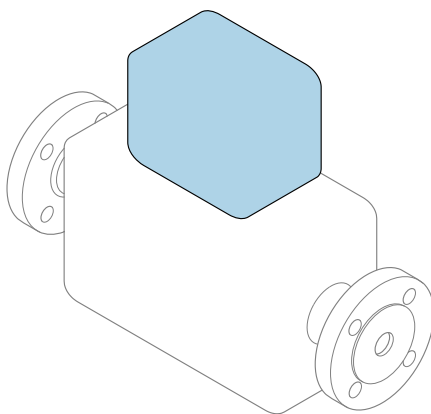


# Brief Operating Instructions

## Proline 100

### PROFINET


Transmitter with  
Coriolis sensor

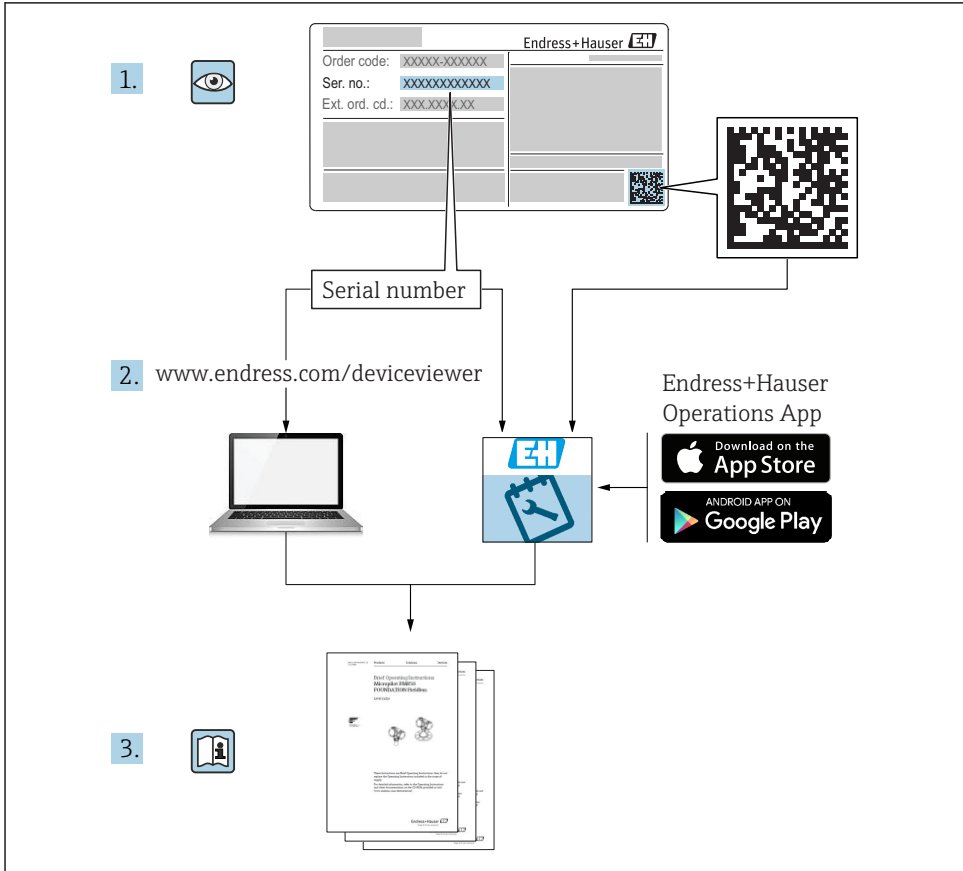


These instructions are Brief Operating Instructions; they are **not** a substitute for the Operating Instructions pertaining to the device.

#### **Transmitter Brief Operating Instructions**

Contain information about the transmitter.

Sensor Brief Operating Instructions →  2



A0023555

## Brief Operating Instructions for the device

The device consists of a transmitter and a sensor.

The process of commissioning these two components is described in two separate manuals:

- Sensor Brief Operating Instructions
- Transmitter Brief Operating Instructions

Please refer to both Brief Operating Instructions when commissioning the device as the contents of the manuals complement one another:

### Sensor Brief Operating Instructions

The Sensor Brief Operating Instructions are aimed at specialists with responsibility for installing the measuring device.

- Incoming acceptance and product identification
- Storage and transport
- Installation

### Transmitter Brief Operating Instructions

The Transmitter Brief Operating Instructions are aimed at specialists with responsibility for commissioning, configuring and parameterizing the measuring device (until the first measured value).

- Product description
- Installation
- Electrical connection
- Operation options
- System integration
- Commissioning
- Diagnostic information

## Additional device documentation



These Brief Operating Instructions are the **Transmitter Brief Operating Instructions**.

The "Sensor Brief Operating Instructions" are available via:

- Internet: [www.endress.com/deviceviewer](http://www.endress.com/deviceviewer)
- Smart phone/tablet: *Endress+Hauser Operations App*

Detailed information about the device can be found in the Operating Instructions and the other documentation:

- Internet: [www.endress.com/deviceviewer](http://www.endress.com/deviceviewer)
- Smart phone/tablet: *Endress+Hauser Operations App*





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


# 1 Document information

## 1.1 Symbols used





### 1.1.1 Safety symbols


Symbol	Meaning
	<b>DANGER!</b> This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.
	<b>WARNING!</b> This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.
	<b>CAUTION!</b> This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.
	<b>NOTE!</b> This symbol contains information on procedures and other facts which do not result in personal injury.

### 1.1.2 Symbols for certain types of information






Symbol	Meaning	Symbol	Meaning
	<b>Permitted</b> Procedures, processes or actions that are permitted.		<b>Preferred</b> Procedures, processes or actions that are preferred.
	<b>Forbidden</b> Procedures, processes or actions that are forbidden.		<b>Tip</b> Indicates additional information.
	Reference to documentation		Reference to page
	Reference to graphic		Series of steps
	Result of a step		Visual inspection

### 1.1.3 Electrical symbols





Symbol	Meaning	Symbol	Meaning
	Direct current		Alternating current
	Direct current and alternating current		<b>Ground connection</b> A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.

Symbol	Meaning
	<b>Protective Earth (PE)</b> A terminal which must be connected to ground prior to establishing any other connections.  The ground terminals are situated inside and outside the device: <ul style="list-style-type: none"><li>■ Inner ground terminal: Connects the protective earth to the mains supply.</li><li>■ Outer ground terminal: Connects the device to the plant grounding system.</li></ul>

1.1.4 Tool symbols

Symbol	Meaning	Symbol	Meaning
	Torx screwdriver		Flat blade screwdriver
	Cross-head screwdriver		Allen key
	Open-ended wrench		

1.1.5 Symbols in graphics

Symbol	Meaning	Symbol	Meaning
1, 2, 3,...	Item numbers		Series of steps
A, B, C, ...	Views	A-A, B-B, C-C, ...	Sections
	Hazardous area		Safe area (non-hazardous area)
	Flow direction		

2 Basic safety instructions

2.1 Requirements for the personnel

The personnel must fulfill the following requirements for its tasks:

- ▶ 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.

## 2.2 Designated use

### Application and media

- The measuring device described in these Brief Operating Instructions is intended only for flow measurement of liquids and gases.
- The measuring device described in these Brief Operating Instructions is intended only for flow measurement of liquids.

Depending on the version ordered, the measuring device can also measure potentially explosive, flammable, poisonous and oxidizing media.

Measuring devices for use in hazardous areas, in hygienic applications or where there is an increased risk due to process pressure, are labeled accordingly on the nameplate.

To ensure that the measuring device remains in proper condition for the operation time:

- ▶ Keep within the specified pressure and temperature range.
- ▶ Only use the measuring device in full compliance with the data on the nameplate and the general conditions listed in the Operating Instructions and supplementary documentation.
- ▶ Based on the nameplate, check whether the ordered device is permitted for the intended use in the hazardous area (e.g. explosion protection, pressure vessel safety).
- ▶ Use the measuring device only for media to which the process-wetted materials are sufficiently resistant.
- ▶ If the measuring device is not operated at atmospheric temperature, compliance with the relevant basic conditions specified in the associated device documentation is absolutely essential: "Documentation" section.
- ▶ Protect the measuring device permanently against corrosion from environmental influences.

### Incorrect use

Non-designated use can compromise safety. The manufacturer is not liable for damage caused by improper or non-designated use.

### WARNING

#### **Danger of breakage due to corrosive or abrasive fluids!**

- ▶ Verify the compatibility of the process fluid with the sensor material.
- ▶ Ensure the resistance of all fluid-wetted materials in the process.
- ▶ Keep within the specified pressure and temperature range.

### NOTICE

#### **Verification for borderline cases:**

- ▶ For special fluids and fluids for cleaning, Endress+Hauser is glad to provide assistance in verifying the corrosion resistance of fluid-wetted materials, but does not accept any warranty or liability as minute changes in the temperature, concentration or level of contamination in the process can alter the corrosion resistance properties.

## Residual risks

### WARNING

**The electronics and the medium may cause the surfaces to heat up. This presents a burn hazard!**

- For elevated fluid temperatures, ensure protection against contact to prevent burns.

*Only applies for Proline Promass E, F, O, X and Cubemass C*

### WARNING

**Danger of housing breaking due to measuring tube breakage!**

- In the event of a measuring tube breakage for a device version without rupture disk it is possible for the pressure loading capacity of the sensor housing to be exceeded. This can lead to rupture or failure of the sensor housing.

## 2.3 Workplace safety

For work on and with the device:

- Wear the required personal protective equipment according to federal/national regulations.

For welding work on the piping:

- Do not ground the welding unit via the measuring device.

If working on and with the device with wet hands:

- Due to the increased risk of electric shock, gloves must be worn.

## 2.4 Operational safety

Risk of injury.

- Operate the device in proper technical condition and fail-safe condition only.
- The operator is responsible for interference-free operation of the device.

## 2.5 Product safety

This measuring device is designed in accordance with good engineering practice to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate.

It meets general safety standards and legal requirements. It also complies with the EU directives listed in the device-specific EU Declaration of Conformity. Endress+Hauser confirms this by affixing the CE mark to the device.

## 2.6 IT security

We only provide a warranty if the device is installed and used as described in the Operating Instructions. The device is equipped with security mechanisms to protect it against any inadvertent changes to the device settings.

IT security measures in line with operators' security standards and designed to provide additional protection for the device and device data transfer must be implemented by the operators themselves.

## 3 Product description

The device consists of a transmitter and a sensor.

The device is available as a compact version:


The transmitter and sensor form a mechanical unit.



For detailed information on the product description, see the Operating Instructions for the device

## 4 Installation



For detailed information about mounting the sensor, see the Sensor Brief Operating Instructions →  3

### 4.1 Mounting the measuring device

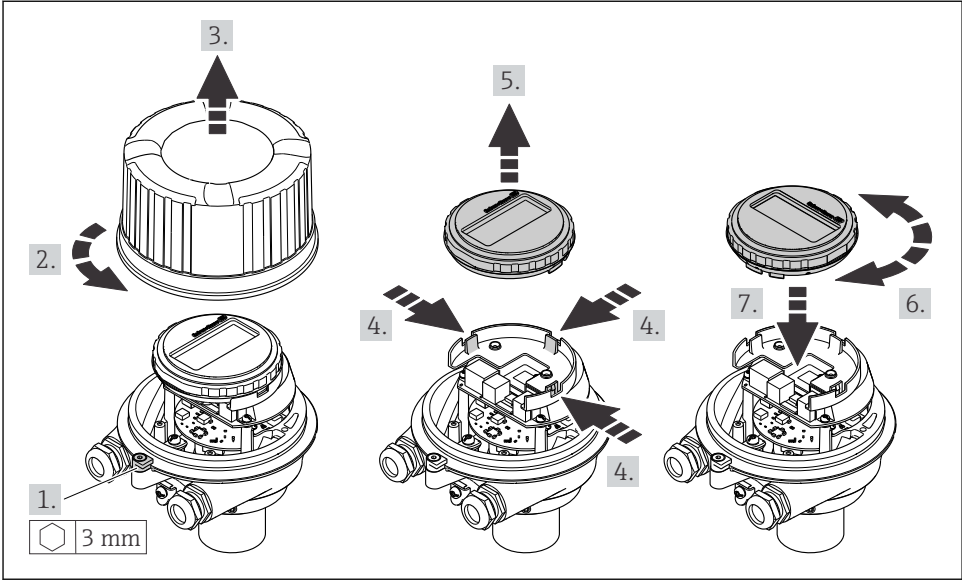
#### 4.1.1 Turning the display module

The local display is only available with the following device version:

Order code for "Display; operation", option **B**: 4-line; illuminated, via communication

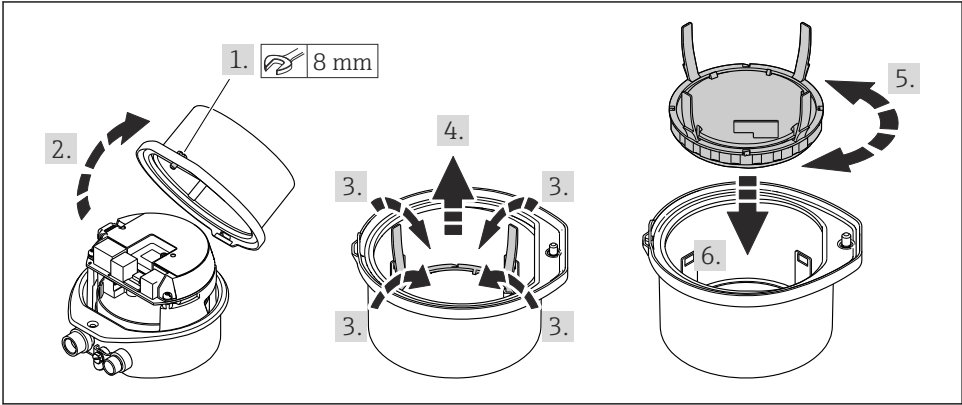
The display module can be turned to optimize display readability.

Aluminum housing version



A0023192

Compact and ultra-compact housing versions



A0023195

## 5 Electrical connection

### NOTICE

**The measuring device does not have an internal circuit breaker.**

- ▶ For this reason, assign the measuring device a switch or power-circuit breaker so that the power supply line can be easily disconnected from the mains.
- ▶ Although the measuring device is equipped with a fuse, additional overcurrent protection (maximum 16 A) should be integrated into the system installation.

### 5.1 Connection conditions

#### 5.1.1 Required tools

- For cable entries: Use corresponding tools
- For securing clamp (on aluminum housing): Allen screw 3 mm
- For securing screw (for stainless steel housing): open-ended wrench 8 mm
- Wire stripper
- When using stranded cables: crimper for wire end ferrule

#### 5.1.2 Requirements for connecting cable

The connecting cables provided by the customer must fulfill the following requirements.

#### Electrical safety

In accordance with applicable federal/national regulations.

#### Permitted temperature range

- The installation guidelines that apply in the country of installation must be observed.
- The cables must be suitable for the minimum and maximum temperatures to be expected.

#### Power supply cable

Standard installation cable is sufficient.

#### Signal cable

##### PROFINET

Standard IEC 61156-6 specifies CAT 5 as the minimum category for a cable used for PROFINET. CAT 5e and CAT 6 are recommended.



For more information on planning and installing PROFINET networks, see: "PROFINET Cabling and Interconnection Technology", Guideline for PROFINET

#### Cable diameter

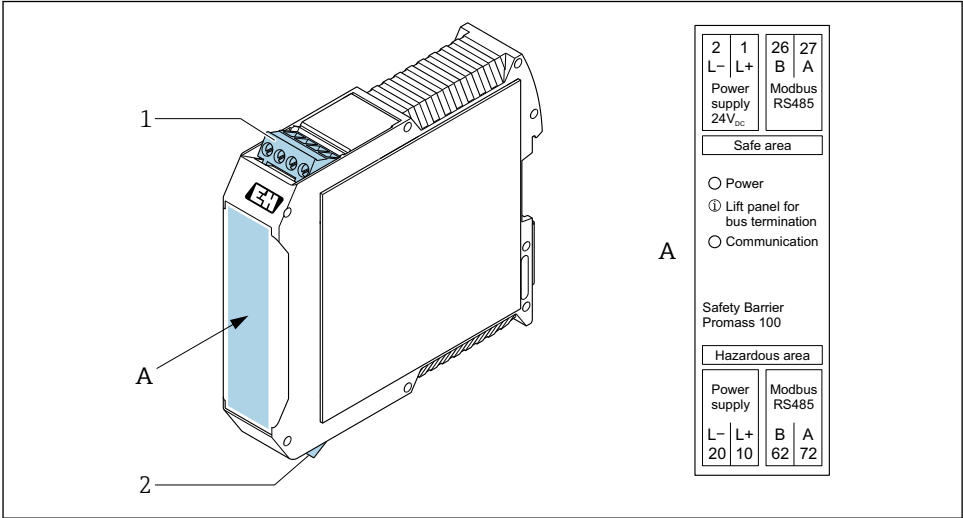
- Cable glands supplied:  
M20 × 1.5 with cable Ø 6 to 12 mm (0.24 to 0.47 in)
- Spring terminals:  
Wire cross-sections 0.5 to 2.5 mm<sup>2</sup> (20 to 14 AWG)

5.1.3 Terminal assignment

The terminal assignment for the electrical connection of the device can be found on the connection nameplate of the electronics module.

In addition, the device version with Modbus RS485 is supplied with the Safety Barrier Promass 100 whose nameplate also bears information on the terminals.

Safety Barrier Promass 100



1 Safety Barrier Promass 100 with terminals

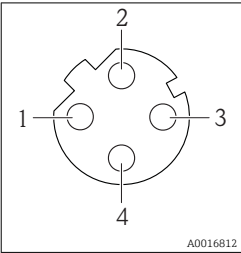
- 1 Non-hazardous area and Zone 2/Div. 2
- 2 Intrinsically safe area

5.1.4 Pin assignment, device plug

Supply voltage

	Pin		Assignment
	1	L+	DC 24 V
	2		Not assigned
	3		Not assigned
	4	L-	DC 24 V
	5		Grounding/shielding
	Coding		Plug/socket
A		Plug	

Device plug for signal transmission (device side)

 A0016812	Pin	Assignment	
	1	+	TD +
	2	+	RD +
	3	-	TD -
	4	-	RD -
	Coding		Plug/socket
	D		Socket


5.1.5 Preparing the measuring device

NOTICE

Insufficient sealing of the housing!

Operational reliability of the measuring device could be compromised.

► Use suitable cable glands corresponding to the degree of protection.

1. Remove dummy plug if present.
2. If the measuring device is supplied without cable glands:  
Provide suitable cable gland for corresponding connecting cable.
3. If the measuring device is supplied with cable glands:  
Observe requirements for connecting cables →  11.

## 5.2 Connecting the measuring device

### NOTICE

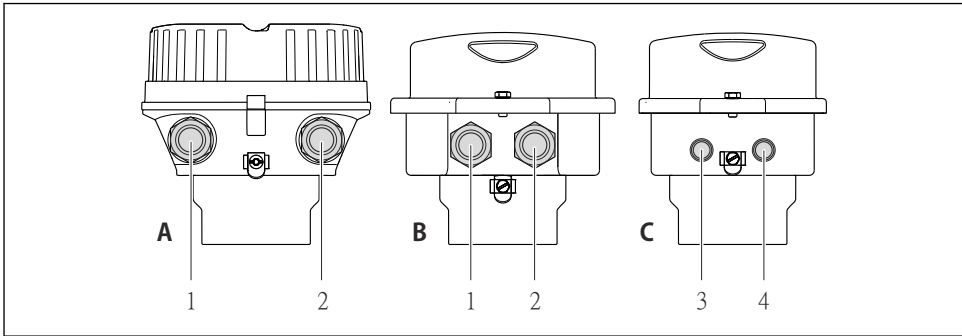
#### Limitation of electrical safety due to incorrect connection!

- ▶ Have electrical connection work carried out by appropriately trained specialists only.
- ▶ Observe applicable federal/national installation codes and regulations.
- ▶ Comply with local workplace safety regulations.
- ▶ Always connect the protective ground cable  $\oplus$  before connecting additional cables.
- ▶ For use in potentially explosive atmospheres, observe the information in the device-specific Ex documentation.
- ▶ The power unit must be tested to ensure it meets safety requirements (e.g. PELV, SELV).

### 5.2.1 Connecting the transmitter

The connection of the transmitter depends on the following order codes:

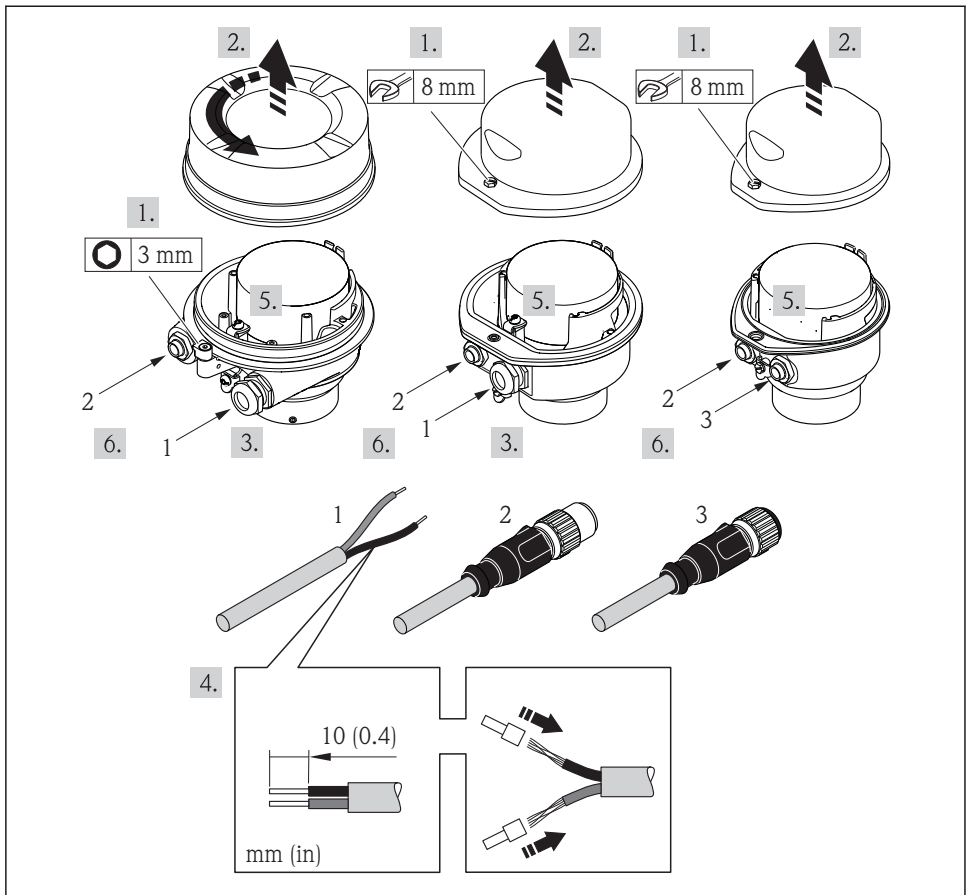
- Housing version: compact or ultra-compact
- Connection version: device plug or terminals



A0016924

#### 2 Housing versions and connection versions

- A Compact, coated aluminum
- B Compact hygienic, stainless or compact, stainless
- 1 Cable entry or device plug for signal transmission
- 2 Cable entry or device plug for supply voltage
- C Ultra-compact hygienic, stainless or ultra-compact, stainless
- 3 Device plug for signal transmission
- 4 Device plug for supply voltage



A0017844

### 3 Device versions with connection examples

- 1 Cable
- 2 Device plug for signal transmission
- 3 Device plug for supply voltage

**i** Depending on the housing version disconnect the local display from the main electronics module: Operating Instructions for the device .

- Connect the cable in accordance with the terminal assignment or the device plug pin assignment .

5.2.2      Ensuring potential equalization

Promass, Cubemass

Requirements

Please consider the following to ensure correct measurement:

- Same electrical potential for the fluid and sensor
- Company-internal grounding concepts

 For devices intended for use in hazardous locations, please observe the guidelines in the Ex documentation (XA).

5.3          Hardware settings

5.3.1       Setting the device name

A measuring point can be quickly identified within a plant on the basis of the tag name. The tag name is equivalent to the device name (name of station of the PROFINET specification). The factory-assigned device name can be changed using the DIP switches or the automation system.

- Example of device name (factory setting): EH-Promass100-XXXXX
- Example of device name (factory setting): EH-Cubemass100-XXXXX

EH	Endress+Hauser
Promass	Instrument family
100	Transmitter
XXXXX	Serial number of the device

The device name currently used is displayed in Setup → Name of station .

Setting the device name using the DIP switches

The last part of the device name can be set using DIP switches 1-8. The address range is between 1 and 254 (factory setting: serial number of the device )

Overview of the DIP switches

DIP switches	Bit	Description
1	1	Configurable part of the device name
2	2	
3	4	
4	8	
5	16	
6	32	
7	64	

DIP switches	Bit	Description
8	128	
9	–	Enable hardware write protection
10	–	Default IP address: use 192.168.1.212

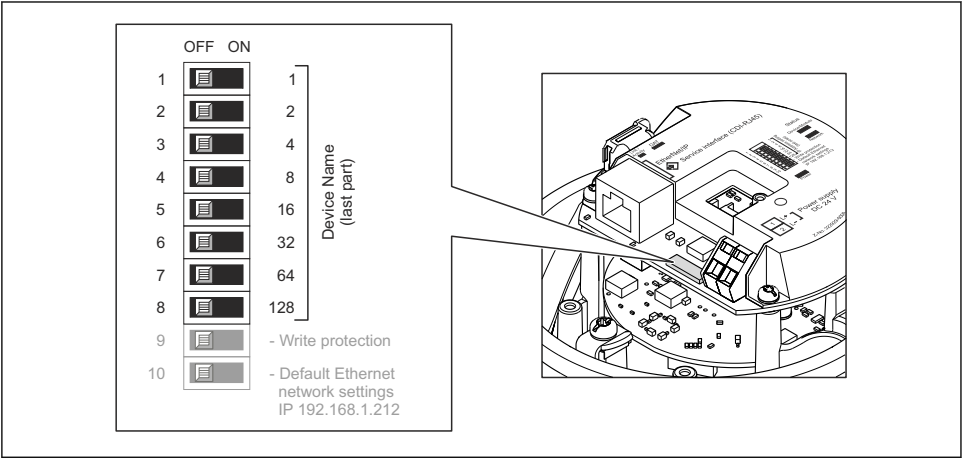
Example: set the device name EH-PROMASS100-065

DIP switches	ON/OFF	Bit
1	ON	1
2...6	OFF	–
7	ON	64
8	OFF	–

Setting the device name

Risk of electric shock when opening the transmitter housing.


- ▶ Disconnect the device from the power supply before opening the transmitter housing.



A0027332

1. Depending on the housing version, loosen the securing clamp or fixing screw of the housing cover.
2. Depending on the housing version, unscrew or open the housing cover and disconnect the local display from the main electronics module where necessary .
3. Set the desired device name using the corresponding DIP switches on the I/O electronics module.
4. Reverse the removal procedure to reassemble the transmitter.


5. Reconnect the device to the power supply. The configured device address is used once the device is restarted.

 If the device is reset via the PROFINET interface, it is not possible to reset the device name to the factory setting. The value 0 is used instead of the device name.

### Setting the device name via the automation system

DIP switches 1-8 must all be set to **OFF** (factory setting) or all be set to **ON** to be able to set the device name via the automation system.

The complete device name (name of station) can be changed individually via the automation system.

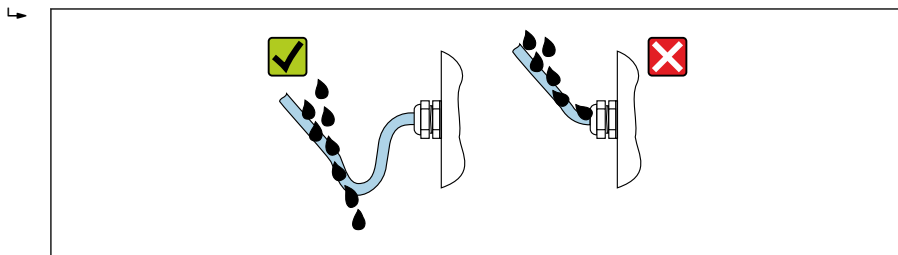
-  The serial number used as part of the device name in the factory setting is not saved. It is not possible to reset the device name to the factory setting with the serial number. The value 0 is used instead of the serial number.
- When assigning the device name via the automation system, enter the device name in lower-case letters.

## 5.4 Ensuring the degree of protection

The measuring device fulfills all the requirements for the IP66/67 degree of protection, Type 4X enclosure.

To guarantee IP66/67 degree of protection, Type 4X enclosure, carry out the following steps after the electrical connection:




1. Check that the housing seals are clean and fitted correctly.
2. Dry, clean or replace the seals if necessary.
3. Tighten all housing screws and screw covers.
4. Firmly tighten the cable glands.
5. To ensure that moisture does not enter the cable entry:  
Route the cable so that it loops down before the cable entry ("water trap").



A0029278

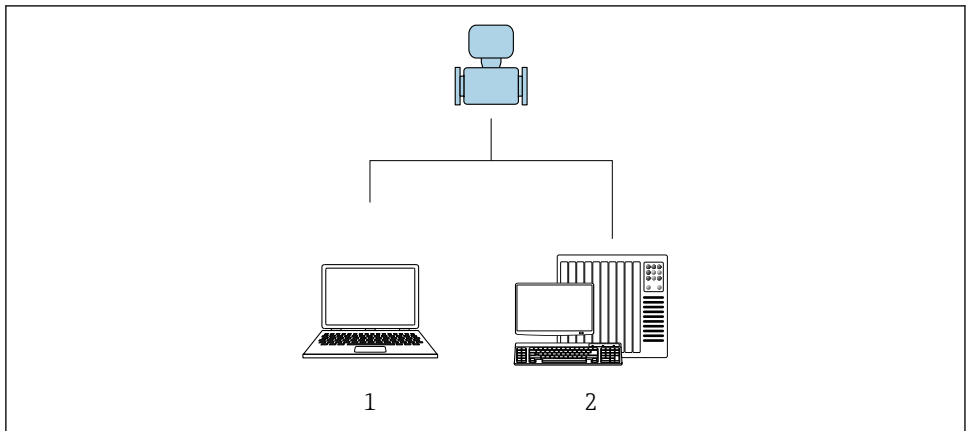
6. Insert dummy plugs into unused cable entries.

## 5.5 Post-connection check

Are cables or the device undamaged (visual inspection)?	<input type="checkbox"/>
Do the cables used meet the requirements →  11?	<input type="checkbox"/>
Do the cables have adequate strain relief?	<input type="checkbox"/>
Are all the cable glands installed, firmly tightened and leak-tight? Cable run with "water trap" →  18?	<input type="checkbox"/>
Depending on the device version: are all the device plugs firmly tightened?	<input type="checkbox"/>
Does the supply voltage match the specifications on the transmitter nameplate?	<input type="checkbox"/>
Is the terminal assignment or pin assignment of the connector →  12 correct?	<input type="checkbox"/>
If supply voltage is present, is the power LED on the electronics module of the transmitter lit green?	<input type="checkbox"/>
Depending on the device version, is the securing clamp or fixing screw firmly tightened?	<input type="checkbox"/>

## 6 Operation options

### 6.1 Overview of operating options

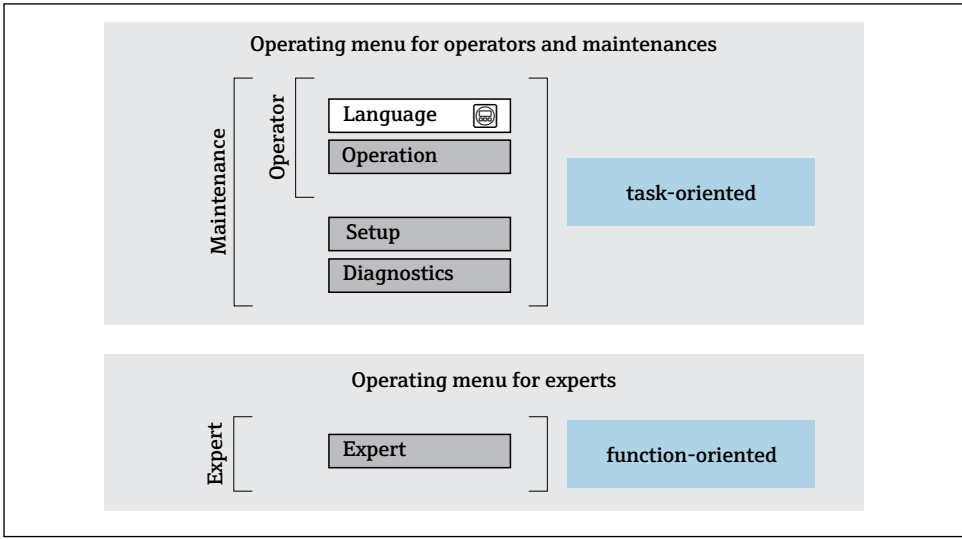


A0017760


- 1 Computer with Web browser (e.g. Internet Explorer) or with "FieldCare" operating tool
- 2 Automation system, e.g. Siemens S7-300 or S7-1500 with Step7 or TIA portal and latest GSD file.

## 6.2 Structure and function of the operating menu

### 6.2.1 Structure of the operating menu




A0014058-EN

 4 Schematic structure of the operating menu

### 6.2.2 Operating philosophy


The individual parts of the operating menu are assigned to certain user roles (operator, maintenance etc.). Each user role contains typical tasks within the device lifecycle.

 For detailed information on the operating philosophy, see the Operating Instructions for the device.

## 6.3 Access to the operating menu via the web browser

### 6.3.1 Function range

Thanks to the integrated Web server, the device can be operated and configured via a Web browser and via a service interface (CDI-RJ45) . In addition to the measured values, status information on the device is also displayed and allows the user to monitor the status of the device. Furthermore the device data can be managed and the network parameters can be configured.


 For additional information on the Web server, refer to the Special Documentation for the device

### 6.3.2 Prerequisites


#### Computer hardware

Interface	The computer must have an RJ45 interface.
Connection	Standard Ethernet cable with RJ45 connector.
Screen	Recommended size: ≥ 12" (depends on the screen resolution)

#### Computer software

Recommended operating systems	<p>Microsoft Windows 7 or higher.</p> <p> Microsoft Windows XP is supported.</p>
Web browsers supported	<ul style="list-style-type: none"> <li>■ Microsoft Internet Explorer 8 or higher</li> <li>■ Microsoft Edge</li> <li>■ Mozilla Firefox</li> <li>■ Google Chrome</li> <li>■ Safari</li> </ul>

#### Computer settings

User rights	Appropriate user rights (e.g. administrator rights) for TCP/IP and proxy server settings are necessary (for adjusting the IP address, subnet mask etc.).
Proxy server settings of the Web browser	The Web browser setting <i>Use a Proxy Server for Your LAN</i> must be <b>deselected</b> .
JavaScript	<p>JavaScript must be enabled.</p> <p> If JavaScript cannot be enabled: enter <code>http://XXX.XXX.X.XXX/basic.html</code> in the address line of the Web browser, e.g. <code>http://192.168.1.212/basic.html</code>. A fully functional but simplified version of the operating menu structure starts in the Web browser.</p>
Network connections	Only the active network connections to the measuring device should be used.
	Switch off all other network connections such as WLAN.



In the event of connection problems:

#### Measuring device: Via CDI-RJ45 service interface

Device	CDI-RJ45 service interface
Measuring device	The measuring device has an RJ45 interface.
Web server	Web server must be enabled; factory setting: ON

### 6.3.3 Establishing a connection

#### Via service interface (CDI-RJ45)

*Preparing the measuring device*

*Configuring the Internet protocol of the computer*

The IP address can be assigned to the measuring device in a variety of ways:

- Dynamic Configuration Protocol (DCP), factory setting:  
The IP address is automatically assigned to the measuring device by the automation system (e.g. Siemens S7).
- Hardware addressing:  
The IP address is set via DIP switches .
- Software addressing:  
The IP address is entered via the **IP address** parameter .
- DIP switch for "Default IP address":  
To establish the network connection via the service interface (CDI-RJ45): the fixed IP address 192.168.1.212 is used .

The measuring device works with the Dynamic Configuration Protocol (DCP), on leaving the factory, i.e. the IP address of the measuring device is automatically assigned by the automation system (e.g. Siemens S7).

To establish a network connection via the service interface (CDI-RJ45): the "Default IP address" DIP switch must be set to **ON**. The measuring device then has the fixed IP address: 192.168.1.212. This address can now be used to establish the network connection.


1. Via DIP switch 2, activate the default IP address 192.168.1.212: .
2. Switch on the measuring device.
3. Connect to the computer using a cable .
4. If a 2nd network card is not used, close all the applications on the notebook.
  - ↳ Applications requiring Internet or a network, such as e-mail, SAP applications, Internet or Windows Explorer.
5. Close any open Internet browsers.
6. Configure the properties of the Internet protocol (TCP/IP) as defined in the table:

IP address	192.168.1.XXX; for XXX all numerical sequences except: 0, 212 and 255 → e.g. 192.168.1.213
Subnet mask	255.255.255.0
Default gateway	192.168.1.212 or leave cells empty

#### Starting the Web browser

1. Start the Web browser on the computer.

2. Enter the IP address of the Web server in the address line of the Web browser:  
192.168.1.212
- The login page appears.

 If a login page does not appear, or if the page is incomplete, see the Special Documentation for the Web server


6.3.4      **Logging on**

Access code	0000 (factory setting); can be changed by customer
-------------	--

6.3.5      **User interface**

Device name:

Device tag:

Status signal: 

Output curr. 1:

Mass flow:

Volume flow:

6.76 mA

1554.7325 kg/h

1554.7326.0000 l/h

Correct.vol.flow:


Density:

Ref.density:

1554.7326.0000 NI/h

0.0001 kg/l

0.0001 kg/NI

Endress+Hauser 

Measured values

Menu

Instrument health status

Data management

Network

Logging

Logout (Maintenance)

Main menu

Display language

English

> Operation

> Setup

> Diagnostics

> Expert

1

2

3

A0029418


- 1      *Function row*
- 2      *Local display language*
- 3      *Navigation area*

**Header**

The following information appears in the header:

- Device tag
- Device status with status signal
- Current measured values

**Function row**

Functions	Meaning
Measured values	Displays the measured values of the measuring device
Menu	<ul style="list-style-type: none"><li>■ Access to the operating menu from the measuring device</li><li>■ The structure of the operating menu is the same as for the operating tools</li></ul> <div> For detailed information on the structure of the operating menu, see the Operating Instructions for the measuring device</div>
Device status	Displays the diagnostic messages currently pending, listed in order of priority

Functions	Meaning
Data management	<p>Data exchange between PC and measuring device:</p> <ul style="list-style-type: none"><li>■ Device configuration:<ul style="list-style-type: none"><li>– Load settings from the device (XML format, save configuration)</li><li>– Save settings to the device (XML format, restore configuration)</li></ul></li><li>■ Logbook - Export Event logbook (.csv file)</li><li>■ Documents - Export documents:<ul style="list-style-type: none"><li>– Export backup data record (.csv file, create documentation of the measuring point configuration)</li><li>– Verification report (PDF file, only available with the "Heartbeat Verification" application package)</li></ul></li><li>■ File for system integration - If using fieldbuses, upload device drivers for system integration from the measuring device: PROFINET: GSD file</li></ul>
Network configuration	<p>Configuration and checking of all the parameters required for establishing the connection to the measuring device:</p> <ul style="list-style-type: none"><li>■ Network settings (e.g. IP address, MAC address)</li><li>■ Device information (e.g. serial number, firmware version)</li></ul>
Logout	End the operation and call up the login page

Navigation area

If a function is selected in the function bar, the submenus of the function open in the navigation area. The user can now navigate through the menu structure.

Working area

Depending on the selected function and the related submenus, various actions can be performed in this area:

- Configuring parameters
- Reading measured values
- Calling up help text
- Starting an upload/download

6.3.6 Disabling the Web server

The Web server of the measuring device can be switched on and off as required using the **Web server functionality** parameter.

Navigation

"Expert" menu → Communication → Web server

Parameter overview with brief description

Parameter	Description	Selection	Factory setting
Web server functionality	Switch the Web server on and off.	<ul style="list-style-type: none"><li>■ Off</li><li>■ HTML Off</li><li>■ On</li></ul>	On

## Function scope of the "Web server functionality" parameter

Option	Description
Off	<ul style="list-style-type: none"> <li>■ The web server is completely disabled.</li> <li>■ Port 80 is locked.</li> </ul>
HTML Off	The HTML version of the web server is not available.
On	<ul style="list-style-type: none"> <li>■ The complete functionality of the web server is available.</li> <li>■ JavaScript is used.</li> <li>■ The password is transferred in an encrypted state.</li> <li>■ Any change to the password is also transferred in an encrypted state.</li> </ul>

### Enabling the Web server

If the Web server is disabled it can only be re-enabled with the **Web server functionality** parameter via the following operating options:

- Via Bedientool "FieldCare"
- Via "DeviceCare" operating tool

#### 6.3.7 Logging out



Before logging out, perform a data backup via the **Data management** function (upload configuration from device) if necessary.

1. Select the **Logout** entry in the function row.  
↳ The home page with the Login box appears.
2. Close the Web browser.
3. If no longer needed:  
Reset modified properties of the Internet protocol (TCP/IP) → 📄 22.



If communication with the Web server was established via the default IP address 192.168.1.212, DIP switch No. 10 must be reset (from **ON** → **OFF**). Afterwards, the IP address of the device is active again for network communication.

## 6.4 Access to the operating menu via the operating tool



The operating menu can also be accessed via the FieldCare and DeviceCare operating tools. See the Operating Instructions for the device.

## 7 System integration










For detailed information on system integration, see the Operating Instructions for the device.

- Overview of device description files
- Current version data for the device
  - Operating tools


## 7.1      Cyclic data transmission Promass, Cubemass

### 7.1.1      Overview of the modules

The following tables shows which modules are available to the measuring device for cyclic data exchange. Cyclic data exchange is performed with an automation system.

Measuring device		Direction Data flow	Control system
Module	Slot		
Analog Input module →  26	1 to 14	→	PROFINET
Digital Input module →  27	1 to 14	→	
Diagnose Input module →  27	1 to 14	→	
Analog Output module →  29	18, 19, 20	←	
Digital Output module →  30	21, 22	←	
Totalizer 1 to 3 →  28	15...17	← →	
Heartbeat Verification module →  31	23	← →	

### 7.1.2      Description of the modules

-  The data structure is described from the perspective of the automation system:
- Input data: Are sent from the measuring device to the automation system.
  - Output data: Are sent from the automation system to the measuring device.

#### Analog Input module

Transmit input variables from the measuring device to the automation system.

*Selection: input variable*

Slot	Input variables
1 to 14	<ul style="list-style-type: none"> <li>■ Mass flow</li> <li>■ Volume flow</li> <li>■ Corrected volume flow</li> <li>■ Target mass flow <sup>1)</sup></li> <li>■ Carrier mass flow</li> <li>■ Density</li> <li>■ Reference density</li> <li>■ Concentration</li> <li>■ Temperature</li> <li>■ Carrier tube temperature <sup>2)</sup></li> <li>■ Electronic temperature</li> <li>■ Oscillation frequency</li> <li>■ Oscillation amplitude</li> <li>■ Frequency fluctuation</li> <li>■ Oscillation damping</li> <li>■ Tube damping fluctuation</li> <li>■ Signal asymmetry</li> <li>■ Exciter current</li> <li>■ Dynamic viscosity <sup>3)</sup></li> <li>■ Kinematic viscosity</li> <li>■ Temp. compensated dynamic viscosity</li> <li>■ Temp. compensated kinematic viscosity</li> </ul>

1) Only available with the Concentration application package

2) Only available with the Heartbeat Verification application package

3) Only available with the Viscosity application package

**Discrete Input module**

Transmit discrete input values from the measuring device to the automation system.

*Selection: device function*

Slot	Device function	Status (meaning)
1...14	Empty pipe detection	<ul style="list-style-type: none"> <li>■ 0 (device function not active)</li> <li>■ 1 (device function active)</li> </ul>
	Low flow cut off	

**Diagnose Input module**

Transmit discrete input values (diagnostic information) from the measuring device to the automation system.

*Selection: device function*

Slot	Device function	Status (meaning)
1 to 14	Last diagnostics	Diagnostic information number and status
	Current diagnosis	

Status

Coding (hex)	Status
0x00	No device error is present.
0x01	Failure (F): A device error is present. The measured value is no longer valid.
0x02	Function check (C): The device is in service mode (e.g. during a simulation).
0x04	Maintenance required (M): Maintenance is required. The measured value is still valid.
0x08	Out of specification (S): The device is being operated outside its technical specification limits (e.g. process temperature range).

Totalizer module

The Totalizer module consists of the Totalizer Value, Totalizer Control and Totalizer Mode submodules.

Totalizer Value submodule

Transmit transmitter value from the device to the automation system.

Selection: input variable

Slot	Sub-slot	Input variable
15...17	1	<ul style="list-style-type: none"><li>■ Mass flow</li><li>■ Volume flow</li><li>■ Corrected volume flow</li><li>■ Target mass flow<sup>1)</sup></li><li>■ Carrier mass flow<sup>1)</sup></li></ul>

1) Only available with the Concentration application package

Totalizer Control submodule

Control the totalizer via the automation system.

Selection: control totalizer

Slot	Sub-slot	Value	Control totalizer
15...17	2	0	Totalize
		1	Reset + hold
		2	Preset + hold
		3	Reset + totalize

Slot	Sub-slot	Value	Control totalizer
		4	Preset + totalize
		5	Hold

### Totalizer Mode submodule

Configure the totalizer via the automation system.

*Selection: totalizer configuration*

Slot	Sub-slot	Value	Control totalizer
15...17	3	0	Balancing
		1	Balance the positive flow
		2	Balance the negative flow

### Analog Output module

Transmit compensation values from the automation system to the measuring device.

*Assigned compensation values*



The configuration is performed via: Expert → Sensor → External compensation

Slot	Compensation value
18	External pressure
19	External temperature
20	External reference density
29	External value for % S&W (sediment and water) <sup>1)</sup>
30	External value for % Water cut <sup>1)</sup>

1) Only available with the Petroleum application package.

*Available units*

Pressure		Temperature		Density		Percent	
Unit code	Unit	Unit code	Unit	Unit code	Unit	Unit code	Unit
1610	Pa a	1001	°C	32840	kg/Nm <sup>3</sup>	1342	%
1616	kPa a	1002	°F	32841	kg/Nl		
1614	MPa a	1000	K	32842	g/Scm <sub>3</sub>		
1137	bar	1003	°R	32843	kg/Scm <sub>3</sub>		
1611	Pa g			32844	lb/Sft <sub>3</sub>		

Pressure		Temperature		Density		Percent	
Unit code	Unit	Unit code	Unit	Unit code	Unit	Unit code	Unit
1617	kPa g						
1615	MPa g						
32797	bar g						
1142	psi a						
1143	psi g						

*Failsafe mode*

A failsafe mode can be defined for using the compensation values.

If the status is GOOD or UNCERTAIN, the compensation values transmitted by the automation system are used. If the status is BAD, the failsafe mode is activated for the use of the compensation values.

Parameters are available per compensation value to define the failsafe mode: Expert → Sensor → External compensation

*Fail safe type parameter*

- Fail safe value option: The value defined in the Fail safe value parameter is used.
- Fallback value option: The last valid value is used.
- Off option: The failsafe mode is disabled.

*Fail safe value parameter*

Use this parameter to enter the compensation value which is used if the Fail safe value option is selected in the Fail safe type parameter.

**Discrete Output module**

Transmit discrete output values from the automation system to the measuring device.

*Assigned device functions*

Slot	Device function	Status (meaning)
21	Flow override	<ul style="list-style-type: none"><li>■ 0 (disable device function)</li><li>■ 1 (enable device function)</li></ul>
22	Zero point adjustment	
24...26	Relay output	Relay output value: <ul style="list-style-type: none"><li>■ 0</li><li>■ 1</li></ul>

**Heartbeat Verification module**

Receive discrete output values from the automation system and transmit discrete input values from the measuring device to the automation system.

The Heartbeat Verification module receives discrete output data from the automation system and transmits discrete input data from the measuring device to the automation system.

The discrete output value is provided by the automation system in order to start Heartbeat Verification. The discrete input value is depicted in the first byte. The second byte contains status information pertaining to the input value.

The discrete input value is used by the measuring device to transmit the status of the Heartbeat Verification device functions to the automation system. The module cyclically transmits the discrete input value, along with the status, to the automation system. The discrete input value is depicted in the first byte. The second byte contains status information pertaining to the input value.

 Only available with the Heartbeat Verification application package.

Assigned device functions

Slot	Device function	Bit	Verification status
23	Status verification (input data)	0	Verification has not been performed
		1	Verification has failed
		2	Currently performing verification
		3	Verification terminated
	Verification result (input data)	<b>Bit</b>	<b>Verification result</b>
		4	Verification has failed
		5	Verification performed successfully
		6	Verification has not been performed
		7	–
	Start verification (output data)	<b>Verification control</b>	
		A change in the status from 0 to 1 starts the verification	

Concentration module

 Only available with the Concentration Measurement application package.

Assigned device functions

Slot	Input variables
28	Choice of medium type

### 7.1.3 Status coding

Status	Coding (hex)	Meaning
BAD - Maintenance alarm	0x24	A measured value is not available because a device error has occurred.
BAD - Process related	0x28	A measured value is not available because the process conditions are not within the device's technical specification limits.
BAD - Function check	0x3C	A function check is active (e.g. cleaning or calibration)
UNCERTAIN - Initial value	0x4F	A pre-defined value is output until a correct measured value is available again or until remedial measures have been carried out that change this status.
UNCERTAIN - Maintenance demanded	0x68	Signs of wear and tear have been detected on the measuring device. Short-term maintenance is needed to ensure that the measuring device remains operational. The measured value might be invalid. The use of the measured value depends on the application.
UNCERTAIN - Process related	0x78	The process conditions are not within the device's technical specification limits. This could have a negative impact on the quality and accuracy of the measured value. The use of the measured value depends on the application.
GOOD - OK	0x80	No error has been diagnosed.
GOOD - Maintenance demanded	0xA8	The measured value is valid. It is highly advisable to service the device in the near future.
GOOD - Function check	0xBC	The measured value is valid. The measuring device is performing an internal function check. The function check does not have any noticeable effect on the process.

### 7.1.4 Factory setting

The slots are already assigned in the automation system for initial commissioning.

#### Assigned slots

Slot	Factory setting
1	Mass flow
2	Volume flow
3	Corrected volume flow
4	Density
5	Reference density
6	Temperature

Slot	Factory setting
7-14	–
15	Totalizer 1
16	Totalizer 2
17	Totalizer 3

## 7.1.5 Startup configuration


<p>Startup configuration (NSU)</p>	<ul style="list-style-type: none"> <li>■ Management: <ul style="list-style-type: none"> <li>- Software revision</li> <li>- Write protection</li> <li>- Web server functionality</li> <li>- WLAN functionality</li> </ul> </li> <li>■ System units: <ul style="list-style-type: none"> <li>- Mass flow</li> <li>- Mass</li> <li>- Volume flow</li> <li>- Volume</li> <li>- Corrected volume flow</li> <li>- Corrected volume</li> <li>- Density</li> <li>- Reference density</li> <li>- Temperature</li> <li>- Pressure</li> </ul> </li> <li>■ Viscosity application package: <ul style="list-style-type: none"> <li>- Dynamic viscosity</li> <li>- Kinematic viscosity</li> </ul> </li> <li>■ Concentration application package: <ul style="list-style-type: none"> <li>- Coefficients A0 to A4</li> <li>- Coefficients B1 to B3</li> <li>- Medium type</li> </ul> </li> <li>■ Sensor adjustment</li> <li>■ Process parameter: <ul style="list-style-type: none"> <li>- Damping (flow, density, temperature)</li> <li>- Flow override</li> </ul> </li> <li>■ Low flow cut off: <ul style="list-style-type: none"> <li>- Assign process variable</li> <li>- Switch-on/switch-off point</li> <li>- Pressure shock suppression</li> </ul> </li> <li>■ Empty pipe detection: <ul style="list-style-type: none"> <li>- Assign process variable</li> <li>- Limit values</li> <li>- Response time</li> <li>- Max. damping</li> </ul> </li> <li>■ Corrected volume flow calculation: <ul style="list-style-type: none"> <li>- External reference density</li> <li>- Fixed reference density</li> <li>- Reference temperature</li> <li>- Linear expansion coefficient</li> <li>- Square expansion coefficient</li> </ul> </li> <li>■ Measuring mode: <ul style="list-style-type: none"> <li>- Medium</li> <li>- Gas type</li> <li>- Reference sound velocity</li> <li>- Temperature coefficient sound velocity</li> </ul> </li> <li>■ External compensation: <ul style="list-style-type: none"> <li>- Pressure compensation</li> <li>- Pressure value</li> <li>- External pressure</li> </ul> </li> <li>■ Alarm delay</li> <li>■ Diagnostic settings</li> <li>■ Diagnostic behavior for diverse diagnostic information</li> </ul>
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	<ul style="list-style-type: none"><li>■ Petroleum application package:<ul style="list-style-type: none"><li>- Petroleum mode</li><li>- Water density unit</li><li>- Water reference density unit</li><li>- Oil density unit</li><li>- Oil sample density</li><li>- Oil sample temperature</li><li>- Oil sample pressure</li><li>- Water sample density</li><li>- Water sample temperature</li><li>- API commodity group</li><li>- API table selection</li><li>- Thermal expansion coefficient</li></ul></li></ul>
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# 8 Commissioning

## 8.1 Function check

Before commissioning the measuring device:

- Make sure that the post-installation and post-connection checks have been performed.
- "Post-installation check" checklist
- "Post-connection check" checklist →  19


## 8.2 Setting the operating language

Factory setting: English or ordered local language

The operating language can be set in FieldCare, DeviceCare or via the Web server: Operation  
→ Display language

## 8.3 Identifying the device in the PROFINET network

A device can be quickly identified within a plant using the PROFINET flash function. If the PROFINET flash function is activated in the automation system, the LED indicating the network status flashes and the red backlight of the onsite display is switched on.

 For detailed information on the flash function, see the Operating Instructions for the device.

## 8.4 Startup parameterization

By activating the startup parameterization function (NSU: Normal Startup Unit), the configuration of the most important measuring device parameters is taken from the automation system.

 For configurations taken from the automation system, see the Operating Instructions for the device.

## 8.5 Configuring the measuring device

The **Setup** menu with its submenus enable fast commissioning of the measuring device. The submenus contain all the parameters required for configuration, such as parameters for measurement or communication.


 The submenus available in the particular device can vary on account of the device version (e.g. sensor).

Submenu	Meaning
Medium selection	Define the medium
Output conditioning	Define the output conditioning
System units	Configure the units for all measured values
Communication	Configure the digital communication interface

Submenu	Meaning
Display	Configure the measured value display
Low flow cut off	Set the low flow cut off
Partially filled pipe detection	Configure partial and empty pipe detection

## 8.6 Protecting settings from unauthorized access

The following write protection options exist in order to protect the configuration of the measuring device from unintentional modification:

- Protect access to parameters via access code
- Protect access to local operation via key locking
- Protect access to measuring device via write protection switch
- Protect access to parameters via startup configuration →  34




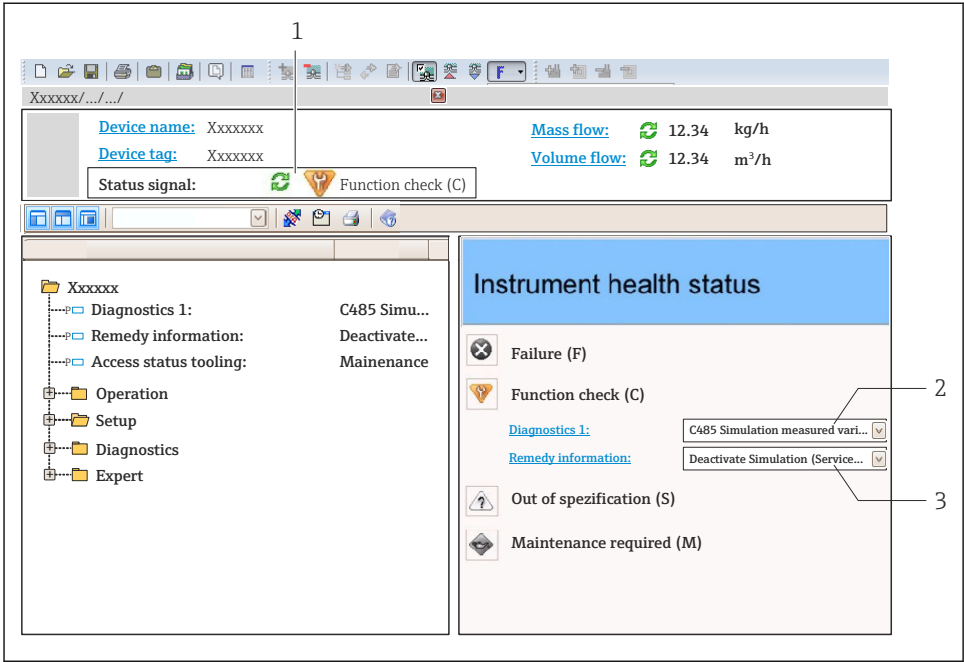
For detailed information on protecting the settings against unauthorized access, see the Operating Instructions for the device.

## 9 Diagnostic information

Any faults detected by the measuring device are displayed as a diagnostic message in the operating tool once the connection has been established and on the home page of the web browser once the user has logged on.

Remedial measures are provided for each diagnostic message to ensure that problems can be rectified quickly.

- In the Web browser: Remedial measures are displayed in red on the home page next to the diagnostic message →  23.
- In FieldCare: Remedial measures are displayed on the home page in a separate field below the diagnostic message: see the Operating Instructions for the device



- 1 Status area with status signal
- 2 Diagnostic information
- 3 Remedy information with Service ID

► Perform the remedial measure displayed.

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