the hour.	0 to 23 h	12 h
Minute	Enter the minutes.	0 to 59 min	0 min
Clear custody transfer logbook	Delete custody transfer logbook selection.	▪ Cancel ▪ Clear data	Cancel
Entry 30 of custody transfer logbook	Display the recorded logbook entries.	0…30	0
Checksum	Shows the firmware's checksum.	Positive integer	–
Toggle DIP switch	Display the DIP switch status.	▪ Off ▪ On	Off

5.4.7 Setting up Custody transfer mode

The measuring device is delivered in an unsealed state. It is the responsibility of the system operator to ensure that the measuring device is put into operation in accordance with national regulations governing locking and sealing.

If the **authorized user login** and **password** are entered via the display module, perform the following steps in the order indicated. If the **authorized user login** and **password** are entered via the web server, the device must first be opened and connected to the service interface.

The procedure does not have a time limit.

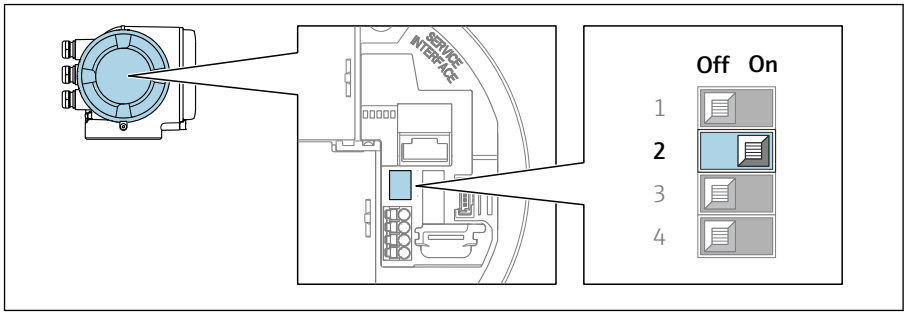
The measuring device can be locked only by means of the **Authorized user login** parameter with associated **password** and **DIP switch 2**. If only **DIP switch 2** is set to the **On** position, the measuring device will not switch to Custody transfer mode. A warning message is generated, which can be cleared only by resetting **DIP switch 2**.

Use a suitable tool - preferably one with a non-metal tip - to switch the DIP switch.

Opening the measuring device and setting up custody transfer mode: Promass 500

1. Using the **Custody transfer locking** parameter→ 16, select the parameters to be locked.
2. In the menu enter the **Authorized user login** parameter and the **Password** parameter→ 19.
3. Enter the time and date information.
4. As an option, the custody transfer logbook can be cleared.
5. Disconnect the power supply to the device.
6. Open the measuring device as described previously. → 16

7.



A0029631

Set **DIP switch 2** to the **On** position.

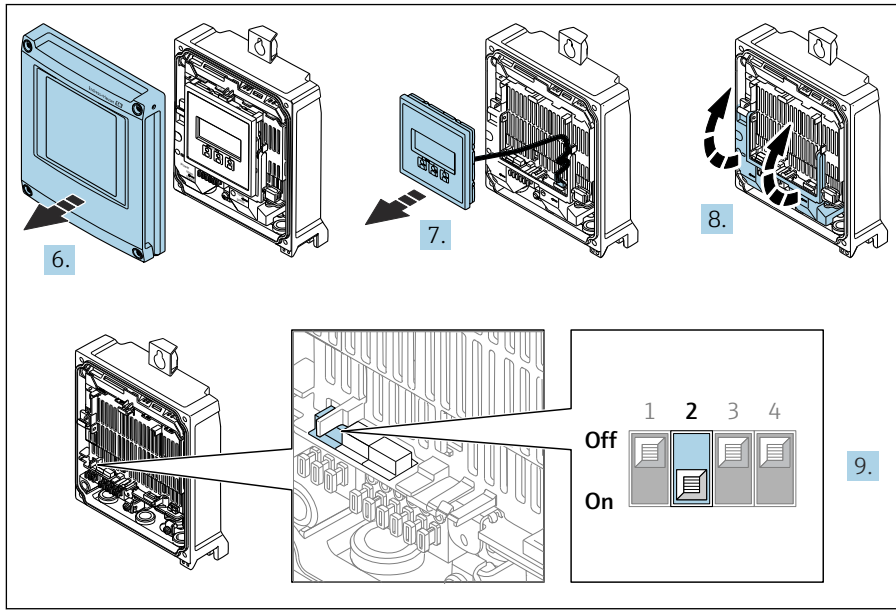
↳ If the measuring device was locked correctly using the **Authorized user login** parameter, **Password** parameter and **DIP switch 2**, the padlock symbol appears on the display and the internal Custody transfer counter is incremented. In addition, an entry with a Timestamp (operating hours) is generated in the Custody transfer logbook. An entry is also recorded in the event logbook.

8. Follow the reverse sequence to close the measuring device, and seal if desired.
9. Reestablish the power supply.
10. A padlock symbol (🔒) appears in the header of the display.

Opening the measuring device and setting up custody transfer mode: Promass 500 digital

1. Using the **Custody transfer locking** parameter→ 🖹 16, select the parameters to be locked.
2. In the menu enter the **Authorized user login** parameter and the **Password** parameter→ 🖹 19.
3. Enter the time and date information.
4. As an option, the custody transfer logbook can be cleared.
5. Disconnect the power supply to the device.

6.



A0040926

Unscrew the cover of the transmitter.

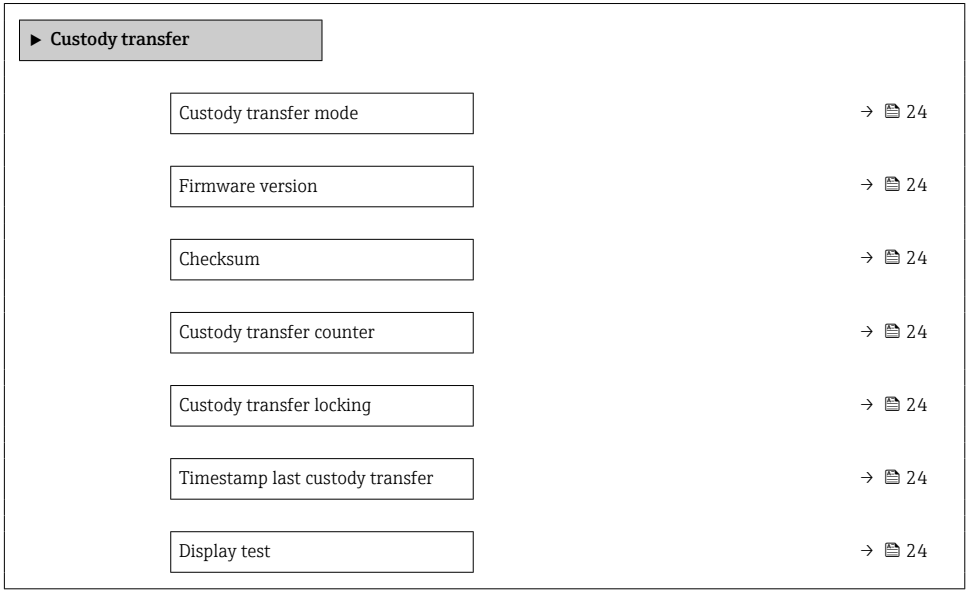
7. Remove the display module.
8. Fold up the cover.
9. Set **DIP switch 2** to the **On** position.
   ↳ If the measuring device was locked correctly using the **Authorized user login** parameter, **Password** parameter and **DIP switch 2**, the padlock symbol appears on the display and the internal Custody transfer counter is incremented. In addition, an entry with a Timestamp (operating hours) is generated in the Custody transfer logbook. An entry is also recorded in the event logbook.
10. Follow the reverse sequence to close the measuring device, and seal if desired.
11. Reestablish the power supply.
12. A padlock symbol (🔒) appears in the header of the display.

5.5 Reading parameters relevant for custody transfer

In custody transfer mode, the following parameters can be viewed via the display or the service interface (Web server).

Navigation

"Operation" menu → Custody transfer



Parameter overview with brief description

Parameter	Description	User interface / Selection	Factory setting
Custody transfer mode	Shows if the device is in custody transfer mode.	▪ Off ▪ On	Off
Firmware version	Shows the device firmware version installed.	Character string in the format xx.yy.zz	–
Checksum	Shows the firmware's checksum.	Positive integer	–
Custody transfer counter	Indicates how often custody transfer mode has been enabled so far.	0 to 65 535	–
Custody transfer locking	Indicate whether all parameters or only parameters relevant to custody transfer should be write-protected.	▪ Defined parameters ▪ All parameters	Defined parameters
Timestamp last custody transfer	Indicates the time when the custody transfer mode was last enabled.	Days (d), hours (h), minutes (m) and seconds (s)	–
Display test	Start or cancel display test.	▪ Cancel ▪ Start	Cancel

5.5.1 Character test string

The character test string is used to test the display. When the test string is selected, the display test sequence starts and the test string is displayed with an inverted background. Once the text display is confirmed, the test string is displayed again with a non-inverted background and the display test is finished.

5.6 Custody transfer logbook

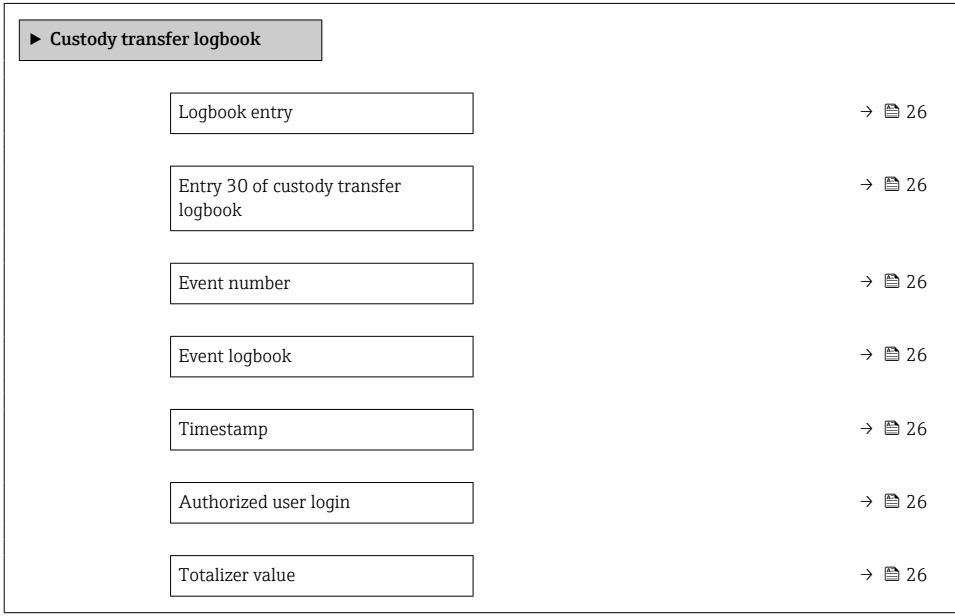
The Custody transfer logbook can be viewed on the display, via FieldCare or via the web server.

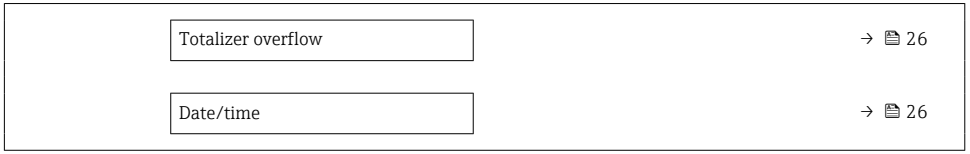
- The last entry is displayed first.
- A maximum of 30 entries can be saved in the Custody transfer logbook. If these are all in use, no further entries will be saved.

The diagnostic behavior of diagnostic number 599 "Custody transfer logbook full" determines the behavior of the device when the 30 entries are reached (factory setting: warning). The diagnostic behavior cannot be edited in the activated custody transfer mode.

For more information on adapting the diagnostic behavior, see the Operating Instructions

Navigation
"Diagnostics" menu → Custody transfer logbook





Parameter overview with brief description

Parameter	Description	User entry / User interface	Factory setting
Logbook entry	Select a logbook entry.	1 to 30	1
Entry 30 of custody transfer logbook	Display the recorded logbook entries.	0...30	0
Event number	Display the event number.	Positive integer	1
Event logbook	Display the event.	–	0
Timestamp	Display the timestamp.	Date of timestamp.	0
Authorized user login	Display the specified authorized user login.	Authorized user login	EH000
Totalizer value	Display the totalizer value.	Signed floating-point number	0
Totalizer overflow	Display the totalizer overflow.	Signed floating-point number	0
Date/time	Display the date/time.	Date/time	0

5.6.1 Custody transfer logbook entries

The following entries are written to the custody transfer logbook. The operating time counter is saved with each entry. Additional information that is saved and useful data are listed in the "Comments" column.

Event	Description
Open the measuring device and set up Custody transfer	▪ Authorized user login ▪ Value of totalizer 1 ▪ Date/time logged in the "Custody transfer activation/deactivation" menu
Disable Custody transfer mode	▪ Authorized user login ▪ Value of totalizer 1 ▪ Date/time logged in the "Custody transfer activation/deactivation" menu
Clear the Custody transfer logbook	▪ Authorized user login ▪ Value of totalizer 1 ▪ Date/time logged in the "Custody transfer activation/deactivation" menu. The custody transfer logbook can be cleared each time the custody transfer mode is activated or deactivated.

Event	Description
Determine parameters locked in Custody transfer	Entries are only generated if the device is not in the custody transfer mode. By comparing the operating time counter, it is possible to check which parameter has been changed in the event logbook.
Set up Custody transfer or power failure	Value of totalizer 1. Each power failure is recorded if the device is in the custody transfer mode.

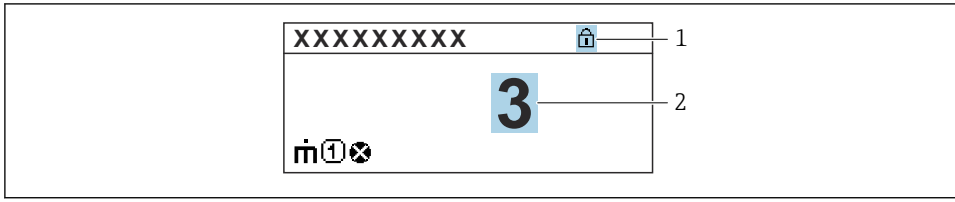
5.6.2 Clearing the Custody transfer logbook

The Custody transfer logbook can be cleared only if you have previously logged in using an **Authorized user login** parameter and **password**.

1. In the **Custody transfer activation** wizard, log in with an **Authorized user login** parameter and **password**.
2. The **Clear custody transfer logbook** parameter is available in the **Custody transfer activation** wizard→ 19.
   ↳ If the Custody transfer logbook is cleared, this is stored as the first new entry in the custody transfer logbook.

5.7 Procedure for market surveillance

The recommended procedure for market surveillance is the comparison between the status of the custody transfer counter shown under display value 4 on the display and the last documented status of the custody transfer counter.



A0032467

1 Custody transfer lock indicator
2 Custody transfer counter status indicator

If the custody transfer counter status on the display and the last documented custody transfer counter status are identical, the device has not been tampered with.

However, if the two custody transfer counter statuses are not identical, the following procedure is recommended:

Retrieve the following parameters in the Custody transfer logbook:

1. **Authorized user login** parameter: Check the last authorized user login where a change was made to parameters relating to custody transfer.
2. **Event logbook** parameter: Verify changes.

3. **Totalizer value** parameter: Check the value of the totalizer at the time of the change.
4. **Timestamp** parameter: Check the operating time at which the change was made.
5. In the Event logbook, search for the entry with the applicable Timestamp in the Event logbook and verify which changes were carried out.

In this way, market surveillance can verify what was changed by whom at a particular time.

5.8 Repeated calibration due to legal metrology controls

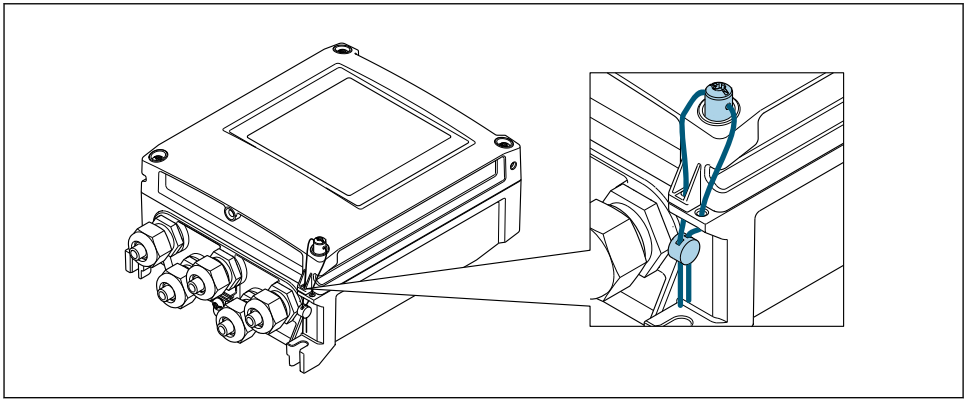
The system operator is obliged to perform a recalibration in accordance with the relevant applicable national regulations.

5.9 Sealing

It is possible to seal the measuring device.. The seal can be applied using a sealing screw and the relevant holder on the housing. The system operator or the competent calibration authority is responsible for applying the seal.

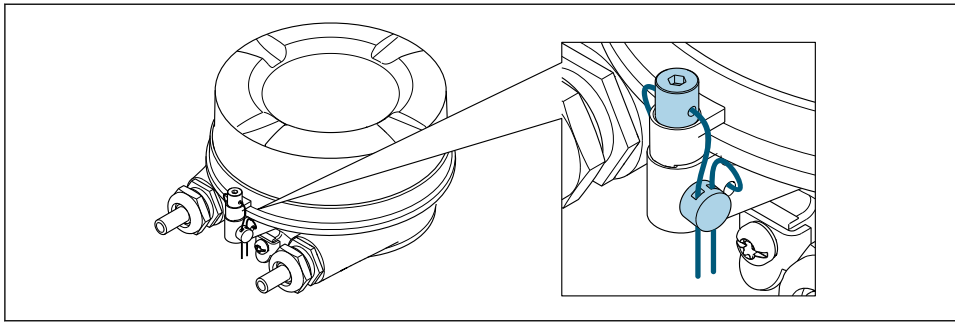
5.9.1 Promass 500 – digital transmitter

Order code for "Transmitter housing", option A "Aluminum, coated"



A0025237

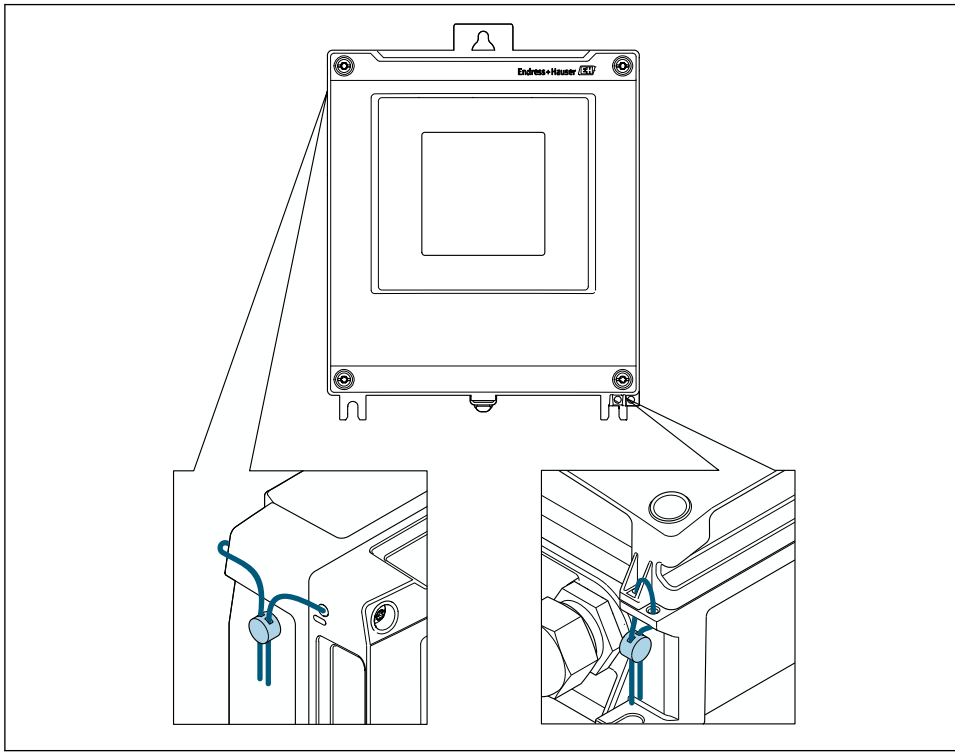
1. Pull the wire through the bore in the housing and through the screw head. In doing so, ensure that the wire is taut and there is no leeway for the screw to loosen.
2. Seal the wire ends.



A0025239

1. Pull the wire through the bore in the housing and through the screw head. In doing so, ensure that the wire is taut and there is no leeway for the screw to loosen.
2. Seal the wire ends.

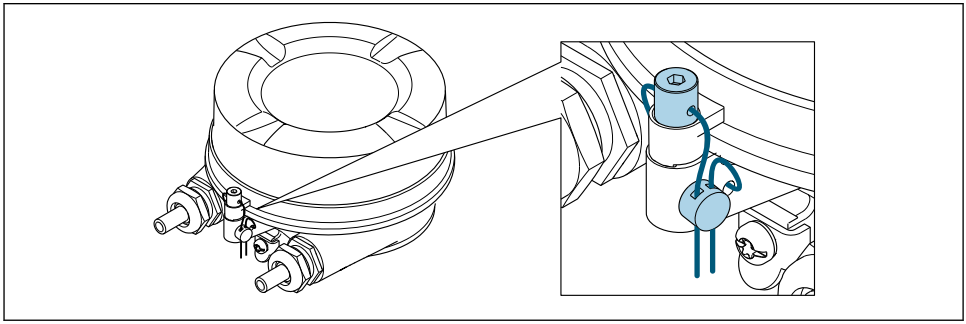
Order code for "Transmitter housing", option D "Polycarbonate"



A0041369

1. When using the display protector (order code for "Accessories", option PV "Display protector"), remove the display protector before sealing.

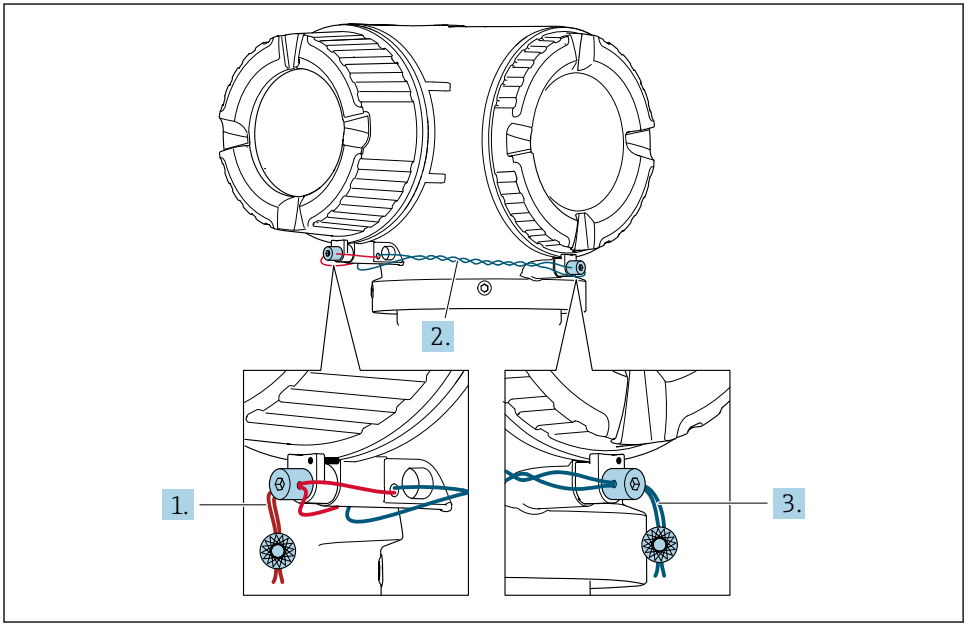
2. Pull the wire through holes in the housing.
3. Seal the wire ends.
4. If using the display protector, re-install the display protector after sealing.



A0025239

1. Pull the wire through the bore in the housing and through the screw head. In doing so, ensure that the wire is taut and there is no leeway for the screw to loosen.
2. Seal the wire ends.

5.9.2 Promass 500 transmitter



A0032276

1. Pull the wire through the bore in the housing and through the screw head. In doing so, ensure that the wire is taut and there is no leeway for the screw to loosen.

2. Pull the wire through the bore in the housing.
3. Twist the wire and guide it to the screw head.
4. Pull each of the wire ends through the screw heads and seal.

6 Parameters in custody transfer mode

Parameters that are relevant for custody transfer must be write-protected in the custody transfer mode. Three options are available for this purpose:

Write protection	Description
Hardware write protection	Sets every parameter to write-protected.
CT locking: **All parameters**	Locks the parameters that are relevant for custody transfer (CT) and also parameters that are predefined by Endress+Hauser and are not relevant for custody transfer.
CT locking: **Defined parameters**	Only locks parameters that are relevant for custody transfer.

The locking status of the device can be read under: Operation → Locking status

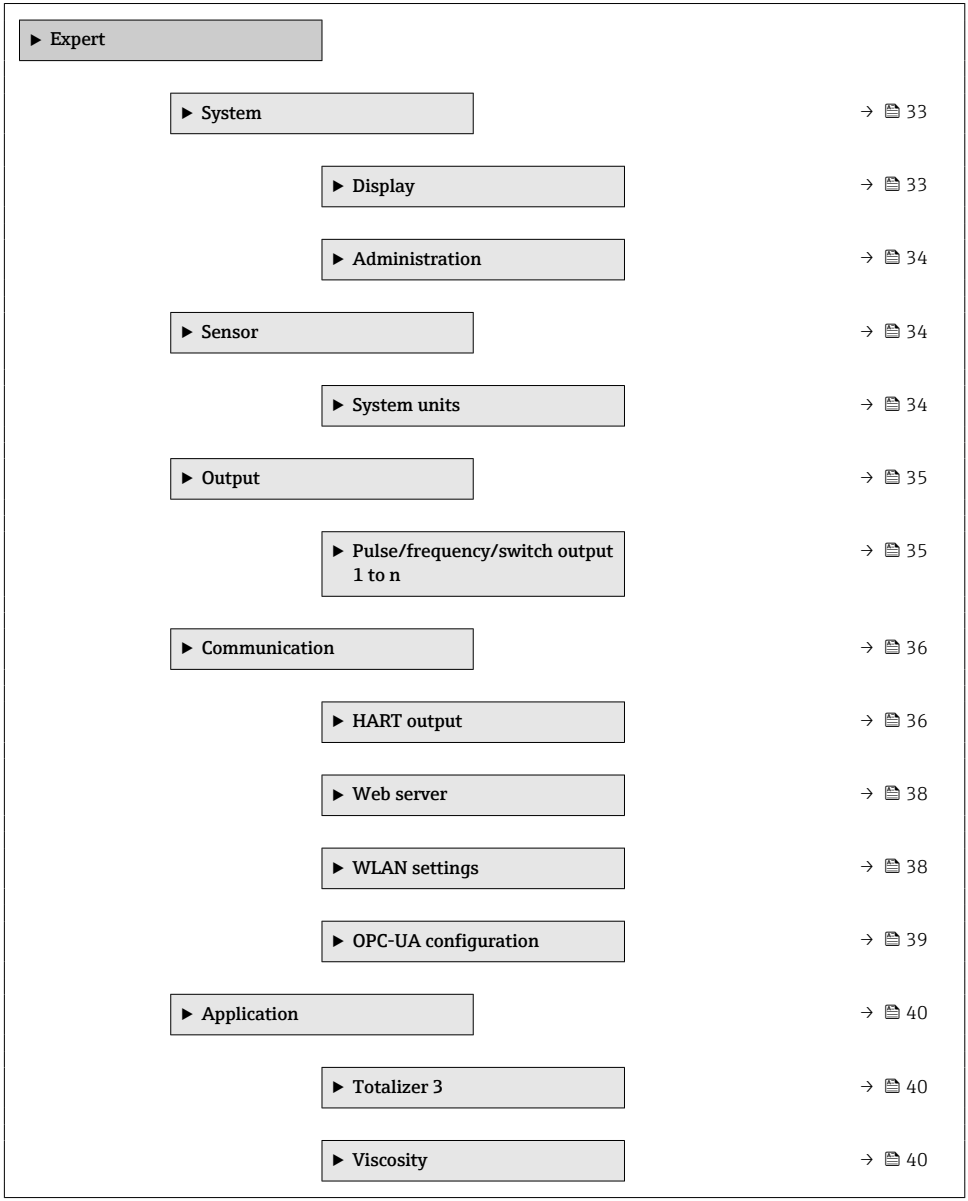
6.1 Configurable parameters

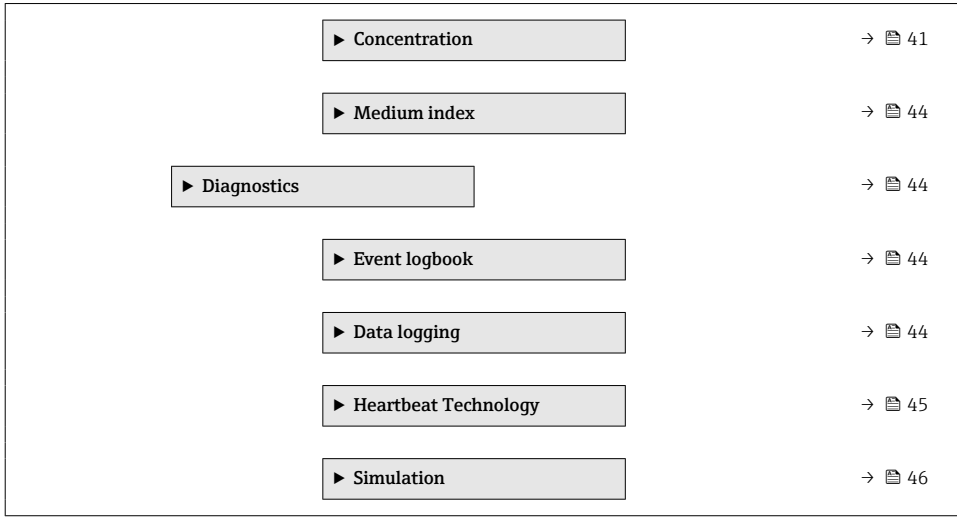
Description

- The parameters that are marked with ☆ can only be edited in the custody transfer locking of **defined parameters** mode.
- The parameters that are not marked can be edited in the custody transfer locking of **all parameters** and **defined parameters** mode.
- Generally speaking, all the parameters that are not listed cannot be edited in the custody transfer mode.

For detailed information on the device parameters, see the "Description of Device Parameters" document

Navigation
"Expert" menu → Application → Custody transfer

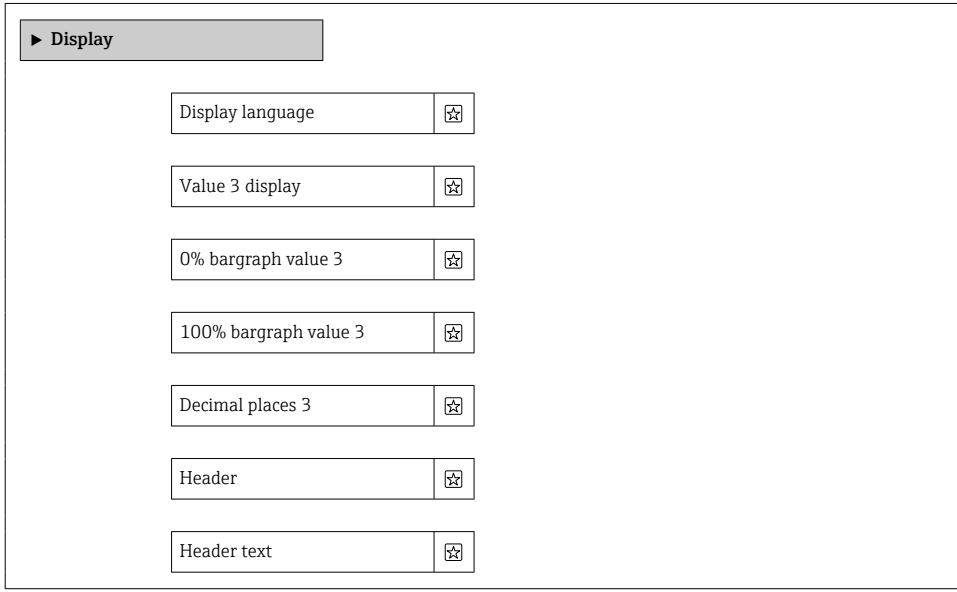


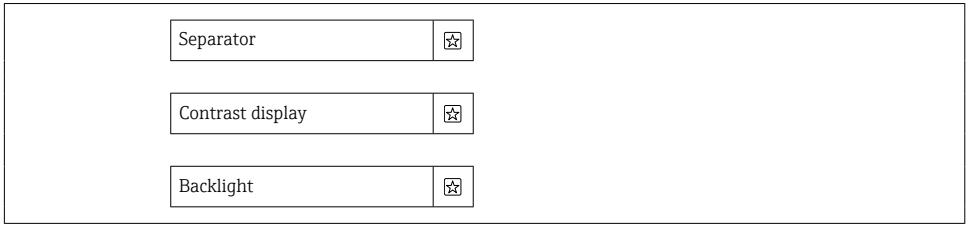


6.1.1 "System" submenu

"Display" submenu

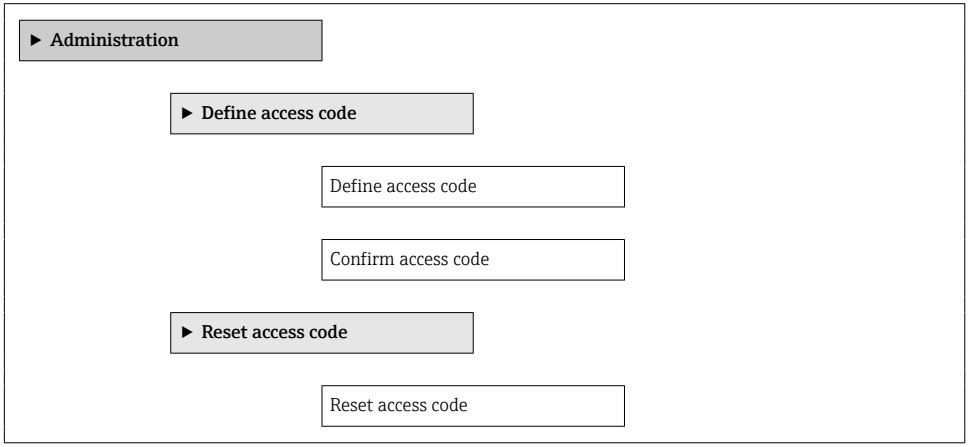
Navigation
"Expert" menu → System → Display





"Administration" submenu

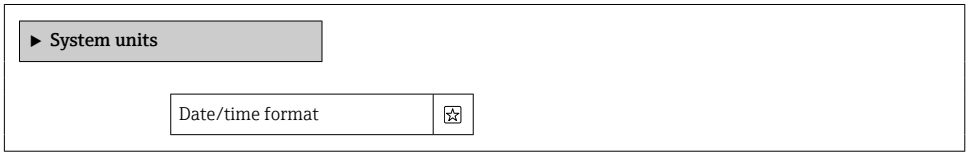
Navigation
"Expert" menu → System → Administration



6.1.2 "Sensor" submenu

"System units" submenu

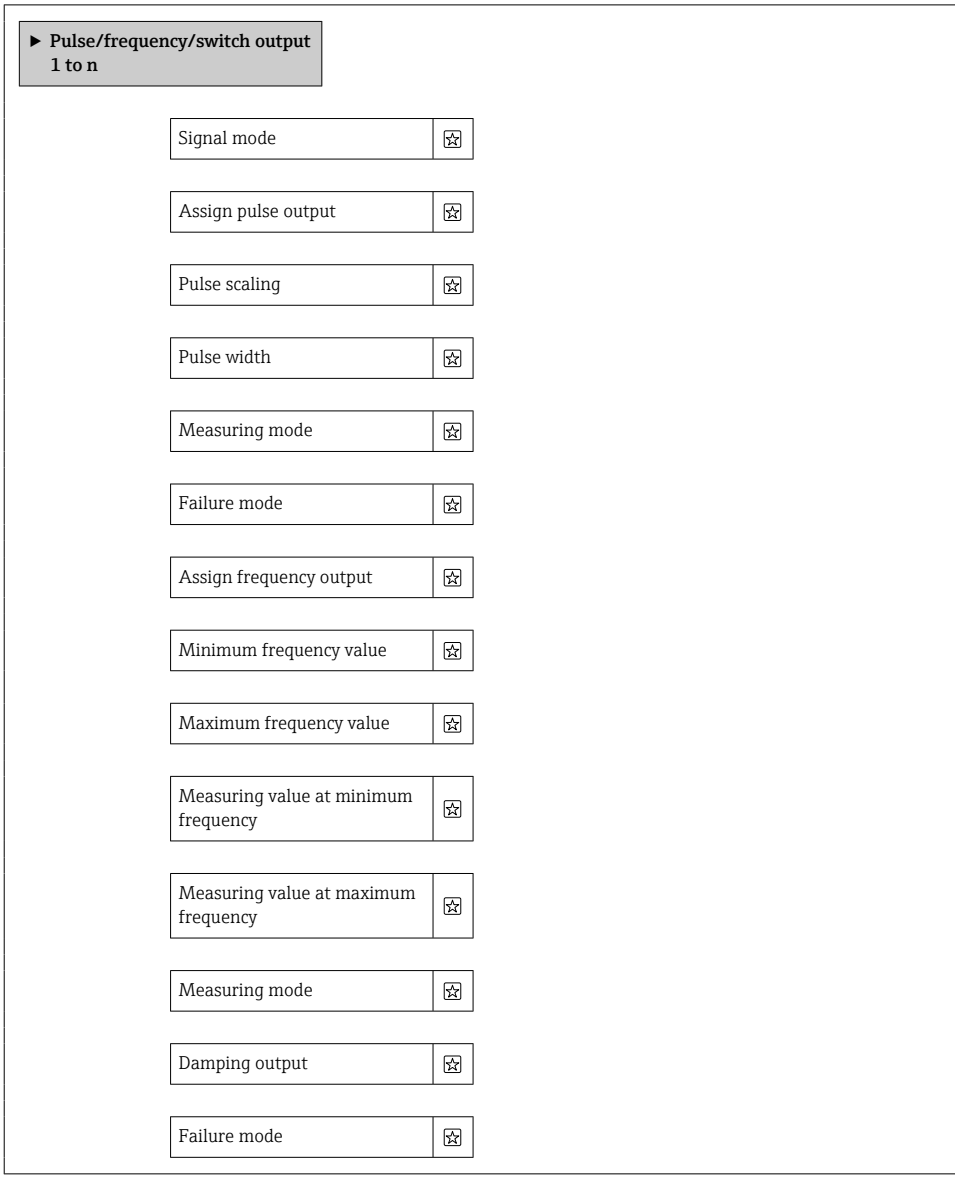
Navigation
"Expert" menu → Sensor → System units

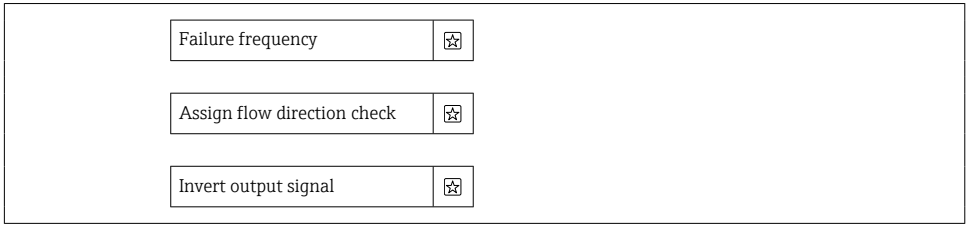


6.1.3 "Output" submenu

"Pulse/frequency/switch output 1 to n" submenu

Navigation
"Expert" menu → Output → Pulse/frequency/switch output 1 to n

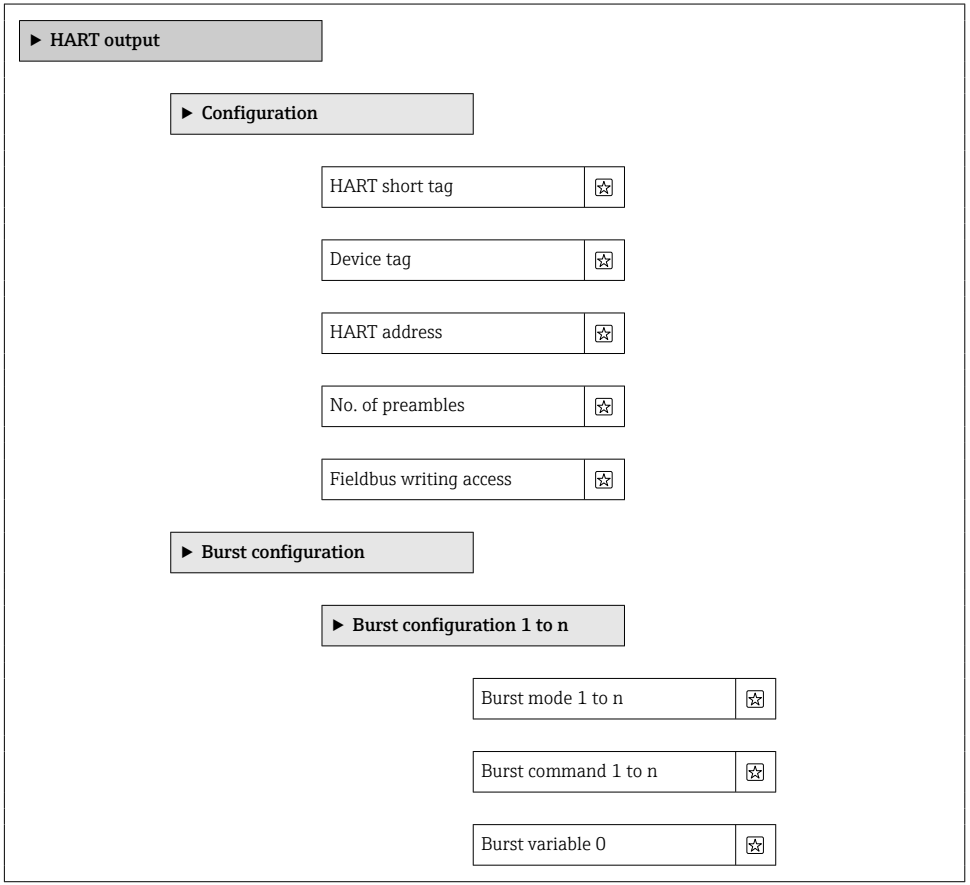


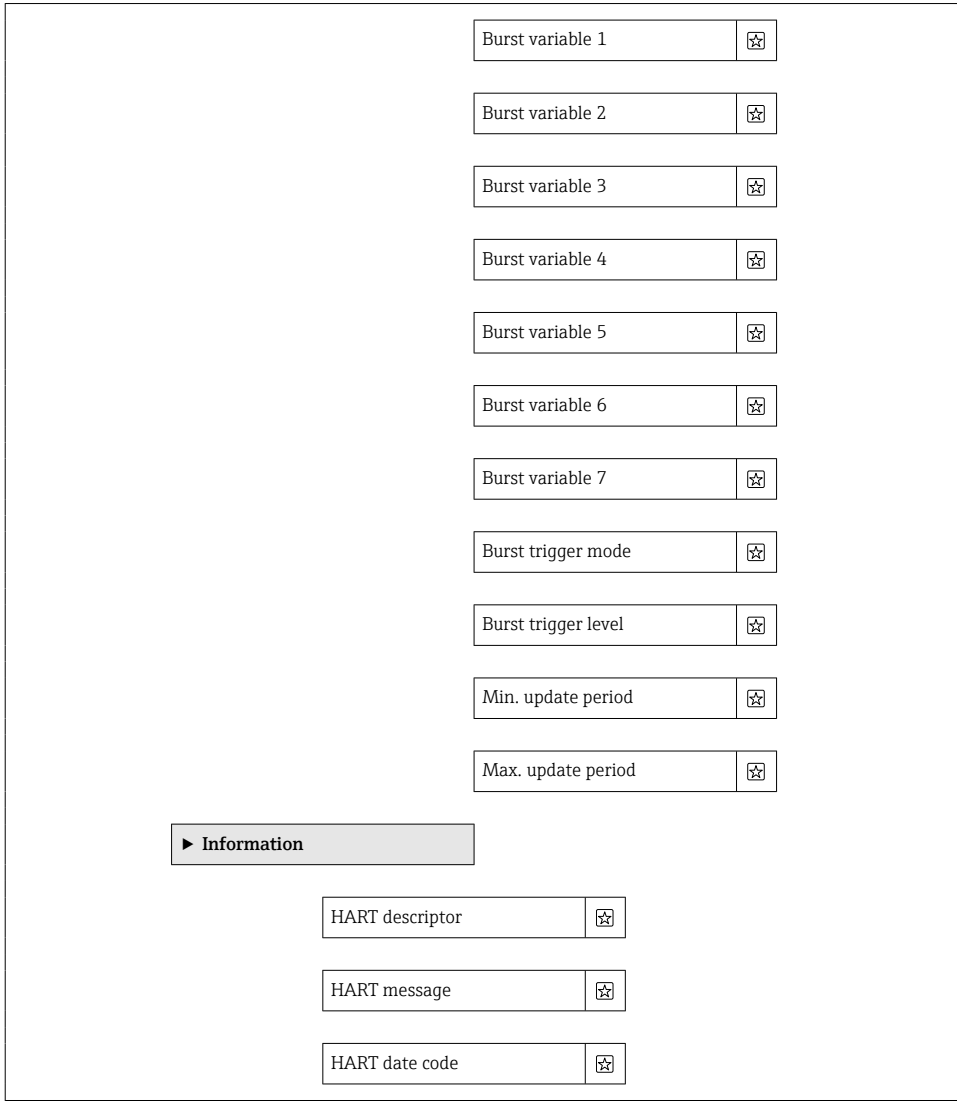


6.1.4 "Communication" submenu

"HART output" submenu

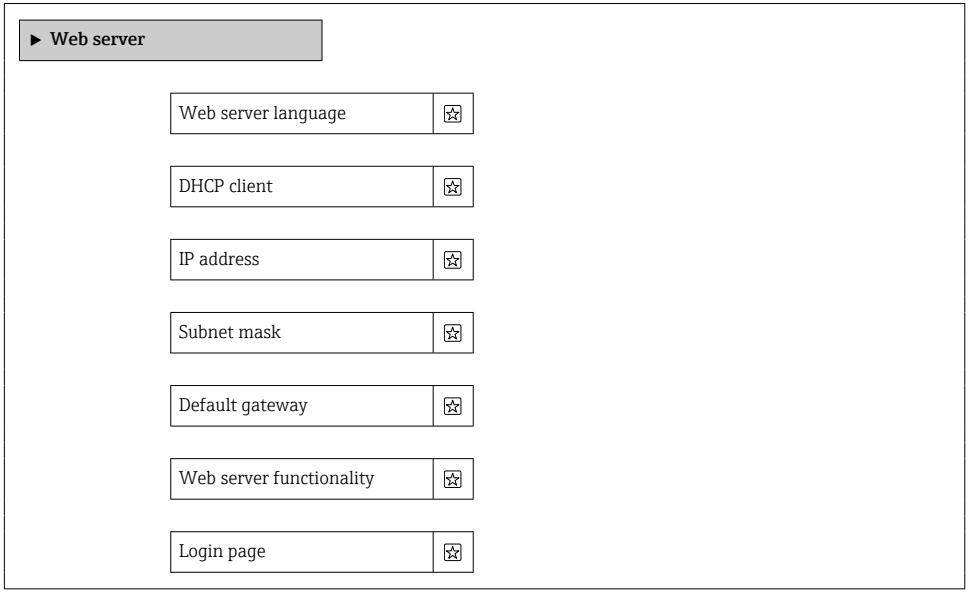
Navigation
"Expert" menu → Communication → HART output




Burst variable 1
Burst variable 2
Burst variable 3
Burst variable 4
Burst variable 5
Burst variable 6
Burst variable 7
Burst trigger mode
Burst trigger level
Min. update period
Max. update period
▶ Information
HART descriptor
HART message
HART date code

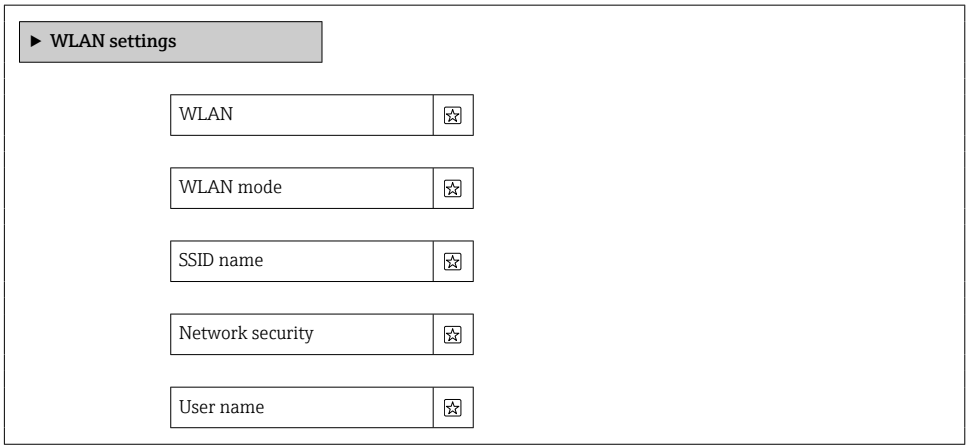
"Web server" submenu

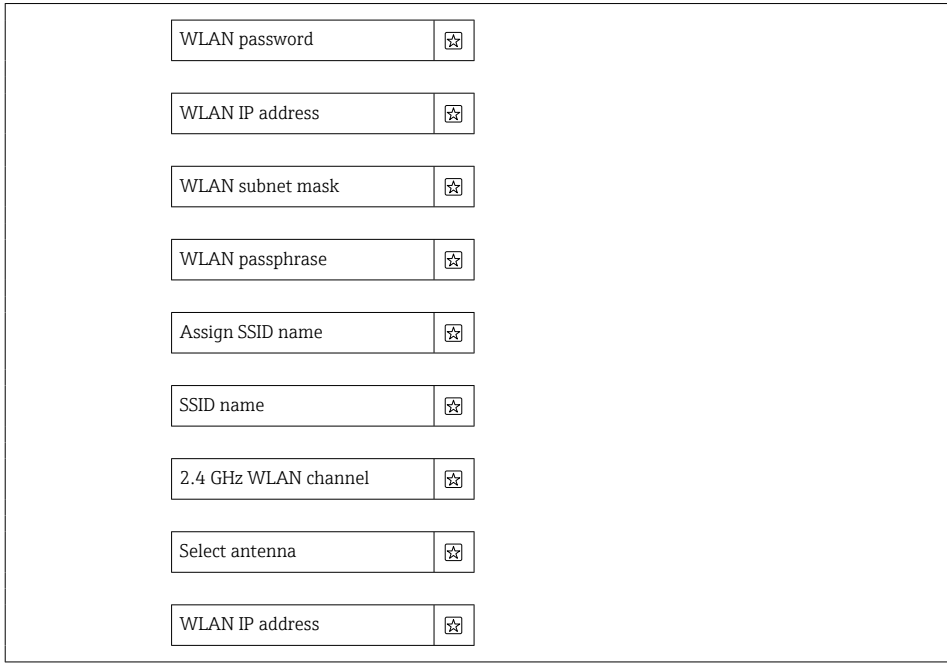
Navigation
"Expert" menu → Communication → Web server



"WLAN settings" wizard

Navigation
"Expert" menu → Communication → WLAN settings

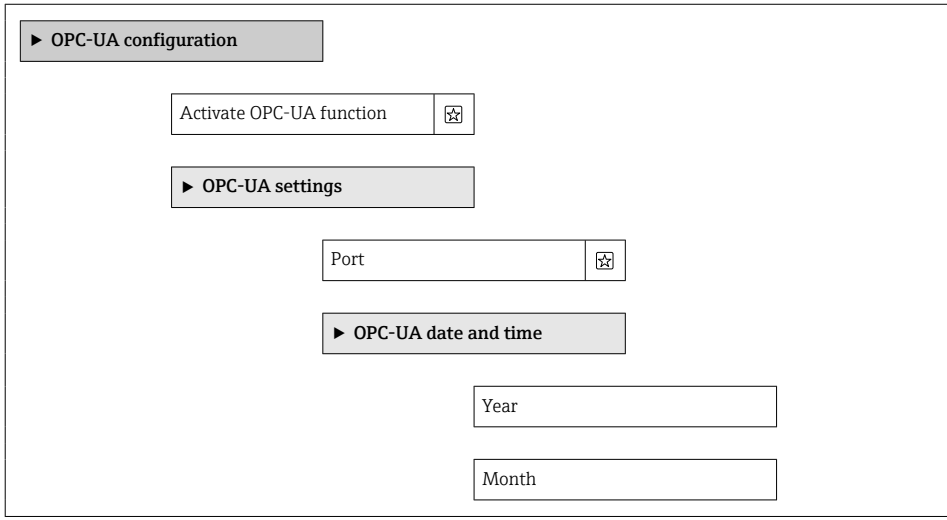


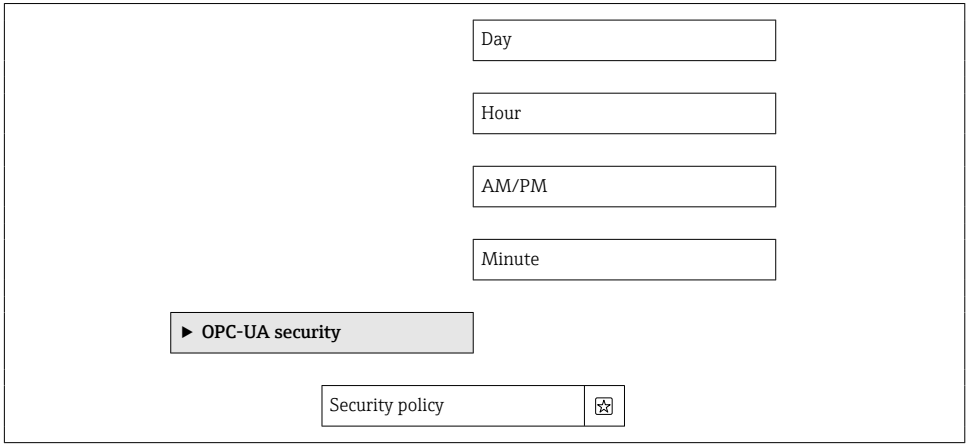


"OPC-UA configuration" submenu

Navigation

"Expert" menu → Communication → OPC-UA configuration

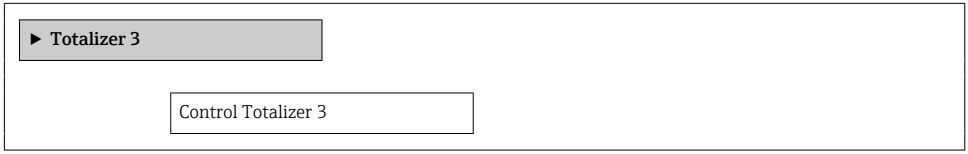




6.1.5 "Application" submenu

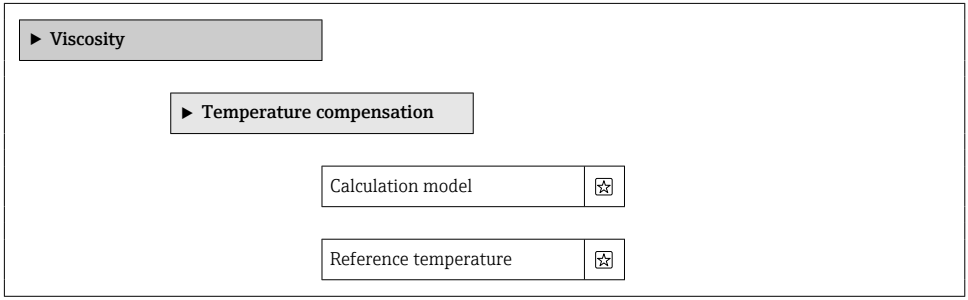
"Totalizer 3" submenu

Navigation
"Expert" menu → Application → Totalizer 3



"Viscosity" submenu

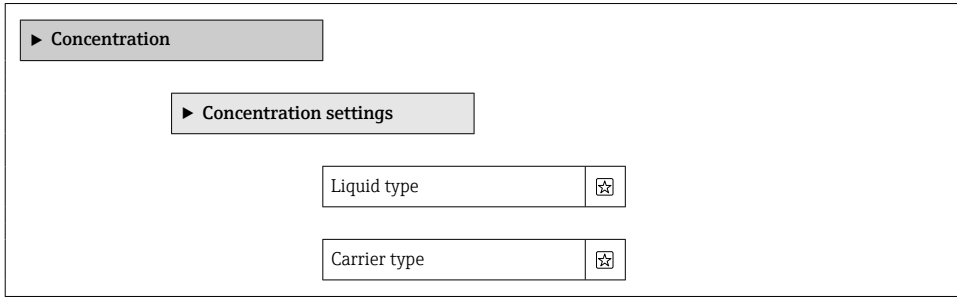
Navigation
"Expert" menu → Application → Viscosity

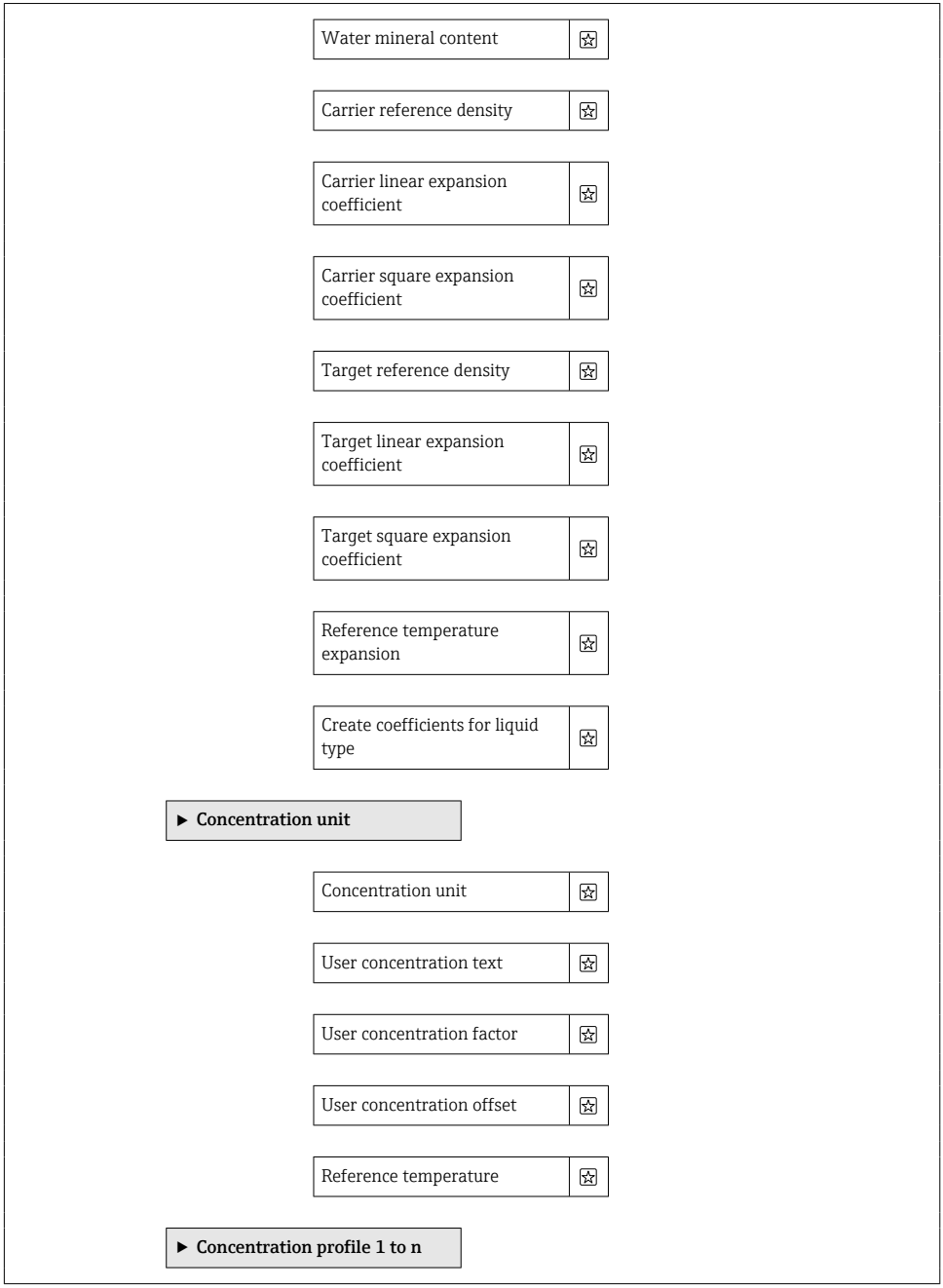


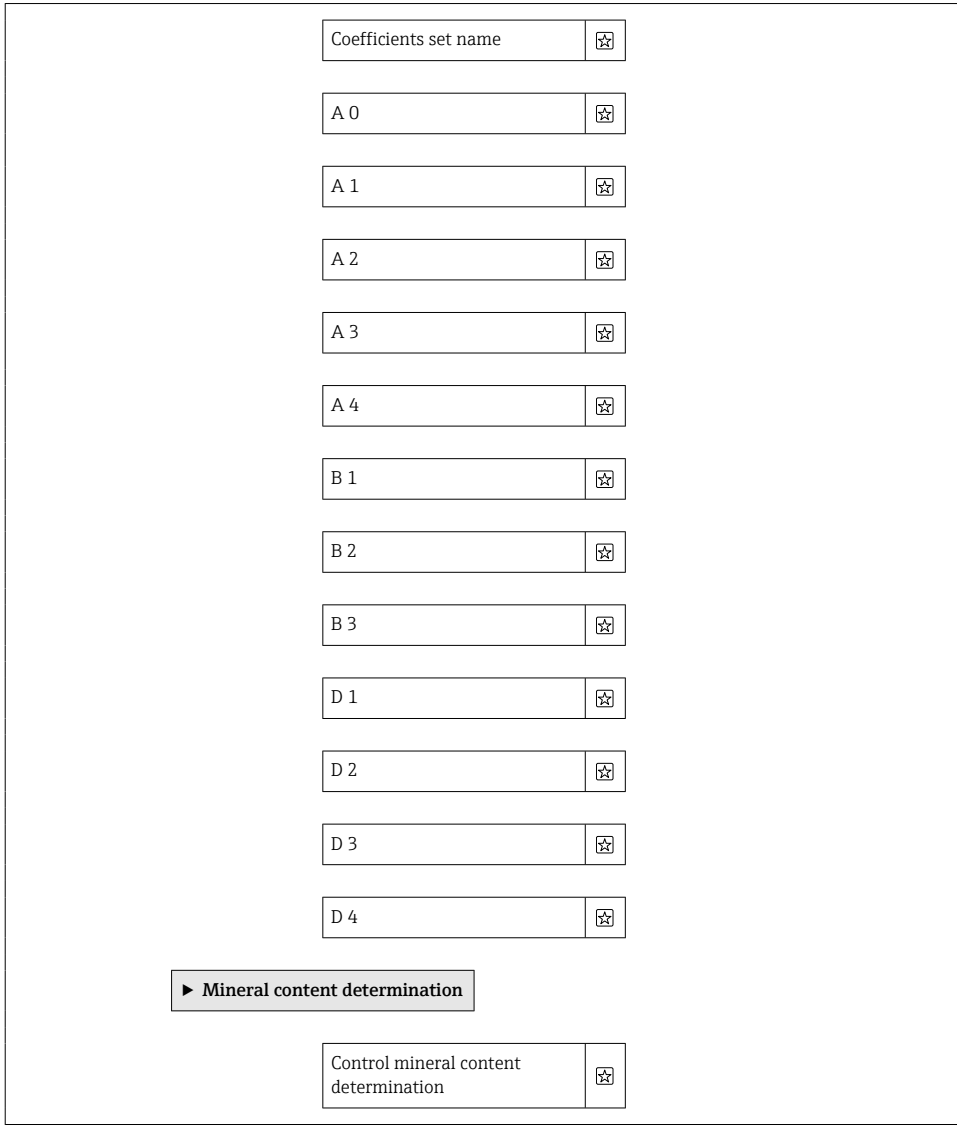
"Concentration" submenu

Navigation

"Expert" menu → Application → Concentration

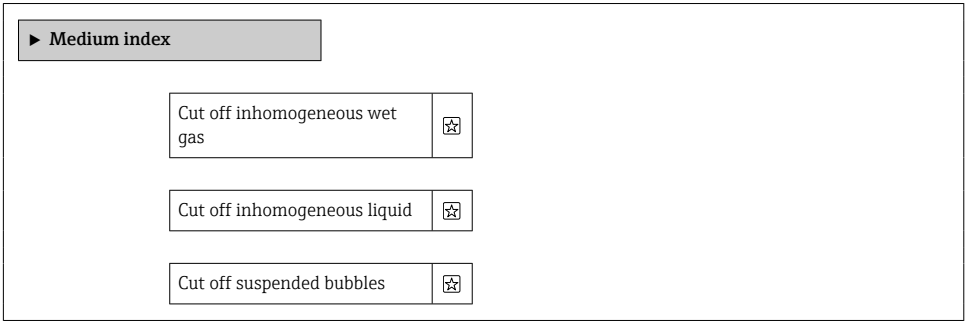



Water mineral content
Carrier reference density
Carrier linear expansion coefficient
Carrier square expansion coefficient
Target reference density
Target linear expansion coefficient
Target square expansion coefficient
Reference temperature expansion
Create coefficients for liquid type
▶ Concentration unit
Concentration unit
User concentration text
User concentration factor
User concentration offset
Reference temperature
▶ Concentration profile 1 to n


Coefficients set name
A 0
A 1
A 2
A 3
A 4
B 1
B 2
B 3
D 1
D 2
D 3
D 4
▶ Mineral content determination
Control mineral content determination

"Medium index" submenu

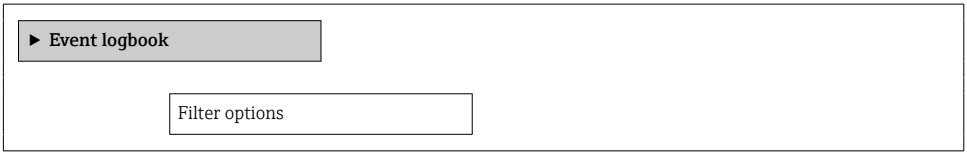
Navigation
"Expert" menu → Application → Medium index



6.1.6 "Diagnostics" submenu

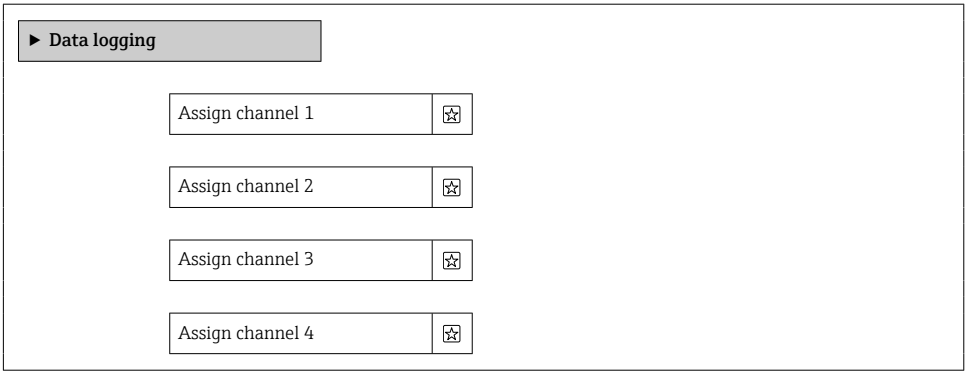
"Event logbook" submenu

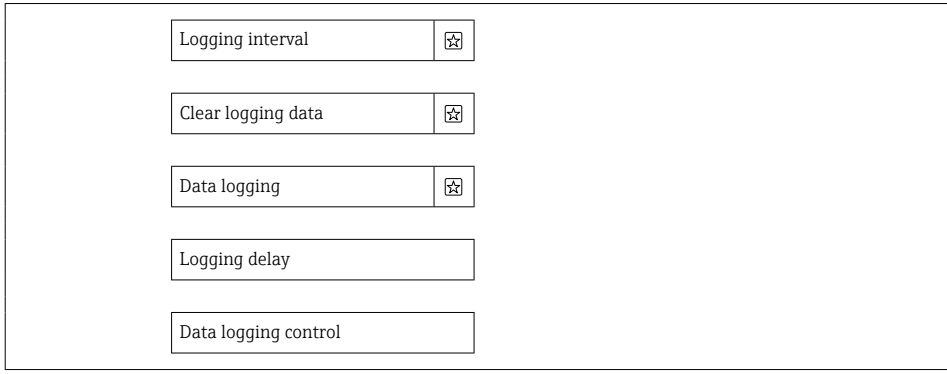
Navigation
"Expert" menu → Diagnostics → Event logbook



"Data logging" submenu

Navigation
"Expert" menu → Diagnostics → Data logging

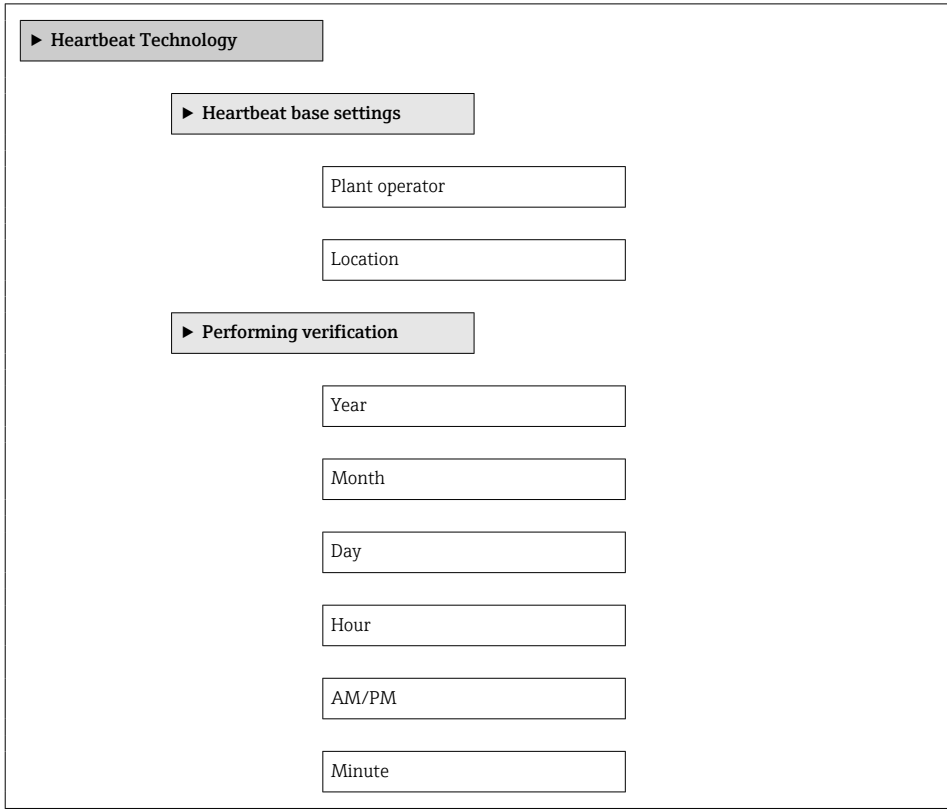


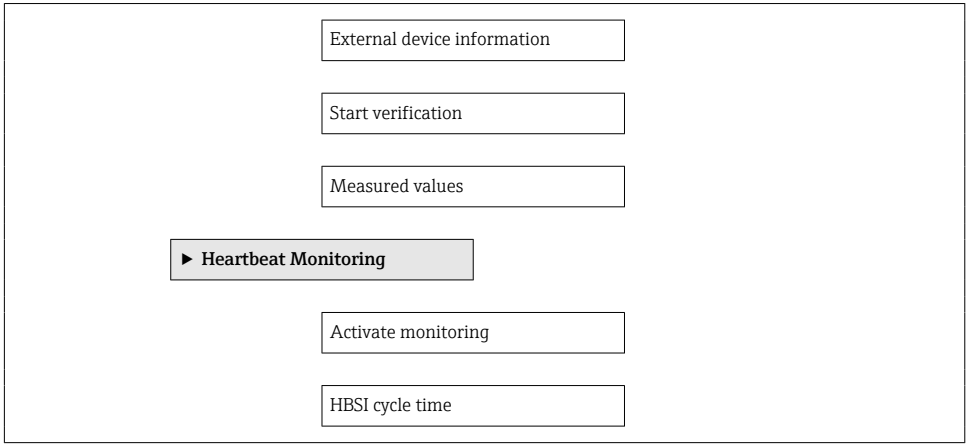


"Heartbeat Technology" submenu

Navigation

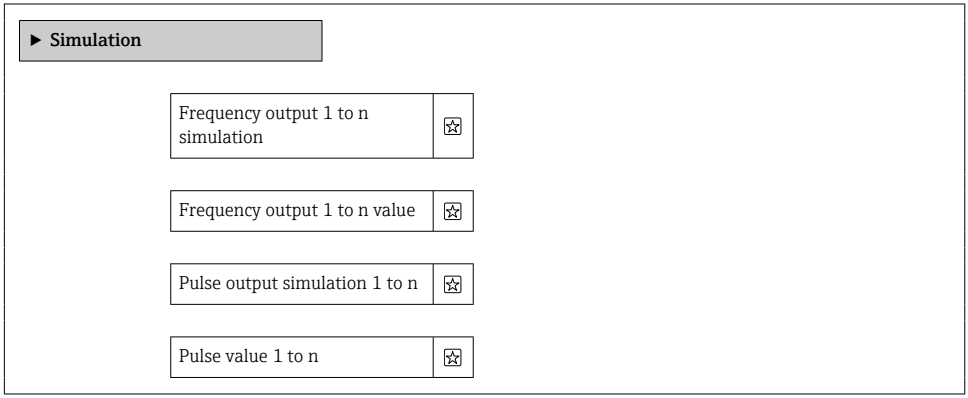
"Expert" menu → Diagnostics → Heartbeat Technology





"Simulation" submenu

Navigation
"Expert" menu → Diagnostics → Simulation



6.2 Deviating parameter configuration

The following parameters correspond to the 'as-delivered' state for custody transfer, gas meters, and deviate from the configuration in the factory settings which can be found in the relevant Description of Device Parameters.

Parameter	Factory setting	Parameter configuration
Format display	1 value, large format	1 value large format + 2 values
Value 1 display	Mass flow	Totalizer 1
Decimal places 1	x.xx	Depends on the nominal diameter of the measuring device

Parameter	Factory setting	Parameter configuration
Value 2 display	none	Mass flow
Value 4 display	none	Custody transfer counter
Display interval	5 s	10 s
Diagnostic no. 374	Warning	Alarm
Mass flow unit	Depends on country	Depends on order
Mass unit	Depends on country	Depends on order
Volume flow unit	Depends on country	Depends on order
Volume unit	Depends on country	Depends on order
Corrected volume flow unit	Depends on country	Depends on order
Corrected volume unit	Depends on country	Depends on order
Corrected volume factor	1	Depends on order
Select medium	Liquid	Gas
Select gas type	Methane CH4	Depends on order
Pressure compensation	Off	Fixed value
Pressure value	0 bar	Depends on order
Corrected volume flow	Calculated reference density	Fixed reference density
Fixed reference density	1 kg/NI	Depends on order
PFS-output 1 to n (Operating mode)	Pulse	Depends on order
Assign pulse output 1 to n	Off	Depends on order
Pulse value	Depends on country and nominal diameter	Depends on order
Pulse width	100 ms	Depends on order
PFS-output 1 to n (Measuring mode)	Forward flow	Forward/reverse flow
Double pulse output (Assign pulse output)	Off	Depends on order
Double pulse output (Pulse scaling)	Depends on country and nominal diameter	Depends on order
Double pulse output (Pulse width)	100 ms	Depends on order
Double pulse output (Measuring mode)	Forward flow	Forward/reverse flow
Totalizer 1 to n (Assign process variable)	Mass flow	Depends on order
Unit totalizer 1 to n	Depends on country	Depends on order
Totalizer 2 (Failure mode)	Stop	Actual value
Totalizer 3 (Operating mode)	Net flow total	Forward flow total

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