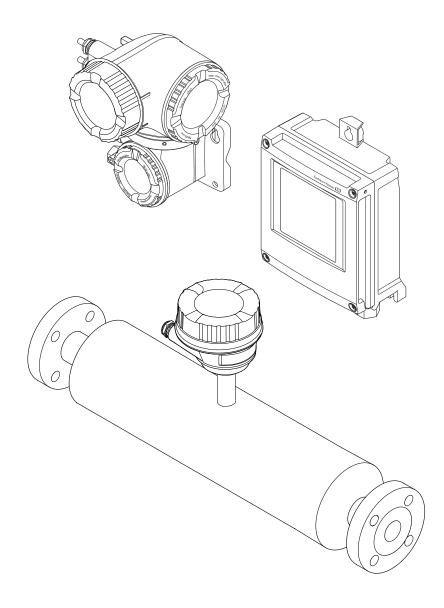
Valid as of version 01.00.zz (Device firmware) Products Solutions Services

Operating Instructions **Proline Promass I 500**

Coriolis flowmeter EtherNet/IP







- Make sure the document is stored in a safe place such that it is always available when working on or with the device.
- To avoid danger to individuals or the facility, read the "Basic safety instructions" section carefully, as well as all other safety instructions in the document that are specific to working procedures.
- The manufacturer reserves the right to modify technical data without prior notice. Your Endress+Hauser sales organization will supply you with current information and updates to this manual.

Table of contents

1	About this document	6	6	Installation	21
1.1 1.2	Document function	6 6 6 6 7	6.2	Installation requirements	23 25 29 29
1.3 1.4	Documentation	8		6.2.4 Installing the transmitter housing: Proline 500 – digital	
2	•	9		6.2.5 Installing the transmitter housing: Proline 500	
2.1 2.2 2.3	Requirements for the personnel	9 9 10		Proline 500	
2.4 2.5 2.6	1	10 10	6.3	Post-installation check	
2.7	Device-specific IT security		7	Electrical connection	35
	2.7.2 Protecting access via a password	11 11 12	7.1 7.2	Electrical safety	35 35 35
3	Product description	.3		7.2.5 Pin assignment of device plug	40
3.1	Product design	13 13	7.3	 7.2.6 Preparing the device Connecting the device: Proline 500 – digital 7.3.1 Connecting the connecting cable 7.3.2 Connecting the transmitter 7.3.3 Integrating the transmitter into a 	40 41 41 46
4	Incoming acceptance and product		- ·	network	
4.1 4.2	identification1Incoming acceptance1Product identification1		7.4	Connecting the device: Proline 500 7.4.1 Connecting the connecting cable 7.4.2 Connecting the transmitter	51
4.2	4.2.1 Transmitter nameplate	16 18	7.5 7.6	7.4.3 Integrating the transmitter into a network	59
5	Storage and transport 2	20		7.6.1 Connection examples	. 60
5.1 5.2	Storage conditions	20 20 21	7.7 7.8 7.9	Hardware settings	62 64 65
5.3	Packaging disposal		8	Operation options	67
			8.1	Overview of operation options	67

3.2	Structure and function of the operating		10.5.6 Configuring the current input	121
	menu		10.5.7 Configuring the status input	122
	8.2.1 Structure of the operating menu 68		10.5.8 Configuring the current output	123
	8.2.2 Operating philosophy 69		10.5.9 Configuring the pulse/frequency/	
3.3	Access to operating menu via local display 70		switch output	127
	8.3.1 Operational display 70		10.5.10 Configuring the relay output	134
	8.3.2 Navigation view		10.5.11 Configuring the local display	137
	8.3.3 Editing view		10.5.12 Configuring the low flow cut off	141
	8.3.4 Operating elements		10.5.13 Partially filled pipe detection	142
	8.3.5 Opening the context menu	10.6	Advanced settings	143
	8.3.6 Navigating and selecting from list 79		10.6.1 Using the parameter to enter the	
	8.3.7 Calling the parameter directly 79		access code	144
	8.3.8 Calling up help text 80		10.6.2 Calculated process variables	144
	8.3.9 Changing the parameters 80		10.6.3 Carrying out a sensor adjustment	
	8.3.10 User roles and related access		10.6.4 Configuring the totalizer	
	authorization 81		10.6.5 Carrying out additional display	
	8.3.11 Disabling write protection via access		configurations	151
	code		10.6.6 WLAN configuration	155
	8.3.12 Enabling and disabling the keypad		10.6.7 Configuration management	157
	lock		10.6.8 Using parameters for device	
3.4	Access to operating menu via web browser 82		administration	158
	8.4.1 Function range 82	10.7	Simulation	160
	8.4.2 Requirements 83	10.8	Protecting settings from unauthorized access	162
	8.4.3 Connecting the device 84		10.8.1 Write protection via access code	163
	8.4.4 Logging on 87		10.8.2 Write protection via write protection	
	8.4.5 User interface		switch	164
	8.4.6 Disabling the Web server 89			
o =	8.4.7 Logging out	11	Operation	167
3.5	Operation via SmartBlue app 90	11.1	Reading the device locking status	167
3.6	Access to the operating menu via the	11.2	Adjusting the operating language	167
	operating tool	11.3	Configuring the display	167
	8.6.1 Connecting the operating tool 91	11.4	Reading off measured values	167
	8.6.2 FieldCare		11.4.1 "Measured variables" submenu	168
	8.6.3 DeviceCare 95		11.4.2 "Totalizer" submenu	171
_			11.4.3 "Input values" submenu	171
9	System integration 96		11.4.4 Output values	173
9.1	Overview of device description files 96	11.5	Adapting the measuring device to the process	
	9.1.1 Current version data for the device 96		conditions	175
	9.1.2 Operating tools 96	11.6	Performing a totalizer reset	175
9.2	Overview of system files 96		11.6.1 Function scope of "Control Totalizer"	
9.3	Integrating the device in the system 97		parameter	175
9.4	Cyclic data transmission 97		11.6.2 Function range of "Reset all	
	9.4.1 Block model 97		totalizers" parameter	176
	9.4.2 Input and output groups 98	11.7	Displaying the measured value history	176
9.5	Diagnostic information via EtherNet/IP 109			
		12	Diagnostics and troubleshooting	180
10	Commissioning	12.1	General troubleshooting	180
10.1	Post-installation and post-connection check 113	12.2	Diagnostic information via LEDs	
10.2	Switching on the measuring instrument 113	12.2	12.2.1 Transmitter	
10.3	Connecting via FieldCare		12.2.2 Sensor connection housing	184
10.4	Setting the operating language	12.3	Diagnostic information on local display	
10.5	Configuring the device		12.3.1 Diagnostic message	186
	10.5.1 Defining the tag name		12.3.2 Calling up remedial actions	188
	10.5.2 Setting the system units	12.4	Diagnostic information in the web browser	
	10.5.3 Configuration of the communication		12.4.1 Diagnostic options	
	interface		12.4.2 Calling up remedial actions	189
	10.5.4 Selecting and setting the medium 119			
	10.5.5 Displaying the I/O configuration 120	i		

12.5	Diagnostic information in FieldCare or	
	DeviceCare	189
	12.5.1 Diagnostic options	189
	12.5.2 Calling up remedy information	190
12.6	Diagnostic information via communication	
	interface	191
	12.6.1 Reading out diagnostic information	191
12.7	Adapting the diagnostic information	191
10.0	12.7.1 Adapting the diagnostic behavior	191
12.8	Overview of diagnostic information	191
	12.8.1 Diagnostic of sensor	192 193
	12.8.3 Diagnostic of configuration	197
	12.8.4 Diagnostic of process	201
12.9	Pending diagnostic events	205
12.10	Diagnostic list	205
	Event logbook	206
	12.11.1 Reading out the event logbook	206
	12.11.2 Filtering the event logbook	207
	12.11.3 Overview of information events	207
12.12	Resetting the device	208
	12.12.1 Function scope of the "Device reset"	
40.40	parameter	208
	Device information	209
12.14	Firmware history	210
13	Maintenance	211
13.1	Maintenance work	211
13.2	13.1.1 Cleaning	211 211
13.3	Measuring and test equipment	211
10.0	ividification delivines	211
14	Repair	212
14.1	General notes	212
11.1	14.1.1 Repair and conversion concept	212
	14.1.2 Notes for repair and conversion	212
14.2	Spare parts	212
14.3	Repair services	
14.4	Return	212
14.5	Disposal	213
	14.5.1 Removing the measuring	
	instrument	213
	14.5.2 Disposing of the measuring	0.10
	instrument	213
15	Accessories	214
15.1	Device-specific accessories	214 214
	15.1.2 For the dansintter	214
15.2	Communication-specific accessories	
15.3	Service-specific accessories	216
15.4	System components	217
16		218
16.1	Application	218
1 ()	Function and system design	210

16.3	Input	219
16.4	Output	222
16.5	Power supply	227
16.6	Performance characteristics	229
16.7	Installation	233
16.8	Environment	233
16.9	Process	235
16.10	Mechanical construction	237
16.11	User interface	241
16.12	Certificates and approvals	244
16.13	Application packages	247
16.14	Accessories	249
16.15	Documentation	249
Index	ζ	251

1 About this document

1.1 Document function

These Operating Instructions contain all the information required in the various life cycle phases of the device: from product identification, incoming acceptance and storage, to installation, connection, operation and commissioning, through to troubleshooting, maintenance and disposal.

1.2 Symbols

1.2.1 Safety symbols

▲ DANGER

This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

▲ WARNING

This symbol alerts you to a potentially dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

A CAUTION

This symbol alerts you to a potentially dangerous situation. Failure to avoid this situation can result in minor or medium injury.

NOTICE

This symbol alerts you to a potentially harmful situation. Failure to avoid this situation can result in damage to the product or something in its vicinity.

1.2.2 Electrical symbols

Symbol	Meaning	
	Direct current	
~	Alternating current	
$\overline{\sim}$	Direct current and alternating current	
<u></u>	Ground connection A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.	
	Protective earth (PE) Ground terminals that must be connected to ground prior to establishing any other connections.	
	The ground terminals are located on the interior and exterior of the device: Interior ground terminal: protective earth is connected to the mains supply. Exterior ground terminal: device is connected to the plant grounding system.	

1.2.3 Communication-specific symbols

Symbol	Meaning
	Wireless Local Area Network (WLAN) Communication via a wireless, local area network
•	LED LED is off.

Symbol	Meaning
<u>-</u>	LED is on.
	LED flashing.

1.2.4 Tool symbols

Symbol	Meaning	
Torx screwdriver		
Phillips screwdriver		
Ó	Open-end wrench	

1.2.5 Symbols for certain types of information

Symbol	Meaning
✓	Permitted Procedures, processes or actions that are permitted.
✓ ✓	Preferred Procedures, processes or actions that are preferred.
X	Forbidden Procedures, processes or actions that are forbidden.
i	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
L	Result of a step
?	Help in the event of a problem
	Visual inspection

1.2.6 Symbols in graphics

Symbol	Meaning	
1, 2, 3,	Item numbers	
1., 2., 3.,	Series of steps	
A, B, C,	Views	
A-A, B-B, C-C,	Sections	
EX	Hazardous area	

Symbol	Meaning	
Safe area (non-hazardous area)		
≋➡	Flow direction	

1.3 Documentation



- *Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from the nameplate
- *Endress+Hauser Operations app*: Enter serial number from nameplate or scan matrix code on nameplate.

The following document types are available in the Downloads area of the Endress+Hauser website (www.endress.com/downloads), depending on the device version:

Document type	Purpose and content of the document
Technical Information (TI)	Planning aid for your device The document contains all the technical data on the device and provides an overview of the accessories and other products that can be ordered for the device.
Brief Operating Instructions (KA)	Guide that takes you quickly to the 1st measured value The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.
Operating Instructions (BA)	Your reference document The Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.
Description of Device Parameters (GP)	Reference for your parameters The document provides a detailed explanation of each individual parameter. The description is aimed at those who work with the device over the entire life cycle and perform specific configurations.
Safety instructions (XA)	Depending on the approval, safety instructions for electrical equipment in hazardous areas are also supplied with the device. These are an integral part of the Operating Instructions.
	The nameplate indicates which Safety Instructions (XA) apply to the device.
Supplementary device-dependent documentation (SD/FY)	Always comply strictly with the instructions in the relevant supplementary documentation. The supplementary documentation is a constituent part of the device documentation.

1.4 Registered trademarks

Ethernet/IP™

Trademark of ODVA, Inc.

TRI-CLAMP®

Registered trademark of Ladish & Co., Inc., Kenosha, USA

2 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.

2.2 Intended use

Application and media

The measuring instrument described in this manual is intended only for the flow measurement of liquids and gases.

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

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

To ensure that the measuring instrument remains in proper condition during the operating time:

- ▶ Only use the measuring instrument in full compliance with the data on the nameplate and the general conditions listed in the manual and supplementary documentation.
- ▶ Using 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 instrument only for media against which the materials in contact with the process are sufficiently resistant.
- ▶ Keep within the specified pressure and temperature range.
- ► Keep within the specified ambient temperature range.
- ► Protect the measuring instrument 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 and ambient conditions!

- ▶ Verify the compatibility of the process fluid with the sensor material.
- ► Ensure the resistance of all wetted materials during 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

A WARNING

Risk of hot or cold burns! The use of media and electronics with high or low temperatures can produce hot or cold surfaces on the device.

► Mount suitable touch protection.

2.3 Workplace safety

For work on and with the device:

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

2.4 Operational safety

Damage to the device!

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

Modifications to the device

Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers!

▶ If modifications are nevertheless required, consult with the manufacturer.

Repair

To ensure continued operational safety and reliability:

- ► Carry out repairs on the device only if they are expressly permitted.
- ▶ Observe federal/national regulations pertaining to the repair of an electrical device.
- ▶ Use only original spare parts and accessories.

2.5 Product safety

This state-of-the-art device is designed and tested in accordance with good engineering practice to meet operational safety standards. It 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. The manufacturer confirms this by affixing the CE mark.

2.6 IT security

The manufacturer warranty is valid only if the product is installed and used as described in the Operating Instructions. The product is equipped with security mechanisms to protect it against any inadvertent changes to the settings.

IT security measures, which provide additional protection for the product and associated data transfer, must be implemented by the operators themselves in line with their security standards.

2.7 Device-specific IT security

The device offers a range of specific functions to support protective measures on the operator's side. These functions can be configured by the user and guarantee greater inoperation safety if used correctly. The following list provides an overview of the most important functions:

Function/interface	Factory setting	Recommendation
Write protection via hardware write protection switch $\rightarrow \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	Not enabled	On an individual basis following risk assessment
Access code (also applies to web server login or FieldCare connection) → 🖺 11	Not enabled (0000)	Assign a customized access code during commissioning
WLAN (order option in display module)	Enabled	On an individual basis following risk assessment
WLAN security mode	Enabled (WPA2- PSK)	Do not change
WLAN passphrase (Password) → 🖺 12	Serial number	Assign an individual WLAN passphrase during commissioning
WLAN mode	Access point	On an individual basis following risk assessment
Web server → 🗎 12	Enabled	On an individual basis following risk assessment
Service interface CDI-RJ45 → 🖺 12	Enabled	-

2.7.1 Protecting access via hardware write protection

Write access to the parameters of the device via the local display, web browser or operating tool (e.g. FieldCare, DeviceCare) can be disabled via a write protection switch (DIP switch on the main electronics module). When hardware write protection is enabled, only read access to the parameters is possible.

2.7.2 Protecting access via a password

Different passwords are available to protect write access to the device parameters or access to the device via the WLAN interface.

- User-specific access code

 Protect write access to the
 - Protect write access to the device parameters via the local display, web browser or operating tool (e.g. FieldCare, DeviceCare). Access authorization is clearly regulated through the use of a user-specific access code.
- WLAN passphrase
 - The network key protects a connection between an operating unit (e.g. notebook or tablet) and the device via the WLAN interface which can be ordered as an option.
- Infrastructure mode
 - When the device is operated in infrastructure mode, the WLAN passphrase corresponds to the WLAN passphrase configured on the operator side.

User-specific access code

Local display, web browser and operating tool (e.g. FieldCare, DeviceCare)

- Write access to the device parameters via the local display, web browser or operating tool (e.g. FieldCare, DeviceCare) can be protected by the modifiable, user-specific access code → 163.
- When delivered, the device does not have an access code; the default value is 0000 (open).

WLAN passphrase: Operation as WLAN access point

A connection between an operating unit (e.g. notebook or tablet) and the device via the WLAN interface ($\rightarrow \triangleq 93$), which can be ordered as an optional extra, is protected by the network key. The WLAN authentication of the network key complies with the IEEE 802.11 standard.

When the device is delivered, the network key is pre-defined depending on the device. It can be changed via the **WLAN settings** submenu in the **WLAN passphrase** parameter $(\rightarrow \blacksquare 157)$.

Infrastructure mode

A connection between the device and WLAN access point is protected by means of an SSID and passphrase on the system side. Please contact the relevant system administrator for access.

General notes on the use of passwords

- The access code and network key supplied with the device should be changed during commissioning for security reasons.
- Follow the general rules for generating a secure password when defining and managing the access code or network key.
- The user is responsible for the management and careful handling of the access code and network key.
- For information on configuring the access code or on what to do if you lose the password, for example, see "Write protection via access code" $\rightarrow \triangleq 163$.

2.7.3 Access via web server

The integrated web server can be used to operate and configure the device via a web terminal connection for signal transmission with Ethernet/IP (RJ45 plug) or WLAN interface.

The web server is enabled when the device is delivered. The web server can be disabled if necessary via the **Web server functionality** parameter (e.g., after commissioning).

The device and status information can be hidden on the login page. This prevents unauthorized access to the information.



For detailed information on device parameters, see: Description of Device Parameters.

2.7.4 Access via service interface (port 2): CDI-RJ45

The device can be connected to a network via the service interface. Device-specific functions guarantee the secure operation of the device in a network.

The use of relevant industrial standards and guidelines that have been defined by national and international safety committees, such as IEC/ISA62443 or the IEEE, is recommended. This includes organizational security measures such as the assignment of access authorization as well as technical measures such as network segmentation.

The device can be integrated into a ring topology. The device is integrated via the terminal connection for signal transmission, output 1 (port 1) and the terminal connection to the service interface (port 2) \rightarrow \bigcirc 59 or \rightarrow \bigcirc 50.

For detailed information on connecting transmitters with an Ex de approval, see separate document "Safety instructions" (XA) for the device.

Product description 3

The measuring system consists of a transmitter and a sensor. The transmitter and sensor are mounted in physically separate locations. They are interconnected by connecting

3.1 Product design

Two versions of the transmitter are available.

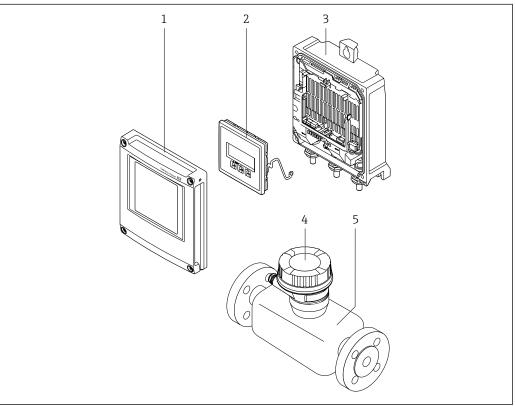
3.1.1 Proline 500 - digital

Signal transmission: digital

Order code for "Integrated ISEM electronics", option A "Sensor"

As the electronics are located in the sensor, the device is ideal: For simple transmitter replacement.

- A standard cable can be used as the connecting cable.
- Not sensitive to external EMC interference.



₽ 1 Important components of a measuring device

- Electronics compartment cover
- Display module
- 3 Transmitter housing
- Sensor connection housing with integrated ISEM electronics: connecting cable connection
- Sensor

Proline 500 3.1.2

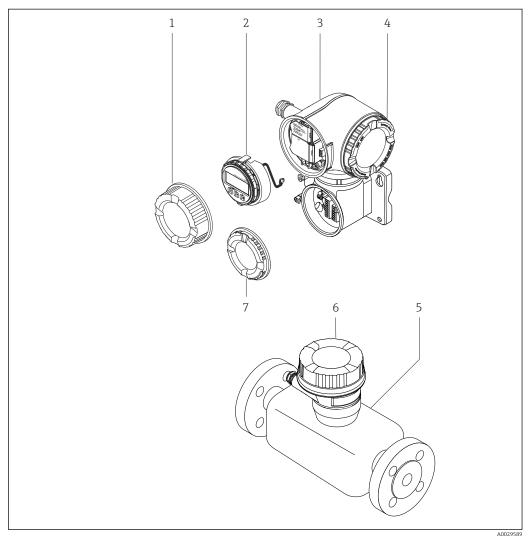
Signal transmission: analog

Order code for "Integrated ISEM electronics", option B "Transmitter"

For use in applications required to meet special requirements due to ambient or operating conditions.

As the electronics are located in the transmitter, the device is ideal in the event of:

- Strong vibrations at the sensor.
- Sensor operation in underground installations.
- Permanent sensor immersion in water.



 \blacksquare 2 Important components of a measuring device

- 1 Connection compartment cover
- 2 Display module
- 3 Transmitter housing with integrated ISEM electronics
- 4 Electronics compartment cover
- 5 Sensor
- 6 Sensor connection housing: connecting cable connection
- 7 Connection compartment cover: connecting cable connection

4 Incoming acceptance and product identification

4.1 Incoming acceptance

On receipt of the delivery:

- 1. Check the packaging for damage.
 - Report all damage immediately to the manufacturer. Do not install damaged components.
- 2. Check the scope of delivery using the delivery note.
- 3. Compare the data on the nameplate with the order specifications on the delivery note.
- 4. Check the technical documentation and all other necessary documents, e.g. certificates, to ensure they are complete.
- If one of the conditions is not satisfied, contact the manufacturer.

4.2 Product identification

The device can be identified in the following ways:

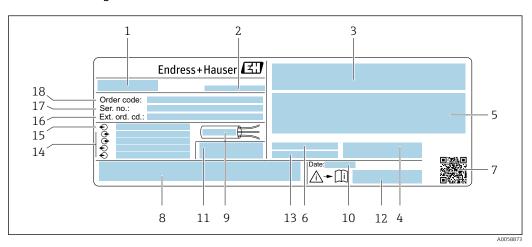
- Nameplate
- Order code with details of the device features on the delivery note
- Enter the serial numbers from the nameplates in the *Device Viewer* (www.endress.com/deviceviewer): all the information about the device is displayed.
- Enter the serial numbers from the nameplates into the *Endress+Hauser Operations app* or scan the DataMatrix code on the nameplate with the *Endress+Hauser Operations app*: all the information about the device is displayed.

For an overview of the scope of the associated Technical Documentation, refer to the following:

- The "Additional standard device documentation" and "Supplementary device-dependent documentation" sections
- The Device Viewer: Enter the serial number from the nameplate (www.endress.com/deviceviewer)
- The *Endress+Hauser Operations app*: Enter the serial number from the nameplate or scan the DataMatrix code on the nameplate.

4.2.1 Transmitter nameplate

Proline 500 - digital

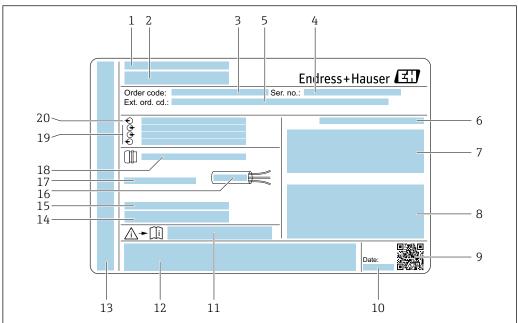


■ 3 Example of a transmitter nameplate

- 1 Name of the transmitter
- 2 Manufacturer/certificate holder
- 3 Space for approvals: Use in hazardous areas
- 4 Degree of protection
- 5 Electrical connection data: available inputs and outputs
- 6 Permitted ambient temperature (T_a)
- 7 2-D matrix code
- 8 Space for approvals and certificates: e.g. CE mark, RCM symbol
- 9 Permitted temperature range for cable
- 10 Manufacturing date: year-month
- 11 Firmware version (FW) and device revision (Dev. Rev.) from the factory
- 12 Document number of safety-related supplementary documentation
- 13 Space for additional information in the case of special products
- 14 Available inputs and outputs, supply voltage
- 15 Electrical connection data: supply voltage
- 16 Extended order code (Ext. ord. cd.)
- 17 Serial number (Ser. no.)
- 18 Order code

16

Proline 500

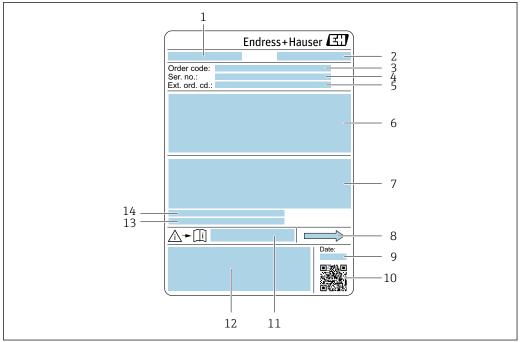


A0058872

■ 4 Example of a transmitter nameplate

- 1 Manufacturer/certificate holder
- 2 Name of the transmitter
- 3 Order code
- 4 Serial number (Ser. no.)
- 5 Extended order code (Ext. ord. cd.)
- 6 Degree of protection
- 7 Space for approvals: use in hazardous areas
- 8 Electrical connection data: available inputs and outputs
- 9 2-D matrix code
- 10 Manufacturing date: year-month
- 11 Document number of safety-related supplementary documentation
- 12 Space for approvals and certificates: e.g. CE mark, RCM symbol
- 13 Space for degree of protection of connection and electronics compartment when used in hazardous areas
- 14 Firmware version (FW) and device revision (Dev. Rev.) from the factory
- 15 Space for additional information in the case of special products
- 16 Permitted temperature range for cable
- 17 Permitted ambient temperature (T_a)
- 18 Information on cable gland
- 19 Available inputs and outputs, supply voltage
- 20 Electrical connection data: supply voltage

4.2.2 Sensor nameplate



A002919

■ 5 Example of a sensor nameplate

- 1 Name of sensor
- 2 Manufacturer/certificate holder
- 3 Order code
- 4 Serial number (Ser. no.)
- 5 Extended order code (Ext. ord. cd.)
- 6 Nominal diameter of the sensor; flange nominal diameter/nominal pressure; sensor test pressure; medium temperature range; material of measuring tube and manifold; sensor-specific information: e.g. pressure range of sensor housing, wide-range density specification (special density calibration)
- 7 Approval information for explosion protection, Pressure Equipment Directive and degree of protection
- 8 Flow direction
- 9 Manufacturing date: year-month
- 10 2-D matrix code
- 11 Document number of safety-related supplementary documentation
- 12 CE mark, RCM symbol
- 13 Surface roughness
- 14 Permitted ambient temperature (T_a)

Order code

The measuring device is reordered using the order code.

Extended order code

- The device type (product root) and basic specifications (mandatory features) are always listed.
- Of the optional specifications (optional features), only the safety and approvalrelated specifications are listed (e.g. LA). If other optional specifications are also ordered, these are indicated collectively using the # placeholder symbol (e.g. #LA#).
- If the ordered optional specifications do not include any safety and approval-related specifications, they are indicated by the + placeholder symbol (e.g. XXXXXX-ABCDE +).

4.2.3 Symbols on the device

Symbol	Meaning
\triangle	WARNING! This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury. Please consult the documentation for the measuring instrument to discover the type of potential danger and measures to avoid it.
[i	Reference to documentation Refers to the corresponding device documentation.
	Protective ground connection A terminal that must be connected to the ground prior to establishing any other connections.

5 Storage and transport

5.1 Storage conditions

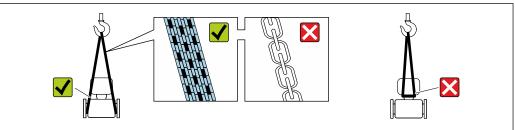
Observe the following notes for storage:

- ► Store in the original packaging to ensure protection from shock.
- ▶ Do not remove protective covers or protective caps installed on process connections. They prevent mechanical damage to the sealing surfaces and contamination in the measuring tube.
- ▶ Protect from direct sunlight. Avoid unacceptably high surface temperatures.
- ► Store in a dry and dust-free place.
- ▶ Do not store outdoors.

Storage temperature $\rightarrow \triangleq 233$

5.2 Transporting the product

Transport the measuring device to the measuring point in the original packaging.



A002925

Do not remove protective covers or caps installed on process connections. They prevent mechanical damage to the sealing surfaces and contamination in the measuring tube.

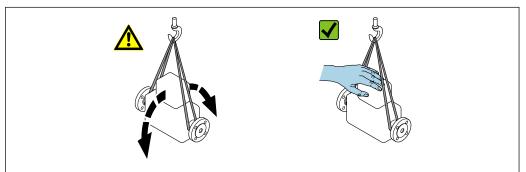
5.2.1 Measuring devices without lifting lugs

MARNING

Center of gravity of the measuring device is higher than the suspension points of the webbing slings.

Risk of injury if the measuring device slips.

- ► Secure the measuring device against slipping or turning.
- ▶ Observe the weight specified on the packaging (stick-on label).



A0029214

5.2.2 Measuring devices with lifting lugs

A CAUTION

Special transportation instructions for devices with lifting lugs

- ▶ Only use the lifting lugs fitted on the device or flanges to transport the device.
- ► The device must always be secured at two lifting lugs at least.

5.2.3 Transporting with a fork lift

If transporting in wood crates, the floor structure enables the crates to be lifted lengthwise or at both sides using a forklift.

5.3 Packaging disposal

All packaging materials are environmentally friendly and 100% recyclable:

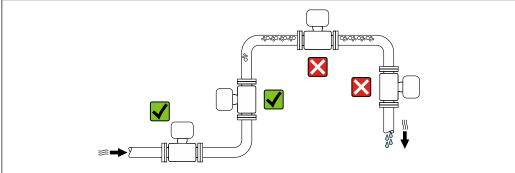
- Outer packaging of device Stretch wrap made of polymer in accordance with EU Directive 2002/95/EC (RoHS)
- Packaging
 - Wood crate treated in accordance with ISPM 15 standard, confirmed by IPPC logo
 - Cardboard box in accordance with European packaging guideline 94/62/EC, recyclability confirmed by Resy symbol
- Transport material and fastening fixtures
 - Disposable plastic pallet
 - Plastic straps
 - Plastic adhesive strips
- Filler material Paper pads

6 Installation

6.1 Installation requirements

6.1.1 Installation position

Mounting location



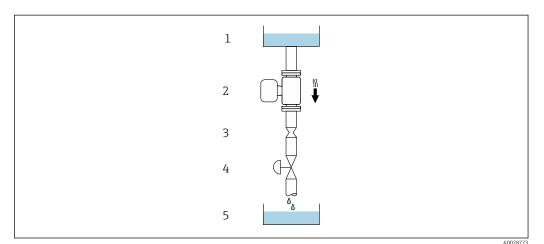
A0028772

To avoid measurement errors caused by gas bubble formation in the measuring tube, avoid the following installation locations in the pipe:

- Highest point of a pipeline
- Directly upstream of a free pipe outlet in a down pipe

Installation in down pipes

However, the following installation suggestion allows for installation in an open vertical pipeline. Pipe restrictions or the use of an orifice with a smaller cross-section than the nominal diameter prevent the sensor running empty while measurement is in progress.



■ 6 Installation in a down pipe (e.g. for batching applications)

- 1 Supply tank
- 2 Sensor
- 3 Orifice plate, pipe restriction
- 4 Valve
- 5 Filling container

DN/NPS		Ø orifice plate, pipe restriction		
[mm]	[mm] [in]		[in]	
8	³ / ₈	6	0.24	
15	1/2	10	0.40	
15 FB	½ FB	15	0.60	
25	1	14	0.55	
25 FB	1 FB	24	0.95	
40	1 1/2	22	0.87	
40 FB	1½ FB	35	1.38	
50	2	28	1.10	
50 FB	2 FB	54	2.13	
80	3	50	1.97	
FB = Full bore				

Orientation

The direction of the arrow on the sensor nameplate helps you to install the sensor according to the flow direction (direction of medium flow through the piping).

	Recommendation		
A	Vertical orientation	A0015591	
В	Horizontal orientation, transmitter at top	A0015589	✓ ✓ 2)
С	Horizontal orientation, transmitter at bottom	A0015590	✓ ✓ ³⁾
D	Horizontal orientation, transmitter at side	A0015592	V V

- 1) This orientation is recommended to ensure self-draining.
- Applications with low process temperatures may reduce the ambient temperature. To maintain the minimum ambient temperature for the transmitter, this orientation is recommended.
- 3) Applications with high process temperatures may increase the ambient temperature. To maintain the maximum ambient temperature for the transmitter, this orientation is recommended.

Inlet and outlet runs



Installation dimensions

For the dimensions and installed lengths of the device, see the "Technical Information" document, "Mechanical construction" section

6.1.2 Environmental and process requirements

Ambient temperature range

Measuring instrument	 -40 to +60 °C (-40 to +140 °F) Order code for "Test, certificate", option JP: -50 to +60 °C (-58 to +140 °F)
Readability of the local display	-20 to $+60$ °C (-4 to $+140$ °F) The readability of the display may be impaired at temperatures outside the temperature range.

Pependency of ambient temperature on medium temperature $\rightarrow \stackrel{\triangle}{=} 235$

► If operating outdoors: Avoid direct sunlight, particularly in warm climatic regions.

Static pressure

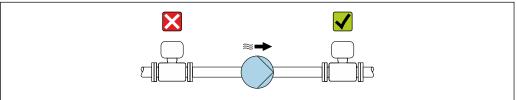
It is important that cavitation does not occur, or that gases entrained in the liquids do not outgas.

Cavitation is caused if the pressure drops below the vapor pressure:

- In liquids that have a low boiling point (e.g. hydrocarbons, solvents, liquefied gases)
- In suction lines
- ► Ensure the static pressure is sufficiently high to prevent cavitation and outgassing.

For this reason, the following mounting locations are recommended:

- At the lowest point in a vertical pipe
- Downstream from pumps (no danger of vacuum)



Thermal insulation

In the case of some fluids, it is important to keep the heat radiated from the sensor to the transmitter to a low level. A wide range of materials can be used for the required insulation.

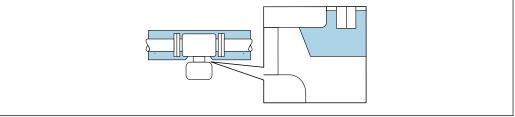
The following device versions are recommended for applications with thermal insulation: Version with extended neck for insulation:

Order code for "Sensor option", option CG with an extended neck length of 105 mm (4.13 in).

NOTICE

Electronics overheating on account of thermal insulation!

- ► Recommended orientation: horizontal orientation, sensor connection housing pointing downwards.
- ▶ Do not insulate the sensor connection housing.
- Maximum permissible temperature at the lower end of the sensor connection housing: 80°C (176°F)
- ▶ Thermal insulation with exposed extension neck: We recommend that you do not insulate the extension neck in order to ensure optimum dissipation of heat.



₽ 7 Thermal insulation with exposed extension neck

Heating

NOTICE

Electronics can overheat due to elevated ambient temperature!

- ▶ Observe maximum permitted ambient temperature for the transmitter.
- Depending on the medium temperature, take the device orientation requirements into account.

NOTICE

Danger of overheating when heating

- ▶ Ensure that the temperature at the lower end of the transmitter housing does not exceed 80 $^{\circ}$ C (176 $^{\circ}$ F).
- ▶ Ensure that sufficient convection takes place at the transmitter neck.
- ► Ensure that a sufficiently large area of the transmitter neck remains exposed. The uncovered part serves as a radiator and protects the electronics from overheating and excessive cooling.
- ▶ When using in potentially explosive atmospheres, observe the information in the device-specific Ex documentation. For detailed information on the temperature tables, see the separate document entitled "Safety Instructions" (XA) for the device.
- ► Consider the behavior of the process diagnostics "830 Ambient temperature too high" and "832 Electronics temperature too high" if overheating cannot be avoided by a suitable system design.

Heating options

If a medium requires that no heat loss should occur at the sensor, users can avail of the following heating options:

- Electrical heating, e.g. with electric band heaters ¹⁾
- Via pipes carrying hot water or steam
- Via heating jackets

Vibrations

The high oscillation frequency of the measuring tubes ensures that the correct operation of the measuring system is not influenced by plant vibrations.

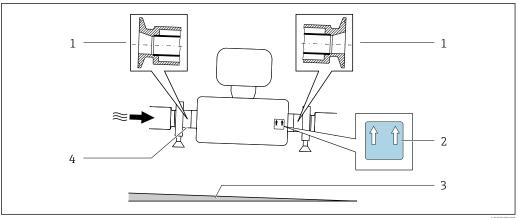
6.1.3 Special installation instructions

Drainability

When installed vertically, the measuring tube can be drained completely and protected against buildup.

When the sensor is installed in a horizontal line, eccentric clamps can be used to ensure complete drainability. When the system is pitched in a specific direction and at a specific slope, gravity can be used to achieve complete drainability. The sensor must be mounted in the correct position to ensure full drainability in the horizontal position. Markings on the sensor show the correct mounting position to optimize drainability.

The use of parallel electric band heaters is generally recommended (bidirectional electricity flow). Particular considerations must be made if a single-wire heating cable is to be used. Additional information is provided in the document EA01339D "Installation instructions for electrical trace heating systems".



A0030297

- 1 Eccentric clamp connection
- 2 "This side up" label indicates which side is up
- 3 Slope the device in accordance with the hygiene guidelines. Slope: approx. 2 % or 21 mm/m (0.24 in/feet)
- 4 Line on the underside indicates the lowest point of the eccentric process connection.

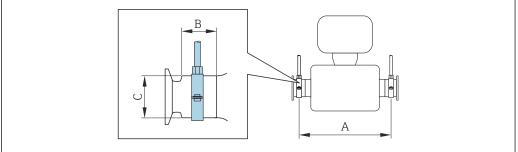
Hygienic compatibility

When installing in hygienic applications, please refer to the information in the "Certificates and approvals/hygienic compatibility" section $\Rightarrow \triangleq 245$

Securing with mounting clamp in the case of hygiene connections

It is not necessary to provide additional support for the sensor for operational performance purposes. If, however, additional support is required for installation purposes, the following dimensions must be observed.

Use mounting clamp with lining between clamp and measuring instrument.



A0030298

DN		A		В		С	
[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]
8	8	373	14.69	20	0.79	40	1.57
15	15	409	16.1	20	0.79	40	1.57
15 FB	15 FB	539	21.22	30	1.18	44.5	1.75
25	25	539	21.22	30	1.18	44.5	1.75
25 FB	25 FB	668	26.3	28	1.1	60	2.36
40	40	668	26.3	28	1.1	60	2.36
40 FB	40 FB	780	30.71	35	1.38	80	3.15
50	50	780	30.71	35	1.38	80	3.15
50 FB	50 FB	1152	45.35	57	2.24	90	3.54
80	80	1152	45.35	57	2.24	90	3.54

Zero point verification and zero adjustment

All measuring instruments are calibrated in accordance with state-of-the-art technology. in the field is generally not required.

Experience shows that zero adjustment is advisable only in special cases:

- To achieve maximum measurement accuracy even with low flow rates.
- Under extreme process or operating conditions (e.q. very high process temperatures or very high-viscosity media).
- For gas applications with low pressure.
- To achieve the highest possible measurement accuracy at low flow rates, the installation must protect the sensor from mechanical stress during operation.

To get a representative zero point, ensure that

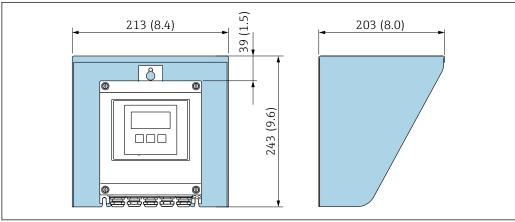
- any flow in the device is prevented during the adjustment
- the process conditions (e.g. pressure, temperature) are stable and representative

Verification and adjustment cannot be performed if the following process conditions are present:

- Gas pockets Ensure that the system has been sufficiently flushed with the medium. Repeat flushing can help to eliminate gas pockets
- Thermal circulation In the event of temperature differences (e.g. between the measuring tube inlet and outlet section), induced flow can occur even if the valves are closed due to thermal circulation in the device
- Leaks at the valves If the valves are not leak-tight, flow is not sufficiently prevented when determining the zero point

If these conditions cannot be avoided, it is advisable to keep the factory setting for the zero point.

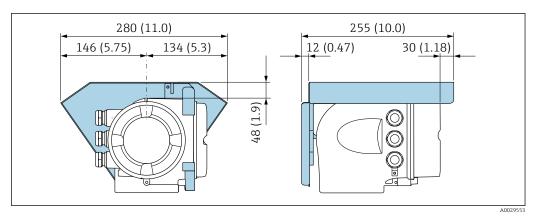
Protective cover



₽8 Weather protection cover for Proline 500 – digital; unit mm (in)

Endress+Hauser 27

A0029552



■ 9 Weather protection cover for Proline 500 – unit mm (in)

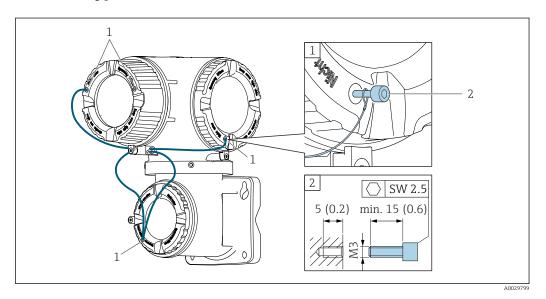
Cover locking: Proline 500

NOTICE

Order code "Transmitter housing", option L "Cast, stainless": The covers of the transmitter housing are provided with a borehole to lock the cover.

The cover can be locked using screws and a chain or cable provided by the customer on site.

- ► The use of stainless steel chains or cables is recommended.
- ► If a protective coating is applied, it is recommended to use a heat shrink tube to protect the housing paint.



- 1 Cover borehole for the securing screw
- 2 Securing screw to lock the cover

6.2 Installing the device

6.2.1 Required tools

For transmitter

For mounting on a post:

- Proline 500 digital transmitter
 - Open-ended wrench AF 10
 - Torx screwdriver TX 25
- Proline 500 transmitter
 Open-ended wrench AF 13

For wall mounting: Drill with drill bit Ø 6.0 mm

For sensor

For flanges and other process connections: Use a suitable mounting tool.

6.2.2 Preparing the measuring instrument

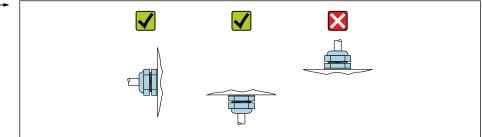
- 1. Remove all remaining transport packaging.
- 2. Remove any protective covers or protective caps present from the sensor.
- 3. Remove stick-on label on the electronics compartment cover.

6.2.3 Installing the measuring instrument

A WARNING

Danger due to improper process sealing!

- ► Ensure that the inside diameters of the gaskets are greater than or equal to that of the process connections and piping.
- ▶ Ensure that the seals and sealing surfaces are clean and undamaged.
- ► Secure the seals correctly.
- 1. Ensure that the direction of the arrow on the nameplate of the sensor matches the flow direction of the medium.
- 2. Install the measuring instrument or turn the transmitter housing so that the cable entries do not point upwards.



A0029263

6.2.4 Installing the transmitter housing: Proline 500 – digital

NOTICE

Ambient temperature too high!

Danger of electronics overheating and housing deformation.

- ▶ Do not exceed the permitted maximum ambient temperature.
- ► If operating outdoors: Avoid direct sunlight and exposure to weathering, particularly in warm climatic regions.

NOTICE

Excessive force can damage the housing!

► Avoid excessive mechanical stress.

The transmitter can be mounted in the following ways:

- Post mounting
- Wall mounting

Pipe mounting

Required tools:

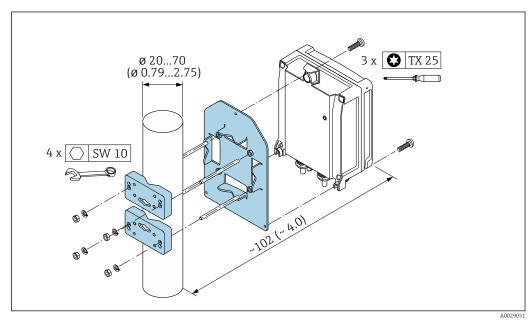
- Open-ended wrench AF 10
- Torx screwdriver TX 25

NOTICE

Excessive tightening torque applied to the fixing screws!

Risk of damaging the plastic transmitter.

► Tighten the fixing screws as per the tightening torque: 2.5 Nm (1.8 lbf ft)



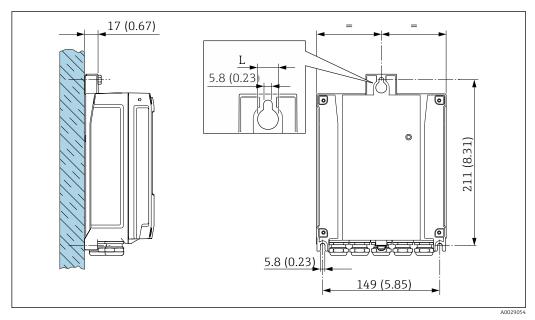
■ 10 Unit mm (in)

Wall mounting

Required tools:

Drill with drill bit \emptyset 6.0 mm

30



■ 11 Unit mm (in)

L Depends on order code for "Transmitter housing"

Order code for "Transmitter housing"

- Option **A**, aluminum, coated: L = 14 mm (0.55 in)
- Option **D**, polycarbonate: L = 13 mm (0.51 in)
- 1. Drill the holes.
- 2. Insert wall plugs into the drilled holes.
- 3. Screw in the securing screws loosely.
- 4. Fit the transmitter housing over the securing screws and mount in place.
- 5. Tighten the securing screws.

6.2.5 Installing the transmitter housing: Proline 500

NOTICE

Ambient temperature too high!

Danger of electronics overheating and housing deformation.

- ▶ Do not exceed the permitted maximum ambient temperature.
- ► If operating outdoors: Avoid direct sunlight and exposure to weathering, particularly in warm climatic regions.

NOTICE

Excessive force can damage the housing!

► Avoid excessive mechanical stress.

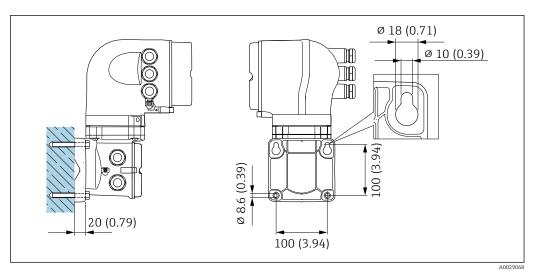
The transmitter can be mounted in the following ways:

- Post mounting
- Wall mounting

Wall mounting

Required tools

Drill with drill bit Ø 6.0 mm



■ 12 Unit mm (in)

- 1. Drill the holes.
- 2. Insert wall plugs into the drilled holes.
- 3. Lightly screw in the securing screws.
- 4. Fit the transmitter housing over the securing screws and hook into place.
- 5. Tighten the securing screws.

Pipe mounting

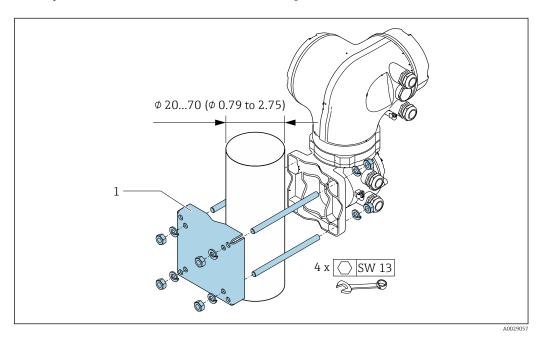
Required tools Open-ended wrench AF 13

A WARNING

Order code for "Transmitter housing", option L "Cast, stainless": cast transmitters are very heavy.

They are unstable if they are not mounted on a secure, fixed post.

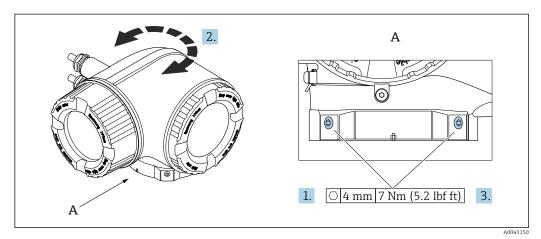
▶ Only mount the transmitter on a secure, fixed post on a stable surface.



■ 13 Unit mm (in)

6.2.6 Turning the transmitter housing: Proline 500

To provide easier access to the connection compartment or display module, the transmitter housing can be turned.

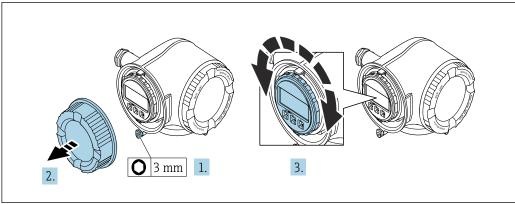


■ 14 Ex housing

- 1. Loosen the fixing screws.
- 2. Turn the housing to the desired position.
- 3. Tighten the securing screws.

6.2.7 Turning the display module: Proline 500

The display module can be turned to optimize display readability and operability.



A003003

- 1. Depending on the device version: Loosen the securing clamp of the connection compartment cover.
- 2. Unscrew the connection compartment cover.
- 3. Turn the display module to the desired position: max. $8 \times 45^{\circ}$ in each direction.
- 4. Screw on the connection compartment cover.
- 5. Depending on the device version: Attach the securing clamp of the connection compartment cover.

6.3 Post-installation check

Is the device undamaged (visual inspection)?		
Does the measuring instrument correspond to the measuring point specifications? For example: Process temperature → 🖺 235 Pressure (refer to the "Pressure-temperature ratings" section of the "Technical Information" document). Ambient temperature Measuring range		
Has the correct orientation for the sensor been selected → 🗎 22? • According to sensor type • According to medium temperature • According to medium properties (outgassing, with entrained solids)		
Does the arrow on the sensor match the direction of flow of the medium? \rightarrow $\ \ \ \ \ \ \ \ \ \ \ \ \ $		
Is the tag name and labeling correct (visual inspection)?		
Is the device sufficiently protected from precipitation and direct sunlight?		
Are the securing screw and securing clamp tightened securely?		

7 Electrical connection

▲ WARNING

Live parts! Incorrect work performed on the electrical connections can result in an electric shock.

- ► Set up a disconnecting device (switch or power-circuit breaker) to easily disconnect the device from the supply voltage.
- ▶ In addition to the device fuse, include an overcurrent protection unit with max. 10 A in the plant installation.

7.1 Electrical safety

In accordance with applicable national regulations.

7.2 Connecting requirements

7.2.1 Required tools

- For cable entries: use appropriate tool
- For securing clamp: Allen key 3 mm
- Wire stripper
- When using stranded cables: crimper for wire end ferrule
- For removing cables from terminal: flat blade screwdriver ≤ 3 mm (0.12 in)

7.2.2 Requirements for connection cable

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

Protective grounding cable for the outer ground terminal

Conductor cross-section < 6 mm² (10 AWG)

Larger cross-sections can be connected using a cable lug.

The grounding impedance must be less than 2 Ω .

Permitted temperature range

- The installation quidelines 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 (incl. conductor for the inner ground terminal)

Standard installation cable is sufficient.

Signal cable

4 to 20 mA current input

Standard installation cable is sufficient.

Pulse/frequency/switch output

Standard installation cable is sufficient.

Relay output

Standard installation cable is sufficient.

Status input

Standard installation cable is sufficient.

EtherNet/IP

Twisted-pair Ethernet CAT 5 or better.



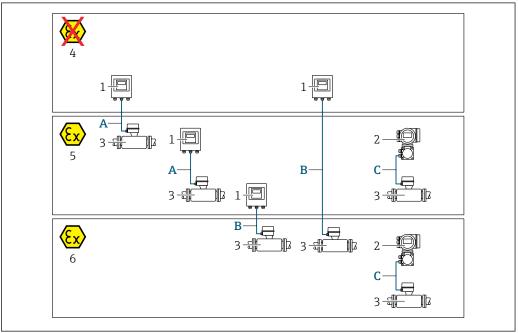
 $See \ \underline{https://www.odva.org"} Ether Net/IP \ Media \ Planning \ \& \ Installation \ Manual".$

Cable diameter

- Cable glands supplied:
 - $M20 \times 1.5$ with cable Ø 6 to 12 mm (0.24 to 0.47 in)
- Spring-loaded terminals: Suitable for strands and strands with ferrules.
 Conductor cross-section 0.2 to 2.5 mm² (24 to 12 AWG)

Choice of connecting cable between the transmitter and sensor

Depends on the type of transmitter and the installation zones



A00324

- 1 Proline 500 digital transmitter
- 2 Proline 500 transmitter
- 3 Sensor Promass
- 4 Non-hazardous area
- 5 Hazardous area: Zone 2; Class I, Division 2
- 6 Hazardous area: Zone 1; Class I, Division 1
- A Standard cable to 500 digital transmitter → 🖺 36

 Transmitter installed in the non-hazardous area or hazardous area: Zone 2; Class I, Division 2/sensor installed in the hazardous area: Zone 2; Class I, Division 2
- B Standard cable to 500 digital transmitter → 🖺 37

 Transmitter installed in the hazardous area: Zone 2; Class I, Division 2/sensor installed in the hazardous area: Zone 1; Class I, Division 1
- C Signal cable to 500 transmitter → 🖺 39

 Transmitter and sensor installed in the hazardous area: Zone 2; Class I, Division 2 or Zone 1;

 Class I, Division 1

A: Connecting cable between sensor and transmitter: Proline 500 – digital

Standard cable

A standard cable with the following specifications can be used as the connecting cable.

36

Design	4 cores (2 pairs); uninsulated stranded CU wires; pair-stranded with common shield			
Shield	Tin-plated copper braid, optical cover ≥ 85 %			
Loop resistance	Power supply line (+, –): maximum 10 Ω			
Cable length	Maximum 300 m (900 ft), see the following table.			
Device plug, side 1	M12 socket, 5-pin, A-coded.			
Device plug, side 2	M12 plug, 5-pin, A-coded.			
Pins 1+2	Connected cores as twisted pair.			
Pins 3+4	Connected cores as twisted pair.			

Cross-section	Cable length [max.]
0.34 mm ² (AWG 22)	80 m (240 ft)
0.50 mm ² (AWG 20)	120 m (360 ft)
0.75 mm ² (AWG 18)	180 m (540 ft)
1.00 mm ² (AWG 17)	240 m (720 ft)
1.50 mm ² (AWG 15)	300 m (900 ft)

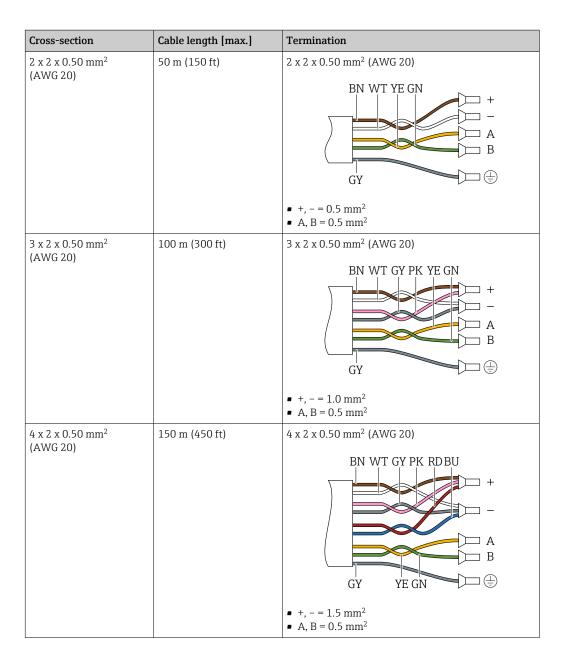
Optionally available connecting cable

Flame resistance	According to DIN EN 60332-1-2
Oil resistance	According to DIN EN 60811-2-1
Shield	Tin-plated copper braid, optical cover ≥ 85 %
Continuous operating temperature	When mounted in a fixed position: -50 to $+105$ °C (-58 to $+221$ °F); when cable can move freely: -25 to $+105$ °C (-13 to $+221$ °F)
Available cable length	Fixed: 20 m (60 ft); variable: up to maximum 50 m (150 ft)

B: Connecting cable between sensor and transmitter: Proline 500 - digital Standard cable

A standard cable with the following specifications can be used as the connecting cable.

Design	4, 6, 8 cores (2, 3, 4 pairs); uninsulated stranded CU wires; pair-stranded with common shield			
Shielding	Tin-plated copper braid, optical cover ≥ 85 %			
Capacitance C	Maximum 760 nF IIC, maximum 4.2 μF IIB			
Inductance L	Maximum 26 μH IIC, maximum 104 μH IIB			
Inductance/resistance ratio (L/R)	Maximum 8.9 $\mu H/\Omega$ IIC, maximum 35.6 $\mu H/\Omega$ IIB (e.g. according to IEC 60079-25)			
Loop resistance	Power supply line (+, –): maximum 5 Ω			
Cable length	Maximum 150 m (450 ft), see the following table.			



Optionally available connecting cable

Connecting cable for	Zone 1; Class I, Division 1
Standard cable	$2\times2\times0.5~\text{mm}^2$ (AWG 20) PVC cable $^{1)}$ with common shield (2 pairs, pair-stranded)
Flame resistance	According to DIN EN 60332-1-2
Oil-resistance	According to DIN EN 60811-2-1
Shielding	Tin-plated copper braid, optical cover ≥ 85 %
Operating temperature	When mounted in a fixed position: -50 to $+105$ °C (-58 to $+221$ °F); when cable can move freely: -25 to $+105$ °C (-13 to $+221$ °F)
Available cable length	Fixed: 20 m (60 ft); variable: up to maximum 50 m (150 ft)

1) UV radiation can impair the cable outer sheath. Protect the cable from direct sunshine where possible.

C: Connecting cable between sensor and transmitter: Proline 500

Design	$6\times0.38\ mm^2$ PVC cable $^{1)}$ with individual shielded cores and common copper shield
Conductor resistance	$\leq 50 \Omega/\text{km} (0.015 \Omega/\text{ft})$
Capacitance: core/shield	≤ 420 pF/m (128 pF/ft)
Cable length (max.)	20 m (60 ft)
Cable lengths (available for order)	5 m (15 ft), 10 m (30 ft), 20 m (60 ft)
Cable diameter	11 mm (0.43 in) ± 0.5 mm (0.02 in)
Continuous operating temperature	Max. 105 °C (221 °F)

¹⁾ UV radiation can impair the cable outer sheath. Protect the cable from direct sunshine where possible.

7.2.3 Terminal assignment

Transmitter: supply voltage, input/outputs

The terminal assignment of the inputs and outputs depends on the individual order version of the device. The device-specific terminal assignment is documented on an adhesive label in the terminal cover.

Supply	Supply voltage Input/output 1 (Port 1) 1)		Input/output 2		Input/output 3		Input/output 4 ²⁾		Service interface (Port 2) 1)
1 (+)	2 (-)	RJ45	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)	CDI-RJ45
			Device-specific terminal assignment: adhesive label in terminal cover.						

¹⁾ Port can be used for communication or as a service interface (CDI-RJ45).

Transmitter and sensor connection housing: connecting cable

The sensor and transmitter, which are mounted in separate locations, are interconnected by a connecting cable. The cable is connected via the sensor connection housing and the transmitter housing.

Terminal assignment and connection of the connecting cable:

- Proline $500 digital \rightarrow 41$
- Proline $500 \rightarrow \blacksquare 51$

7.2.4 Available device plugs for Proline 500

Pevice plugs may not be used in hazardous areas!

Order code for "Input; output 1", option NA "EtherNet/IP"

Order code for	Cable entry/connection			
"Electrical connection"	2	3		
L, N, P, U	Connector M12×1	-		
R ^{1) 2)} S ^{1) 2)} , T ^{1) 2)} , V ^{1) 2)}	Connector M12×1	Connector M12×1		

Not compatible with an external WLAN antenna (order code for "Accessory enclosed", option P8), an RJ45 M12 adapter for the service interface (order code for "Accessory mounted", option NB)

²⁾ Input/output only available for Proline 500 - digital.

²⁾ Suitable for integrating the device into a ring topology.

7.2.5 Pin assignment of device plug

2	Pin		Assignment	Coding	Plug/socket
	1	+	Tx	D	Socket
1 3	2	+	Rx		
	3	-	Tx		
	4	-	Rx		
4 A0032047					
	Met		Cable shield		
	al				
	plug				
	hous				
	ing				

7.2.6 Preparing the device

Carry out the steps in the following order:

- 1. Mount the sensor and transmitter.
- 2. Sensor connection housing: Connect connecting cable.
- 3. Transmitter: Connect connecting cable.
- 4. Transmitter: Connect signal cable and cable for supply voltage.

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 instrument is supplied without cable glands: Provide suitable cable gland for corresponding connecting cable.
- 3. If the measuring instrument is supplied with cable glands: Observe requirements for connecting cables → 🗎 35.

7.3 Connecting the device: Proline 500 – digital

NOTICE

An incorrect connection compromises electrical safety!

- ▶ Only properly trained specialist staff may perform electrical connection work.
- ▶ Observe applicable federal/national installation codes and regulations.
- ► Comply with local workplace safety regulations.
- ▶ Always connect the protective ground cable ⊕ before connecting additional cables.
- ► When using in potentially explosive atmospheres, observe the information in the device-specific Ex documentation.

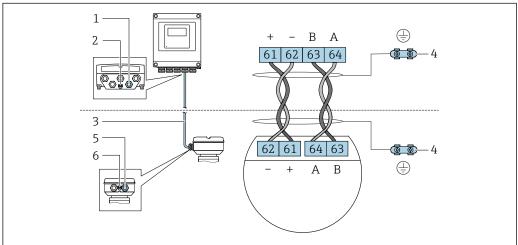
7.3.1 Connecting the connecting cable

NOTICE

Risk of damaging the electronic components!

- ► Connect the sensor and transmitter to the same potential equalization.
- ▶ Only connect the sensor to a transmitter with the same serial number.

Connecting cable terminal assignment



A0028198

- 1 Cable entry for cable on transmitter housing
- 2 Protective earth (PE)
- 3 Connecting cable ISEM communication
- 4 Grounding via ground connection; in the version with a device plug, grounding is ensured through the plug itself
- 5 Cable entry for cable or connection of device plug on sensor connection housing
- 6 Protective earth (PE)

Connecting the connecting cable to the sensor connection housing

- Connection via terminals with order code for "Sensor connection housing":

 - Option **B** "Stainless" \rightarrow 🗎 43
 - Option **L** "Cast, stainless" \rightarrow 🗎 42
- Connection via connectors with order code for "Sensor connection housing":
 Option C "Ultra-compact hygienic, stainless" → 월 44

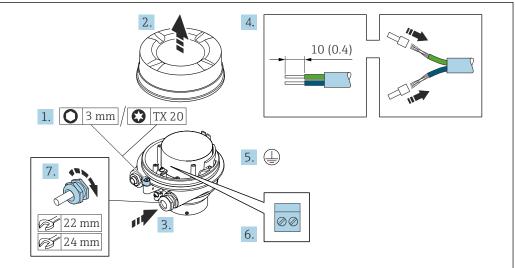
Connecting the connecting cable to the transmitter

The cable is connected to the transmitter via terminals $\rightarrow \triangleq 45$.

Connecting the sensor connection housing via terminals

For the device version with the order code for "Sensor connection housing":

- Option A "Aluminum coated"
- Option L "Cast, stainless"



A0029616

- 1. Loosen the securing clamp of the housing cover.
- 2. Unscrew the housing cover.
- 3. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.
- 4. Strip the cable and cable ends. In the case of stranded cables, fit ferrules.
- 5. Connect the protective ground.
- 6. Connect the cable in accordance with the connecting cable terminal assignment.
- 7. Firmly tighten the cable glands.
 - This concludes the process for connecting the connecting cable.

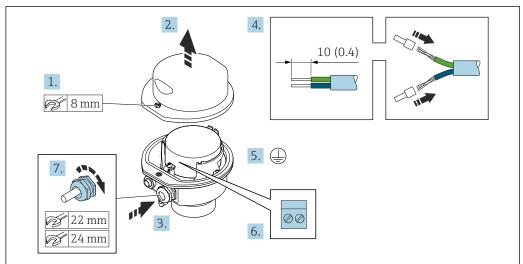
MARNING

Housing degree of protection voided due to insufficient sealing of the housing.

- ► Screw in the thread on the cover without using any lubricant. The thread on the cover is coated with a dry lubricant.
- 8. Screw on the housing cover.
- 9. Tighten the securing clamp of the housing cover.

Connecting the sensor connection housing via terminals

For the device version with the order code for "Sensor connection housing": Option ${\bf B}$ "Stainless"

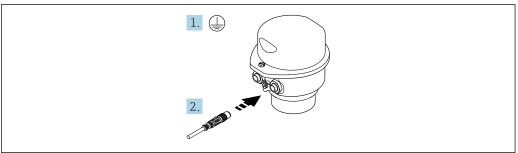


A0029613

- 1. Release the securing screw of the housing cover.
- 2. Open the housing cover.
- 3. Push the cable through the cable entry . To ensure tight sealing, do not remove the sealing ring from the cable entry.
- 4. Strip the cable and cable ends. In the case of stranded cables, fit ferrules.
- 5. Connect the protective ground.
- 6. Connect the cable in accordance with the connecting cable terminal assignment.
- 7. Firmly tighten the cable glands.
 - ightharpoonup This concludes the process for connecting the connecting cable.
- 8. Close the housing cover.
- 9. Tighten the securing screw of the housing cover.

Connecting the sensor connection housing via the connector

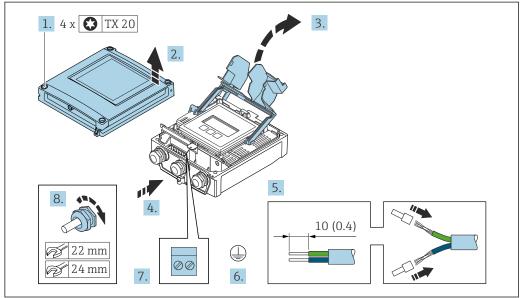
For the device version with the order code for "Sensor connection housing": Option ${\bf C}$ "Ultra-compact hygienic, stainless"



A002961

- 1. Connect the protective ground.
- 2. Connect the connector.

Connecting the connecting cable to the transmitter

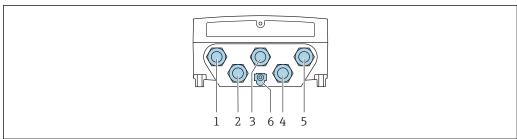


A002959

- 1. Loosen the 4 fixing screws on the housing cover.
- 2. Open the housing cover.
- 3. Fold open the terminal cover.
- 4. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.
- 5. Strip the cable and cable ends. In the case of stranded cables, fit ferrules.
- 6. Connect the protective ground.
- 8. Firmly tighten the cable glands.
 - ► The process for connecting the connecting cable is now complete.
- 9. Close the housing cover.
- 10. Tighten the securing screw of the housing cover.
- 11. After connecting the connecting cable:Connect the signal cable and the supply voltage cable →

 46.

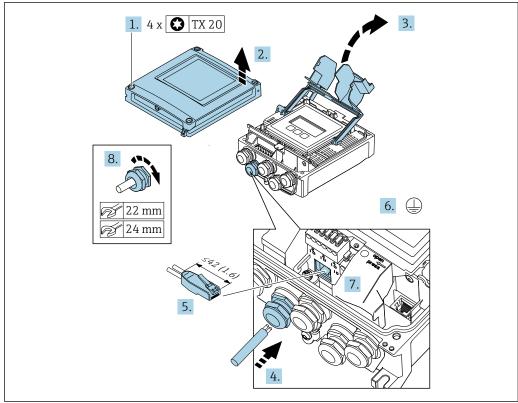
7.3.2 Connecting the transmitter



A002820

- 1 Terminal connection for supply voltage
- 2 Terminal connection for signal transmission, input/output
- 3 Terminal connection for signal transmission, input/output
- 4 Terminal connection for connecting cable between sensor and transmitter
- 5 Terminal connection for signal transmission, input/output or terminal for network connection (DHCP client) via service interface (CDI-RJ45); optional: connection for external WLAN antenna
- 6 Protective earth (PE)
- In addition to connecting the device via EtherNet/IP and the available input/outputs, additional connection options are also available:
 - Integrate into a network via the service interface (CDI-RJ45) \rightarrow \triangleq 49.
 - Integrate the device into a ring topology $\rightarrow \triangleq 50$.

Connecting the EtherNet/IP plug

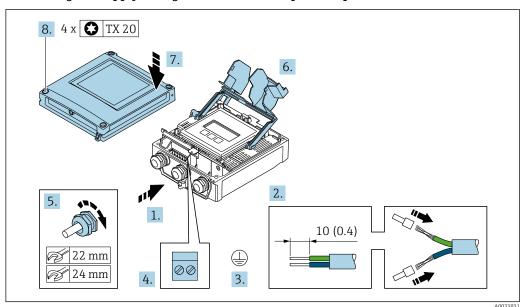


A003398

- 1. Loosen the 4 fixing screws on the housing cover.
- 2. Open the housing cover.
- 3. Fold open the terminal cover.
- 4. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.
- 5. Strip the cable and cable ends and connect to the RJ45 connector.

- 6. Connect the protective ground.
- 7. Plug in the RJ45 connector.
- 8. Firmly tighten the cable glands.
 - ► This concludes the EtherNet/IP connection process.

Connecting the supply voltage and additional inputs/outputs



- 1. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.
- 2. Strip the cable and cable ends. In the case of stranded cables, fit ferrules.
- 3. Connect the protective ground.
- 4. Connect the cable according to the terminal assignment.
 - Signal cable terminal assignment: The device-specific terminal assignment is documented on an adhesive label in the terminal cover.

Supply voltage terminal assignment: Adhesive label in the terminal cover or $\rightarrow \implies 39$.

- 5. Firmly tighten the cable glands.
 - ► This concludes the cable connection process.
- 6. Close the terminal cover.
- 7. Close the housing cover.

A WARNING

Housing degree of protection may be voided due to insufficient sealing of the housing.

► Screw in the screw without using any lubricant.

NOTICE

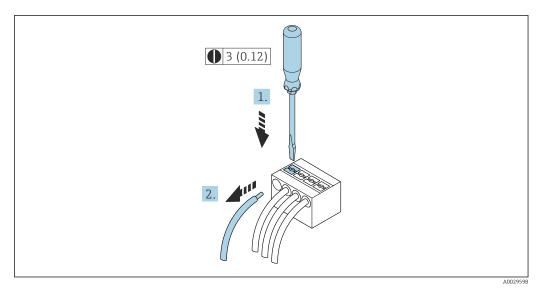
Excessive tightening torque applied to the fixing screws!

Risk of damaging the plastic transmitter.

- ► Tighten the fixing screws as per the tightening torque: 2.5 Nm (1.8 lbf ft)
- 8. Tighten the 4 fixing screws on the housing cover.

Removing a cable

To remove a cable from the terminal:



■ 15 Unit mm(in)

- 1. Use a flat-blade screwdriver to press down on the slot between the two terminal holes.
- 2. Remove the cable end from the terminal.

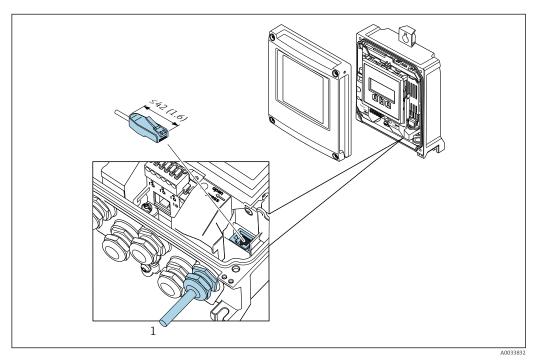
7.3.3 Integrating the transmitter into a network

Integrating via the service interface

The device is integrated via the connection to the service interface (CDI-RJ45).

Note the following when connecting:

- Recommended cable: CAT5e, CAT6 or CAT7, with shielded connector (e.g. brand: YAMAICHI; Part No. Y-ConProfixPlug63/Prod. ID: 82-006660)
- Maximum cable thickness: 6 mm
- Length of plug including anti-bend protection: 42 mm
- Bending radius: 5 x cable thickness



1 Service interface (CDI-RJ45)

An adapter for the RJ45 to the M12 plug is optionally available for the non-hazardous area:

Order code for "Accessories", option NB: "Adapter RJ45 M12 (service interface)"

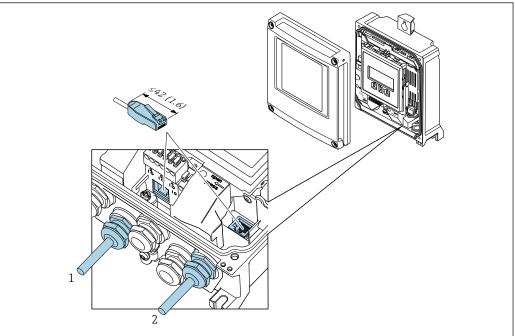
The adapter connects the service interface (CDI-RJ45) to an M12 plug mounted in the cable entry. The connection to the service interface can thus be established via an M12 plug without opening the device.

Integrating into a ring topology

The device is integrated via the terminal connection for signal transmission (output 1) and the connection to the service interface (CDI-RJ45).

Note the following when connecting:

- Recommended cable: CAT5e, CAT6 or CAT7, with shielded connector (e.g. brand: YAMAICHI; Part No. Y-ConProfixPlug63/Prod. ID: 82-006660)
- Maximum cable thickness: 6 mm
- Length of plug including anti-bend protection: 42 mm
- Bending radius: 2.5 x cable thickness



A003383

- 1 EtherNet/IP connection
- 2 Service interface (CDI-RJ45)
- An adapter for the RJ45 to the M12 plug is optionally available:

 Order code for "Accessories", option **NB**: "Adapter RJ45 M12 (service interface)"

The adapter connects the service interface (CDI-RJ45) to an M12 plug mounted in the cable entry. The connection to the service interface can thus be established via an M12 plug without opening the device.

7.4 Connecting the device: Proline 500

NOTICE

An incorrect connection compromises electrical safety!

- ► Only properly trained specialist staff may perform electrical connection work.
- ▶ Observe applicable federal/national installation codes and regulations.
- ► Comply with local workplace safety regulations.
- ▶ Always connect the protective ground cable ⊕ before connecting additional cables.
- ► When using in potentially explosive atmospheres, observe the information in the device-specific Ex documentation.

7.4.1 Connecting the connecting cable

NOTICE

Risk of damaging the electronic components!

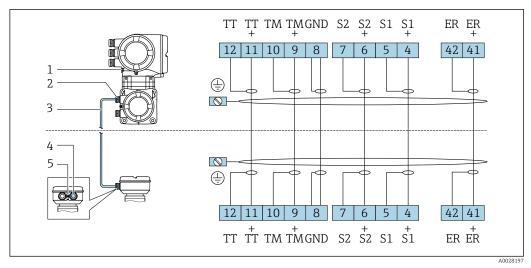
- ▶ Connect the sensor and transmitter to the same potential equalization.
- ▶ Only connect the sensor to a transmitter with the same serial number.

A CAUTION

Measurement error due to shortening of the connecting cable

► The connecting cable is ready for installation and must be used in the length supplied. Shortening the connecting cable can affect the sensor's measurement accuracy.

Connecting cable terminal assignment



- 1 Protective earth (PE)
- 2 Cable entry for connecting cable on transmitter connection housing
- 3 Connecting cable
- 4 Cable entry for connecting cable on sensor connection housing
- 5 Protective earth (PE)

Connecting the connecting cable to the sensor connection housing

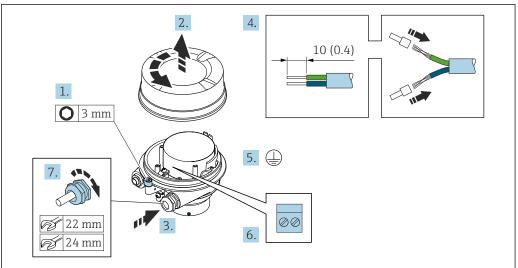
Connection via terminals with order code for "Housing":

- Option **A** "Aluminum coated" $\rightarrow \triangleq 52$
- Option **B** "Stainless" → 🖺 53
- Option **L** "Cast, stainless" \rightarrow 🗎 52

Connecting the sensor connection housing via terminals

For the device version with the order code for "Housing":

- Option A "Aluminum coated"
- Option L "Cast, stainless"



Δ0029612

- 1. Loosen the securing clamp of the housing cover.
- 2. Unscrew the housing cover.
- 3. Push the cable through the cable entry . To ensure tight sealing, do not remove the sealing ring from the cable entry.
- 4. Strip the cable and cable ends. In the case of stranded cables, fit ferrules.
- 5. Connect the protective ground.
- 6. Connect the cable in accordance with the connecting cable terminal assignment.
- 7. Firmly tighten the cable glands.
 - The process for connecting the connecting cable is now complete.

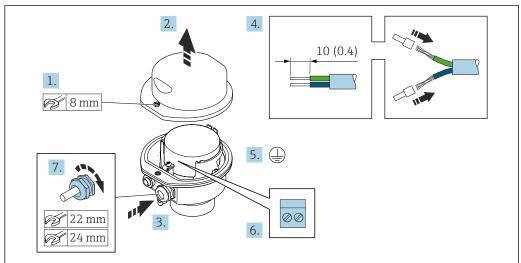
A WARNING

Housing degree of protection voided due to insufficient sealing of the housing.

- ► Screw in the thread on the cover without using any lubricant. The thread on the cover is coated with a dry lubricant.
- 8. Screw on the housing cover.
- 9. Tighten the securing clamp of the housing cover.

Connecting the sensor connection housing via terminals

For the device version with the order code for "Housing": Option ${\bf B}$ "Stainless"



Δ0029613

- 1. Release the securing screw of the housing cover.
- 2. Open the housing cover.
- 3. Push the cable through the cable entry . To ensure tight sealing, do not remove the sealing ring from the cable entry.
- 4. Strip the cable and cable ends. In the case of stranded cables, fit ferrules.
- 5. Connect the protective ground.
- 6. Connect the cable in accordance with the connecting cable terminal assignment.
- 7. Firmly tighten the cable glands.
 - ► This concludes the process for connecting the connecting cable.
- 8. Close the housing cover.
- 9. Tighten the securing screw of the housing cover.

4. 10 (0.4) 5. 1. O 3 mm 6. 2.

Attaching the connecting cable to the transmitter

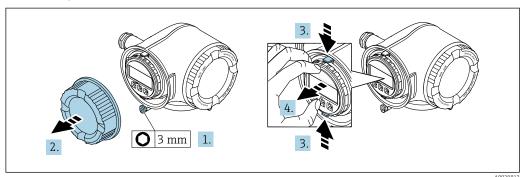
A002959

- 1. Loosen the securing clamp of the connection compartment cover.
- 2. Unscrew the connection compartment cover.
- 3. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.
- 4. Strip the cable and cable ends. In the case of stranded cables, also fit ferrules.
- 5. Connect the protective ground.
- 7. Firmly tighten the cable glands.
 - This concludes the process for attaching the connecting cable.
- 8. Screw on the connection compartment cover.
- 9. Tighten the securing clamp of the connection compartment cover.
- **10.** After connecting the connecting cable:

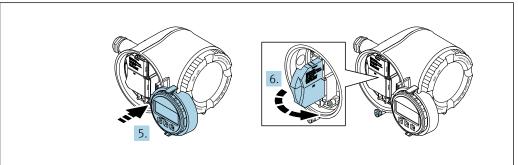
 Connect the signal cable and the supply voltage cable.

7.4.2 Connecting the transmitter

Connecting connector

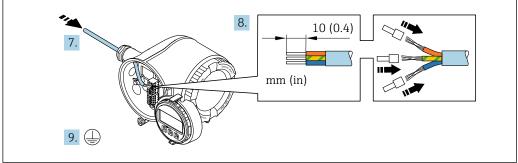


- 1. Loosen the securing clamp of the connection compartment cover.
- 2. Unscrew the connection compartment cover.
- 3. Squeeze the tabs of the display module holder together.
- 4. Remove the display module holder.



A0029814

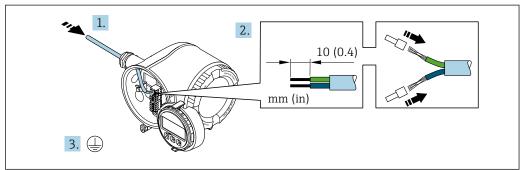
- 5. Attach the holder to the edge of the electronics compartment.
- 6. Open the terminal cover.



A0029815

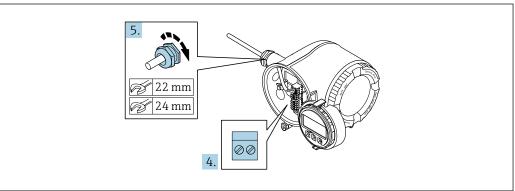
- 7. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.
- 8. Strip the cable and cable ends and connect to terminals 26-27. In the case of stranded cables, also fit ferrules.
- 9. Connect protective earth (PE).
- 10. Firmly tighten the cable glands.
 - ► This concludes the connection via the APL port.

Connecting the supply voltage and additional inputs/outputs



A003398

- 1. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.
- 2. Strip the cable and cable ends. In the case of stranded cables, also fit ferrules.
- 3. Connect the protective ground.



A003398

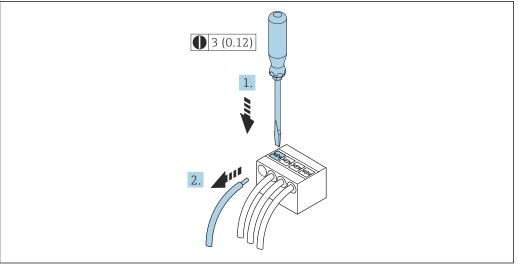
- 4. Connect the cable according to the terminal assignment.
 - Signal cable terminal assignment: The device-specific terminal assignment is documented on an adhesive label in the terminal cover.

Supply voltage terminal assignment: Adhesive label in the terminal cover or $\rightarrow \implies 39$.

- 5. Firmly tighten the cable glands.
 - ► This concludes the cable connection process.
- 6. Close the terminal cover.
- 7. Fit the display module holder in the electronics compartment.
- 8. Screw on the connection compartment cover.
- 9. Secure the securing clamp of the connection compartment cover.

Removing a cable

To remove a cable from the terminal:



A0029598

■ 16 Unit mm(in)

- 1. Use a flat-blade screwdriver to press down on the slot between the two terminal holes.
- 2. Remove the cable end from the terminal.

7.4.3 Integrating the transmitter into a network

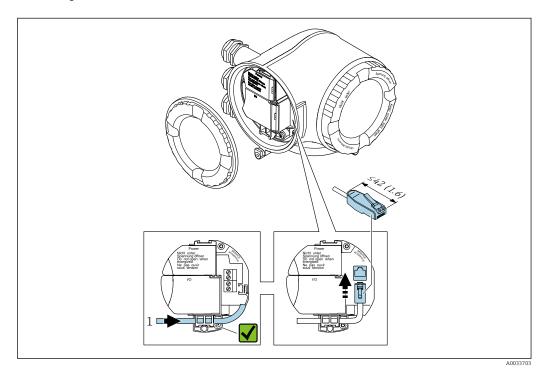
This section only presents the basic options for integrating the device into a network. For information on the procedure to follow to connect the transmitter correctly $\rightarrow \triangleq 51$.

Integrating via the service interface

The device is integrated via the connection to the service interface (CDI-RJ45).

Note the following when connecting:

- Recommended cable: CAT 5e, CAT 6 or CAT 7, with shielded connector (e.g. manufacturer YAMAICHI; Part No Y-ConProfixPlug63 / Prod. ID: 82-006660)
- Maximum cable thickness: 6 mm
- Length of plug including anti-bend protection: 42 mm
- Bending radius: 5 x cable thickness



1 Service interface (CDI-RJ45)

An adapter for the RJ45 to the M12 plug is optionally available:
Order code for "Accessories", option **NB**: "Adapter RJ45 M12 (service interface)"

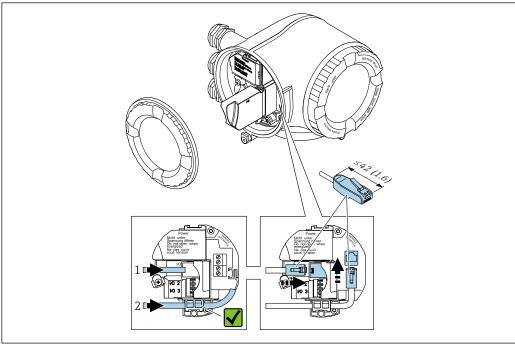
The adapter connects the service interface (CDI-RJ45) to an M12 plug mounted in the cable entry. The connection to the service interface can thus be established via an M12 plug without opening the device.

Integrating into a ring topology

The device is integrated via the terminal connection for signal transmission (output 1) and the connection to the service interface (CDI-RJ45).

Note the following when connecting:

- Recommended cable: CAT5e, CAT6 or CAT7, with shielded connector (e.g. brand: YAMAICHI; Part No. Y-ConProfixPlug63/Prod. ID: 82-006660)
- Maximum cable thickness: 6 mm
- Length of plug including anti-bend protection: 42 mm
- Bending radius: 2.5 x cable thickness



A0033717

- 1 EtherNet/IP connection
- 2 Service interface (CDI-RJ45)
- An adapter for the RJ45 to the M12 plug is optionally available:
 Order code for "Accessories", option **NB**: "Adapter RJ45 M12 (service interface)"

The adapter connects the service interface (CDI-RJ45) to an M12 plug mounted in the cable entry. The connection to the service interface can thus be established via an M12 plug without opening the device.

7.5 Potential equalization

7.5.1 Requirements

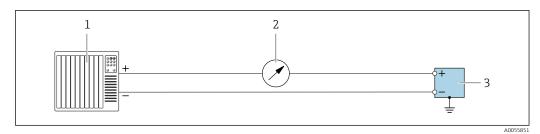
For potential equalization:

- Pay attention to in-house grounding concepts
- Take account of operating conditions like the pipe material and grounding
- Connect the medium, sensor and transmitter to the same electric potential
- Use a ground cable with a minimum cross-section of 6 mm² (10 AWG) and a cable lug for potential equalization connections

7.6 Special connection instructions

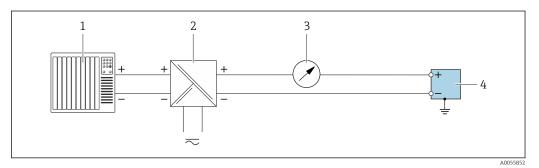
7.6.1 Connection examples

Current output 4 to 20 mA (without HART)



■ 17 Connection example for 4 to 20 mA current output (active)

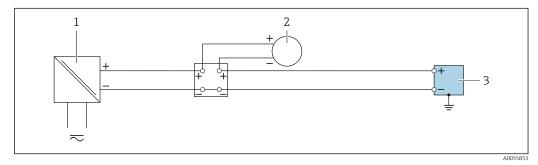
- 1 Automation system with current input (e.g. PLC)
- 2 Optional additional display unit: Observe maximum load
- 3 Flowmeter with current output (active)



■ 18 Connection example for 4 to 20 mA current output (passive)

- 1 Automation system with current input (e.g. PLC)
- 2 Power supply
- 3 Optional additional display unit: Observe maximum load
- 4 Transmitter with current output (passive)

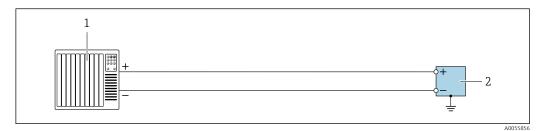
Current input 4 to 20 mA



■ 19 Connection example for 4 to 20 mA current input

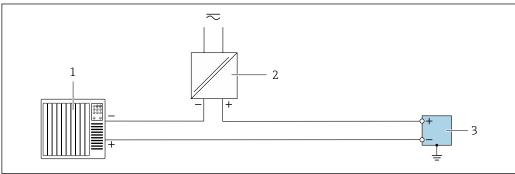
- 1 Power supply
- 2 External measuring instrument with 4 to 20 mA passive current output. e.g. pressure or temperature)
- 3 Transmitter with 4 to 20 mA current input

Pulse output/frequency output/switch output



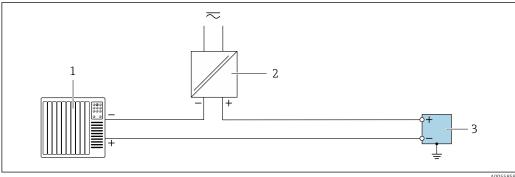
Connection example for pulse output/frequency output/switch output (active)

- Automation system with pulse input/frequency input/switch input (e.g. PLC)
- Transmitter with pulse output/frequency output/switch output (active)



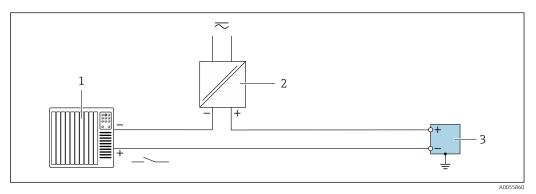
- **₽** 21 Connection example for pulse output/frequency output/switch output (passive)
- Automation system with pulse input/frequency input/switch input (e.g. PLC)
- 2 Power supply
- Transmitter with pulse output/frequency output/switch output (passive)

Relay output



- **₽** 22 Connection example for relay output
- Automation system with switch input (e.g. PLC)
- 2 Power supply
- *Transmitter with relay output*

Status input



23 € Connection example for status input

- Automation system with switch output passive e.g. PLC)
- Power supply
- 3 Transmitter with status input

EtherNet/IP

See https://www.odva.org"EtherNet/IP Media Planning & Installation Manual".

7.7 Hardware settings

7.7.1 Setting the device address

The IP address of the measuring instrument can be configured for the network via DIP switches.

Addressing data

	IP address and con	ifiguration options		
1st octet	2nd octet	3rd octet	4th octet	
192.	168.	1.	XXX	
	\		\downarrow	
Can only be	configured via softwar	e addressing	Can be configured via	

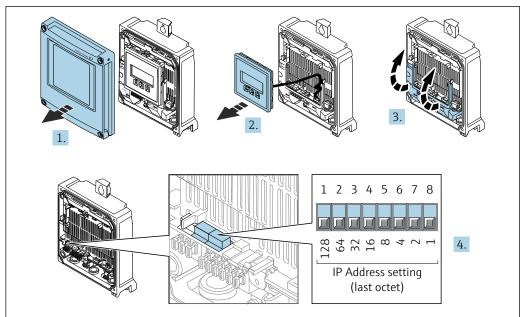
IP address range	1 to 254 (4th octet)
IP address broadcast	255
Addressing mode ex works	Software addressing; all DIP switches for hardware addressing are set to OFF.
IP address ex works	DHCP server active

Software addressing: The IP address is entered via the IP address parameter (→ 🖺 118).

Setting the IP address: Proline 500 - digital

Risk of electric shock when opening the transmitter housing.

- ▶ Before opening the transmitter housing:
- Disconnect the device from the power supply.
- The default IP address may **not** be activated .



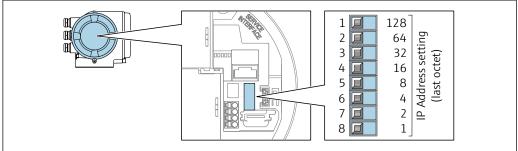
A0029678

- 1. Loosen the 4 fixing screws on the housing cover.
- 2. Open the housing cover.
- 3. Fold open the terminal cover.
- 4. Set the desired IP address using the corresponding DIP switches on the I/O electronics module.
- 5. Reassemble the transmitter in the reverse order.
- 6. Reconnect the device to the power supply.
 - └─ The configured device address is used once the device is restarted.

Setting the IP address: Proline 500

Risk of electric shock when opening the transmitter housing.

- ▶ Before opening the transmitter housing:
- ► Disconnect the device from the power supply.
- 🙌 The default IP address may **not** be activated .



A0029635

- 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 IP address using the corresponding DIP switches on the I/O electronics module.
- 4. Reassemble the transmitter in the reverse order.

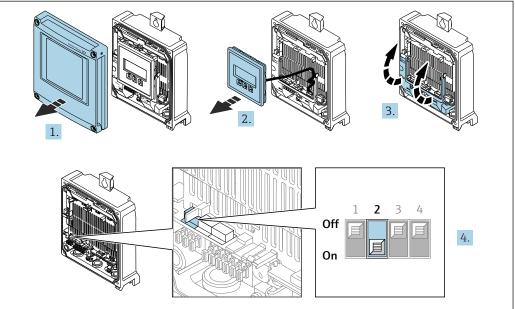
- 5. Reconnect the device to the power supply.
 - The configured device address is used once the device is restarted.

7.7.2 Activating the default IP address

Activating the default IP address by DIP switch: Proline 500 - digital

Risk of electric shock when opening the transmitter housing.

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



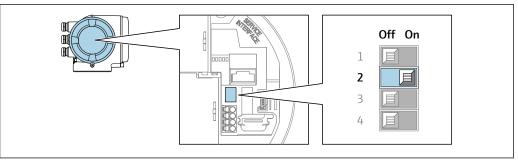
A003450

- 1. Loosen the 4 fixing screws on the housing cover.
- 2. Open the housing cover.
- 3. Fold open the terminal cover.
- 4. Set DIP switch no. 2 on the I/O electronics module from **OFF** \rightarrow **ON**.
- 5. Reassemble the transmitter in the reverse order.
- 6. Reconnect the device to the power supply.
 - The default IP address is used once the device is restarted.

Activating the default IP address by DIP switch: Proline 500

Risk of electric shock when opening the transmitter housing.

- ► Before opening the transmitter housing:
- ▶ Disconnect the device from the power supply.



A0034499

- 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. DIP switch no. 2 on the I/O electronics module from **OFF** \rightarrow **ON**.
- 4. Reassemble the transmitter in the reverse order.
- 5. Reconnect the device to the power supply.
 - ► The default IP address is used once the device is restarted.

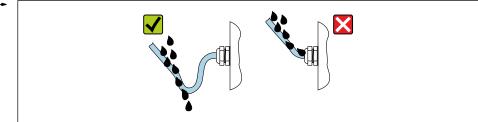
7.8 Ensuring the degree of protection

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

To ensure degree of protection IP66/67, Type 4X enclosure, carry out the following steps after making 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. The supplied cable glands and plastic dummy plugs used for the threaded cable entries do not ensure degree of protection IP66/67, Type 4X enclosure. To achieve this degree of protection, cable glands and plastic dummy plugs that are not used must be replaced by threaded dummy plugs with the degree of protection IP66/67, Type 4X enclosure.

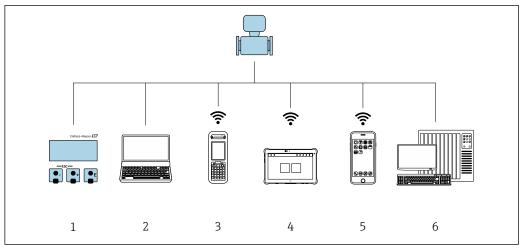
7.9 Post-connection check

Are the device and cable undamaged (visual inspection)?	
Is the protective earthing established correctly?	

Do the cables used meet the requirements ?	
Are the mounted cables strain-relieved and fixed securely in place?	
Are all cable glands installed, securely tightened and leak-tight? Cable run with "water trap" → 🖺 65?	
Is the terminal assignment correct ?	
Are dummy plugs inserted in unused cable entries and have transportation plugs been replaced with dummy plugs?	

8 Operation options

8.1 Overview of operation options

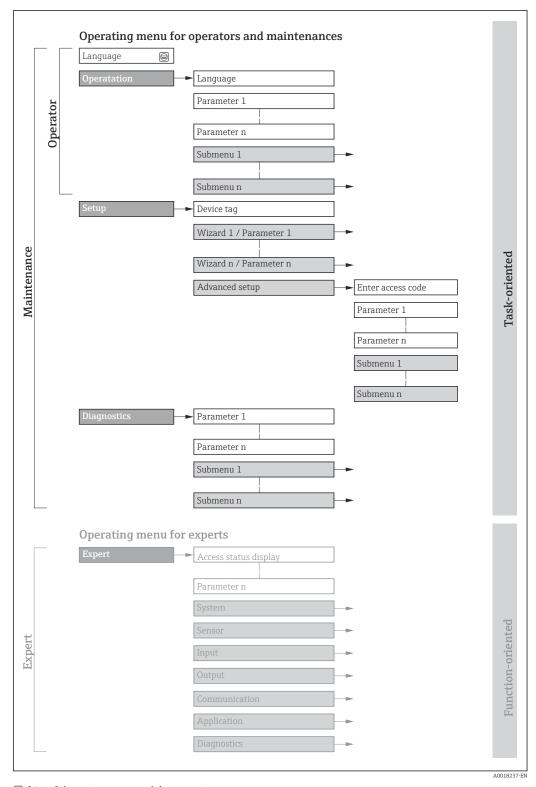


A0026E12

- 1 Local operation via display module
- 2 Computer with web browser or operating tool (e.g. FieldCare, DeviceCare, AMS Device Manager, SIMATIC PDM)
- 3 Field Xpert SFX350 or SFX370
- 4 Field Xpert SMT70
- 5 Mobile handheld terminal
- 6 Automation system (e.g. PLC)

8.2 Structure and function of the operating menu

8.2.1 Structure of the operating menu



 \blacksquare 24 Schematic structure of the operating menu

8.2.2 Operating philosophy

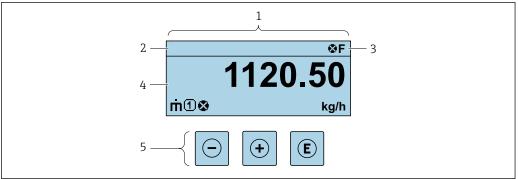
The individual parts of the operating menu are assigned to certain user roles (e.g. operator, maintenance etc.). Each user role contains typical tasks within the device life cycle.

Menu/pa	arameter	User role and tasks	Content/meaning
Language	Task-	Role "Operator", "Maintenance"	Defining the operating language
Operation	oriented	Tasks during operation: Configuring the operational display Reading measured values	 Defining the operating language Defining the web server operating language Resetting and controlling totalizers Configuring the operational display (e.g. display format, display contrast) Resetting and controlling totalizers
Setup		"Maintenance" role Commissioning:	Wizard for quick commissioning: Configuring the system units Configuring the communication interface Defining the medium Displaying the I/O configuration Configuring the inputs Configuring the outputs Configuring the operational display Configuring the low flow cut off Configuring the detection of partially filled and empty pipes
			Advanced setup For more customized configuration of the measurement (adaptation to special measuring conditions) Calculated process variables Sensor adjustment Configuring totalizers Configuring the display Configuring the WLAN settings Data backup Administration (define access code, reset measuring instrument)
Diagnostics		"Maintenance" role Troubleshooting: Diagnostics and elimination of process and device errors Measured value simulation	Contains all parameters for error detection and analyzing process and device errors: Diagnostic list Contains up to 5 currently pending diagnostic messages. Event logbook Contains event messages that have occurred. Device information Contains information for identifying the device. Measured values Contains all current measured values. Data logging submenu with the "Extended HistoROM" order option Storage and visualization of measured values Heartbeat Technology The functionality of the device is checked on demand and the verification results are documented. Simulation Used to simulate measured values or output values. Testpoints

Menu/p	arameter	User role and tasks	Content/meaning
Expert	Function- oriented	Tasks that require detailed knowledge of the function of the device: Commissioning measurements under difficult conditions Optimal adaptation of the measurement to difficult conditions Detailed configuration of the communication interface Error diagnostics in difficult cases	Contains all the parameters of the device and makes it possible to access these parameters directly using an access code. The structure of this menu is based on the function blocks of the device: System Contains all higher-level device parameters that do not affect measurement or measured value communication. Sensor Configuring the measurement. Input Configuring the status input. Output Configuring the analog current outputs as well as the pulse/frequency and switch output. Communication Configuring the digital communication interface and the web server. Application Configuring the functions that go beyond the actual measurement (e.g. totalizer). Diagnostics Error detection and analysis of process and device errors and for device simulation and the Heartbeat Technology menu.

8.3 Access to operating menu via local display

8.3.1 Operational display



A002934

- 1 Operational display
- 2 Tag name
- 3 Status area
- 4 Display area for measured values (up to 4 lines)
- 5 Operating elements $\rightarrow \Box 77$

Status area

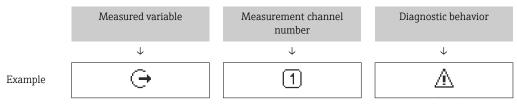
The following symbols appear in the status area of the operational display at the top right:

- Status signals → 🗎 186
 - **F**: Failure
 - **C**: Function check
 - **S**: Out of specification
 - M: Maintenance required
- Diagnostic behavior → 🖺 187
 - Alarm
 - <u></u> <u> </u> : Warning
- 🛱: Locking (the device is locked via the hardware)
- ←: Communication (communication via remote operation is active)

70

Display area

In the display area, each measured value is prefaced by certain symbol types for further description:



Appears only if a diagnostics event is present for this measured variable.

Measured variables

Symbol	Meaning
ṁ	Mass flow
Ü	Volume flowCorrected volume flow
ρ	DensityReference density
4	Temperature

The number and display format of the measured variables can be configured via the **Format display** parameter ($\Rightarrow \triangleq 138$).

Totalizer

Symbol	Meaning
Σ	Totalizer The measurement channel number indicates which of the three totalizers is displayed.

Output

Symbol	Meaning
(-)	Output The measurement channel number indicates which of the outputs is displayed.

Input

Symbol	Meaning
€	Status input

Measurement channel numbers

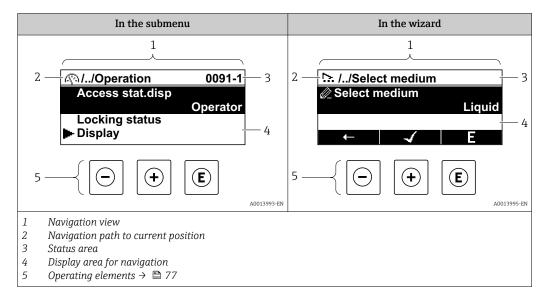
Symbol	Meaning
14	Measurement channel 1 to 4 The measurement channel number is displayed only if more than one channel is present for the same measured variable type (e.g. Totalizer 1 to 3).

Diagnostic behavior

Symbol	Symbol Meaning	
8	 Alarm Measurement is interrupted. Signal outputs and totalizers assume the defined alarm condition. A diagnostic message is generated. 	
Δ	 Warning Measurement is resumed. The signal outputs and totalizers are not affected. A diagnostic message is generated. 	

The diagnostic behavior pertains to a diagnostic event that is relevant to the displayed measured variable.

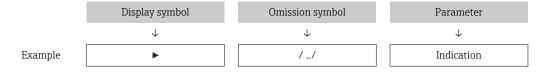
8.3.2 Navigation view

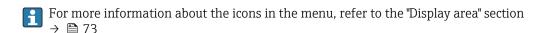


Navigation path

The navigation path to the current position is displayed at the top left in the navigation view and consists of the following elements:

- The display symbol for the menu/submenu (►) or the wizard (►).
- An omission symbol (/ ../) for operating menu levels in between.
- Name of the current submenu, wizard or parameter





Status area

The following appears in the status area of the navigation view in the top right corner:

- In the submenu
 - The direct access code to the parameter (e.g., 0022-1)
 - If a diagnostic event is present, the diagnostic behavior and status signal
- In the wizard

If a diagnostic event is present, the diagnostic behavior and status signal



- For information on the diagnostic behavior and status signal $\rightarrow \triangleq 186$

Display area

Menus

Symbol	Meaning
P	Operation Is displayed: In the menu next to the "Operation" selection At the left in the navigation path in the Operation menu

۶	Setup Is displayed: ■ In the menu next to the "Setup" selection ■ At the left in the navigation path in the Setup menu
્ય	Diagnosis Is displayed: ■ In the menu next to the "Diagnostics" selection ■ At the left in the navigation path in the Diagnostics menu
÷c	Expert Is displayed: In the menu next to the "Expert" selection At the left in the navigation path in the Expert menu

Submenus, wizards, parameters

Symbol	Meaning
•	Submenu
75.	Wizards
Ø.	Parameters within a wizard No display symbol exists for parameters in submenus.

Locking procedure

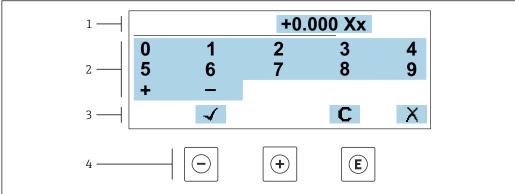
Symbol	Meaning
â	Parameter locked When displayed in front of a parameter name, indicates that the parameter is locked. By a user-specific access code By the hardware write protection switch

Wizards

Symbol	Meaning
←	Switches to the previous parameter.
√	Confirms the parameter value and switches to the next parameter.
E	Opens the editing view of the parameter.

8.3.3 **Editing view**

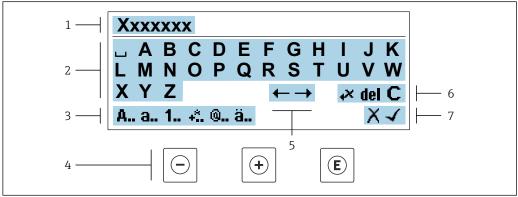
Numeric editor



■ 25 For entering values in parameters (e.g. limit values)

- 1 Entry display area
- 2 Input screen
- 3 Confirm, delete or reject entry
- Operating elements

Text editor



 \blacksquare 26 For entering text in parameters (e.g. device tag)

- Entry display area
- 2 Current input screen
- Change input screen
- Operating elements
- 5 Move entry position
- Delete entry
- Reject or confirm entry

Using the operating elements in the editing view

Operating key	Meaning
	Minus key Move the entry position to the left.
+	Plus key Move the entry position to the right.

Operating key	Meaning
E	 Enter key Pressing the key briefly confirms your selection. Pressing the key for 2 s confirms your entry.
-++	Escape key combination (press keys simultaneously) Close the editing view without accepting a change.

Input screens

Symbol	Meaning
Α	Upper case
a	Lower case
1	Numbers
+*	Punctuation marks and special characters: = + - * / 2 3 4 4 4 2 3 4 () [] < > { }
@	Punctuation marks and special characters: ' " `^. , ; : ? ! % μ ° € \$ £ ¥ § @ # / \ I ~ & _
ä	Umlauts and accents

Controlling data entries

Symbol	Meaning	
←→	Move entry position	
X	Reject entry	
4	Confirm entry	
•×	Delete character immediately to the left of the entry position	
del	Delete character immediately to the right of the entry position	
С	Clear all the characters entered	

76

8.3.4 Operating elements

Operating key	Meaning		
	Minus key In menu, submenu Moves the selection bar upwards in a picklist In wizards Goes to previous parameter In the text and numeric editor Move the entry position to the left.		
(+)	Plus key In menu, submenu Moves the selection bar downwards in a picklist In wizards Goes to the next parameter In the text and numeric editor Move the entry position to the right.		
E	Enter key In the operational display Pressing the key briefly opens the operating menu. In menu, submenu Pressing the key briefly: Opens the selected menu, submenu or parameter. Starts the wizard. If help text is open, closes the help text of the parameter. Pressing the key for 2 s in a parameter: If present, opens the help text for the function of the parameter. In wizards Opens the editing view of the parameter and confirms the parameter value In the text and numeric editor Pressing the key briefly confirms your selection. Pressing the key for 2 s confirms your entry.		
(a) + (+)	Escape key combination (press keys simultaneously) In menu, submenu Pressing the key briefly: Exits the current menu level and takes you to the next higher level. If help text is open, closes the help text of the parameter. Pressing the key for 2 s returns you to the operational display ("home position"). In wizards Exits the wizard and takes you to the next higher level In the text and numeric editor Exits the Editing view without applying the changes.		
-+E	 Minus/Enter key combination (press and hold down the keys simultaneously) If keypad lock is active: Pressing the key for 3 s deactivates the keypad lock. If keypad lock is not active: Pressing the key for 3 s opens the context menu including the option for activating the keypad lock. 		

8.3.5 Opening the context menu

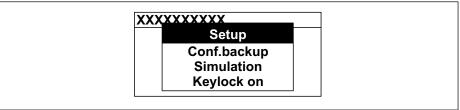
Using the context menu, the user can call up the following menus quickly and directly from the operational display: $\frac{1}{2} \left(\frac{1}{2} \right) = \frac{1}{2} \left(\frac{1}{2} \right) \left(\frac{$

- Setup
- Data backup
- Simulation

Calling up and closing the context menu

The user is in the operational display.

- 1. Press the \Box and \Box keys for longer than 3 seconds.
 - ► The context menu opens.



A0034608-EN

- 2. Press \Box + \pm simultaneously.
 - The context menu is closed and the operational display appears.

Calling up the menu via the context menu

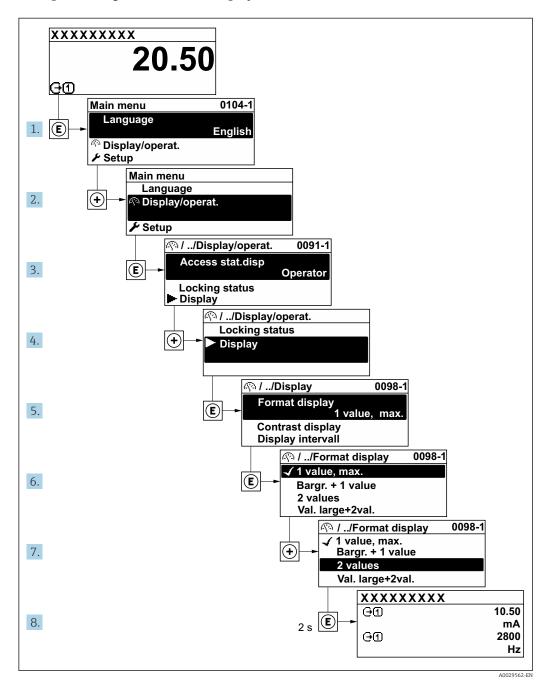
- 1. Open the context menu.
- 2. Press 🛨 to navigate to the desired menu.
- 3. Press **E** to confirm the selection.
 - ► The selected menu opens.

8.3.6 Navigating and selecting from list

Different operating elements are used to navigate through the operating menu. The navigation path is displayed on the left in the header. Icons are displayed in front of the individual menus. These icons are also shown in the header during navigation.

For an explanation of the navigation view with symbols and operating elements $\Rightarrow \implies 73$

Example: Setting the number of displayed measured values to "2 values"



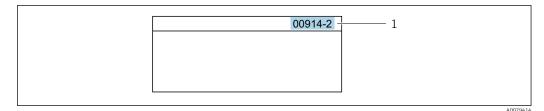
8.3.7 Calling the parameter directly

A parameter number is assigned to every parameter to be able to access a parameter directly via the onsite display. Entering this access code in the **Direct access** parameter calls up the desired parameter directly.

Navigation path

Expert → Direct access

The direct access code consists of a 5-digit number (at maximum) and the channel number, which identifies the channel of a process variable: e.g. 00914-2. In the navigation view, this appears on the right-hand side in the header of the selected parameter.



1 Direct access code

Note the following when entering the direct access code:

- The leading zeros in the direct access code do not have to be entered. Example: Enter "914" instead of "00914"
- If no channel number is entered, channel 1 is opened automatically. Example: Enter 00914 → Assign process variable parameter
- If a different channel is opened: Enter the direct access code with the corresponding channel number.

Example: Enter **00914-2** → **Assign process variable** parameter

For the direct access codes of the individual parameters, see the "Description of Device Parameters" document for the device

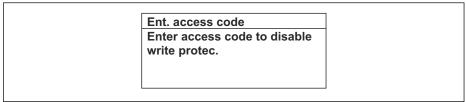
8.3.8 Calling up help text

Help text is available for some parameters and can be called up from the navigation view. The help text provides a brief explanation of the parameter function and thereby supports swift and safe commissioning.

Calling up and closing the help text

The user is in the navigation view and the selection bar is on a parameter.

- 1. Press E for 2 s.
 - ► The help text for the selected parameter opens.



A0014002-EN

- 27 Example: Help text for parameter "Enter access code"
- 2. Press \Box + \pm simultaneously.
 - ► The help text is closed.

8.3.9 Changing the parameters

Parameters can be changed via the numeric editor or text editor.

- Numeric editor: Change values in a parameter, e.g. specifications for limit values.
- Text editor: Enter text in a parameter, e.g. tag name.

A message is displayed if the value entered is outside the permitted value range.

Ent. access code
Invalid or out of range input
value
Min:0
Max:9999

A0014049-EN

For a description of the editing view - consisting of the text editor and numeric editor - with symbols $\rightarrow \stackrel{\triangle}{=} 75$, for a description of the operating elements $\rightarrow \stackrel{\triangle}{=} 77$

8.3.10 User roles and related access authorization

The two user roles "Operator" and "Maintenance" have different write access to the parameters if the customer defines a user-specific access code. This protects the device configuration via the local display from unauthorized access $\rightarrow \blacksquare 163$.

Defining access authorization for user roles

An access code is not yet defined when the device is delivered from the factory. Access authorization (read and write access) to the device is not restricted and corresponds to the "Maintenance" user role.

- ▶ Define the access code.
 - The "Operator" user role is redefined in addition to the "Maintenance" user role. Access authorization differs for the two user roles.

Access authorization to parameters: "Maintenance" user role

Access code status	Read access	Write access
An access code has not yet been defined (factory setting).	V	V
After an access code has been defined.	V	✓ 1)

1) The user only has write access after entering the access code.

Access authorization to parameters: "Operator" user role

Access code status	Read access	Write access
After an access code has been defined.	V	_ 1)

- The user role with which the user is currently logged on is indicated by the **Access** status parameter. Navigation path: Operation → Access status

8.3.11 Disabling write protection via access code

Parameter write protection via local operation can be disabled by entering the user-specific access code in the **Enter access code** parameter ($\rightarrow \implies 144$) via the respective access option.

1. After you press ©, the input prompt for the access code appears.

- 2. Enter the access code.
 - The \(\bar{\mathbb{O}}\) -symbol in front of the parameters disappears; all previously write-protected parameters are now re-enabled.

8.3.12 Enabling and disabling the keypad lock

The keypad lock makes it possible to block access to the entire operating menu via local operation. As a result, it is no longer possible to navigate through the operating menu or change the values of individual parameters. Users can only read the measured values on the operational display.

The keypad lock is switched on and off via the context menu.

Switching on the keypad lock

- The keypad lock is switched on automatically:
 - If the device has not been operated via the display for > 1 minute.
 - Each time the device is restarted.

To activate the keylock manually:

- 1. The device is in the measured value display.

 Press the □ and □ keys for 3 seconds.
 - ► A context menu appears.
- 2. In the context menu select the **Keylock on** option.
 - ► The keypad lock is switched on.
- If the user attempts to access the operating menu while the keypad lock is active, the **Keylock on** message appears.

Switching off the keypad lock

- ► The keypad lock is switched on. Press the □ and © keys for 3 seconds.
 - ► The keypad lock is switched off.

8.4 Access to operating menu via web browser

8.4.1 Function range

The integrated web server can be used to operate and configure the device via a web browser via service interface (CDI-RJ45) or via WLAN interface. The structure of the operating menu is the same as for the local display. In addition to the measured values, status information on the device is displayed and can be used to monitor device health. Furthermore the device data can be managed and the network parameters can be configured.

A device that has a WLAN interface (can be ordered as an option) is required for the WLAN connection: order code for "Display; Operation", option G "4-line, illuminated; touch control + WLAN". The device acts as an Access Point and enables communication by computer or a mobile handheld terminal.

For additional information on the web server, see the Special Documentation for the device. $\rightarrow \stackrel{\triangle}{=} 250$

8.4.2 Requirements

Computer hardware

Hardware	Interface	
	RJ45	WLAN
Interface	The computer must have a RJ45 interface. 1)	The operating unit must have a WLAN interface.
Connection	Standard Ethernet cable	Connection via wireless local area network.
Screen	Recommended size: ≥12" (depends on the screen resolution)	

¹⁾ Recommended cable: CAT5e, CAT6 or CAT7, with shielded plug (e.g. YAMAICHI product; part no. Y-ConProfixPlug63/Prod. ID: 82-006660)

Computer software

Software	Interface	
	RJ45	WLAN
Recommended operating systems	 Microsoft Windows 8 or higher. Mobile operating systems: iOS Android Microsoft Windows XP and Windows 7 is supported. 	
Web browsers supported	 Microsoft Edge Mozilla Firefox Google Chrome Safari 	

Computer settings

Settings	Interface		
	RJ45	WLAN	
User rights	Appropriate user rights (e.g. administrator rights) for TCP/IP and proxy server settings are necessary (e.g. for adjusting the IP address, subnet mask etc.).		
Proxy server settings of the web browser	The web browser's <i>Use a Proxy Server for Your La</i> deselected .	AN setting must be	
JavaScript	JavaScript must be enabled.	JavaScript must be enabled.	
	If JavaScript cannot be enabled: Enter http://192.168.1.212/servlet/ basic.html in the address bar of the web browser. A fully functional but simplified version of the operating menu structure starts in the web browser.	The WLAN display requires JavaScript support.	
	When installing a new firmware version: To enable correct data display, clear the temporary memory (cache) under Internet options in the web browser.		
Network connections	Use only the active network connections for the measuring instrument.		
Switch off all other network connections such as WLAN for example.		Switch off all other network connections.	

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	
	For information on enabling the Web server → 🖺 89	
IP address	If the IP address of the device is not known: ■ The IP address can be read out via local operation: Diagnostics → Device information → IP address ■ Communication with the Web server can be established via the default IP address 192.168.1.212. The DHCP function is enabled in the device at the factory, i.e. the device expects an IP address to be assigned by the network. This function can be disabled and the device can be set to the default IP address 192.168.1.212: set DIP switch No. 2 from OFF → ON. Set the default IP address → 64.	

Measuring device: via WLAN interface

Device	WLAN interface	
Measuring device	The measuring device has a WLAN antenna: Transmitter with integrated WLAN antenna Transmitter with external WLAN antenna	
Web server	Web server and WLAN must be enabled; factory setting: ON For information on enabling the Web server → ■ 89	
IP address	If the IP address of the device is not known: ■ The IP address can be read out via local operation: Diagnostics → Device information → IP address ■ Communication with the Web server can be established via the default IP address 192.168.1.212. The DHCP function is enabled in the device at the factory, i.e. the device expects an IP address to be assigned by the network. This function can be disabled and the device can be set to the default IP address 192.168.1.212: set DIP switch No. 2 from OFF → ON. Set the default IP address → 64.	

8.4.3 Connecting the device

Via service interface (CDI-RJ45)

Preparing the measuring device

Proline 500 – digital

- 1. Loosen the 4 fixing screws on the housing cover.
- 2. Open the housing cover.
- 3. The location of the connection socket depends on the measuring device and the communication protocol.

Connect the computer to the RJ45 plug via the standard Ethernet cable .

Proline 500

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.
- 3. Connect the computer to the RJ45 plug via the standard Ethernet connecting cable..

Configuring the Internet protocol of the computer

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

- Dynamic Host Configuration Protocol (DHCP), factory setting:
 The IP address is automatically assigned to the measuring device by the automation system (DHCP server).
- Hardware addressing:

The IP address is set via DIP switches .

- Software addressing:
 - The IP address is entered via the **IP address** parameter ($\rightarrow \equiv 118$).
- 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 device works with the Dynamic Host Configuration Protocol (DHCP) ex-works, i.e. the IP address of the measuring device is automatically assigned by the automation system (DHCP server).

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

- 1. Via DIP switch 2, activate the default IP address 192.168.1.212: .
- 2. Switch on the measuring device.
- 3. Connect the computer to the RJ45 plug via the standard Ethernet cable $\rightarrow \Box$ 92.
- 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 \rightarrow e.g. 192.168.1.213	
Subnet mask 255.255.255.0		
Default gateway	ault gateway 192.168.1.212 or leave cells empty	

Via WLAN interface

Configuring the Internet protocol of the mobile device

NOTICE

If the WLAN connection is lost during the configuration, settings made may be lost.

▶ Make sure that the WLAN connection is not disconnected while configuring the device.

NOTICE

Please note the following to avoid a network conflict:

- ► Avoid accessing the measuring instrument simultaneously from the same mobile device via the service interface (CDI-RJ45) and the WLAN interface.
- ▶ Only activate one service interface (CDI-RJ45 or WLAN interface).
- ▶ If simultaneous communication is necessary: configure different IP address ranges, e.g. 192.168.0.1 (WLAN interface) and 192.168.1.212 (CDI-RJ45 service interface).

Preparing the mobile terminal

► Enable WLAN on the mobile terminal.

Establishing a WLAN connection from the mobile terminal to the measuring device

- 1. In the WLAN settings of the mobile terminal: Select the measuring device using the SSID (e.g. EH_Promass_500_A802000).
- 2. If necessary, select the WPA2 encryption method.
- 3. Enter the password:
 - Serial number of the measuring device ex-works (e.g. L100A802000).
 - The LED on the display module flashes. It is now possible to operate the measuring device with the web browser, FieldCare or DeviceCare.
- The serial number can be found on the nameplate.
- To ensure the safe and swift assignment of the WLAN network to the measuring point, it is advisable to change the SSID name. It should be possible to clearly assign the new SSID name to the measuring point (e.g. tag name) because it is displayed as the WLAN network.

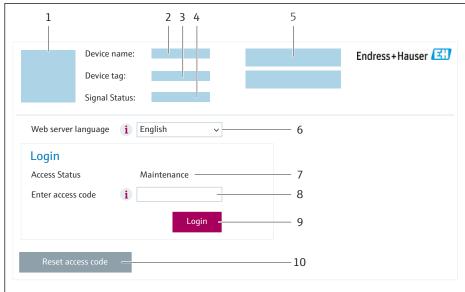
Terminating the WLAN connection

► After configuring the device: Terminate the WLAN connection between the mobile terminal and measuring device.

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.



A00E2670

- 1 Picture of device
- 2 Device name
- 3 Device tag
- 4 Status signal
- 5 Current measured values
- 6 Operating language
- 7 User role
- 8 Access code
- 9 Login
- 10 Reset access code ($\rightarrow \equiv 160$)
- If a login page does not appear, or if the page is incomplete $\rightarrow \stackrel{\triangle}{=} 181$

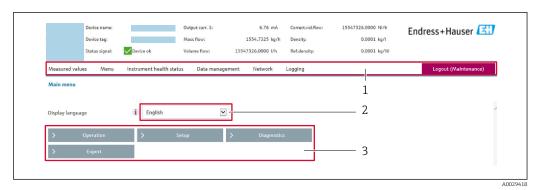
8.4.4 Logging on

- 1. Select the preferred operating language for the Web browser.
- 2. Enter the user-specific access code.
- 3. Press **OK** to confirm your entry.

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

If no action is performed for 10 minutes, the Web browser automatically returns to the login page.

8.4.5 User interface



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

Header

The following information appears in the header:

- Device name
- Device tag
- Device status with status signal \rightarrow 🖺 189
- Current measured values

Function row

Functions	Meaning
Measured values	Displays the measured values of the measuring instrument
Menu	 Access to the operating menu from the measuring instrument The structure of the operating menu is the same as for the local display Detailed information on the "Description of Device Parameters" operating menu
Device status	Displays the diagnostic messages currently pending, listed in order of priority
Data management	Data exchange between computer and measuring instrument: Device configuration: Load settings from the device (XML format, save configuration) Save settings to the device (XML format, restore configuration) Logbook - Export Event logbook (.csv file) Documents - Export documents: Export backup data record (.csv file, create documentation of the measuring point configuration) Verification report (PDF file, only available with the "Heartbeat Verification" application package) File for system integration - If using fieldbuses, upload device drivers for system integration from the measuring instrument: EtherNet/IP: EDS file Firmware update - Flashing a firmware version
Network	Configuration and checking of all the parameters required for establishing the connection to the measuring instrument: Network settings (e.g. IP address, MAC address) Device information (e.g. serial number, firmware version)
Logout	End the operation and call up the login page

Navigation area

The menus, the associated submenus and parameters can be selected in the navigation area.

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

8.4.6 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 \rightarrow Communication \rightarrow Web server

Parameter overview with brief description

Parameter	Description	Selection
Web server functionality	Switch the Web server on and off.	OffHTML OffOn

Function scope of the "Web server functionality" parameter

Option	Description	
Off	The Web server is completely disabled.Port 80 is locked.	
HTML Off	The HTML version of the Web server is not available.	
On	 The complete Web server functionality is available. JavaScript is used. The password is transferred in an encrypted state. Any change to the password is also transferred in an encrypted state. 	

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

8.4.7 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 the modified properties of the Internet protocol (TCP/IP) →

 85.
- 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 $ON \rightarrow OFF$). Afterwards, the IP address of the device is active again for network communication.

8.5 Operation via SmartBlue app

The device can be operated and configured with the SmartBlue App.

- The SmartBlue app must be downloaded onto a mobile device for this purpose
- For information on the compatibility of the SmartBlue app with mobile devices, see
 Apple App Store (iOS devices) or Google Play Store (Android devices)
- Incorrect operation by unauthorized persons is prevented by means of encrypted communication and password encryption.
- The Bluetooth® function can be deactivated after initial device setup.



A00332

■ 28 QR code for free Endress+Hauser SmartBlue App

Download and installation:

- 1. Scan the QR code or enter **SmartBlue** in the search field of the Apple App Store (iOS) or Google Play Store (Android).
- 2. Install and start the SmartBlue app.
- 3. For Android devices: enable location tracking (GPS) (not required for iOS devices).
- 4. Select a device that is ready to receive from the device list displayed.

Login:

- 1. Enter the user name: admin
- 2. Enter the initial password: serial number of the device
- 3. Change the password after logging in for the first time

Information on password and reset code

For devices that meet the requirements of IEC 62443-4-1 "Secure product developement lifecycle management" ("ProtectBlue"):

- If the user-defined password is lost: refer to the user management instructions and the reset button in the operating manual.
- Refer to the associated Security Manual (SD).

For all other devices (without "ProtectBlue"):

- If the user-defined password is lost, access can be restored via a reset code. The reset code is the serial number of the device in reverse. The original password is once again valid after the reset code has been entered.
- The reset code can also be changed in addition to the password.
- If the user-defined reset code is lost, the password can no longer be reset via the SmartBlue app. Contact Endress+Hauser Service in this case.

8.6 Access to the operating menu via the operating tool

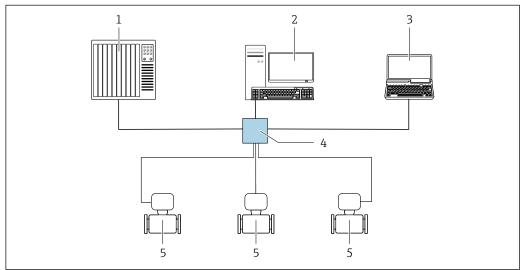
The structure of the operating menu in the operating tools is the same as for operation via the local display.

8.6.1 Connecting the operating tool

Via EtherNet/IP network

This communication interface is available in device versions with EtherNet/IP.

Star topology



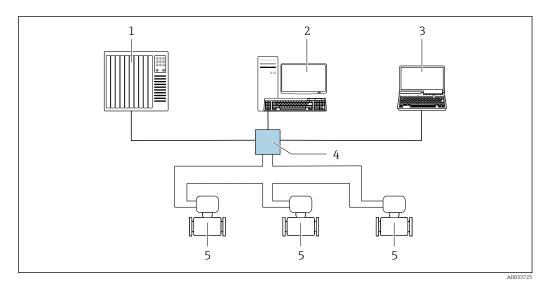
A003207

■ 29 Options for remote operation via Ethernet/IP network: star topology

- 1 Automation system, z. B. "RSLogix" (Rockwell Automation)
- 2 Workstation for measuring instrument operation: with Custom Add-On Profile for "RSLogix 5000" (Rockwell Automation) or with Electronic Data Sheet (EDS)
- 3 Computer with web browser for accessing the integrated web server or computer with operating tool (e.g. FieldCare, DeviceCare) with COM DTM "CDI Communication TCP/IP"
- 4 Standard Ethernet switch, e.g. Scalance X204 (Siemens)
- 5 Measuring instrument

Ring topology

The device is integrated via the terminal connection for signal transmission (output 1) and the service interface (CDI-RJ45).



■ 30 Options for remote operation via EtherNet/IP network: ring topology

- 1 Automation system, z. B. "RSLogix" (Rockwell Automation)
- 2 Workstation for measuring instrument operation: with Custom Add-On Profile for RSLogix 5000 (Rockwell Automation) or with Electronic Data Sheet (EDS)
- 3 Computer with web browser for accessing the integrated web server or computer with operating tool (e.g. FieldCare, DeviceCare) with COM DTM "CDI Communication TCP/IP"
- 4 Standard Ethernet switch, e.g. Scalance X204 (Siemens)
- 5 Measuring instrument

Service interface

Via service interface (CDI-RJ45)

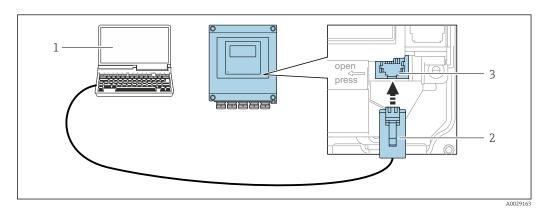
To configure the device on site, a point-to-point connection can be established. Alternatively, a connection via Modbus TCP can be used. The connection is made with the housing open, directly via the device's service interface (CDI-RJ45).

An adapter for the RJ45 to the M12 connector is optionally available for the non-hazardous area:

Order code for "Accessories", option NB: "Adapter RJ45 M12 (service interface)"

The adapter connects the service interface (CDI-RJ45) to an M12 connector mounted in the cable entry. The connection to the service interface can be established via an M12 connector without opening the device.

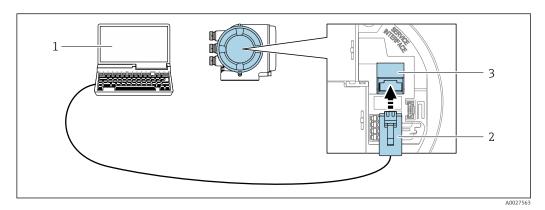
Proline 500 – digital transmitter



■ 31 Connection via service interface (CDI-RJ45)

- 1 Computer with web browser for accessing the integrated web server or computer with operating tool, e.g. "FieldCare", "DeviceCare" with COM DTM "CDI Communication TCP/IP"
- 2 Standard Ethernet connecting cable with RJ45 connector
- 3 Service interface (CDI-RJ45) of the measuring instrument with access to the integrated web server

Proline 500 transmitter



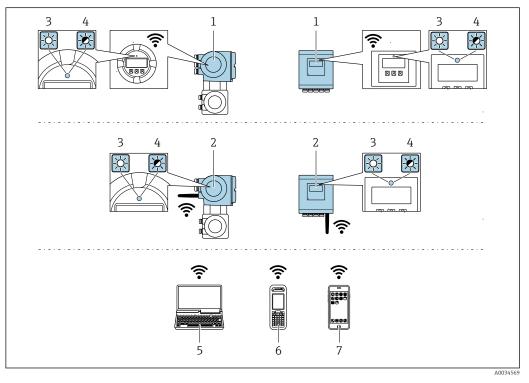
■ 32 Connection via service interface (CDI-RJ45)

- Computer with web browser for accessing integrated web server or with operating tool e.g, "FieldCare", "DeviceCare", with COM DTM "CDI Communication TCP/IP" or Modbus DTM
- 2 Standard Ethernet connecting cable with RJ45 connector
- 3 Service interface (CDI-RJ45) of the measuring instrument with access to the integrated web server

Via WLAN interface

The optional WLAN interface is available on the following device version:

Order code for "Display; operation", option G "4-line, illuminated; touch control + WLAN"



- 1 Transmitter with integrated WLAN antenna
- 2 Transmitter with external WLAN antenna
- 3 LED lit constantly: WLAN reception is enabled on measuring instrument
- 4 LED flashing: WLAN connection established between operating unit and measuring instrument
- 5 Computer with WLAN interface and web browser for accessing integrated device web server or with operating tool e.g FieldCare, DeviceCare)
- 6 Mobile handheld terminal with WLAN interface and web browser for accessing integrated device web server or operating tool (e.g. FieldCare, DeviceCare)
- 7 Smartphone or tablet (e.g. Field Xpert SMT70)

Function	WLAN: IEEE 802.11 b/g (2.4 GHz) • Access point with DHCP server (factory setting) • Network
Encryption	WPA2-PSK AES-128 (in accordance with IEEE 802.11i)
Configurable WLAN channels	1 to 11
Degree of protection	IP66/67
Available antennas	 Internal antenna External antenna (optional) In the event of poor transmission/reception conditions at the place of installation. Only 1 antenna is active at any one time!
Range	 Internal antenna: typically 10 m (32 ft) External antenna: typically 50 m (164 ft)
Materials (external antenna)	 Antenna: ASA plastic (acrylonitrile styrene acrylate) and nickel-plated brass Adapter: Stainless steel and nickel-plated brass Cable: Polyethylene Plug: Nickel-plated brass Angle bracket: Stainless steel

Configuring the Internet protocol of the mobile device

NOTICE

If the WLAN connection is lost during the configuration, settings made may be lost.

▶ Make sure that the WLAN connection is not disconnected while configuring the device.

NOTICE

Please note the following to avoid a network conflict:

- ► Avoid accessing the measuring instrument simultaneously from the same mobile device via the service interface (CDI-RJ45) and the WLAN interface.
- ▶ Only activate one service interface (CDI-RJ45 or WLAN interface).
- ▶ If simultaneous communication is necessary: configure different IP address ranges, e.g. 192.168.0.1 (WLAN interface) and 192.168.1.212 (CDI-RJ45 service interface).

Preparing the mobile terminal

► Enable WLAN on the mobile terminal.

Establishing a WLAN connection from the mobile terminal to the measuring device

- 1. In the WLAN settings of the mobile terminal: Select the measuring device using the SSID (e.g. EH_Promass_500_A802000).
- 2. If necessary, select the WPA2 encryption method.
- 3. Enter the password:

Serial number of the measuring device ex-works (e.g. L100A802000).

- The LED on the display module flashes. It is now possible to operate the measuring device with the web browser, FieldCare or DeviceCare.
- The serial number can be found on the nameplate.
- To ensure the safe and swift assignment of the WLAN network to the measuring point, it is advisable to change the SSID name. It should be possible to clearly assign the new SSID name to the measuring point (e.g. tag name) because it is displayed as the WLAN network.

Terminating the WLAN connection

► After configuring the device: Terminate the WLAN connection between the mobile terminal and measuring device.

8.6.2 FieldCare

Function range

FDT-based (Field Device Technology) plant asset management tool from Endress+Hauser. It can configure all smart field units in a system and helps you manage them. By using the status information, it is also a simple but effective way of checking their status and condition.

Access is via:

- CDI-RJ45 service interface → 🗎 92
- WLAN interface → 🗎 93

Typical functions:

- Transmitter parameter configuration
- Loading and saving of device data (upload/download)
- Documentation of the measuring point
- Visualization of the measured value memory (line recorder) and event logbook



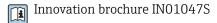
- Operating Instructions BA00027S
- Operating Instructions BA00059S
- Source for device description files $\rightarrow \triangleq 96$

8.6.3 DeviceCare

Function range

Tool for connecting and configuring Endress+Hauser field devices.

The fastest way to configure Endress+Hauser field devices is with the dedicated "DeviceCare" tool. Together with the device type managers (DTMs) it presents a convenient, comprehensive solution.



Source for device description files $\rightarrow \stackrel{\triangle}{=} 96$

9 System integration

9.1 Overview of device description files

9.1.1 Current version data for the device

Firmware version	01.00.zz	 On the title page of the manual On the transmitter nameplate Firmware version Diagnostics → Device information → Firmware version
Release date of firmware version	10.2017	
Manufacturer ID	0x11	Manufacturer ID Diagnostics → Device information → Manufacturer ID
Device type code	0x103B	Device type Diagnostics → Device information → Device type
Device revision	Major revision 1Minor revision 1	 On the transmitter nameplate Device revision Diagnostics → Device information → Device revision
Device profile	Generic device (product type: 0x2B)	

For an overview of the various firmware versions for the device $\rightarrow \, \stackrel{\triangle}{=} \, 210$

9.1.2 Operating tools

The suitable device description file for the individual operating tools is listed in the table below, along with information on where the file can be acquired.

Operating tool via Service interface (CDI-RJ45)	Sources for obtaining device descriptions	
FieldCare	 www.endress.com → Downloads area USB stick (contact Endress+Hauser) E-mail → Downloads area 	
DeviceCare	 www.endress.com → Downloads area E-mail → Downloads area 	

9.2 Overview of system files

System files	Version	Description	How to acquire
Electronic Data Sheet (EDS system file)	2.1	Certified in accordance with the following ODVA guidelines: Conformance test Performance test PlugFest Embedded EDS Support (File Object 0x37)	 www.endress.com → Download Area EDS system file integrated in the device: can be downloaded via the web browser
Add-on Profile	Major revision 1Minor revision 1	System file for "Studio 5000" software (Rockwell Automation)	www.endress.com → Download Area

Integrating the device in the system 9.3



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

A detailed description of the integration of the device into an automation system (e.g. a Rockwell Automation system) is available in a separate document: www.endress.com \rightarrow Select country \rightarrow Solutions \rightarrow Fieldbus planning → Fieldbus technologies → EtherNet/IP

9.4 Cyclic data transmission

Cyclic data transmission when using the device master file (GSD).

9.4.1 Block model

The block model shows which input and output data the measuring device makes available for implicit messaging. Cyclical data exchange is performed using an EtherNet/IP scanner, e.g. a distributed control system etc.

	Measur	ing device			Control systen
	Input Assembly Fix (Assem100) 44 byte	→ 🖺 99	Permanently assigned input group	→	
	Mass flow fixed input assembly (Assem106) 32 byte	→ 🖺 100	Permanently assigned input group	÷	
	Volume flow fixed input assembly (Assem107) 62 byte	→ 🖺 100	Permanently assigned input group	→	
	Viscosity fixed input assembly ¹⁾ (Assem108) 52 byte	→ 🖺 100	Permanently assigned input group	→	
	Concentration fixed input assembly ²⁾ (Assem109) 66 byte	→ 🖺 101	Permanently assigned input group	÷	
Transducer Block	API Referenced corrections fixed input assembly ³⁾ (Assem110) 64 byte	→ 🖺 101	Permanently assigned input group	→	EtherNet/IP
	Water cut % fixed input assembly ³⁾ (Assem111) 80 byte	→ 🖺 101	Permanently assigned input group	→	
	Heartbeat monitoring fixed input assembly ⁴⁾ (Assem113) 96 byte	→ 🖺 102	Permanently assigned input group	→	
	Input assembly custom (Assem101) 88 byte	→ 🖺 102	Configurable input group	→	
	Output assembly fix (Assem102) 54 byte	→ 🖺 103	Permanently assigned output group	+	
	Config assembly (Assem104) 2709 byte	→ 🖺 105	Permanently assigned configuration	→	

- 1) Only available with the Viscosity application package.
- 2) Only available with the Concentration application package.
- Only available with the Petroleum application package.
- Only available with the Heartbeat Verification application package.

9.4.2 Input and output groups

Possible configurations

$Configuration\ 1: Exclusive\ Owner\ Multicast$

Input Assembly Fix		Instance	Size [byte]	Min. RPI (ms)
Input Assembly Configurable	Configuration	0 x 64	398	-
Output Assembly Fix	O → T Configuration	0 x 66	64	5
Input Assembly Fix	$T \rightarrow O$ Configuration	0 x 64	44	5

Configuration 2: Input Only Multicast

Input Assembly Fix	Instance	Size [byte]	Min. RPI (ms)	
Input Assembly Configurable	Configuration	0 x 68	398	_
Output Assembly Fix	O → T Configuration	0 x C7	-	_
Input Assembly Fix	T → O Configuration	0 x 64	44	5

Configuration 3: Exclusive Owner Multicast

Input Assembly Configurable		Instance	Size [byte]	Min. RPI (ms)
Input Assembly Configurable	Configuration	0 x 68	398	_
Output Assembly Fix	O → T Configuration	0 x 66	64	5
Input Assembly Fix	$T \rightarrow O$ Configuration	0 x 65	88	5

Configuration 4: Input Only Multicast

Input Assembly Configurable		Instance	Size [byte]	Min. RPI (ms)
Input Assembly Configurable	Configuration	0 x 68	398	_
Output Assembly Fix	O → T Configuration	0 x C7	_	_
Input Assembly Fix	$T \rightarrow O$ Configuration	0 x 64	88	5

Configuration 5: Exclusive Owner Multicast

Input Assembly Fix	Instance	Size [byte]	Min. RPI (ms)	
Input Assembly Configurable	Configuration	0 x 69	-	_
Output Assembly Fix	O → T Configuration	0 x 66	64	5
Input Assembly Fix	$T \rightarrow O$ Configuration	0 x 64	44	5

Configuration 6: Input Only Multicast

Input Assembly Fix		Instance	Size [byte]	Min. RPI (ms)
Input Assembly Configurable	Configuration	0 x 69	-	_
Output Assembly Fix	O → T Configuration	0 x C7	-	_
Input Assembly Fix	$T \rightarrow O$ Configuration	0 x 65	44	5

Configuration 7: Exclusive Owner Multicast

Input Assembly Configurable		Instance	Size [byte]	Min. RPI (ms)
Input Assembly Configurable	Configuration	0 x 69	_	-
Output Assembly Fix	O → T Configuration	0 x 66	64	5
Input Assembly Fix	T → O Configuration	0 x 64	88	5

Configuration 8: Input Only Multicast

Input Assembly Configurable		Instance	Size [byte]	Min. RPI (ms)
Input Assembly Configurable	Configuration	0 x 69	_	-
Output Assembly Fix	O → T Configuration	0 x C7	_	-
Input Assembly Fix	$T \rightarrow O$ Configuration	0 x 65	88	5

Possible connections

No.	#1	#2	#3	#4	#5	#6	#7	#8	#9
Number of connections	1	1	1	1	1	1	1	1	1
Input assembly fixed (Assem100)	Х								
Mass flow fixed input assembly (Assem106)		Х							
Volume flow fixed input assembly (Assem107)			Х						
Input assembly custom (Assem101)				Х					
Viscosity fixed input assembly (Assem108)					Х				
Concentration fixed input assembly (Assem109)						Х			
API Referenced corrections fixed input assembly (Assem110)							Х		
Water cut % fixed input assembly (Assem111)								Х	
Heartbeat monitoring fixed input assembly (Assem112)									Х

Permanently assigned input group

Input assembly fixed (Assem100), 44 byte

Desc	ription	Byte
1.	File header (not visible)	1 to 4
2.	Current diagnosis ¹⁾	5 to 8
3.	Mass flow	9 to 12
4.	Volume flow	13 to 16
5.	Corrected volume flow	17 to 20
6.	Temperature	21 to 24
7.	Density	25 to 28
8.	Reference density	29 to 32
9.	Totalizer 1	33 to 36

Desc	ription	Byte
10.	Totalizer 2	37 to 40
11.	Totalizer 3	41 to 44

1) Diagnostic information via EtherNet/IP $\rightarrow \blacksquare$ 109

Mass flow fixed input assembly (Assem106), 32 byte

Description	Byte
1. File header (not visible)	1 to 4
2. Current diagnosis ¹⁾	5 to 8
3. Mass flow	9 to 12
4. Density	13 to 16
5. Temperature	17 to 20
6. Totalizer 1	21 to 24
7. Mass flow unit	25 to 26
8. Density unit	27 to 28
9. Temperature unit	29 to 30
10. Totalizer 1 unit	31 to 32

1) Diagnostic information via EtherNet/IP \rightarrow \blacksquare 109

Volume flow fixed input assembly (Assem107), 62 byte

Description	Byte
Mass flow fixed input assembly	1 to 32
2. Volume flow	33 to 36
3. Corrected volume flow	37 to 40
4. Reference density	41 to 44
5. Totalizer 2	45 to 48
6. Totalizer 3	49 to 52
7. Volume flow unit	53 to 54
8. Corrected volume flow unit	55 to 56
9. Reference density unit	57 to 58
10. Totalizer 2 unit	59 to 60
11. Totalizer 3 unit	61 to 62

Viscosity fixed input assembly (Assem108), 52 byte $^{1)}$

Description	Byte
Mass flow fixed input assembly	1 to 32
2. Dynamic viscosity	33 to 36
3. Kinematic viscosity	37 to 40
4. Temp. compensated dynamic viscosity	41 to 44
5. Temp. compensated kinematic viscosity	45 to 48

100

Description	Byte
6. Dynamic viscosity unit	49 to 50
7. Kinematic viscosity unit	51 to 52

1) Only available with the Viscosity application package.

Concentration fixed input assembly (Assem109), 66 byte 1)

Description	Byte
Mass flow fixed input assembly	1 to 32
2. Target mass flow	33 to 36
3. Carrier mass flow	37 to 40
4. Target volume flow	41 to 44
5. Carrier volume flow	45 to 48
6. Target corrected volume flow	49 to 52
7. Carrier corrected volume flow	53 to 56
8. Concentration	57 to 60
9. Volume flow unit	61 to 62
10. Corrected volume flow unit	63 to 64
11. Concentration unit	65 to 66

1) Only available with the Concentration application package.

API Referenced corrections fixed input assembly (Assem110), 60 byte $^{1)}$

Description	Byte
Mass flow fixed input assembly	1 to 32
2. Alternative reference density	33 to 36
3. GSV flow	37 to 40
4. Alternative GSV flow	41 to 44
5. NSV flow	45 to 48
6. Alternative NSV flow	49 to 52
7. S&W volume flow	53 to 56
8. Volume flow unit	57 to 58
9. Reference density unit	59 to 60

1) Only available with the Petroleum application package.

Water cut % fixed input assembly (Assem111), 76 byte 1)

Description	Byte
Mass flow fixed input assembly	1 to 32
2. Oil density	33 to 36
3. Water density	37 to 40
4. Water cut %	41 to 44
5. Oil mass flow	45 to 48
6. Water mass flow	49 to 52
7. Oil volume flow	53 to 56

Description	Byte
8. Water volume flow	57 to 60
9. Oil corrected volume flow	61 to 64
10. Water corrected volume flow	65 to 68
11. Volume flow unit	69 to 70
12. Corrected volume flow unit	71 to 72
13. Oil density unit	73 to 74
14. Water density unit	75 to 76

¹⁾ Only available with the Petroleum application package

Heartbeat monitoring fixed input assembly (Assem112), $100 \text{ byte}^{1)}$

Description		Byte
1.	Mass flow fixed input assembly	1 to 32
2.	Signal asymmetry	33 to 36
3.	Oscillation frequency 0	37 to 40
4.	Oscillation frequency 1	41 to 44
5.	Oscillation amplitude 0	45 to 48
6.	Oscillation amplitude 1	49 to 52
7.	Oscillation damping 0	53 to 56
8.	Oscillation damping 1	57 to 60
9.	Tube damping fluctuation 0	61 to 64
10.	Tube damping fluctuation 1	65 to 68
11.	Exciter current 0	69 to 72
12.	Exciter current 1	73 to 76
13.	HBSI	77 to 80
14.	Frequency fluctuation 0	81 to 84
15.	Frequency fluctuation 1	85 to 88
16.	Electronics temperature	89 to 92
17.	Carrier pipe temperature	93 to 96
18.	Verification status	97 to 98
19.	Verification results	99 to 100

 $^{{\}hbox{\it 1)}} \qquad \hbox{\it Only available with the Heartbeat Verification application package.}$

Configurable input group

Input assembly custom (Assem101), 88 byte

Description	Format
1 10. Input values 1 to 10	Real
11 20. Input values 11 to 20	Double integer

102

Possible input values

Possible input values 1 to 10:

- Off
- Mass flow
- Volume flow
- Corrected volume flow
- Target mass flow 1)
- Carrier mass flow ¹⁾
- Target volume flow 1)
- Carrier volume flow ¹⁾
- Target corrected volume flow ¹⁾ Carrier corrected volume flow ¹⁾
- Density
- Reference density
- Concentration ¹⁾
- Dynamic viscosity ²⁾
- Kinematic viscosity ²⁾

- Temperature-compensated dynamic viscosity 2)
- Temperature-compensated kinematic viscosity 2)
- Temperature
- Carrier tube temperature ³⁾
- Electronics temperature
- Oscillation frequency 0
- Oscillation frequency 1 3)
- Oscillation amplitude 0
- Oscillation amplitude 1 ³⁾
- Frequency fluctuation 0
- Frequency fluctuation 1³⁾
- Oscillation damping 0
- Oscillation damping 1
- Tube damping fluctuation 0
- Tube damping fluctuation 1
- Signal asymmetry

- Exciter current 0
- ullet Exciter current 1 $^{3)}$
- Monitoring of exciter current 0
- Monitoring of exciter current 1 3)
- HBSI 3)
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Alternative reference density ⁴⁾
- GSV flow ⁴⁾
- Alternative GSV flow ⁴⁾
- NSV flow ⁴⁾
- Alternative NSV flow ⁴⁾
- S&W volume flow ⁴
- 1) Only available with the Concentration application package.
- 2) Only available with the Viscosity application package
- Only available with the Heartbeat Verification application package.
- 4) Only available with the Petroleum application package.

Possible input values 11 to 20:

- Current diagnostics
- Previous diagnostics
- Mass flow unit
- Volume flow unit Corrected volume flow unit
- Temperature unit
- Density unit
- Reference density unit
- Concentration unit Current unit
- Totalizer 1 unit
- Totalizer 2 unit
- Totalizer 3 unit
- Verification results
- Verification status
- Status of zero adjustment

Permanently assigned output group

Output assembly fix (Assem102), 54 byte

Description (format)	Byte	Bit	Value
1. Totalizer 1	1	0	
2. Totalizer 2		1	
3. Totalizer 3		2	
4. Verification		3	• 0: Disable
5. Concentration of medium type		4	■ 1: Enable
6. Compensation, pressure		5	
7. Reference density compensation		6	
8. Compensation, temperature		7	
9. S&W correction value %	2	0	
10. Water cut %		1	
11. Flow override		2	
12. Zero adjustment		3	• 0: Disable
13. Not Used		4	■ 1: Enable
14. Not Used		5	
15. Not Used		6	
16. Not Used		7	

Descripti	ion (format)	Byte	Bit	Value
17. No	ot Used	3 to 4	16	-
18. Co	ntrol totalizer 1 (integer)	5 to 6	16	-32226 (0): Add
19. Co	ntrol totalizer 2 (integer)	7 to 8	16	-32490 (1): Reset and stop-32228 (2): Default value and stop
20. Co	ntrol totalizer 3 (integer)	9 to 10	16	 198 (3): Reset and add 199 (4): Default value and add 32608 (3): Stop
21. Sta	art verification (integer)	11 to 12	16	32823 (0): Cancel33158 (1): Start
22. Se	lect concentration of medium type	13 to 14	16	 3062 (0): Aqueous Fructose 3063 (0): Aqueous Glucose 3068 (0): Aqueous Hydrochloric Acid 3077 (0): Aqueous Hydrogen Peroxide 3065 (0): Aqueous Sucrose 3064 (0): Aqueous Invert Sugar 3069 (0): Aqueous Nitric Acid 3070 (0): Aqueous Phosphoric Acid 3075 (0): Aqueous Potassium Hydroxide 3071 (0): Aqueous Sodium Hydroxide 3060 (0): Ethanol Water 3066 (0): Ammonium Nitrate In Water 3067 (0): Ferric Chloride In Water 3073 (0): High Fructose Corn Syrup 42 3074 (0): High Fructose Corn Syrup 55 3072 (0): High Fructose Corn Syrup 90 3092 (0): Percent Volume / Percent Mass 3081 (0): Wort 3083 (0): Coef Set 1 3083 (0): Coef Set 2 3084 (0): Coef Set 3
23. No	ot Used	15 to 16	16	-
24. Ex	ternal pressure (real)	17 to 20	32	Data format: Byte 1 to 4: External pressure Floating-point number (IEEE754)
25. Ex	ternal pressure unit (integer)	21 to 22	16	■ 1610 (11): Pa a ■ 1616 (12): kPa a ■ 1614 (237): MPa a ■ 1137 (7): bar ■ 1611 (240): Pa g ■ 1617 (240): kPa a ■ 1615 (240): MPa a ■ 32797 (7): bar g ■ 1142 (6): psi a ■ 1143 (240): psi g
26. No	ot Used	23 to 24	16	-
27. Ex	ternal reference density (real)	25 to 28	32	Data format: Byte 1 to 4: External ref. density Floating-point number (IEEE754)
28. Ex	ternal reference density unit (integer)	29 to 30	16	 32840 (240): kg/Nm³ 32841 (240): kg/Nl 32842 (240): g/Scm³ 32843 (240): kg/Scm³ 32844 (240): lb/Sft³

Descr	ription (format)	Byte	Bit	Value
29.	Not Used	31 to 32	16	-
30.	External temperature (real)	33 to 36	32	Data format: Byte 1 to 4: External temperature Floating-point number (IEEE754)
31.	External temperature unit (integer)	37 to 38	16	■ 1001 (32): °C ■ 1002 (33): °F ■ 1000 (35): K ■ 1003 (34): °R
32.	Not Used	39 to 40	16	-
33.	External value % S&W (real)	41 to 44	32	Data format: Byte 1-4: External value, % S&W Floating-point number (IEEE754)
34.	External value, water cut % (real)	45 to 48	32	Data format: Byte 1-4: External value, water cut % Floating-point number (IEEE754)
35	Flow override monitoring	49 to 50	16	■ 33004 (0): Off ■ 33006 (1): On
36	Monitoring of zero adjustment	51 to 52	16	 32823 (0): Cancel 33242 (0): Active 248 (0): Error zero adjustment 33158 (1): Start

Permanently assigned configuration group

Config assembly (Assem104), 2704 byte

Desci	ription (format)			Bits	Byte	Offset
1.	None			32	4	0
2.	Parameter 36	_	Write protection	8	1	4
3.	None			8	1	5
4.	Parameter 87	System units	Mass flow unit	16	2	6
5.	Parameter 86	System units	Mass unit	16	2	8
6.	Parameter 93	System units	Volume flow unit	16	2	10
7.	Parameter 92	System units	Volume unit	16	2	12
8.	Parameter 80	System units	Corrected volume flow unit	16	2	14
9.	Parameter 79	System units	Corrected volume unit	16	2	16
10.	Parameter 81	System units	Density unit	16	2	18
11.	Parameter 89	System units	Reference density unit	16	2	20
12.	Parameter 91	System units	Temperature unit	16	2	22
13.	None			16	2	24
14.	Parameter 88	System units	Pressure unit	16	2	26
15.	Parameter 85	System units	Kinematic viscosity unit	16	2	28
16.	Parameter 84	System units	Dynamic viscosity unit	16	2	30
17.	Parameter 78	System units	Concentration unit	16	2	32
18.	Parameter 82	System units	Oil density unit	16	2	34
19.	Parameter 83	System units	Water density unit	16	2	36
20.	Parameter 90	System units	Water reference density unit	16	2	38
21.	None			32	4	40

Descr	ription (format)	Bits	Byte	Offset		
22.	None			16	2	44
23.	Parameter 224	-	Enter access code	16	2	46
24.	Parameter 94	Totalizer 1	Assign process variable	16	2	48
25.	Parameter 106	Totalizer 1	Unit totalizer	16	2	50
26.	Parameter 103	Totalizer 1	Totalizer operating mode	16	2	52
27.	Parameter 100	Totalizer 1	Failure mode	16	2	54
28.	Parameter 244	Totalizer operation	Preset value tot. 1	32	4	56
29.	Parameter 97	Totalizer operation	Control totalizer 1	16	2	60
30.	Parameter 95	Totalizer 2	Assign process variable	16	2	62
31.	Parameter 107	Totalizer 2	Unit totalizer	16	2	64
32.	Parameter 104	Totalizer 2	Totalizer operating mode	16	2	66
33.	Parameter 101	Totalizer 2	Failure mode	16	2	68
34.	Parameter 98	Totalizer operation	Control totalizer 2	16	2	70
35.	Parameter 245	Totalizer operation	Preset value tot. 2	32	4	72
36.	Parameter 96	Totalizer 3	Assign process variable	16	2	76
37.	Parameter 108	Totalizer 3	Unit totalizer	16	2	78
38.	Parameter 105	Totalizer 3	Totalizer operating mode	16	2	80
39.	Parameter 102	Totalizer 3	Failure mode	16	2	82
40.	Parameter 246	Totalizer operation	Preset value tot. 3	32	4	84
41.	Parameter 99	Totalizer operation	Control totalizer 3	16	2	88
42.	Parameter 16	Configurable input assembly	Input assembly position 1	16	2	90
43.	Parameter 27	Configurable input assembly	Input assembly position 2	16	2	92
44.	Parameter 29	Configurable input assembly	Input assembly position 3	16	2	94
45.	Parameter 30	Configurable input assembly	Input assembly position 4	16	2	96
46.	Parameter 31	Configurable input assembly	Input assembly position 5	16	2	98
47.	Parameter 32	Configurable input assembly	Input assembly position 6	16	2	100
48.	Parameter 33	Configurable input assembly	Input assembly position 7	16	2	102
49.	Parameter 34	Configurable input assembly	Input assembly position 8	16	2	104
50.	Parameter 35	Configurable input assembly	Input assembly position 9	16	2	106
51.	Parameter 17	Configurable input assembly	Input assembly position 10	16	2	108
52.	Parameter 18	Configurable input assembly	Input assembly position 11	16	2	110
53.	Parameter 19	Configurable input assembly	Input assembly position 12	16	2	112
54.	Parameter 20	Configurable input assembly	Input assembly position 13	16	2	114
55.	Parameter 21	Configurable input assembly	Input assembly position 14	16	2	116
56.	Parameter 22	Configurable input assembly	Input assembly position 15	16	2	118
57.	Parameter 23	Configurable input assembly	Input assembly position 16	16	2	120
58.	Parameter 24	Configurable input assembly	Input assembly position 17	16	2	122
59.	Parameter 25	Configurable input assembly	Input assembly position 18	16	2	124
60.	Parameter 26	Configurable input assembly	Input assembly position 19	16	2	126
61.	Parameter 28	Configurable input assembly	Input assembly position 20	16	2	128
62.	Parameter 38	Sensor adjustment	Flow direction	16	2	130
63.	Parameter 40	Process parameters	Flow override	16	2	132
64.	Parameter 37	Low flow	Assign process variable	16	2	134

Descri	iption (format)	Bits	Byte	Offset		
65.	Parameter 39	Empty pipe detection	Assign process variable	16	2	136
66.	Parameter 41	Corrected volume flow calculation	Corrected volume flow calculation	16	2	138
67.	Parameter 188	Low flow	Switch-on point low flow cut off	32	4	140
68.	Parameter 187	Low flow	Off value low flow cutoff	32	4	144
69.	Parameter 209	Low flow	Pressure shock suppression	32	4	148
70.	Parameter 191	Empty pipe detection	Low value partial filled pipe detection	32	4	152
71.	Parameter 189	Partially filled pipe detection	High value partial filled pipe detection	32	4	156
72.	Parameter 190	Empty pipe detection	Response time part. filled pipe detect.	32	4	160
73.	Parameter 182	Corrected volume flow calculation	Fixed reference density	32	4	164
74.	Parameter 186	Corrected volume flow calculation	Linear expansion coefficient	32	4	168
75.	Parameter 211	Corrected volume flow calculation	Square expansion coefficient	32	4	172
76.	Parameter 210	Corrected volume flow calculation	Reference temperature	32	4	176
77.	Parameter 183	Process parameters	Flow damping	32	4	180
78.	Parameter 184	Process parameters	Density damping	32	4	184
79.	Parameter 185	Process parameters	Temperature damping	32	4	188
80.	Parameter 5	External compensation	Pressure compensation	16	2	192
81.	Parameter 6	External compensation	Temperature mode	16	2	194
82.	Parameter 2	Medium selection	Select medium	16	2	196
83.	Parameter 3	Medium selection	Select gas type	16	2	198
84.	Parameter 119	External compensation	Pressure value	32	4	200
85.	Parameter 133	Medium selection	Temperature coefficient sound velocity	32	4	204
86.	Parameter 128	Medium selection	Reference sound velocity	32	4	208
87.	Parameter 115	Empty pipe detection	Max. damping empty pipe detection	32	4	212
88.	Parameter 241	Diagnostic settings	Alarm delay	32	4	216
89.	Parameter 58	Diagnostic behavior	Assign behavior for diagnostic information 046	8	1	220
90.	Parameter 57	Diagnostic behavior	Assign behavior for diagnostic information 140	8	1	221
91.	Parameter 59	Diagnostic behavior	Assign behavior for diagnostic information 144	8	1	222
92.	Parameter 60	Diagnostic behavior	Assign behavior for diagnostic information 374	8	1	223
93.	Parameter 61	Diagnostic behavior	Assign behavior for diagnostic information 302	8	1	224
94.	None			8	1	225
95.	Parameter 74	Diagnostic behavior	Assign behavior for diagnostic information 441	16	2	226
96.	Parameter 75	Diagnostic behavior	Assign behavior for diagnostic information 442	16	2	228
97.	Parameter 76	Diagnostic behavior	Assign behavior for diagnostic information 443	16	2	230
98.	Parameter 73	Diagnostic behavior	Assign behavior for diagnostic information 444	16	2	232
99.	Parameter 62	Diagnostic behavior	Assign behavior for diagnostic information 830	8	1	234
100.	Parameter 63	Diagnostic behavior	Assign behavior for diagnostic information 831	8	1	235

Descri	iption (format)			Bits	Byte	Offset
101.	Parameter 64	Diagnostic behavior	Assign behavior for diagnostic information 832	8	1	236
102.	Parameter 65	Diagnostic behavior	Assign behavior for diagnostic information 833	8	1	237
103.	Parameter 66	Diagnostic behavior	Assign behavior for diagnostic information 834	8	1	238
104.	Parameter 67	Diagnostic behavior	Assign behavior for diagnostic information 835	8	1	239
105.	Parameter 72	Diagnostic behavior	Assign behavior for diagnostic information 862	16	2	240
106.	Parameter 68	Diagnostic behavior	Assign behavior for diagnostic information 912	8	1	242
107.	Parameter 69	Diagnostic behavior	Assign behavior for diagnostic information 913	8	1	243
108.	Parameter 70	Diagnostic behavior	Assign behavior for diagnostic information 944	8	1	244
109.	Parameter 71	Diagnostic behavior	Assign behavior for diagnostic information 948	8	1	245
110.	None			32	4	246
111.	None			16	2	250
112.	Parameter 12	Concentration	Liquid type	16	2	252
113.	None			32	4	254
114.	None			16	2	258
115.	Parameter 138	Concentration	Coefficient A0	32	4	260
116.	Parameter 141	Concentration	Coefficient A1	32	4	264
117.	Parameter 144	Concentration	Coefficient A2	32	4	268
118.	Parameter 147	Concentration	Coefficient A3	32	4	272
119.	Parameter 150	Concentration	Coefficient A4	32	4	276
120.	Parameter 153	Concentration	Coefficient B1	32	4	280
121.	Parameter 156	Concentration	Coefficient B2	32	4	284
122.	Parameter 159	Concentration	Coefficient B3	32	4	288
123.	Parameter 162	Concentration	Coefficient D1	32	4	292
124.	Parameter 165	Concentration	Coefficient D2	32	4	296
125.	Parameter 168	Concentration	Coefficient D3	32	4	300
126.	Parameter 171	Concentration	Coefficient D4	32	4	304
127.	Parameter 55		Petroleum mode	16	2	308
128.	Parameter 53		API product group	16	2	310
129.	Parameter 54		API table selection	16	2	312
130.	None			16	2	314
131.	Parameter 237		Thermal expansion coefficient	32	4	316
132.	Parameter 220		Oil density sample	32	4	320
133.	Parameter 235		Oil temperature sample	32	4	324
134	Parameter 230		Oil pressure sample	32	4	328
135	Parameter 222		Water density sample	32	4	332
136	Parameter 236		Water temperature sample	32	4	336

9.5 Diagnostic information via EtherNet/IP

Status signal	No.	Short text	Value
	000	-	0
F	882	Input signal	16777265
F	910	Tubes not oscillating	16777296
F	437	Configuration incompatible	16777312
F	242	Software incompatible	16777319
F	252	Modules incompatible	16777323
F	272	Main electronic failure	16777337
F	270	Main electronic failure	16777340
F	271	Main electronic failure	16777341
F	270	Main electronic failure	16777343
F	270	Main electronic failure	16777344
F	825	Operating temperature	16777352
F	410	Data transfer	16777355
F	273	Main electronic failure	16777368
F	270	Main electronic failure	16777375
F	083	Memory content	16777376
F	270	Main electronic failure	16777377
F	022	Sensor temperature	16777406
F	022	Sensor temperature	16777407
F	833	Electronic temperature too low	16777409
F	832	Electronic temperature too high	16777411
F	834	Process temperature too high	16777413
F	835	Process temperature too low	16777414
F	270	Main electronic failure	16777428
F	022	Sensor temperature	16777429
F	022	Sensor temperature	16777430
F	062	Sensor connection	16777435
F	062	Sensor connection	16777436
F	311	Electronic failure	16777441
F	273	Main electronic failure	16777445
F	082	Data storage	16777447
F	190	Special event 2	16777450
F	273	Main electronic failure	16777483
F	390	Special event 3	16777490
F	062	Sensor connection	16777491
F	062	Sensor connection	16777492
F	992	Special event 13	16777503
F	590	Special event 4	16777508
F	990	Special event 5	16777509
F	991	Special event 9	16777510
F	591	Special event 8	16777511

Status signal	No.	Short text	Value
F	391	Special event 7	16777512
F	191	Special event 6	16777513
F	262	Module connection	16777545
F	537	Configuration	16777546
F	201	Device failure	16777547
F	192	Special event 10	16777552
F	392	Special event 11	16777553
F	592	Special event 12	16777554
F	382	Data storage	16777581
F	383	Memory content	16777582
F	283	Memory content	16777583
F	144	Measuring error too high	16777671
С	411	Up-/download active	33554536
С	411	Up-/download active	33554537
С	411	Up-/download active	33554540
С	484	Simulation failure mode	33554576
С	485	Simulation measured variable	33554579
С	453	Flow override	33554580
С	833	Electronic temperature too low	33554625
С	832	Electronic temperature too high	33554627
С	834	Process temperature too high	33554629
С	835	Process temperature too low	33554630
С	992	Special event 13	33554719
С	192	Special event 10	33554768
С	392	Special event 11	33554769
С	592	Special event 12	33554770
С	495	Simulation diagnostic event	33554782
С	302	Device verification active	33554926
М	438	Dataset	67108970
М	833	Electronic temperature too low	67109057
М	832	Electronic temperature too high	67109059
М	834	Process temperature too high	67109061
М	835	Process temperature too low	67109062
М	311	Electronic failure	67109090
М	992	Special event 13	67109151
М	192	Special event 10	67109200
М	392	Special event 11	67109201
М	592	Special event 12	67109202
S	825	Operating temperature	134217861
S	825	Operating temperature	134217863
S	842	Process limit	134217873
S	862	Partly filled pipe	134217874
S	830	Sensor temperature too high	134217920

Status signal	No.	Short text	Value
S	833	Electronic temperature too low	134217921
S	831	Sensor temperature too low	134217922
S	832	Electronic temperature too high	134217923
S	912	Medium inhomogeneous	134217924
S	834	Process temperature too high	134217925
S	835	Process temperature too low	134217926
S	046	Sensor limit exceeded	134217928
S	046	Sensor limit exceeded	134217930
S	140	Sensor signal	134217932
S	913	Medium unsuitable	134217933
S	274	Main electronic failure	134217934
S	274	Main electronic failure	134217935
S	912	Medium inhomogeneous	134217951
S	912	Inhomogeneous	134218005
S	992	Special event 13	134218015
S	843	Process limit	134218019
S	192	Special event 10	134218064
S	392	Special event 11	134218065
S	592	Special event 12	134218066
S	912	Inhomogeneous	134218082
S	948	Tube damping too high	134218088
S	944	Monitoring failed	134218182
I	1089	Power on	268435545
I	1090	Configuration reset	268435546
I	1091	Configuration changed	268435547
I	1110	Write protection switch changed	268435566
I	1111	Density adjust failure	268435567
I	1137	Electronic changed	268435593
I	1151	History reset	268435607
I	1155	Reset electronic temperature	268435611
I	1157	Memory error event list	268435613
I	1185	Display backup done	268435641
I	1186	Restore via display done	268435642
I	1187	Settings downloaded with display	268435643
I	1188	Display data cleared	268435644
I	1189	Backup compared	268435645
I	1209	Density adjustment ok	268435665
I	1221	Zero point adjust failure	268435677
I	1222	Zero point adjustment ok	268435678
I	1256	Display: access status changed	268435712
I	1264	Safety sequence aborted	268435720
I	1335	Firmware changed	268435791
I	1361	Wrong web server login	268435817

Status signal	No.	Short text	Value
I	1397	Fieldbus: access status changed	268435853
I	1398	CDI: access status changed	268435854
I	1444	Device verification passed	268435900
I	1445	Device verification failed	268435901
I	1446	Device verification active	268435902
I	1447	Record application reference data	268435903
I	1448	Application reference data recorded	268435904
I	1449	Recording application ref. data failed	268435905
I	1450	Monitoring off	268435906
I	1451	Monitoring on	268435907
I	1457	Failed: Measured error verification	268435913
I	1459	Failed: I/O module verification	268435915
I	1460	Failed: Sensor integrity verification	268435916
I	1461	Failed: Sensor verification	268435917
I	1462	Failed: Sensor electronic module verific.	268435918

10 Commissioning

10.1 Post-installation and post-connection check

Before commissioning the device:

- ▶ Make sure that the post-installation and post-connection checks have been performed successfully.
- Checklist for "Post-installation" check → □ 34
- Checklist for "Post-connection" check → 🗎 65

10.2 Switching on the measuring instrument

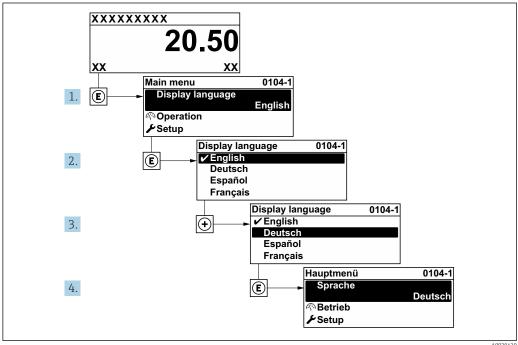
- ▶ Switch on the device upon successful completion of the post-mounting and postconnection check.
 - After a successful startup, the local display switches automatically from the startup display to the operational display.
- If nothing appears on the local display or if a diagnostic message is displayed, refer to the section on "Diagnostics and troubleshooting" $\rightarrow \blacksquare$ 180.

10.3 Connecting via FieldCare

- For connecting via FieldCare
- For user interface of FieldCare

10.4 Setting the operating language

Factory setting: English or ordered local language



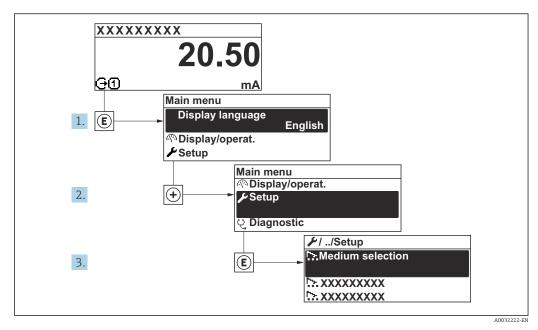
■ 33 Taking the example of the local display

Endress+Hauser 113

Δ0029420

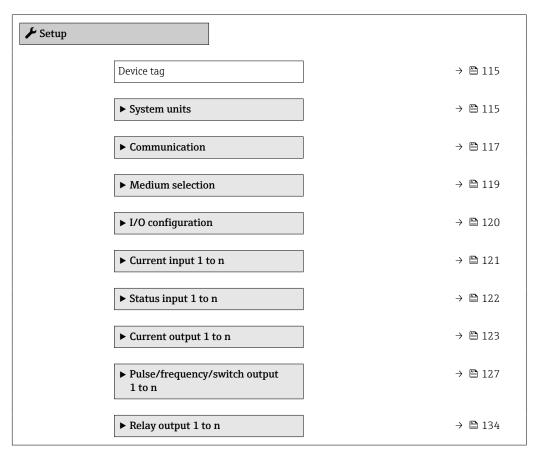
10.5 Configuring the device

The **Setup** menu with its guided wizards contains all the parameters needed for standard operation.



 \blacksquare 34 Navigation to the "Setup" menu using the example of the local display

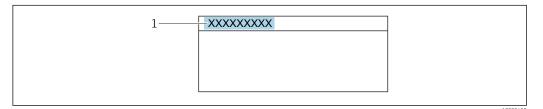
The number of submenus and parameters can vary depending on the device version. Certain submenus and parameters in these submenus are not described in the Operating Instructions. Instead a description is provided in the Special Documentation for the device ("Supplementary documentation").



► Display	→ 🖺 137
► Low flow cut off	→ 🖺 141
▶ Partially filled pipe detection	→ 🖺 142
► Advanced setup	→ 🗎 143

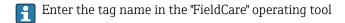
10.5.1 Defining the tag name

To enable fast identification of the measuring point within the system, you can enter a unique designation using the **Device tag** parameter and thus change the factory setting.



 \blacksquare 35 Header of the operational display with tag name

1 Tag name



Navigation

"Setup" menu → Device tag

Parameter overview with brief description

Parameter	Description	User entry
Device tag	31	Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /).

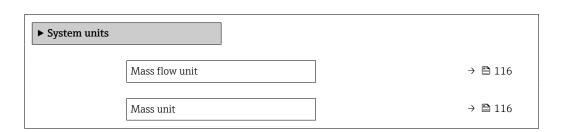
10.5.2 Setting the system units

In the **System units** submenu the units of all the measured values can be set.

The number of submenus and parameters can vary depending on the device version. Certain submenus and parameters in these submenus are not described in the Operating Instructions. Instead a description is provided in the Special Documentation for the device ("Supplementary documentation").

Navigation

"Setup" menu → System units



Volume flow unit	→ 🖺 116
Volume unit	→ 🖺 116
Corrected volume flow unit	→ 🖺 116
Corrected volume unit	→ 🖺 116
Density unit	→ 🖺 117
Reference density unit	→ 🖺 116
Temperature unit	→ 🖺 117
Pressure unit	→ 1 17

Parameter	Description	Selection	Factory setting
Mass flow unit	Select mass flow unit. Effect The selected unit applies to: Output Low flow cut off Simulation process variable	Unit choose list	Country-specific: kg/h lb/min
Mass unit	Select mass unit.	Unit choose list	Country-specific: kg lb
Volume flow unit	Select volume flow unit. Effect The selected unit applies to: Output Low flow cut off Simulation process variable	Unit choose list	Country-specific: l/h gal/min (us)
Volume unit	Select volume unit.	Unit choose list	Country-specific: l (DN > 150 (6"): m³ option) gal (us)
Corrected volume flow unit	Select corrected volume flow unit. Effect The selected unit applies to: Corrected volume flow parameter $(\rightarrow \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	Unit choose list	Country-specific: NI/h Sft³/min
Corrected volume unit	Select corrected volume unit.	Unit choose list	Country-specific: NI Sft³
Reference density unit	Select reference density unit.	Unit choose list	Country-specific kg/Nl lb/Sft ³

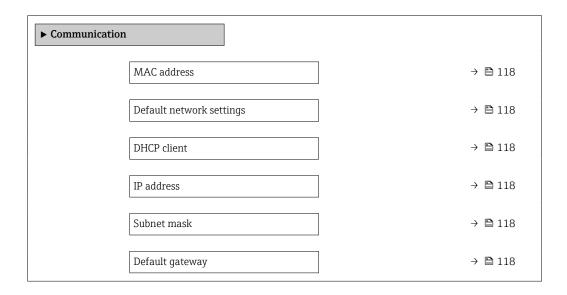
Parameter	Description	Selection	Factory setting
Density unit	Select density unit. Effect The selected unit applies to: Output Simulation process variable Density adjustment (Expert menu)	Unit choose list	Country-specific: • kg/l • lb/ft³
Density 2 unit	Select second density unit.	Unit choose list	Country-specific: kg/l lb/ft³
Temperature unit	Select temperature unit. Effect The selected unit applies to: Electronic temperature parameter (6053) Maximum value parameter (6051) Minimum value parameter (6052) External temperature parameter (6080) Maximum value parameter (6108) Minimum value parameter (6109) Carrier pipe temperature parameter (6027) Maximum value parameter (6030) Maximum value parameter (6030) Reference temperature parameter (1816) Temperature parameter	Unit choose list	Country-specific: ■ °C ■ °F
Pressure unit	Select process pressure unit. Effect The unit is taken from: ■ Pressure value parameter (→ 🖺 120) ■ External pressure parameter (→ 🖺 120) ■ Pressure value	Unit choose list	Country-specific: • bar a • psi a

10.5.3 Configuration of the communication interface

The **Communication** submenu guides you systematically through all the parameters that have to be configured for selecting and setting the communication interface.

Navigation

"Setup" menu \rightarrow Communication



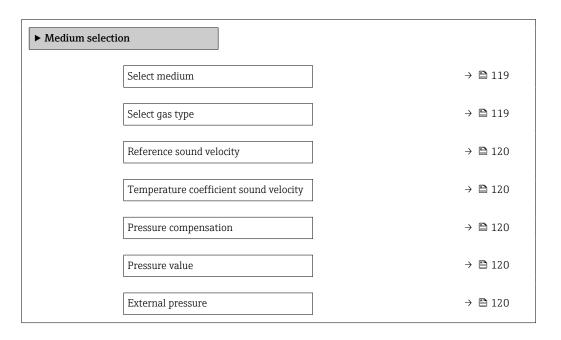
Parameter	Description	User interface / Selection / User entry	Factory setting
MAC address	Displays the MAC address of the measuring instrument. MAC = Media Access Control	Unique 12-digit character string comprising letters and numbers, e.g.: 00:07:05:10:01:5F	Each measuring instrument is given an individual address.
Default network settings	Select whether to restore network settings.	Off On	-
DHCP client	Select to activate/deactivate DHCP client functionality.	Off On	On
	Result If the DHCP client functionality of the web server is activated, the IP address, Subnet mask and Default gateway are set automatically.		
	 Identification is via the MAC address of the measuring device. The IP address in the IP address parameter is ignored as long as the DHCP client parameter is active. This is also the case, in particular, if the DHCP server cannot be reached. The IP address in the parameter of the same name is only used if the DHCP client parameter is inactive. 		
IP address	IP address of the Web server integrated in the measuring instrument.	4 octet: 0 to 255 (in the particular octet)	-
	If the DHCP client and write access are switched off, the IP address can also be entered.		
	Enter the IP address of the service interface (port 2).		
Subnet mask	Displays the subnet mask. If the DHCP client and write access are switched off, the Subnet mask can also be entered.	4 octet: 0 to 255 (in the particular octet)	-
Default gateway	Displays the default gateway. If the DHCP client and write access are switched off, the Default gateway can also be entered.	4 octet: 0 to 255 (in the particular octet)	-

10.5.4 Selecting and setting the medium

The **Select medium** wizard submenu contains parameters that must be configured in order to select and set the medium.

Navigation

"Setup" menu \rightarrow Medium selection



Parameter overview with brief description

Parameter	Prerequisite	Description	Selection / User entry / User interface
Select medium	-	Use this function to select the type of medium: "Gas" or "Liquid". Select the "Other" option in exceptional cases in order to enter the properties of the medium manually (e.g. for highly compressive liquids such as sulfuric acid).	LiquidGas
Select gas type	In the Medium selection submenu, the Gas option is selected.	Select measured gas type.	 Air Ammonia NH3 Argon Ar Sulfur hexafluoride SF6 Oxygen O2 Ozone O3 Nitrogen oxide NOx Nitrogen N2 Nitrous oxide N2O Methane CH4 Hydrogen H2 Helium He Hydrogen chloride HCl Hydrogen sulfide H2S Ethylene C2H4 Carbon dioxide CO2 Carbon monoxide CO Chlorine Cl2 Butane C4H10 Propane C3H8 Propylene C3H6 Ethane C2H6 Others

Parameter	Prerequisite	Description	Selection / User entry / User interface
Reference sound velocity	In the Select gas type parameter, the Others option is selected.	Enter sound velocity of gas at 0 °C (32 °F).	1 to 99 999.9999 m/s
Reference sound velocity	In the Select medium type parameter, the Others option is selected.	Enter sound velocity of gas at 0 $^{\circ}$ C (32 $^{\circ}$ F).	Signed floating-point number
Temperature coefficient sound velocity	In the Select gas type parameter, the Others option is selected.	Enter temperature coefficient for the gas sound velocity.	Positive floating point number
Temperature coefficient sound velocity	In the Select medium type parameter, the Others option is selected.	Enter temperature coefficient for the gas sound velocity.	Signed floating-point number
Pressure compensation	-	Select pressure compensation type.	 Off Fixed value External value Current input 1* Current input 2* Current input 3*
Pressure value	In the Pressure compensation parameter, the Fixed value option is selected.	Enter process pressure to be used for pressure correction.	Positive floating-point number
External pressure	In the Pressure compensation parameter, the External value option or the Current input 1n option is selected.	Shows the external process pressure value.	

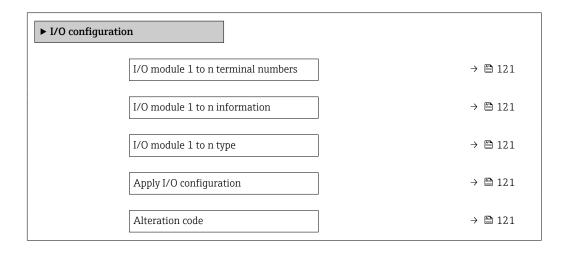
^{*} Visibility depends on order options or device settings

10.5.5 Displaying the I/O configuration

The **I/O configuration** submenu guides the user systematically through all the parameters in which the configuration of the I/O modules is displayed.

Navigation

"Setup" menu \rightarrow I/O configuration



Parameter	Description	User interface / Selection / User entry
I/O module 1 to n terminal numbers	Shows the terminal numbers used by the I/O module.	 Not used 26-27 (I/O 1) 24-25 (I/O 2) 22-23 (I/O 3) 20-21 (I/O 4)*
I/O module 1 to n information	Shows information of the plugged I/O module.	 Not plugged Invalid Not configurable Configurable EtherNet/IP
I/O module 1 to n type	Shows the I/O module type.	 Off Current output Current input Status input Pulse/frequency/switch output Double pulse output Relay output
Apply I/O configuration	Apply parameterization of the freely configurable I/O module.	■ No ■ Yes
Alteration code	Enter the code in order to change the I/O configuration.	Positive integer

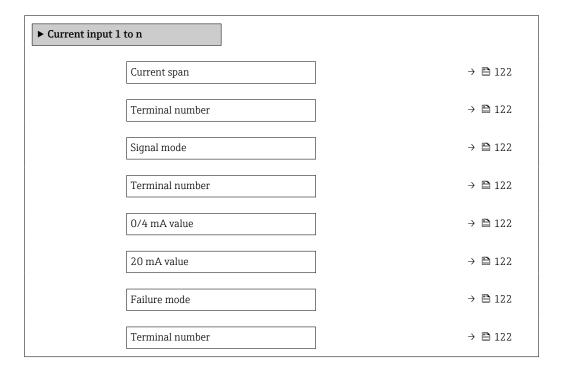
Visibility depends on order options or device settings

10.5.6 Configuring the current input

The **"Current input" wizard** guides the user systematically through all the parameters that have to be set for configuring the current input.

Navigation

"Setup" menu \rightarrow Current input



Failure value	→ 🖺 122	
Terminal number	→ 🖺 122	

Parameter	Prerequisite	Description	Selection / User interface / User entry	Factory setting
Current span	-	Select current range for process value output and upper/lower level for alarm signal.	 420 mA 420 mA NAMUR 420 mA US 020 mA 	-
Terminal number	-	Shows the terminal numbers used by the current input module.	 Not used 24-25 (I/O 2) 22-23 (I/O 3) 20-21 (I/O 4)* 	-
Signal mode	The measuring device is not approved for use in the hazardous area with type of protection Ex-i.	Select the signal mode for the current input.	PassiveActive	Active
0/4 mA value	-	Enter 4 mA value.	Signed floating-point number	-
20 mA value	-	Enter 20 mA value.	Signed floating-point number	Depends on country and nominal diameter
Failure mode	-	Define input behavior in alarm condition.	AlarmLast valid valueDefined value	-
Failure value	In the Failure mode parameter, the Defined value option is selected.	Enter value to be used by the device if input value from external device is missing.	Signed floating-point number	-

^{*} Visibility depends on order options or device settings

10.5.7 Configuring the status input

The **Status input** submenu guides the user systematically through all the parameters that have to be set for configuring the status input.

Navigation

"Setup" menu \rightarrow Status input 1 to n

► Status input 1 to n	
Assign status input	→ 🖺 123
Terminal number	→ 🖺 123
Active level	→ 🖺 123
Terminal number	→ 🖺 123

122

Response time status input	→ 🖺 123
Terminal number	→ 🖺 123

Parameter	Description	Selection / User interface / User entry
Assign status input	Select function for the status input.	 Off Reset totalizer 1 Reset totalizer 2 Reset totalizer 3 Reset all totalizers Flow override
Terminal number	Shows the terminal numbers used by the status input module.	 Not used 24-25 (I/O 2) 22-23 (I/O 3) 20-21 (I/O 4)*
Active level	Define input signal level at which the assigned function is triggered.	■ High ■ Low
Response time status input	Define the minimum amount of time the input signal level must be present before the selected function is triggered.	5 to 200 ms

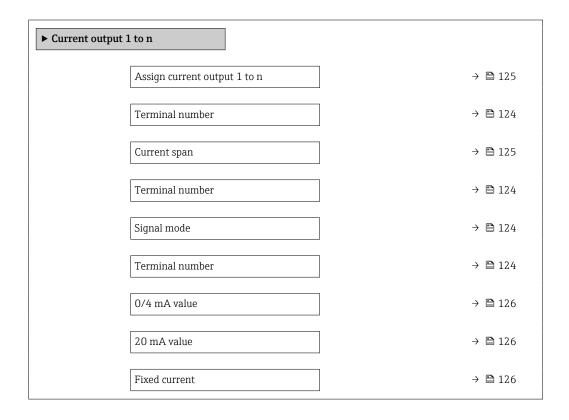
Visibility depends on order options or device settings

10.5.8 Configuring the current output

The **Current output** wizard guides you systematically through all the parameters that have to be set for configuring the current output.

Navigation

"Setup" menu \rightarrow Current output



Terminal number	→ 🖺 124
Damping output 1 to n	→ 🖺 126
Failure mode	→ 🖺 126
Terminal number	→ 🖺 124
Failure current	→ 🖺 126
Terminal number	→ 🖺 124

Parameter	Prerequisite	Description	User interface / Selection / User entry	Factory setting
Terminal number	-	Shows the terminal numbers used by the current output module.	 Not used 24-25 (I/O 2) 22-23 (I/O 3) 20-21 (I/O 4)* 	-
Signal mode	-	Select the signal mode for the current output.	PassiveActive	Active

124

Parameter	Prerequisite	Description	User interface / Selection / User entry	Factory setting
Assign current output 1 to n		Select process variable for current output.	• Off • Mass flow • Volume flow • Corrected volume flow • Carrier mass flow* • Carrier mass flow* • Target mass flow* • Target volume flow* • Carrier volume flow* • Carrier corrected volume flow* • Carrier corrected volume flow* • Density • Reference density • Concentration* • Dynamic viscosity* • Kinematic viscosity* • Temp. compensated dynamic viscosity* • Temp. compensated kinematic viscosity* • Temp. compensated kinematic viscosity* • Temp. compensated winematic viscosity* • Temp. • Coscillation frequency 0 • Oscillation frequency 1 • Oscillation frequency 1 • Oscillation amplitude 0 • Oscillation amplitude 1 • Frequency fluctuation 0 • Frequency fluctuation 1 • Oscillation damping 1 • Oscillation damping fluctuation 0 • Oscillation damping fluctuation 1 • Oscillation damping fluctuation 1 • Signal asymmetry • Exciter current 0 • Exciter current 1 • HBSI* • Pressure*	
Current span	_	Select current range for process value output and upper/lower level for alarm signal.	 420 mA NAMUR 420 mA US 420 mA 020 mA Fixed current 	Depends on country: • 420 mA NAMUR • 420 mA US

Parameter	Prerequisite	Description	User interface / Selection / User entry	Factory setting
0/4 mA value	In Current span parameter (→ 🖺 125), one of the following options is selected: • 420 mA NAMUR • 420 mA US • 420 mA • 020 mA	Enter 4 mA value.	Signed floating-point number	Depends on country: Okg/h Olb/min
20 mA value	In Current span parameter (→ 🖺 125), one of the following options is selected: • 420 mA NAMUR • 420 mA US • 420 mA • 020 mA	Enter 20 mA value.	Signed floating-point number	Depends on country and nominal diameter
Fixed current	The Fixed current option is selected in the Current span parameter (→ 🖺 125).	Defines the fixed output current.	0 to 22.5 mA	22.5 mA
Damping output 1 to n	A process variable is selected in the Assign current output parameter (→ 🖹 125) and one of the following options is selected in the Current span parameter (→ 🖺 125): • 420 mA NAMUR • 420 mA US • 420 mA • 020 mA	Set reaction time for output signal to fluctuations in the measured value.	0.0 to 999.9 s	-
Failure mode	A process variable is selected in the Assign current output parameter (→ 🖹 125) and one of the following options is selected in the Current span parameter (→ 🖺 125): • 420 mA NAMUR • 420 mA US • 420 mA • 020 mA	Define output behavior in alarm condition.	Min.Max.Last valid valueActual valueDefined value	-
Failure current	The Defined value option is selected in the Failure mode parameter.	Enter current output value in alarm condition.	0 to 22.5 mA	22.5 mA

^{*} Visibility depends on order options or device settings

10.5.9 Configuring the pulse/frequency/switch output

The **Pulse/frequency/switch output** wizard guides you systematically through all the parameters that can be set for configuring the selected output type.

Navigation

"Setup" menu \rightarrow Advanced setup \rightarrow Pulse/frequency/switch output



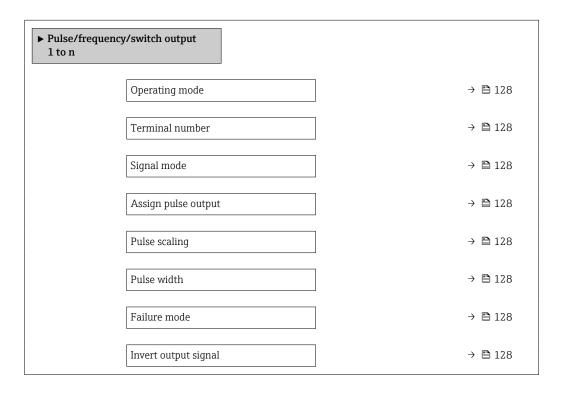
Parameter overview with brief description

Parameter	Description	Selection
Operating mode	Define the output as a pulse, frequency or switch output.	PulseFrequencySwitch

Configuring the pulse output

Navigation

"Setup" menu → Pulse/frequency/switch output



Parameter	Prerequisite	Description	Selection / User interface / User entry	Factory setting
Operating mode	-	Define the output as a pulse, frequency or switch output.	PulseFrequencySwitch	_
Terminal number	-	Shows the terminal numbers used by the PFS output module.	 Not used 24-25 (I/O 2) 22-23 (I/O 3) 20-21 (I/O 4)* 	-
Signal mode	-	Select the signal mode for the PFS output.	PassiveActive	-
Assign pulse output 1 to n	The Pulse option is selected in Operating mode parameter.	Select process variable for pulse output.	Off Mass flow Volume flow Corrected volume flow Target mass flow* Carrier mass flow* Target volume flow* Carrier volume flow* Target corrected volume flow Carrier orrected volume flow*	
Value per pulse	The Pulse option is selected in the Operating mode parameter (→ 🖺 127) and a process variable is selected in the Assign pulse output parameter (→ 🖺 128).	Enter measured value at which a pulse is output.	Positive floating point number	Depends on country and nominal diameter
Pulse width	The Pulse option is selected in the Operating mode parameter (→ 🖺 127) and a process variable is selected in the Assign pulse output parameter (→ 🖺 128).	Define time width of the output pulse.	0.05 to 2 000 ms	-
Failure mode	The Pulse option is selected in the Operating mode parameter (→ 🖺 127) and a process variable is selected in the Assign pulse output parameter (→ 🖺 128).	Define output behavior in alarm condition.	Actual valueNo pulses	-
Invert output signal	-	Invert the output signal.	■ No ■ Yes	-

^{*} Visibility depends on order options or device settings

128

Configuring the frequency output

Navigation

"Setup" menu → Pulse/frequency/switch output

► Pulse/frequen 1 to n	cy/switch output	
	Operating mode	→ 🖺 129
	Terminal number	→ 🖺 129
	Signal mode	→ 🖺 129
	Assign frequency output	→ 🖺 130
	Minimum frequency value	→ 🖺 131
	Maximum frequency value	→ 🖺 131
	Measuring value at minimum frequency	→ 🖺 131
	Measuring value at maximum frequency	→ 🗎 131
	Failure mode	→ 🖺 131
	Failure frequency	→ 🖺 131
	Invert output signal	→ 🗎 131

Parameter overview with brief description

Parameter	Prerequisite	Description	Selection / User interface / User entry	Factory setting
Operating mode	-	Define the output as a pulse, frequency or switch output.	PulseFrequencySwitch	-
Terminal number	-	Shows the terminal numbers used by the PFS output module.	 Not used 24-25 (I/O 2) 22-23 (I/O 3) 20-21 (I/O 4)* 	-
Signal mode	-	Select the signal mode for the PFS output.	PassiveActive	-

Parameter	Prerequisite	Description	Selection / User interface / User entry	Factory setting
Assign frequency output	The Frequency option is selected in Operating mode parameter (→ 🗎 127).	Select process variable for frequency output.	■ Off ■ Mass flow ■ Volume flow ■ Corrected volume flow* ■ Density ■ Reference density* ■ Temperature ■ Pressure ■ Dynamic viscosity* ■ Kinematic viscosity* ■ Temp. compensated dynamic viscosity* ■ Temp. compensated kinematic viscosity* ■ Concentration* ■ Target mass flow* ■ Carrier mass flow* ■ Carrier wolume flow* ■ Carrier volume flow* ■ Carrier volume flow* ■ Carrier corrected volume flow* ■ Carrier corrected volume flow ■ Oscillation damping 0 ■ Oscillation damping 1 ■ Oscillation damping fluctuation 0 ■ Oscillation damping fluctuation 1 ■ Oscillation frequency 0 ■ Oscillation frequency 1 ■ Frequency fluctuation 1 ■ Oscillation amplitude 1 ■ Signal asymmetry ■ Carrier pipe temperature ■ Electronic temperature	

Parameter	Prerequisite	Description	Selection / User interface / User entry	Factory setting
Minimum frequency value	The Frequency option is selected in the Operating mode parameter ($\rightarrow \stackrel{\triangle}{=} 127$) and a process variable is selected in the Assign frequency output parameter ($\rightarrow \stackrel{\triangle}{=} 130$).	Enter minimum frequency.	0.0 to 10 000.0 Hz	-
Maximum frequency value	The Frequency option is selected in the Operating mode parameter ($\rightarrow \triangleq 127$) and a process variable is selected in the Assign frequency output parameter ($\rightarrow \triangleq 130$).	Enter maximum frequency.	0.0 to 10 000.0 Hz	-
Measuring value at minimum frequency	The Frequency option is selected in the Operating mode parameter (→ 🖺 127) and a process variable is selected in the Assign frequency output parameter (→ 🖺 130).	Enter measured value for minmum frequency.	Signed floating-point number	Depends on country and nominal diameter
Measuring value at maximum frequency	The Frequency option is selected in the Operating mode parameter (→ 🖺 127) and a process variable is selected in the Assign frequency output parameter (→ 🖺 130).	Enter measured value for maximum frequency.	Signed floating-point number	Depends on country and nominal diameter
Failure mode	The Frequency option is selected in the Operating mode parameter (→ 🖺 127) and a process variable is selected in the Assign frequency output parameter (→ 🖺 130).	Define output behavior in alarm condition.	Actual valueDefined value0 Hz	-
Failure frequency	In the Operating mode parameter (→ 🗎 127), the Frequency option is selected, in the Assign frequency output parameter (→ 🖺 130) a process variable is selected, and in the Failure mode parameter, the Defined value option is selected.	Enter frequency output value in alarm condition.	0.0 to 12 500.0 Hz	-
Invert output signal	-	Invert the output signal.	■ No ■ Yes	-

^{*} Visibility depends on order options or device settings

Configuring the switch output

Navigation

"Setup" menu → Pulse/frequency/switch output

► Pulse/frequ 1 to n	uency/switch output	
	Operating mode	→ 🖺 132
	Terminal number	→ 🖺 132
	Signal mode	→ 🗎 132
	Switch output function	→ 🖺 133
	Assign diagnostic behavior	→ 🗎 133
	Assign limit	→ 🖺 133
	Assign flow direction check	→ 🗎 133
	Assign status	→ 🖺 133
	Switch-on value	→ 🖺 134
	Switch-off value	→ 🖺 134
	Switch-on delay	→ 🖺 134
	Switch-off delay	→ 🖺 134
	Failure mode	→ 🖺 134
	Invert output signal	→ 🖺 134

Parameter overview with brief description

Parameter	Prerequisite	Description	Selection / User interface / User entry	Factory setting
Operating mode	-	Define the output as a pulse, frequency or switch output.	PulseFrequencySwitch	-
Terminal number	-	Shows the terminal numbers used by the PFS output module.	 Not used 24-25 (I/O 2) 22-23 (I/O 3) 20-21 (I/O 4)* 	-
Signal mode	_	Select the signal mode for the PFS output.	PassiveActive	-

Parameter	Prerequisite	Description	Selection / User interface / User entry	Factory setting
Switch output function	The Switch option is selected in the Operating mode parameter.	Select function for switch output.	 Off On Diagnostic behavior Limit Flow direction check Status 	-
Assign diagnostic behavior	 In the Operating mode parameter, the Switch option is selected. In the Switch output function parameter, the Diagnostic behavior option is selected. 	Select diagnostic behavior for switch output.	AlarmAlarm or warningWarning	-
Assign limit	The Switch option is selected in Operating mode parameter. The Limit option is selected in Switch output function parameter.	Select process variable for limit function.	■ Mass flow ■ Volume flow ■ Corrected volume flow ■ Target mass flow* ■ Carrier mass flow* ■ Target volume flow* ■ Carrier volume flow* ■ Carrier corrected volume flow* ■ Carrier corrected volume flow* ■ Carrier corrected volume flow* ■ Density ■ Reference density ■ Dynamic viscosity* ■ Concentration* ■ Kinematic viscosity* ■ Temp. compensated dynamic viscosity* ■ Temp. compensated kinematic viscosity* ■ Temp. Temp. compensated kinematic viscosity* ■ Totalizer 1 ■ Totalizer 1 ■ Totalizer 2 ■ Totalizer 3 ■ Oscillation damping ■ Pressure	
Assign flow direction check	 The Switch option is selected in the Operating mode parameter. The Flow direction check option is selected in the Switch output function parameter. 	Select process variable for flow direction monitoring.		-
Assign status	 The Switch option is selected in Operating mode parameter. The Status option is selected in Switch output function parameter. 	Select device status for switch output.	Partially filled pipe detectionLow flow cut off	_

Parameter	Prerequisite	Description	Selection / User interface / User entry	Factory setting
Switch-on value	 The Switch option is selected in the Operating mode parameter. The Limit option is selected in the Switch output function parameter. 	Enter measured value for the switch-on point.	Signed floating-point number	Depends on country: • 0 kg/h • 0 lb/min
Switch-off value	 The Switch option is selected in the Operating mode parameter. The Limit option is selected in the Switch output function parameter. 	Enter measured value for the switch-off point.	Signed floating-point number	Depends on country: • 0 kg/h • 0 lb/min
Switch-on delay	 The Switch option is selected in the Operating mode parameter. The Limit option is selected in the Switch output function parameter. 	Define delay for the switch-on of status output.	0.0 to 100.0 s	-
Switch-off delay	 The Switch option is selected in the Operating mode parameter. The Limit option is selected in the Switch output function parameter. 	Define delay for the switch-off of status output.	0.0 to 100.0 s	-
Failure mode	-	Define output behavior in alarm condition.	Actual statusOpenClosed	-
Invert output signal	-	Invert the output signal.	NoYes	-

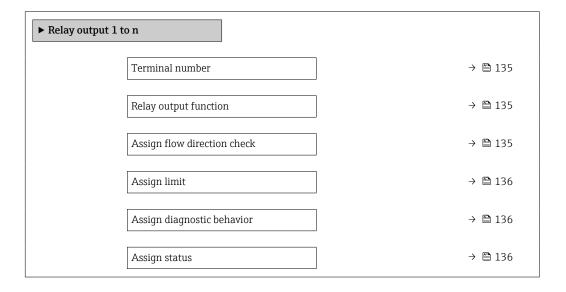
^{*} Visibility depends on order options or device settings

10.5.10 Configuring the relay output

The **Relay output** wizard guides the user systematically through all the parameters that have to be set for configuring the relay output.

Navigation

"Setup" menu \rightarrow Relay output 1 to n



Switch-off value	→ 🖺 136
Switch-off delay	→ 🗎 136
Switch-on value	→ 🖺 136
Switch-on delay	→ 🖺 136
Failure mode	→ 🖺 136
Switch status	→ 🖺 136
Powerless relay status	→ 🖺 136

Parameter	Prerequisite	Description	User interface / Selection / User entry	Factory setting
Terminal number	-	Shows the terminal numbers used by the relay output module.	 Not used 24-25 (I/O 2) 22-23 (I/O 3) 20-21 (I/O 4) 	-
Relay output function	-	Select the function for the relay output.	 Closed Open Diagnostic behavior Limit Flow direction check Digital Output 	-
Assign flow direction check	The Flow direction check option is selected in the Relay output function parameter.	Select process variable for flow direction monitoring.		-

Parameter	Prerequisite	Description	User interface / Selection / User entry	Factory setting
Assign limit	The Limit option is selected in Relay output function parameter.	Select process variable for limit function.	Mass flow Volume flow Corrected volume flow Target mass flow Target volume flow Carrier mass flow Target volume flow Carrier volume flow Carrier corrected volume flow Target corrected volume flow Carrier corrected volume flow Target corrected volume flow Target corrected volume flow Carrier corrected volume flow Tenentity Tenentity Temp. Concentration Timp. Compensated dynamic viscosity Temp. Compensated kinematic viscosity Temp. Totalizer 1 Totalizer 1 Totalizer 2 Totalizer 3 Oscillation damping Pressure	
Assign diagnostic behavior	In the Relay output function parameter, the Diagnostic behavior option is selected.	Select diagnostic behavior for switch output.	AlarmAlarm or warningWarning	-
Assign status	In the Relay output function parameter, the Digital Output option is selected.	Select device status for switch output.	Partially filled pipe detectionLow flow cut off	-
Switch-off value	The Limit option is selected in the Relay output function parameter.	Enter measured value for the switch-off point.	Signed floating-point number	Depends on country: Okg/h Olb/min
Switch-off delay	In the Relay output function parameter, the Limit option is selected.	Define delay for the switch-off of status output.	0.0 to 100.0 s	-
Switch-on value	The Limit option is selected in the Relay output function parameter.	Enter measured value for the switch-on point.	Signed floating-point number	Depends on country: Okg/h Olb/min
Switch-on delay	In the Relay output function parameter, the Limit option is selected.	Define delay for the switch-on of status output.	0.0 to 100.0 s	-
Failure mode	-	Define output behavior in alarm condition.	Actual statusOpenClosed	-
Switch status	-	Shows the current relay switch status.	OpenClosed	-
Powerless relay status	-		OpenClosed	-

^{*} Visibility depends on order options or device settings

10.5.11 Configuring the local display

The **Display** wizard guides you systematically through all the parameters that can configured for configuring the local display.

Navigation

"Setup" menu \rightarrow Display



Parameter	Prerequisite	Description	Selection / User entry	Factory setting
Format display	A local display is provided.	Select how measured values are shown on the display.	 1 value, max. size 1 bargraph + 1 value 2 values 1 value large + 2 values 4 values 	-

is shown on the local display. Volume How Corrected volume How Density Reference duristly Correct output Temperature Correct output Correct output Correct output Prossure Dynamic viscosity Dynamic viscosity Nicement Viscosity Tempe compensated dynamic viscosity Totalizer 1 Totalizer 2 Totalizer 3 Connectration Target mass flow Carrier mass flow Carrier wolume How Target corrected volume flow Carrier corrected volume flow Hissi Fixter current 0 Desidation dunging of Considering Con	Parameter	Prerequisite	Description	Selection / User entry	Factory setting
■ Current output Z	Value 1 display	A local display is provided.		Mass flow Volume flow Corrected volume flow* Density Reference density* Temperature Current output 1 Current output 2 Density Pressure Dynamic viscosity* Dynamic viscosity* Dynamic viscosity Temp. compensated dynamic viscosity Temp. compensated kinematic viscosity Totalizer 1 Totalizer 2 Totalizer 3 Concentration* Target mass flow* Carrier mass flow Carrier wolume flow* Carrier volume flow* Carrier corrected volume flow Farget current 0 Exciter current 0 Exciter current 1 Oscillation damping 0 Oscillation damping 1 Oscillation damping fluctuation 0 Coscillation frequency 0 Oscillation frequency 1 Frequency fluctuation 1 Socillation amplitude 0 Frequency fluctuation 1 Socillation omanplitude 0 Carrier pipe temperature Electronic temperature Electronic temperature	

Parameter	Prerequisite	Description	Selection / User entry	Factory setting
			 Current output 3 * 	
0% bargraph value 1	A local display is provided.	Enter 0% value for bar graph display.	Signed floating-point number	Country-specific: Okg/h Olb/min
100% bargraph value 1	A local display is provided.	Enter 100% value for bar graph display.	Signed floating-point number	Depends on country and nominal diameter
Value 2 display	A local display is provided.	Select the measured value that is shown on the local display.	For the picklist, see Value 1 display parameter (→ 139)	-
Value 3 display	A local display is provided.	Select the measured value that is shown on the local display.	For the picklist, see Value 1 display parameter (→ 139)	-
0% bargraph value 3	A selection was made in the Value 3 display parameter.	Enter 0% value for bar graph display.	Signed floating-point number	Country-specific: Okg/h Olb/min
100% bargraph value 3	A selection was made in the Value 3 display parameter.	Enter 100% value for bar graph display.	Signed floating-point number	-
Value 4 display	A local display is provided.	Select the measured value that is shown on the local display.	For the picklist, see Value 1 display parameter (→ 139)	-
Value 5 display	A local display is provided.	Select the measured value that is shown on the local display.	For the picklist, see Value 1 display parameter (→ 139)	-
Value 6 display	A local display is provided.	Select the measured value that is shown on the local display.	For the picklist, see Value 1 display parameter (→ 139)	-
Value 7 display	A local display is provided.	Select the measured value that is shown on the local display.	For the picklist, see Value 1 display parameter (→ 139)	-
Value 8 display	A local display is provided.	Select the measured value that is shown on the local display.	For the picklist, see Value 1 display parameter (→ 139)	-

^{*} Visibility depends on order options or device settings

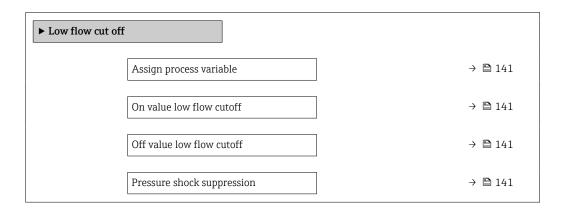
140

10.5.12 Configuring the low flow cut off

The **Low flow cut off** wizard systematically guides the user through all the parameters that must be set to configure low flow cut off.

Navigation

"Setup" menu \rightarrow Low flow cut off



Parameter overview with brief description

Parameter	Prerequisite	Description	Selection / User entry	Factory setting
Assign process variable	-	Select process variable for low flow cut off.	 Off Mass flow Volume flow Corrected volume flow	-
On value low flow cutoff	A process variable is selected in the Assign process variable parameter ($\rightarrow \implies 141$).	Enter on value for low flow cut off.	Positive floating- point number	Depends on country and nominal diameter
Off value low flow cutoff	A process variable is selected in the Assign process variable parameter ($\rightarrow \implies 141$).	Enter off value for low flow cut off.	0 to 100.0 %	_
Pressure shock suppression	A process variable is selected in the Assign process variable parameter ($\rightarrow riangleq 141$).	Enter time frame for signal suppression (= active pressure shock suppression).	0 to 100 s	-

10.5.13 Partially filled pipe detection

The **Partial filled pipe detection** wizard guides you systematically through all parameters that have to be set for configuring the monitoring of the pipe filling.

Navigation

"Setup" menu \rightarrow Partially filled pipe detection

▶ Partially filled pipe detection	
Assign process variable	→ 🖺 142
Low value partial filled pipe detection	→ 🖺 142
High value partial filled pipe detection	→ 🖺 142
Response time part. filled pipe detect.	→ 🖺 142

Parameter overview with brief description

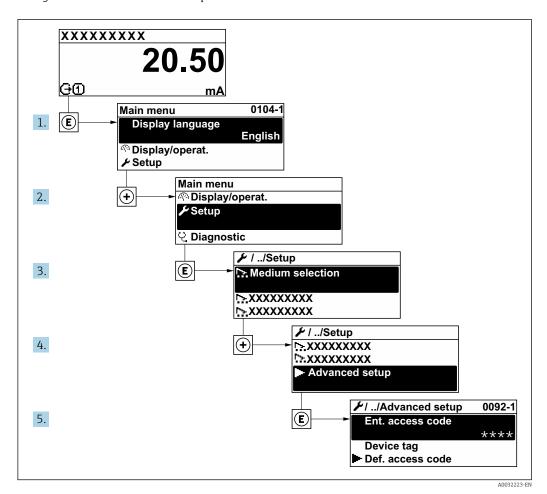
Parameter	Prerequisite	Description	Selection / User entry	Factory setting
Assign process variable	-	Select process variable for partially filled pipe detection.	OffDensityReference density	Density
Low value partial filled pipe detection	A process variable is selected in the Assign process variable parameter ($\rightarrow \implies 142$).	Enter lower limit value for deactivating partialy filled pipe detection.	Signed floating-point number	Depends on country: • 200 kg/m ³ • 12.5 lb/ft ³
High value partial filled pipe detection	A process variable is selected in the Assign process variable parameter ($\rightarrow \implies 142$).	Enter upper limit value for deactivating partialy filled pipe detection.	Signed floating-point number	Depends on country: • 6000 kg/m ³ • 374.6 lb/ft ³
Response time part. filled pipe detect.	A process variable is selected in the Assign process variable parameter (→ 🖺 142).	Use this function to enter the minimum time (hold time) the signal must be present before diagnostic message S962 "Pipe only partly filled" is triggered in the event of a partially filled or empty measuring pipe.	0 to 100 s	-

142

10.6 Advanced settings

The **Advanced setup** submenu with its submenus contains parameters for specific settings.

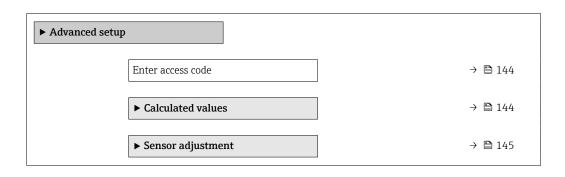
Navigation to the "Advanced setup" submenu

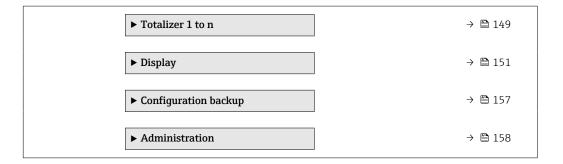


The number of submenus and parameters can vary depending on the device version and the available application packages. These submenus and their parameters are explained in the Special Documentation for the device and not in Operating Instructions.

Navigation

"Setup" menu → Advanced setup





10.6.1 Using the parameter to enter the access code

Navigation

"Setup" menu → Advanced setup

Parameter overview with brief description

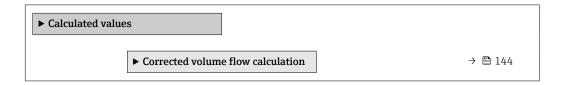
Parameter	Description	User entry
Enter access code	1	Max. 16-digit character string comprising numbers, letters and special characters

10.6.2 Calculated process variables

The **Calculated values** submenu contains parameters for calculating the corrected volume flow.

Navigation

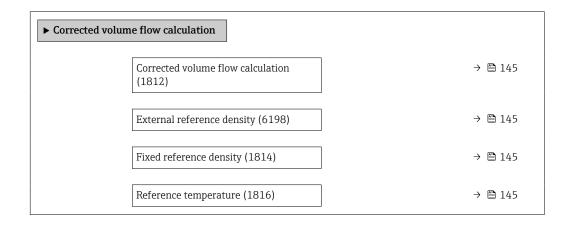
"Setup" menu → Advanced setup → Calculated values



"Corrected volume flow calculation" submenu

Navigation

"Setup" menu \rightarrow Advanced setup \rightarrow Calculated values \rightarrow Corrected volume flow calculation



Linear expansion coefficient (1817)	→ 🖺 145
Square expansion coefficient (1818)	→ 🖺 145

Parameter	Prerequisite	Description	Selection / User interface / User entry	Factory setting
Corrected volume flow calculation	-	Select reference density for calculating the corrected volume flow.	 Fixed reference density Calculated reference density External reference density Current input 1 * Current input 2 * Current input 3 * 	-
External reference density	In the Corrected volume flow calculation parameter, the External reference density option is selected.	Shows external reference density.	Floating point number with sign	-
Fixed reference density	The Fixed reference density option is selected in the Corrected volume flow calculation parameter parameter.	Enter fixed value for reference density.	Positive floating- point number	-
Reference temperature	The Calculated reference density option is selected in the Corrected volume flow calculation parameter parameter.	Enter reference temperature for calculating the reference density.	−273.15 to 99999 °C	Country-specific: +20°C +68°F
Linear expansion coefficient	The Calculated reference density option is selected in the Corrected volume flow calculation parameter parameter.	Enter linear, medium-specific expansion coefficient for calculating the reference density.	Signed floating-point number	-
Square expansion coefficient	The Calculated reference density option is selected in the Corrected volume flow calculation parameter parameter.	For media with a non-linear expansion pattern: enter the quadratic, medium-specific expansion coefficient for calculating the reference density.	Signed floating-point number	-

^{*} Visibility depends on order options or device settings

10.6.3 Carrying out a sensor adjustment

The **Sensor adjustment** submenu contains parameters that pertain to the functionality of the sensor.

Navigation

"Setup" menu \rightarrow Advanced setup \rightarrow Sensor adjustment





Parameter	Description	Selection
Installation direction	Set sign of flow direction to match the direction of the arrow on the sensor.	Flow in arrow directionFlow against arrow direction

Zero verification and zero adjustment

Experience shows that zero adjustment is advisable only in special cases:

- To achieve maximum measurement accuracy even with low flow rates.
- Under extreme process or operating conditions (e.g. very high process temperatures or very high-viscosity media).
- For gas applications with low pressure.
- To achieve the highest possible measurement accuracy at low flow rates, the installation must protect the sensor from mechanical stress during operation.

To get a representative zero point, ensure that:

- any flow in the device is prevented during the adjustment
- the process conditions (e.g. pressure, temperature) are stable and representative

Zero verification and zero adjustment cannot be performed if the following process conditions are present:

- Gas pockets
 - Ensure that the system has been sufficiently flushed with the medium. Repeat flushing can help to eliminate gas pockets
- Thermal circulation
 - In the event of temperature differences (e.g. between the measuring tube inlet and outlet section), induced flow can occur even if the valves are closed due to thermal circulation in the device
- Leaks at the valves
 - If the valves are not leak-tight, flow is not sufficiently prevented when determining the zero point

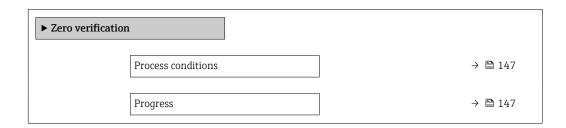
If these conditions cannot be avoided, it is advisable to keep the factory setting for the zero point.

Zero point verification

The zero point can be verified with the **Zero verification** wizard.

Navigation

"Setup" menu \rightarrow Advanced setup \rightarrow Sensor adjustment \rightarrow Zero verification



Status	→ 🖺 147
Additional information	→ 🖺 147
Recommendation:	→ 🖺 147
Root cause	→ 🖺 147
Abort cause	→ 🗎 147
Zero point measured	→ 🖺 147
Zero point standard deviation	→ 🖺 147

Parameter	Description	Selection / User interface	Factory setting
Process conditions	Ensure process conditions as follows.	 Tubes are completely filled Process operational pressure applied No-flow conditions (closed valves) Process and ambient temperatures stable 	-
Progress	Shows the progress of the process.	0 to 100 %	-
Zero point adjustment status		BusyAlarmOk	-
Additional information	Indicate whether to display additional information.	HideShow	-
Recommendation:	Indicates whether an adjustment is recommended. Only recommended if the measured zero point deviates significantly from the current zero point.	Do not adjust zero pointAdjust zero point	-
Abort cause	Indicates why the wizard was aborted.	Check process conditions!A technical issue has occurred	-
Root cause	Shows the diagnostic and remedy.	 Zero point too high. Ensure no-flow. Zero point is unstable. Ensure no-flow. Fluctuation high. Avoid 2-phase medium. 	-
Zero point measured	Shows the zero point measured for the adjustment.	Signed floating-point number	_
Zero point standard deviation	Shows the standard deviation of the zero point measured.	Positive floating-point number	_

Zero adjust

The zero point can be adjusted with the **Zero adjustment** wizard.



- A zero point verification should be performed before a zero adjustment.
- The zero point can also be adjusted manually: Expert → Sensor → Calibration

$\begin{tabular}{ll} \textbf{Navigation} \\ \begin{tabular}{ll} \textbf{"Setup" menu} \to \textbf{Advanced setup} \to \textbf{Sensor adjustment} \\ \end{tabular} \to \textbf{Zero adjustment} \\ \end{tabular}$

► Zero adjustme	ent	
	Process conditions	→ 🖺 148
	Progress	→ 🖺 148
	Status	→ 🖺 148
	Root cause	→ 🖺 148
	Abort cause	→ 🖺 148
	Root cause	→ 🖺 148
	Reliability of measured zero point	→ 🖺 149
	Additional information	→ 🖺 149
	Reliability of measured zero point	→ 🖺 149
	Zero point measured	→ 🖺 149
	Zero point standard deviation	→ 🖺 149
	Select action	→ 🖺 149

Parameter overview with brief description

Parameter	Description	Selection / User interface	Factory setting
Process conditions	Ensure process conditions as follows.	 Tubes are completely filled Process operational pressure applied No-flow conditions (closed valves) Process and ambient temperatures stable 	-
Progress	Shows the progress of the process.	0 to 100 %	-
Zero point adjustment status		BusyAlarmOk	-
Abort cause	Indicates why the wizard was aborted.	Check process conditions! A technical issue has occurred	-
Root cause	Shows the diagnostic and remedy.	 Zero point too high. Ensure no-flow. Zero point is unstable. Ensure no-flow. Fluctuation high. Avoid 2-phase medium. 	-

148

Parameter	Description	Selection / User interface	Factory setting
Reliability of measured zero point	Indicates the reliability of the zero point measured.	Not doneGoodUncertain	-
Additional information	Indicate whether to display additional information.	HideShow	-
Zero point measured	Shows the zero point measured for the adjustment.	Signed floating-point number	-
Zero point standard deviation	Shows the standard deviation of the zero point measured.	Positive floating-point number	-
Select action	Select the zero point value to apply.	 Keep current zero point Apply zero point measured Apply factory zero point* 	-

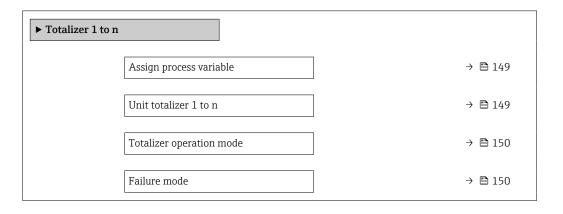
^{*} Visibility depends on order options or device settings

10.6.4 Configuring the totalizer

In the "Totalizer 1 to n" submenu, you can configure the specific totalizer.

Navigation

"Setup" menu \rightarrow Advanced setup \rightarrow Totalizer 1 to n



Parameter overview with brief description

Parameter	Prerequisite	Description	Selection	Factory setting
Assign process variable	_	Select process variable for totalizer.	■ Off ■ Mass flow ■ Volume flow ■ Corrected volume flow ■ Target mass flow ■ Carrier mass flow ■ Target volume flow ■ Target volume flow ■ Carrier volume flow ■ Carrier corrected volume flow ■ Carrier corrected volume flow	_
Unit totalizer 1 to n	A process variable is selected in the Assign process variable parameter ($\rightarrow \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	Select process variable totalizer unit.	Unit choose list	Depends on country: • kg • lb

Parameter	Prerequisite	Description	Selection	Factory setting
Totalizer operation mode	A process variable is selected in the Assign process variable parameter ($\rightarrow \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	Select totalizer calculation mode.	Net flow totalForward flow totalReverse flow total	-
Failure mode	A process variable is selected in the Assign process variable parameter (→ 🖺 149) of the Totalizer 1 to n submenu.	Define totalizer behavior in alarm condition.	StopActual valueLast valid value	-

^{*} Visibility depends on order options or device settings

10.6.5 Carrying out additional display configurations

In the $\bf Display$ submenu you can set all the parameters associated with the configuration of the local display.

Navigation

"Setup" menu \rightarrow Advanced setup \rightarrow Display

Format display Format display Value 1 display	
Value 1 display ⇒	
0% bargraph value 1 $\Rightarrow \implies 154$ 100% bargraph value 1 $\Rightarrow \implies 154$ Decimal places 1 $\Rightarrow \implies 154$ Value 2 display $\Rightarrow \implies 154$ Decimal places 2 $\Rightarrow \implies 154$	
Decimal places 1 $\rightarrow \ \ \ \Rightarrow \ \ \ 154$ Value 2 display $\rightarrow \ \ \ \Rightarrow \ \ \ 154$ Decimal places 2 $\rightarrow \ \ \ \Rightarrow \ \ \ \ \Rightarrow \ \ \ \Rightarrow \ \ \ \Rightarrow \ \ \ \Rightarrow \ \ \ \ \Rightarrow \ \ \ \ \Rightarrow \ \ \ \ \Rightarrow \ \ \ \ \ \Rightarrow \ \ \ \$	
Decimal places 2 → 🖺 154	
Value 3 display → 🖺 154	
0% bargraph value 3 → 🖺 154	
100% bargraph value 3 → 🖺 154	
Decimal places 3 → 🖺 154	
Value 4 display → 🖺 154	
Decimal places 4 → 🗎 154	
Display language → 🗎 155	
Display interval → 🗎 155	
Display damping → 🗎 155	
Header → 🖺 155	
Header text → 🗎 155	
Separator → 🖺 155	
Backlight → 🖺 155	

Parameter	Prerequisite	Description	Selection / User entry	Factory setting
Format display	A local display is provided.	Select how measured values are shown on the display.	 1 value, max. size 1 bargraph + 1 value 2 values 1 value large + 2 values 4 values 	-

Parameter	Prerequisite	Description	Selection / User entry	Factory setting
Value 1 display	A local display is provided.	Select the measured value that is shown on the local display.	Mass flow Volume flow Corrected volume flow Density Reference density Temperature Current output 1 Current output 2 Current output 4 Pressure Dynamic viscosity Dynamic viscosity Kinematic viscosity Temp. compensated dynamic viscosity Temp. compensated kinematic viscosity Totalizer 1 Totalizer 2 Totalizer 3 Concentration Target mass flow Carrier mass flow Carrier wolume flow Carrier volume flow Carrier corrected volume flow Target corrected volume flow Carrier corrected volume flow Carrier corrected volume flow Target corrected volume flow Facciter current 0 Exciter current 1 Oscillation damping 0 Oscillation damping 1 Oscillation damping 1 Coscillation damping fluctuation 0 Coscillation damping fluctuation 1 Coscillation damping fluctuation 1 Coscillation damping fluctuation 0 Coscillation damping fluctuation 1 Coscillation damping fluctuation 1 Coscillation frequency 1 Frequency fluctuation 1 Coscillation amplitude 0 Coscillation amplitude 0 Coscillation carpier pipe temperature Current output 1 Corrected volume 1 Corrected volume 1 Corrected volume 1 Coscillation camping 1 Coscillation coscillation coscillation coscillation coscillation coscillation co	
		1	Current output 2 *	

Parameter	Prerequisite	Description	Selection / User entry	Factory setting
			 Current output 3 * 	
0% bargraph value 1	A local display is provided.	Enter 0% value for bar graph display.	Signed floating-point number	Country-specific: Okg/h Olb/min
100% bargraph value 1	A local display is provided.	Enter 100% value for bar graph display.	Signed floating-point number	Depends on country and nominal diameter
Decimal places 1	A measured value is specified in the Value 1 display parameter.	Select the number of decimal places for the display value.	 X X.X X.XX X.XXX X.XXXX	-
Value 2 display	A local display is provided.	Select the measured value that is shown on the local display.	For the picklist, see Value 1 display parameter (→ 139)	-
Decimal places 2	A measured value is specified in the Value 2 display parameter.	Select the number of decimal places for the display value.	X X.X X.XX X.XXX X.XXXX	-
Value 3 display	A local display is provided.	Select the measured value that is shown on the local display.	For the picklist, see Value 1 display parameter (→ 139)	-
0% bargraph value 3	A selection was made in the Value 3 display parameter.	Enter 0% value for bar graph display.	Signed floating-point number	Country-specific: Okg/h Olb/min
100% bargraph value 3	A selection was made in the Value 3 display parameter.	Enter 100% value for bar graph display.	Signed floating-point number	-
Decimal places 3	A measured value is specified in the Value 3 display parameter.	Select the number of decimal places for the display value.	X X.X X.XX X.XXX X.XXXX	-
Value 4 display	A local display is provided.	Select the measured value that is shown on the local display.	For the picklist, see Value 1 display parameter (→ 🖺 139)	_
Decimal places 4	A measured value is specified in the Value 4 display parameter.	Select the number of decimal places for the display value.	 X X.X X.XX X.XXX X.XXXX 	-

Parameter	Prerequisite	Description	Selection / User entry	Factory setting
Display language	A local display is provided.	Set display language.	■ English ■ Deutsch* ■ Français* ■ Español* ■ Italiano* ■ Nederlands* ■ Portuguesa* ■ Polski* ■ русский язык (Russian)* ■ Svenska* ■ Türkçe* ■ 中文 (Chinese)* ■ 日本語 (Japanese)* ■ 한국어 (Korean)* ■ tiếng Việt (Vietnamese)* ■ čeština (Czech)*	English (alternatively, the ordered language is preset in the device)
Display interval	A local display is provided.	Set time measured values are shown on display if display alternates between values.	1 to 10 s	_
Display damping	A local display is provided.	Set display reaction time to fluctuations in the measured value.	0.0 to 999.9 s	_
Header	A local display is provided.	Select header contents on local display.	Device tagFree text	-
Header text	The Free text option is selected in the Header parameter.	Enter display header text.	Max. 12 characters, such as letters, numbers or special characters (e.g. @, %, /)	-
Separator	A local display is provided.	Select decimal separator for displaying numerical values.	• . (point) • , (comma)	. (point)
Backlight	One of the following conditions is met: Order code for "Display; operation", option F "4-line, illum.; touch control" Order code for "Display; operation", option G "4-line, illum.; touch control +WLAN"	Switch the local display backlight on and off.	DisableEnable	-

 $^{^{\}star}$ Visibility depends on order options or device settings

10.6.6 WLAN configuration

The **WLAN Settings** submenu guides the user systematically through all the parameters that have to be set for the WLAN configuration.

Navigation

"Setup" menu \rightarrow Advanced setup \rightarrow WLAN settings



WLAN mode	→ 🗎 156
SSID name	→ 🖺 156
Network security	→ 🖺 156
Security identification	→ 🗎 156
User name	→ 🗎 156
WLAN password	→ 🖺 156
WLAN IP address	→ 🗎 156
WLAN passphrase	→ 🗎 157
Assign SSID name	→ 🗎 157
SSID name	→ 🖺 157
Connection state	→ 🖺 157
Received signal strength	→ 🖺 157

Parameter	Prerequisite	Description	Selection / User entry / User interface	Factory setting
WLAN	-	Switch WLAN on and off.	DisableEnable	-
WLAN mode	-	Select WLAN mode.	WLAN access pointWLAN Client	-
SSID name	The client is activated.	Enter the user-defined SSID name (max. 32 characters).	-	-
Network security	-	Select the security type of the WLAN network.	 Unsecured WPA2-PSK EAP-PEAP with MSCHAPv2 EAP-PEAP MSCHAPv2 no server authentic. EAP-TLS 	-
Security identification	-	Select security settings and download these settings via menu Data management > Security > WLAN.	Root certificateDevice certificateDevice private key	-
User name	-	Enter user name.	-	-
WLAN password	-	Enter WLAN password.	-	-
WLAN IP address	-	Enter IP address of the device WLAN interface.	4 octet: 0 to 255 (in the particular octet)	-

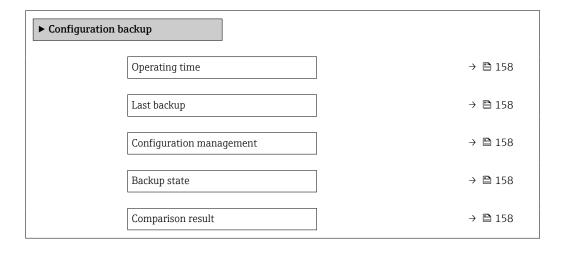
Parameter	Prerequisite	Description	Selection / User entry / User interface	Factory setting
WLAN passphrase	The WPA2-PSK option is selected in the Security type parameter.	Enter the network key (8 to 32 characters). The network key supplied with the device should be changed during commissioning for security reasons.	8 to 32-digit character string comprising numbers, letters and special characters (without spaces)	Serial number of the measuring device (e.g. L100A802000)
Assign SSID name	-	Select which name will be used for SSID: device tag or user-defined name.	Device tagUser-defined	-
SSID name	 The User-defined option is selected in the Assign SSID name parameter. The WLAN access point option is selected in the WLAN mode parameter. 	Enter the user-defined SSID name (max. 32 characters). The user-defined SSID name may only be assigned once. If the SSID name is assigned more than once, the devices can interfere with one another.	Max. 32-digit character string comprising numbers, letters and special characters	EH_device designation_last 7 digits of the serial number (e.g. EH_Promass_500_A 802000)
Connection state	_	Displays the connection status.	ConnectedNot connected	-
Received signal strength	-	Shows the received signal strength.	LowMediumHigh	-

10.6.7 Configuration management

After commissioning, you can save the current device configurationor restore the previous device configuration. The device configuration is managed via the **Configuration management** parameter.

Navigation

"Setup" menu \rightarrow Advanced setup \rightarrow Configuration backup



Parameter	Description	User interface / Selection
Operating time	Indicates how long the device has been in operation.	Days (d), hours (h), minutes (m) and seconds (s)
Last backup	Shows when the last data backup was saved to HistoROM backup.	Days (d), hours (h), minutes (m) and seconds (s)
Configuration management	Select action for managing the device data in the HistoROM backup.	 Cancel Execute backup Restore Compare Clear backup data
Backup state	Shows the current status of data saving or restoring.	 None Backup in progress Restoring in progress Delete in progress Compare in progress Restoring failed Backup failed
Comparison result	Comparison of current device data with HistoROM backup.	 Settings identical Settings not identical No backup available Backup settings corrupt Check not done Dataset incompatible

Function range of "Configuration management" parameter

Options	Description
Cancel	No action is executed and the user exits the parameter.
Execute backup	A backup copy of the current device configuration is saved from the HistoROM backup to the memory of the device. The backup copy includes the transmitter data of the device.
Restore	The last backup copy of the device configuration is restored from the display module from the device memory to the device's HistoROM backup. The backup copy includes the transmitter data of the device.
Compare	The device configuration saved in the device memory is compared with the current device configuration of the HistoROM backup.
Clear backup data	The backup copy of the device configuration is deleted from the memory of the device.

- HistoROM backup
 A HistoROM is a "non-volatile" device memory in the form of an EEPROM.
- While this action is in progress, the configuration cannot be edited via the local display and a message on the processing status appears on the display.

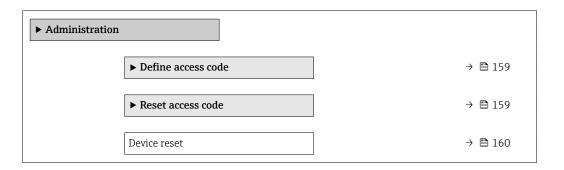
10.6.8 Using parameters for device administration

The **Administration** submenu systematically guides the user through all the parameters that can be used for device administration purposes.

158

Navigation

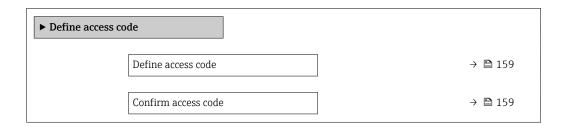
"Setup" menu \rightarrow Advanced setup \rightarrow Administration



Using the parameter to define the access code

Navigation

"Setup" menu \rightarrow Advanced setup \rightarrow Administration \rightarrow Define access code



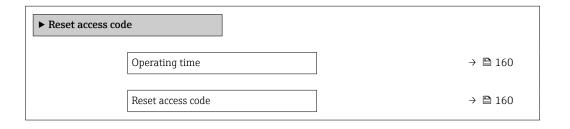
Parameter overview with brief description

Parameter	Description	User entry
Define access code	Restrict write-access to parameters to protect the configuration of the device against unintentional changes.	Max. 16-digit character string comprising numbers, letters and special characters
Confirm access code	Confirm the entered access code.	Max. 16-digit character string comprising numbers, letters and special characters

Using the parameter to reset the access code

Navigation

"Setup" menu \rightarrow Advanced setup \rightarrow Administration \rightarrow Reset access code



Parameter	Description	User interface / User entry
Operating time	Indicates how long the device has been in operation.	Days (d), hours (h), minutes (m) and seconds (s)
Reset access code	Reset access code to factory settings. For a reset code, contact your Endress+Hauser service organization.	Character string comprising numbers, letters and special characters
	The reset code can only be entered via: Web browser DeviceCare, FieldCare (via CDI-RJ45 service interface) Fieldbus	

Using the parameter to reset the device

Navigation

"Setup" menu \rightarrow Advanced setup \rightarrow Administration

Parameter overview with brief description

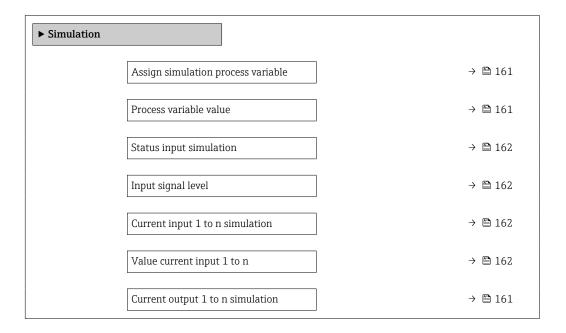
Parameter	Description	Selection
Device reset	Reset the device configuration - either entirely or in part - to a defined state.	 Cancel To delivery settings Restart device Restore S-DAT backup

10.7 Simulation

Via the **Simulation** submenu, it is possible to simulate various process variables in the process and the device alarm mode and verify downstream signal chains (switching valves or closed-control loops). The simulation can be performed without a real measurement (no flow of medium through the device).

Navigation

"Diagnostics" menu \rightarrow Simulation



Value current output 1 to n	→ 🖺 162
Frequency output simulation 1 to n	→ 🖺 162
Frequency value 1 to n	→ 🖺 162
Pulse output simulation 1 to n	→ 🖺 162
Pulse value 1 to n	→ 🗎 162
Switch output simulation 1 to n	→ 🖺 162
Switch status 1 to n	→ 🖺 162
Relay output 1 to n simulation	→ 🖺 162
Switch status 1 to n	→ 🖺 162
Device alarm simulation	→ 🖺 162
Diagnostic event category	→ 🖺 162
Diagnostic event simulation	→ 🖺 162

Parameter	Prerequisite	Description	Selection / User entry
Assign simulation process variable		Select a process variable for the simulation process that is activated.	Off Mass flow Volume flow Corrected volume flow Target mass flow Carrier mass flow Target volume flow Target volume flow Target corrected volume flow Target volume fl
Process variable value	A process variable is selected in the Assign simulation process variable parameter ($\rightarrow \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	Enter the simulation value for the selected process variable.	Depends on the process variable selected
Current output 1 to n simulation	-	Switch the simulation of the current output on and off.	■ Off ■ On

Parameter	Prerequisite	Description	Selection / User entry
Value current output 1 to n	In the Current output 1 to n simulation parameter, the On option is selected.	Enter the current value for simulation.	3.59 to 22.5 mA
Frequency output simulation 1 to n	In the Operating mode parameter, the Frequency option is selected.	Switch the simulation of the frequency output on and off.	■ Off ■ On
Frequency value 1 to n	In the Frequency output simulation 1 to n parameter, the On option is selected.	Enter the frequency value for the simulation.	0.0 to 12 500.0 Hz
Pulse output simulation 1 to n	In the Operating mode parameter, the Pulse option is selected.	Set and switch off the pulse output simulation. For Fixed value option: Pulse width parameter (→ defines the pulse width of the pulses output.	OffFixed valueDown-counting value
Pulse value 1 to n	In the Pulse output simulation 1 to n parameter, the Down-counting value option is selected.	Enter the number of pulses for simulation.	0 to 65 535
Switch output simulation 1 to n	In the Operating mode parameter, the Switch option is selected.	Switch the simulation of the switch output on and off.	Off On
Switch status 1 to n	-	Select the status of the status output for the simulation.	OpenClosed
Relay output 1 to n simulation	-	Switch simulation of the relay output on and off.	Off On
Switch status 1 to n	The On option is selected in the Switch output simulation 1 to n parameter parameter.	Select status of the relay output for the simulation.	OpenClosed
Device alarm simulation	-	Switch the device alarm on and off.	Off On
Diagnostic event category	-	Select a diagnostic event category.	SensorElectronicsConfigurationProcess
Diagnostic event simulation	-	Select a diagnostic event to simulate this event.	 Off Diagnostic event picklist (depends on the category selected)
Current input 1 to n simulation	-	Switch simulation of the current input on and off.	Off On
Value current input 1 to n	In the Current input 1 to n simulation parameter, the On option is selected.	Enter the current value for simulation.	0 to 22.5 mA
Status input simulation	-	Switch simulation of the status input on and off.	Off On
Input signal level	In the Status input simulation parameter, the On option is selected.	Select the signal level for the simulation of the status input.	■ High ■ Low

^{*} Visibility depends on order options or device settings

10.8 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 → 163
- ullet Protect access to measuring device via write protection switch ullet \cong 164

10.8.1 Write protection via access code

The effects of the user-specific access code are as follows:

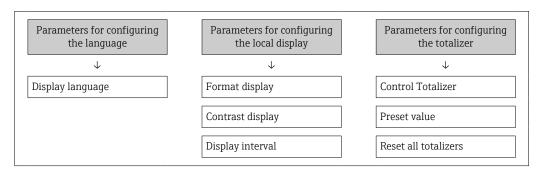
- Via local operation, the parameters for the measuring device configuration are write-protected and their values can no longer be changed.
- Device access is protected via the Web browser, as are the parameters for the measuring device configuration.
- Device access is protected via FieldCare or DeviceCare (via CDI-RJ45 service interface), as are the parameters for the measuring device configuration.

Defining the access code via the local display

- 1. Navigate to the **Define access code** parameter ($\rightarrow \triangleq 159$).
- 2. Maximum of 16-digit character string comprising numbers, letters and special characters as the access code.
- 3. Enter the access code again in the **Confirm access code** parameter (→ 🖺 159) to confirm.
 - ► The 🗈 symbol appears in front of all write-protected parameters.
- Disabling parameter write protection via access code \rightarrow $\stackrel{\triangle}{=}$ 81.
 - If the access code is lost: Resetting the access code $\rightarrow \blacksquare 164$.
 - The user role with which the user is currently logged in is displayed in Access status parameter.
 - Navigation path: Operation → Access status
 - User roles and their access rights $\rightarrow \triangleq 81$
- The device automatically locks the write-protected parameters again if a key is not pressed for 10 minutes in the navigation and editing view.
- The device locks the write-protected parameters automatically after 60 s if the user skips back to the operational display mode from the navigation and editing view.

Parameters which can always be modified via the local display

Certain parameters that do not affect the measurement are excepted from parameter write protection via the local display. Despite the user-specific access code, they can always be modified, even if the other parameters are locked.



Defining the access code via the web browser

- 1. Navigate to the **Define access code** parameter ($\rightarrow \triangleq 159$).
- 2. Define a 16-digit (max.) numeric code as the access code.

- 3. Enter the access code again in the **Confirm access code** parameter (→ 159) to confirm.
 - ► The web browser switches to the login page.
- \blacksquare Disabling parameter write protection via access code \rightarrow \blacksquare 81.
 - If the access code is lost: Resetting the access code $\rightarrow \triangleq 164$.
 - The Access status parameter shows which user role the user is currently logged in with.
 - Navigation path: Operation → Access status
 - User roles and their access rights \rightarrow $\stackrel{ riangle}{ riangle}$ 81

If no action is performed for 10 minutes, the web browser automatically returns to the login page.

Resetting the access code

If you misplace the user-specific access code, it is possible to reset the code to the factory setting. A reset code must be entered for this purpose. The user-specific access code can then be defined again afterwards.

Via Web browser, FieldCare, DeviceCare (via CDI-RJ45 service interface), fieldbus

- You can only obtain a reset code from your local Endress+Hauser service organization. The code must be calculated explicitly for every device.
- 1. Note down the serial number of the device.
- 2. Read off the **Operating time** parameter.
- 3. Contact the local Endress+Hauser service organization and tell them the serial number and the operating time.
 - ► Get the calculated reset code.
- 4. Enter the reset code in the **Reset access code** parameter ($\rightarrow \triangleq 160$).
 - The access code has been reset to the factory setting **0000**. It can be redefined $\rightarrow \boxminus 163$.
- For IT security reasons, the calculated reset code is only valid for 96 hours from the specified operating time and for the specific serial number. If you cannot return to the device within 96 hours, you should either increase the operating time you read out by a few days or switch off the device.

10.8.2 Write protection via write protection switch

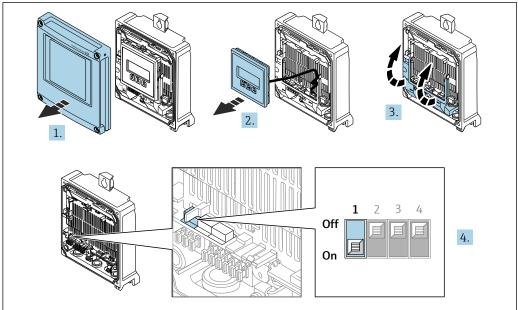
Unlike parameter write protection via a user-specific access code, this allows the user to lock write access to the entire operating menu - apart from the **"Contrast display"** parameter.

The parameter values are now read only and cannot be edited any more (exception "Contrast display" parameter):

- Via local display
- Via EtherNet/IP protocol

Proline 500 - digital

Enable/disable write protection



A0029673

- 1. Open the housing cover.
- 2. Remove the display module.
- 3. Fold open the terminal cover.

4. Enable or disable write protection:

Setting the write protection (WP) switch on the main electronics module to the **ON** position enables hardware write protection/setting to **OFF** (factory setting) disables hardware write protection.

In the Locking status parameter, the Hardware locked option is displayed
 → ■ 167. When hardware write protection is enabled, the ⑤ symbol appears in the header of the measured value display and in the navigation view in front of the parameters.



A002942

- 5. Insert the display module.
- 6. Close the housing cover.

7. NOTICE

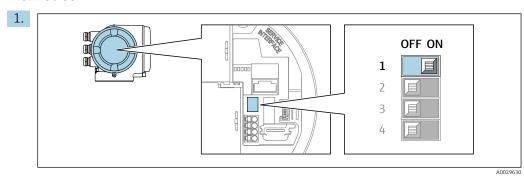
Excessive tightening torque applied to the fixing screws!

Risk of damaging the plastic transmitter.

▶ Tighten the fixing screws as per the tightening torque: 2.5 Nm (1.8 lbf ft)

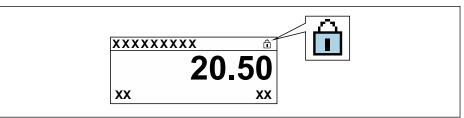
Tighten the fixing screws.

Proline 500



Setting the write protection (WP) switch on the main electronics module to the **ON** position enables hardware write protection.

└ In the **Locking status** parameter, the **Hardware locked** option is displayed $\rightarrow \stackrel{\triangle}{=} 167$. In addition, on the local display the $\stackrel{\triangle}{=}$ symbol appears in front of the parameters in the header of the operational display and in the navigation view.



A002942

- 2. Setting the write protection (WP) switch on the main electronics module to the **OFF** position (factory setting) disables hardware write protection.

166

11 Operation

11.1 Reading the device locking status

Device active write protection: Locking status parameter

Operation → Locking status

Function scope of the "Locking status" parameter

Options	Description
None	The access authorization displayed in the Access status parameter applies → 🖺 81. Only appears on local display.
Hardware locked	The DIP switch for hardware locking is activated on the PCB board. This locks write access to the parameters (e.g. via local display or operating tool) $\rightarrow \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $
Temporarily locked	Write access to the parameters is temporarily locked on account of internal processes running in the device (e.g. data upload/download, reset, etc.). Once the internal processing has been completed, the parameters can be changed again.

11.2 Adjusting the operating language



Detailed information:

- To configure the operating language → 🗎 113
- \bullet For information on the operating languages supported by the measuring device $\rightarrow \; \trianglerighteq \; 241$

11.3 Configuring the display

Detailed information:

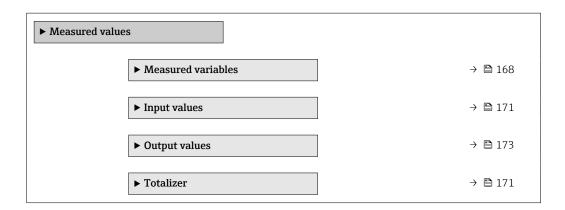
- On the basic settings for the local display $\rightarrow \implies 137$
- On the advanced settings for the local display $\rightarrow \implies 151$

11.4 Reading off measured values

With the **Measured values** submenu, it is possible to read all the measured values.

Navigation

"Diagnostics" menu → Measured values



11.4.1 "Measured variables" submenu

The **Measured variables** submenu contains all the parameters needed to display the current measured values for each process variable.

Navigation

"Diagnostics" menu \rightarrow Measured values \rightarrow Measured variables

► Measured varia	ibles	
	Mass flow	→ 🖺 169
	Volume flow	→ 🖺 169
	Corrected volume flow	→ 🖺 169
	Density	→ 🖺 169
	Reference density	→ 🖺 169
	Temperature	→ 🖺 169
	Pressure	→ 🖺 169
	Dynamic viscosity	→ 🖺 169
	Kinematic viscosity	→ 🖺 169
	Temp. compensated dynamic viscosity	→ 🖺 169
	Temp. compensated kinematic viscosity	→ 🖺 170
	Concentration	→ 🖺 170
	Target mass flow	→ 🖺 170
	Carrier mass flow	→ 🖺 170
	Target corrected volume flow	→ 🖺 170
	Carrier corrected volume flow	→ 🖺 170
	Target volume flow	→ 🖺 171
	Carrier volume flow	→ 🖺 171

Parameter	Prerequisite	Description	User interface
Mass flow	-	Displays the mass flow that is currently measured. Dependency The unit is taken from: Mass flow unit parameter (→ 116)	Signed floating-point number
Volume flow	-	Displays the volume flow that is currently calculated. Dependency The unit is taken from the Volume flow unit parameter (→ 116).	Signed floating-point number
Corrected volume flow	_	Displays the corrected volume flow that is currently calculated. Dependency The unit is taken from: Corrected volume flow unit parameter (→ 116)	Signed floating-point number
Density	-	Shows the density currently measured. Dependency The unit is taken from the Density unit parameter (\rightarrow) 117).	Signed floating-point number
Reference density	-	Displays the reference density that is currently calculated. Dependency The unit is taken from: Reference density unit parameter (→ 🖺 116)	Signed floating-point number
Temperature	-	Shows the medium temperature currently measured. Dependency The unit is taken from: Temperature unit parameter (→ 🖺 117)	Signed floating-point number
Pressure value	-	Displays either a fixed or external pressure value. Dependency The unit is taken from the Pressure unit parameter (→ 🖺 117).	Signed floating-point number
Dynamic viscosity	For the following order code: "Application package", option EG "Viscosity" The software options currently enabled are displayed in the Software option overview parameter.	Displays the dynamic viscosity that is currently calculated. Dependency The unit is taken from: Dynamic viscosity unit parameter	Signed floating-point number
Kinematic viscosity	For the following order code: "Application package", option EG "Viscosity" The software options currently enabled are displayed in the Software option overview parameter.	Displays the kinematic viscosity that is currently calculated. Dependency The unit is taken from: Kinematic viscosity unit parameter	Signed floating-point number
Temp. compensated dynamic viscosity	For the following order code: "Application package", option EG "Viscosity" The software options currently enabled are displayed in the Software option overview parameter.	Displays the temperature compensation that is currently calculated for the viscosity. Dependency The unit is taken from: Dynamic viscosity unit parameter	Signed floating-point number

Parameter	Prerequisite	Description	User interface
Temp. compensated kinematic viscosity	For the following order code: "Application package", option EG "Viscosity"	Displays the temperature compensation that is currently calculated for the kinetic viscosity.	Signed floating-point number
	The software options currently enabled are displayed in the Software option overview parameter.	Dependency The unit is taken from: Kinematic viscosity unit parameter (0578)	
Concentration	For the following order code: Order code for "Application package", option ED "Concentration"	Displays the concentration that is currently calculated. Dependency	Signed floating-point number
	The software options currently enabled are displayed in the Software option overview parameter.	The unit is taken from the Concentration unit parameter.	
Target mass flow	With the following conditions: Order code for "Application package", option ED "Concentration"	Displays the mass flow that is currently measured for the target medium. Dependency	Signed floating-point number
	The software options currently enabled are displayed in the Software option overview parameter.	Dependency The unit is taken from: Mass flow unit parameter (→ 116)	
Carrier mass flow	With the following conditions: Order code for "Application package", option ED "Concentration"	Displays the mass flow of the carrier medium that is currently measured. Dependency	Signed floating-point number
	The software options currently enabled are displayed in the Software option overview parameter.	The unit is taken from: Mass flow unit parameter (→ 🖺 116)	
Target corrected volume flow	With the following conditions: Order code for "Application package", option ED "Concentration" The Ethanol in water option or %mass / %volume option is selected in the Liquid type parameter.	Displays the corrected volume flow that is currently measured for the target fluid. Dependency The unit is taken from the Volume flow unit parameter (→ 🖺 116).	Signed floating-point number
	The software options currently enabled are displayed in the Software option overview parameter.	unit parameter (> = 110).	
Carrier corrected volume flow	With the following conditions: Order code for "Application package", option ED "Concentration" In the Liquid type parameter, the Ethanol in water option or %mass / %volume option is selected.	Displays the corrected volume flow currently measured for the carrier fluid. Dependency The unit is taken from the Volume flow unit parameter (→ 🖺 116).	Signed floating-point number
	The software options currently enabled are displayed in the Software option overview parameter.		

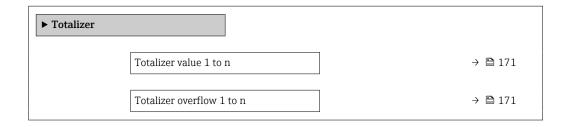
Parameter	Prerequisite	Description	User interface
Target volume flow	With the following conditions: Order code for "Application package", option ED "Concentration" The Ethanol in water option or %mass / %volume option is selected in the Liquid type parameter. The %vol option is selected in the Concentration unit parameter.	Displays the volume flow currently measured for the target medium. $Dependency$ The unit is taken from the Volume flow unit parameter ($\Rightarrow \implies 116$).	Signed floating-point number
	The software options currently enabled are displayed in the Software option overview parameter.		
Carrier volume flow	With the following conditions: Order code for "Application package", option ED "Concentration" The Ethanol in water option or %mass / %volume option is selected in the Liquid type parameter. The %vol option is selected in the Concentration unit parameter.	Displays the volume flow currently measured for the carrier medium. Dependency The unit is taken from the Volume flow unit parameter (→ 🖺 116).	Signed floating-point number
	The software options currently enabled are displayed in the Software option overview parameter.		

11.4.2 "Totalizer" submenu

The **Totalizer** submenu contains all the parameters needed to display the current measured values for every totalizer.

Navigation

"Diagnostics" menu \rightarrow Measured values \rightarrow Totalizer



Parameter overview with brief description

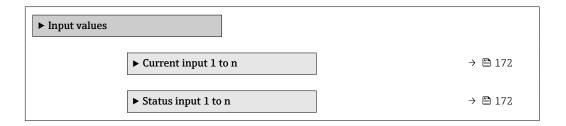
Parameter	Prerequisite	Description	User interface
Totalizer value 1 to n	A process variable is selected in the Assign process variable parameter (→ 🖺 149) of the Totalizer 1 to n submenu.	Displays the current totalizer counter value.	Signed floating-point number
Totalizer overflow 1 to n	A process variable is selected in the Assign process variable parameter (→ 🖺 149) of the Totalizer 1 to n submenu.	Displays the current totalizer overflow.	Integer with sign

11.4.3 "Input values" submenu

The **Input values** submenu guides you systematically to the individual input values.

Navigation

"Diagnostics" menu \rightarrow Measured values \rightarrow Input values

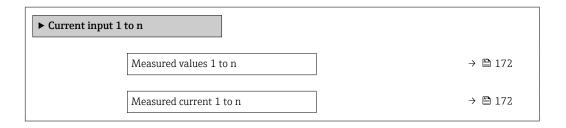


Input values of current input

The **Current input 1 to n** submenu contains all the parameters needed to display the current measured values for every current input.

Navigation

"Diagnostics" menu \rightarrow Measured values \rightarrow Input values \rightarrow Current input 1 to n



Parameter overview with brief description

Parameter	Description	User interface
Measured values 1 to n	Displays the current input value.	Signed floating-point number
Measured current 1 to n	Displays the current value of the current input.	0 to 22.5 mA

Input values of status input

The **Status input 1 to n** submenu contains all the parameters needed to display the current measured values for every status input.

Navigation

"Diagnostics" menu \rightarrow Measured values \rightarrow Input values \rightarrow Status input 1 to n



Parameter overview with brief description

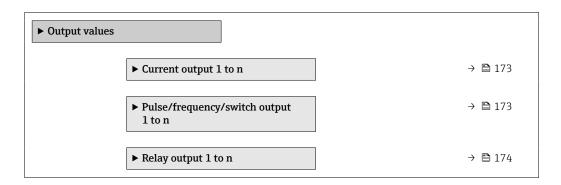
Parameter	Description	User interface
Value status input	Shows the current input signal level.	High Low

11.4.4 Output values

The **Output values** submenu contains all the parameters needed to display the current measured values for every output.

Navigation

"Diagnostics" menu \rightarrow Measured values \rightarrow Output values

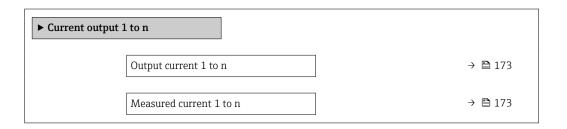


Output values of current output

The **Value current output** submenu contains all the parameters needed to display the current measured values for every current output.

Navigation

"Diagnostics" menu \rightarrow Measured values \rightarrow Output values \rightarrow Value current output 1 to n



Parameter overview with brief description

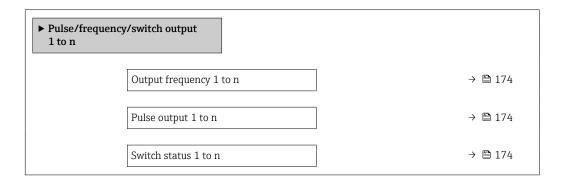
Parameter	Description	User interface
Output current 1	Displays the current value currently calculated for the current output.	3.59 to 22.5 mA
Measured current	Displays the current value currently measured for the current output.	0 to 30 mA

Output values for pulse/frequency/switch output

The Pulse/frequency/switch output 1 to n submenu contains all the parameters needed to display the current measured values for every pulse/frequency/switch output.

Navigation

"Diagnostics" menu \rightarrow Measured values \rightarrow Output values \rightarrow Pulse/frequency/switch output 1 to n



Parameter overview with brief description

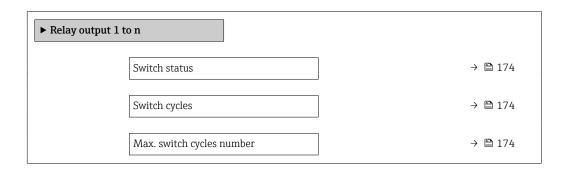
Parameter	Prerequisite	Description	User interface
Output frequency 1 to n	In the Operating mode parameter, the Frequency option is selected.	Displays the value currently measured for the frequency output.	0.0 to 12 500.0 Hz
Pulse output 1 to n	The Pulse option is selected in the Operating mode parameter parameter.	Displays the pulse frequency currently output.	Positive floating-point number
Switch status 1 to n	The Switch option is selected in the Operating mode parameter.	Displays the current switch output status.	OpenClosed

Output values for relay output

The **Relay output 1 to n** submenu contains all the parameters needed to display the current measured values for every relay output.

Navigation

"Diagnostics" menu \rightarrow Measured values \rightarrow Output values \rightarrow Relay output 1 to n



Parameter overview with brief description

Parameter	Description	User interface
Switch status	Shows the current relay switch status.	OpenClosed
Switch cycles	Shows number of all performed switch cycles.	Positive integer
Max. switch cycles number	Shows the maximal number of guaranteed switch cycles.	Positive integer

11.5 Adapting the measuring device to the process conditions

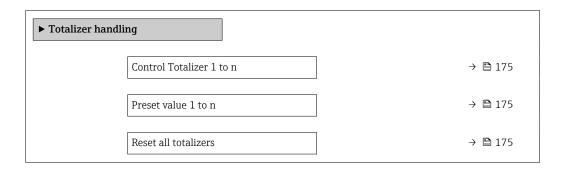
The following are available for this purpose:

- Basic settings using the **Setup** menu (\rightarrow 🗎 114)
- Advanced settings using the Advanced setup submenu (→ 🗎 143)

11.6 Performing a totalizer reset

Navigation

"Operation" menu → Totalizer handling



Parameter overview with brief description

Parameter	Prerequisite	Description	Selection / User entry	Factory setting
Control Totalizer 1 to n	A process variable is selected in the Assign process variable parameter (→ 🖺 149) of the Totalizer 1 to n submenu.	Control totalizer value.	 Totalize Reset + hold Preset + hold Reset + totalize Preset + totalize Hold 	-
Preset value 1 to n	A process variable is selected in the Assign process variable parameter (→ 🖺 149) of the Totalizer 1 to n submenu.	Specify start value for totalizer. Dependency The unit of the selected process variable is defined in the Unit totalizer parameter (→ 149) for the totalizer.	Signed floating-point number	Depends on country: • 0 kg • 0 lb
Reset all totalizers	-	Reset all totalizers to 0 and start.	CancelReset + totalize	-

11.6.1 Function scope of "Control Totalizer" parameter

Options	Description
Totalize	The totalizer is started or continues running.
Reset + hold	The totaling process is stopped and the totalizer is reset to 0.
Preset + hold ¹⁾	The totaling process is stopped and the totalizer is set to its defined start value from the Preset value parameter.
Reset + totalize	The totalizer is reset to 0 and the totaling process is restarted.

Options	Description
Preset + totalize 1)	The totalizer is set to the defined start value in the Preset value parameter and the totaling process is restarted.
Hold	Totalizing is stopped.

Visible depending on the order options or device settings

11.6.2 Function range of "Reset all totalizers" parameter

Options	Description
Cancel	No action is executed and the user exits the parameter.
Reset + totalize	Resets all totalizers to 0 and restarts the totaling process. This deletes all the previously aggregated flow values.

11.7 Displaying the measured value history

The **Extended HistoROM** application package must be enabled in the device (order option) for the Data logging submenu to appear. This contains all the parameters for the measured value history.

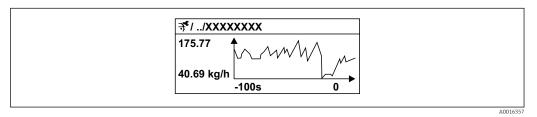


Data logging is also available via:

- Web browser

Function scope

- A total of 1000 measured values can be stored
- 4 logging channels
- Adjustable logging interval for data logging
- Displays the measured value trend for each logging channel in the form of a chart



■ 36 Chart of a measured value trend

- x-axis: depending on the number of channels selected displays 250 to 1000 measured values of a process variable.
- y-axis: displays the approximate measured value span and constantly adapts this to the ongoing measurement.
- If the length of the logging interval or the assignment of the process variables to the channels is changed, the content of the data logging is deleted.

Navigation

"Diagnostics" menu → Data logging

▶ Data logging Assign channel 1 → 🖺 178 → 🖺 178 Assign channel 2

Assign channel 3	→ 🖺 178
Assign channel 4	→ 🖺 179
Logging interval	→ 🖺 179
Clear logging data	→ 🖺 179
Data logging	→ 🖺 179
Logging delay	→ 🖺 179
Data logging control	→ 🗎 179
Data logging status	→ 🖺 179
Entire logging duration	→ 🗎 179

Parameter	Prerequisite	Description	Selection / User entry / User interface
Assign channel 1	The Extended HistoROM application package is available.	Assign process variable to logging channel.	• Off • Mass flow • Volume flow • Corrected volume flow* • Density • Reference density* • Temperature • Oscillation amplitude • Current output 1 • Current output 2* • Current output 3* • Current output 4* • Pressure • Dynamic viscosity* • Kinematic viscosity* • Temp. compensated dynamic viscosity* • Temp. compensated kinematic viscosity* • Target mass flow* • Carrier mass flow* • Carrier wolume flow* • Carrier volume flow* • Carrier volume flow* • Carrier corrected volume flow* • Carrier corrected volume flow* • Carrier corrected volume flow* • Oscillation amplitude • HBSI* • Exciter current 1 • Oscillation damping 1 • Oscillation damping 1 • Oscillation damping fluctuation 0* • Oscillation frequency 0 • Oscillation frequency 1 • Oscillation amplitude • Frequency fluctuation 0* • Frequency fluctuation 0* • Frequency fluctuation 1 • Oscillation amplitude 1 • Oscillation amplitude 1 • Signal asymmetry • Carrier pipe temperature • Electronic temperature
Assign channel 2	The Extended HistoROM application package is available. The software options currently enabled are displayed in the Software option overview parameter.	Assign a process variable to logging channel.	For the picklist, see Assign channel 1 parameter (→ 🖺 178)
Assign channel 3	The Extended HistoROM application package is available. The software options currently enabled are displayed in the Software option overview parameter.	Assign a process variable to logging channel.	For the picklist, see Assign channel 1 parameter (→ 🖺 178)

178

Parameter	Prerequisite	Description	Selection / User entry / User interface
Assign channel 4	The Extended HistoROM application package is available. The software options currently enabled are displayed in the Software option overview parameter.	Assign a process variable to logging channel.	For the picklist, see Assign channel 1 parameter (→ 🖺 178)
Logging interval	The Extended HistoROM application package is available.	Define the logging interval for data logging. This value defines the time interval between the individual data points in the memory.	0.1 to 3 600.0 s
Clear logging data	The Extended HistoROM application package is available.	Clear the entire logging data.	Cancel Clear data
Data logging	-	Select the type of data logging.	OverwritingNot overwriting
Logging delay	In the Data logging parameter, the Not overwriting option is selected.	Enter the time delay for measured value logging.	0 to 999 h
Data logging control	In the Data logging parameter, the Not overwriting option is selected.	Start and stop measured value logging.	NoneDelete + startStop
Data logging status	In the Data logging parameter, the Not overwriting option is selected.	Displays the measured value logging status.	DoneDelay activeActiveStopped
Entire logging duration	In the Data logging parameter, the Not overwriting option is selected.	Displays the total logging duration.	Positive floating-point number

^{*} Visibility depends on order options or device settings

12 Diagnostics and troubleshooting

12.1 General troubleshooting

For local display

Fault	Possible causes	Remedial action
Local display is dark, but signal output is within the valid range	The cable of the display module is not plugged in correctly.	Insert the plug correctly into the main electronics module and display module.
Local display dark and no output signals	Supply voltage does not match the voltage specified on the nameplate.	Apply the correct supply voltage .
Local display dark and no output signals	Supply voltage has incorrect polarity.	Reverse polarity of supply voltage.
Local display dark and no output signals	No contact between connecting cables and terminals.	Check the electrical contact between the cable and terminals and correct if necessary.
Local display dark and no output signals	 Terminals are not plugged into the I/O electronics module correctly. Terminals are not plugged into the main electronics module correctly. 	Check terminals.
Local display dark and no output signals	I/O electronics module is defective.Main electronics module is defective.	Order spare part → 🗎 212.
Local display dark and no output signals	The connector between the main electronics module and display module is not plugged in correctly.	Check the connection and correct if necessary.
Local display cannot be read, but signal output is within the valid range	Display is set too bright or too dark.	■ Set the display brighter by simultaneously pressing
Local display is dark, but signal output is within the valid range	Display module is defective.	Order spare part → 🖺 212.
Backlighting of local display is red	Diagnostic event with "Alarm" diagnostic behavior has occurred.	Take remedial actions → 🖺 191
Text on local display appears in a language that cannot be understood.	The selected operating language cannot be understood.	1. Press □ + ₺ for 2 s ("home position"). 2. Press □. 3. Configure the required language in the Display language parameter (→ 🗎 155).
Message on local display: "Communication Error" "Check Electronics"	Communication between the display module and the electronics is interrupted.	 Check the cable and the connector between the main electronics module and display module. Order spare part → 212.

For output signals

Fault	Possible causes	Remedial action
Signal output outside the valid range	Main electronics module is defective.	Order spare part → 🖺 212.
Device shows correct value on local display, but signal output is incorrect, though in the valid range.	Parameter configuration error	Check and adjust parameter configuration.
Device is measuring incorrectly.	Configuration error or device is operated outside the application.	Check and correct parameter configuration. Observe limit values specified in the "Technical Data". "Technical Data".

For access

Fault	Possible causes	Remedial action	
Write access to parameters is not possible.	Hardware write protection is enabled.	Set the write protection switch on the main electronics module to the OFF position → 🖺 164.	
Write access to parameters is not possible.	Current user role has limited access authorization.	 Check user role → ■ 81. Enter correct customer-specific access code → ■ 81. 	
Connection via EtherNet/IP is not possible.	Device plug is connected incorrectly.	Check the pin assignment of the device plugs .	
Connection to the web server is not possible.	Web server is disabled.	Use the "FieldCare" or "DeviceCare" operating tool to check if the web server of the device is enabled and enable if necessary → 🖺 89.	
	The Ethernet interface on the PC is incorrectly configured.	 Check the properties of the Internet protocol (TCP/IP)→	
Connection to the web server is not possible.	 The IP address on the PC is incorrectly configured. IP address is not known. 	 If addressing via hardware: open the transmitter and check the configured IP address (last octet). Check the IP address of the device with the IT specialist. If the IP address is not known, set DIP switch no. 10 to ON, restart the device and enter the factory IP address 192.168.1.212. 	
		EtherNet/IP communication is interrupted by enabling the DIP switch.	
	The web browser setting "Use a proxy server for LAN" is enabled on the PC.	Disable the use of the proxy server in the LAN settings.	
	Apart from the active network connection to the measuring instrument, other network connections are also being used.	 Make sure that no other network connections are established by the computer (also no WLAN) and close other programs with network access to the computer. If using a docking station for notebooks, make sure that a network connection to another network is not active. 	
Connection to the web server is not possible.	WLAN access data are incorrect.	 Check WLAN network status. Log on to the device again using WLAN access data. Check that WLAN is enabled on the measuring instrument and operating unit →	
	WLAN communication is disabled.	-	
Unable to connect to web server, FieldCare or DeviceCare.	WLAN network is not available.	 Check if WLAN reception is present: LED on display module is lit blue. Check if WLAN connection is enabled: LED on display module flashes blue. Switch on instrument function. 	
Network connection not present or unstable	WLAN network is weak.	 Operating unit outside reception range: Check network status on operating unit. To improve network performance, use an external WLAN antenna. 	
	Parallel WLAN and Ethernet communication	 Check network settings. Temporarily enable only the WLAN as an interface. 	
Web browser is frozen and operation no longer possible	Data transfer is active.	Wait until data transfer or current action is finished.	
	Connection lost	 Check cable connection and power supply. Refresh the web browser and restart if necessary. 	

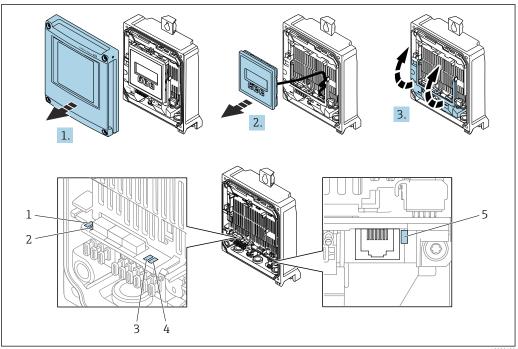
Fault	Possible causes	Remedial action
Display of web browser content is difficult to read or incomplete.	Web browser version used is not optimal.	 Use correct web browser version →
	Unsuitable view settings.	Change the font size/display ratio of the web browser.
Incomplete or no display of content in the web browser	JavaScript is not enabled.JavaScript cannot be enabled.	► Enable JavaScript. ► Enter http://XXX.XXX.X.X.XX/servlet/basic.html as the IP address.
Operation with FieldCare or DeviceCare via service interface CDI-RJ45 (port 8000) is not possible.	Firewall of the PC or network is blocking communication.	Depending on the settings of the firewall used on the PC or in the network, the firewall must be adapted or disabled to allow FieldCare/DeviceCare access.
Flashing the firmware with FieldCare or DeviceCare via service interface CDI-RJ45 (port 8000 or TFTP ports) is not possible.	Firewall of the PC or network is blocking communication. Depending on the settings of the fire on the PC or in the network, the fire adapted or disabled to allow FieldCa DeviceCare access.	

12.2 Diagnostic information via LEDs

12.2.1 Transmitter

Proline 500 - digital

Various LEDs in the transmitter provide information on the device status.



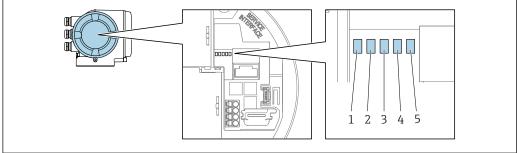
A002968

- 1 Supply voltage
- 2 Device status
- 3 network status
- 4 Port 1 active: EtherNet/IP
- 5 Port 2 active: EtherNet/IP and service interface (CDI)
- 1. Open the housing cover.
- 2. Remove the display module.
- 3. Fold open the terminal cover.

LED		Color	Meaning
1	Supply voltage	Off	Supply voltage is off or too low.
		Green	Supply voltage is OK.
2	Device status/module	Off	Firmware error
	status (normal operation)	Green	Device status is OK.
	•	Flashing green	Device is not configured.
		Flashing red	A diagnostic event with "Warning" diagnostic behavior has occurred.
		Red	A diagnostic event with "Alarm" diagnostic behavior has occurred.
		Red/green flashing	The device restarts/self-test.
2	Device status/module	Flashes red slowly	If > 30 seconds: problem with the boot loader.
	status (during start-up)	Flashes red quickly	If > 30 seconds: compatibility problem when reading the firmware.
3	Network status	Off	The device does not have an EtherNet/IP address.
		Green	EtherNet/IP connection is active.
		Flashing green	The device has an Ethernet/IP address but no EtherNet/IP connection is active.
		Red	The EtherNet/IP address of the device has been assigned twice.
		Flashing red	EtherNet/IP connection is in the "time out" mode.
		Red/green flashing	The device restarts/self-test.
4	Port 1 active:	Off	Not connected or no connection established.
	Ethernet/IP	White	Connected and connection established.
		Flashing white	Communication not active.
5	Port 2 active:	Off	Not connected or no connection established.
	Ethernet/IP and service interface (CDI)	Yellow	Connected and connection established.
		Flashing yellow	Communication not active.

Proline 500

Various LEDs in the transmitter provide information on the device status.



A0029629

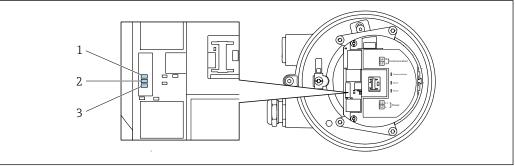
- 1 Supply voltage
- 2 Device status
- 3 network status
- 4 Port 1 active: EtherNet/IP
- 5 Port 2 active: EtherNet/IP and service interface (CDI)

LED		Color	Meaning
1	Supply voltage	Off	Supply voltage is off or too low.
		Green	Supply voltage is OK.
2	Device status/module	Off	Firmware error.
	status (normal operation)	Green	Device status is OK.
	•	Flashing green	Device is not configured.
		Flashing red	A diagnostic event with "Warning" diagnostic behavior has occurred.
		Red	A diagnostic event with "Alarm" diagnostic behavior has occurred.
		Red/green flashing	The device restarts/self-test.
2	Device status/module	Flashes red slowly	If > 30 seconds: problem with the boot loader.
	status (during start-up)	Flashes red quickly	If > 30 seconds: compatibility problem when reading the firmware.
3	Network status	Off	The device does not have an EtherNet/IP address.
		Green	EtherNet/IP connection is active.
		Flashing green	The device has an Ethernet/IP address but no EtherNet/IP connection is active.
		Red	The EtherNet/IP address of the device has been assigned twice.
		Flashing red	EtherNet/IP connection is in the "time out" mode.
		Red/green flashing	The device restarts/self-test.
4	Port 1 active:	Off	Not connected or no connection established.
	Ethernet/IP	White	Connected and connection established.
		Flashing white	Communication not active.
5	Port 2 active:	Off	Not connected or no connection established.
	Ethernet/IP and service interface (CDI)	Yellow	Connected and connection established.
		Flashing yellow	Communication not active.

12.2.2 Sensor connection housing

Proline 500 - digital

Various LEDs on the ISEM electronics unit (intelligent sensor electronics module) in the sensor connection housing provide information about the device status.



A00296

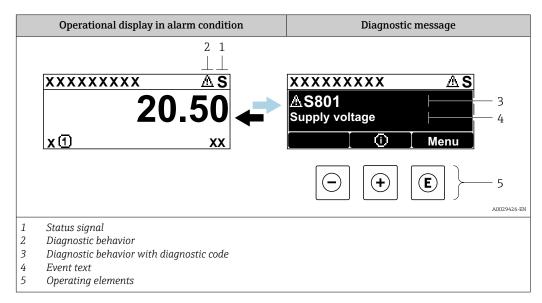
- 1 Communication
- 2 Device status
- 3 Supply voltage

LED		Color	Meaning
1	Communication	White	Communication active.
2	Device status (normal	Red	Fault
	operation)	Flashing red	Warning
2	Device status (during	Flashes red slowly	If > 30 seconds: problem with the boot loader.
	start-up)	Flashes red quickly	If > 30 seconds: compatibility problem when reading the firmware.
3	Supply voltage	Green	Supply voltage is OK.
		Off	Supply voltage is off or too low.

12.3 Diagnostic information on local display

12.3.1 Diagnostic message

Faults detected by the self-monitoring system of the measuring instrument are displayed as a diagnostic message in alternation with the operational display.



If two or more diagnostic events are pending simultaneously, only the message of the diagnostic event with the highest priority is shown.

- Other diagnostic events that have occurred can be displayed in the **Diagnostics** menu:
 - Via parameter \rightarrow 🗎 205
 - Via submenus \rightarrow 🖺 205

Status signals

The status signals provide information on the state and reliability of the device by categorizing the cause of the diagnostic information (diagnostic event).

- The status signals are categorized in accordance with VDI/VDE 2650 and NAMUR Recommendation NE 107:
 - F = Failure
 - C = Function Check
 - S = Out of Specification
 - M = Maintenance Required

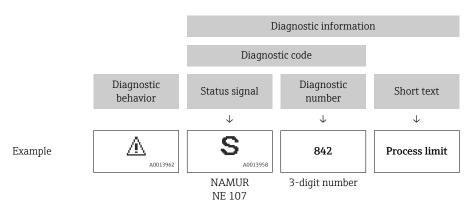
Symbol	Meaning
F	Failure A device error has occurred. The measured value is no longer valid.
С	Function check The device is in the service mode (e.g. during a simulation).
S	Out of specification The device is being operated: Outside its technical specification limits (e.g. outside the process temperature range)
М	Maintenance required Maintenance is required. The measured value remains valid.

Diagnostic behavior

Symbol	Meaning
*	 Alarm Measurement is interrupted. Signal outputs and totalizers assume the defined alarm condition. A diagnostic message is generated.
Δ	 Warning Measurement is resumed. The signal outputs and totalizers are not affected. A diagnostic message is generated.

Diagnostic information

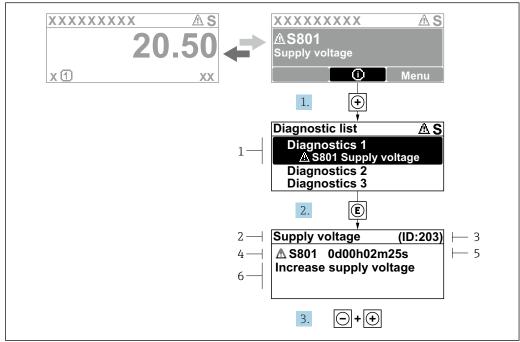
The fault can be identified using the diagnostic information. The short text helps you by providing information about the fault. In addition, the corresponding symbol for the diagnostic behavior is displayed in front of the diagnostic information on the local display.



Operating elements

Operating key	Meaning
(+)	Plus key In menu, submenu Opens the message about the remedial measures.
E	Enter key In menu, submenu Opens the operating menu.

12.3.2 Calling up remedial actions



A0029431-EN

- 37 Message for remedial actions
- 1 Diagnostic information
- 2 Event text
- 3 Service ID
- 4 Diagnostic behavior with diagnostic code
- 5 Operating time of occurrence
- 6 Remedial actions
- 1. The user is in the diagnostic message.

Press ± (① symbol).

- The **Diagnostic list** submenu opens.
- 2. Select the desired diagnostic event with \pm or \Box and press \Box .
 - └ The message about the remedial measures opens.
- 3. Press \Box + \pm simultaneously.
 - ► The message about the remedial measures closes.

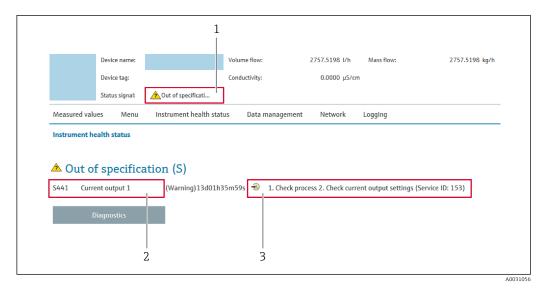
The user is in the **Diagnostics** menu in the **Diagnostic list** submenu. A list of active diagnostics is displayed. The user can select a diagnostic event.

- 1. Press E.
 - ► The message for the remedial actions for the selected diagnostic event opens.
- 2. Press \Box + \pm simultaneously.
 - ► The message about the remedial actions closes.

12.4 Diagnostic information in the web browser

12.4.1 Diagnostic options

Any faults detected by the measuring device are displayed in the Web browser on the home page once the user has logged on.



- 1 Status area with status signal
- 2 Diagnostic information
- 3 Remedial measures with service ID
- In addition, diagnostic events which have occurred can be shown in the **Diagnostics** menu:

 - Via submenu → 🗎 205

Status signals

The status signals provide information on the state and reliability of the device by categorizing the cause of the diagnostic information (diagnostic event).

Symbol	Meaning		
8	Failure A device error has occurred. The measured value is no longer valid.		
Function check The device is in service mode (e.g. during a simulation).			
<u>^</u>	Out of specification The device is being operated: Outside its technical specification limits (e.g. outside the process temperature range)		
&	Maintenance required Maintenance is required. The measured value remains valid.		

The status signals are categorized in accordance with VDI/VDE 2650 and NAMUR Recommendation NE 107.

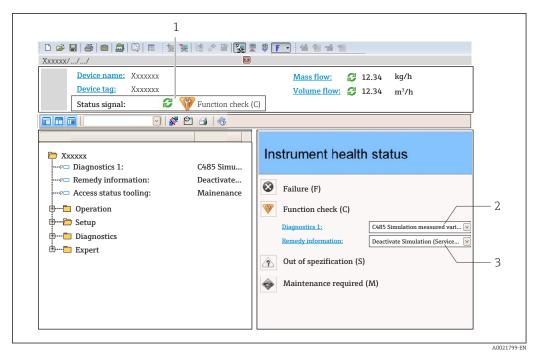
12.4.2 Calling up remedial actions

Remedial actions are provided for each diagnostic event to ensure that problems can be rectified quickly. These actions are displayed along with the diagnostic event and the related diagnostic information.

12.5 Diagnostic information in FieldCare or DeviceCare

12.5.1 Diagnostic options

Any faults detected by the measuring device are displayed on the home page of the operating tool once the connection has been established.



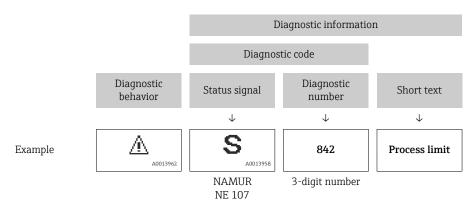
- 1 Status area with status signal → 🖺 186
- 2 Diagnostic information $\rightarrow \implies 187$
- 3 Remedial actions with service ID
- In addition, diagnostic events which have occurred can be shown in the **Diagnostics** menu:

 - Via submenu →

 205

Diagnostic information

The fault can be identified using the diagnostic information. The short text helps you by providing information about the fault. In addition, the corresponding symbol for the diagnostic behavior is displayed in front of the diagnostic information on the local display.



12.5.2 Calling up remedy information

Remedy information is provided for every diagnostic event to ensure that problems can be rectified quickly:

- On the home page Remedy information is displayed in a separate field below the diagnostics information.
- In the **Diagnostics** menu
 Remedy information can be called up in the working area of the user interface.

The user is in the **Diagnostics** menu.

- 1. Call up the desired parameter.
- 2. On the right in the working area, mouse over the parameter.
 - ► A tool tip with remedy information for the diagnostic event appears.

12.6 Diagnostic information via communication interface

12.6.1 Reading out diagnostic information

The current diagnostic event and associated diagnostic information can be read out: **Input Assembly Fix**

Input F	Input Fix Assembly byte 1 to 8							
1	1 2 3 4 5 6 7 8							
	File header (not visible)		Diagnosti	c number	Status signal	_		

12.7 Adapting the diagnostic information

12.7.1 Adapting the diagnostic behavior

Each item of diagnostic information is assigned a specific diagnostic behavior at the factory. The user can change this assignment for specific diagnostic information in the **Diagnostic behavior** submenu.

 $\texttt{Expert} \rightarrow \texttt{System} \rightarrow \texttt{Diagnostic handling} \rightarrow \texttt{Diagnostic behavior}$

You can assign the following options to the diagnostic number as the diagnostic behavior:

Options	Description
Alarm	The device stops measurement. The totalizers assume the defined alarm condition. A diagnostic message is generated. The background lighting changes to red.
Warning	The device continues to measure. The totalizers are not affected. A diagnostic message is generated.
Logbook entry only	The device continues to measure. The diagnostic message is only displayed in the Event logbook submenu (Event list submenu) and is not displayed in alternating sequence with the operational display.
Off	The diagnostic event is ignored, and no diagnostic message is generated or entered.

12.8 Overview of diagnostic information



- The amount of diagnostic information and the number of measured variables affected increase if the measuring device has one or more application packages.
- All of the measured variables affected in the entire Promass instrument family are always listed under "Measured variables affected". The measured variables available for the device in question depend on the device version. When assigning the measured variables to the device functions, for example to the individual outputs, all of the measured variables available for the device version in question are available for selection.
- In the case of some items of diagnostic information, the diagnostic behavior can be changed. Adapting the diagnostic information $\rightarrow \implies 191$

12.8.1 Diagnostic of sensor

	Diagnostic	information	Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
022	Temperature sensor defective		Check or replace sensor electronic module (ISEM)	• 0x10000BE • 0x10000BF
	Status signal	F	2. If available: Check connection cable between sensor and	■ 0x10000D5 ■ 0x10000D6
	Diagnostic behavior	Alarm	transmitter 3. Replace sensor	- UNICOCODO

	Diagnostic	information	Remedy instructions	Coding of diagnostic
No.	S	Short text		information (hex)
046	Sensor limit exceeded		Inspect sensor Check process condition	■ 0x80000C8 ■ 0x80000CA
	Status signal	S		
	Diagnostic behavior [from the factory] 1)	Alarm		

1) Diagnostic behavior can be changed.

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	hort text		information (hex)
062	Sensor connection faulty		Check or replace sensor electronic module (ISEM)	■ 0x10000DB ■ 0x10000DC
	Status signal	F	2. If available: Check connection	• 0x10000DC
H	Diagnostic behavior	Alarm	cable between sensor and	■ 0x1000114
	Diagnostic beliavior	Aldılıı	transmitter 3. Replace sensor	

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	S	hort text		information (hex)
063	Exciter current faulty		1. Check or replace sensor 0x80002B3 electronic module (ISEM) 2. If available: Check connection cable between sensor and	0x80002B3
	Status signal	S		
	Diagnostic behavior Alarm	transmitter 3. Replace sensor		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
082	Data storage		Check module connections Contact service	0x10000E7
	Status signal	F		
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
083	Memory content		1. Restart device	0x10000A0
			2. Restore HistoROM S-DAT backup	
	Status signal	F	('Device reset' parameter) - 3. Replace HistoROM S-DAT	
	Diagnostic behavior	Alarm	J. Replace Historiol 113 DAT	

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	S	hort text		information (hex)
140	Sensor signal asymmetrical		Check or replace sensor electronic module (ISEM)	0x80000CC
	Status signal S 2. If available: Check connection	• • • • • • • • • • • • • • • • • • • •		
	Diagnostic behavior [from the factory] ¹⁾	Alarm	transmitter 3. Replace sensor	

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	S	hort text		information (hex)
144	Measuring error too high		Check or change sensor Check process conditions Ox10001C7	0x10001C7
	Status signal	F		
	Diagnostic behavior [from the factory] 1)	Alarm		

1) Diagnostic behavior can be changed.

12.8.2 Diagnostic of electronic

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
201	Device failure		Restart device Contact service	0x100014B
	Status signal	F		
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	. Short text			information (hex)
242	Software incompatible			0x1000067
			2. Flash or change main electronics	
	Status signal	F	module	
	Diagnostic behavior	Alarm		

	Diagnostic i	information	Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
252	Modules incompatible		Check electronic modules Change electronic modules	0x100006B
	Status signal	F	-	
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	. Short text			information (hex)
252	Modules incompatible			0x10002C0
			is plugged	
	Status signal	F	2. Replace electronic module	
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	hort text		information (hex)
262	Sensor electronic connection fault	у	1. Check or replace connection 0x1000149 cable between sensor electronic	0x1000149
	Status signal	F module (ISEM) and main electronics		
		2. Check or replace ISEM or main		

	Diagnostic :	information	Remedy instructions	Coding of diagnostic
No.	SI	hort text		information (hex)
270	Main electronic failure		Change main electronic module	■ 0x1000078 ■ 0x100007C
	Status signal	F		■ 0x1000080 ■ 0x100009F
	Diagnostic behavior	Alarm		• 0x10002D7

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
271	Main electronic failure		1. Restart device	0x100007D
			2. Change main electronic module	
	Status signal	F		
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
272	Main electronic failure		1. Restart device	0x1000079
			2. Contact service	
	Status signal	F		
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
273	Main electronic failure		Change electronic	■ 0x1000098 ■ 0x10000E5
	Status signal	F		
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
275	I/O module 1 to n defective		Change I/O module	0x100007A
	Status signal	F		
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
276	I/O module 1 to n faulty		Restart device Change I/O module	• 0x100007B • 0x1000081
	Status signal	F	-	
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	o. Short text			information (hex)
283	Memory content		1. Reset device	• 0x10000E1
			2. Contact service	■ 0x100016F
	Status signal	F		
	Diagnostic behavior	Alarm		

No.	Diagnostic information No. Short text		Remedy instructions	Coding of diagnostic information (hex)
302	Device verification active		Device verification active, please wait.	0x20001EE
	Status signal	С	wait.	
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
311	Electronic failure		1. Do not reset device	0x40000E2
			2. Contact service	
	Status signal	M		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	nort text		information (hex)
332	Writing in HistoROM backup failed		Replace user interface board Ex d/XP: replace transmitter	0x10002C7
	Status signal	F		
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	nort text		information (hex)
361	I/O module 1 to n faulty		Restart device	0x1000095
			2. Check electronic modules	
	Status signal	F	3. Change I/O Modul or main electronics	
	Diagnostic behavior	Alarm	ciccionics	

	Diagnostic	information	Remedy instructions	Coding of diagnostic
No.	SI	hort text		information (hex)
372	Sensor electronic (ISEM) faulty		1. Restart device	■ 0x10000A1
			2. Check if failure recurs	■ 0x10000C7
	Status signal	F	3. Replace sensor electronic module	■ 0x10000C9
	3		(ISEM)	■ 0x10000D4
	Diagnostic behavior	Alarm		■ 0x10000DA
				■ 0x1000120
				■ 0x10002CB
				■ 0x10002CC
				■ 0x10002CD
				■ 0x10002CE
				■ 0x10002CF
				■ 0x10002D0

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
373	Sensor electronic (ISEM) faulty		Transfer data or reset device	0x10002D1
			2. Contact service	
	Status signal	F		
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic information (hex)
No.	S	hort text		information (nex)
374	Sensor electronic (ISEM) faulty		Restart device	0x80000CE
	Status signal	S	3. Replace sensor electronic module (ISEM)	
	Diagnostic behavior [from the factory] ¹⁾	Warning	(ISLIVI)	

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	S	hort text		information (hex)
375	I/O- 1 to n communication failed		Restart device Check if failure recurs	0x1000107
	Status signal	F	Replace module rack inclusive electronic modules	
	Diagnostic behavior	Alarm	ciccionic modules	

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
382	Data storage		1. Insert T-DAT	0x100016D
			2. Replace T-DAT	
	Status signal	F		
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
383	,		Restart device Delete T-DAT via 'Reset device'	0x100016E
	Status signal F parameter	parameter 3. Replace T-DAT		
	Diagnostic behavior	Alarm	J. Replace I DAI	

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
387	HistoROM backup failed		Contact service organization	0x1000288
	Status signal	F		
	Diagnostic behavior	Alarm		

12.8.3 Diagnostic of configuration

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
303	I/O 1 to n configuration changed		1. Apply I/O module configuration 0x40002 (parameter 'Apply I/O	0x400026C
	Status signal	M	configuration') 2. Afterwards reload device	
	Diagnostic behavior Warning	description and check wiring		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	nort text		information (hex)
330	Flash file invalid		Update firmware of device	0x40002C9
			2. Restart device	
	Status signal	M		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
331	Firmware update failed		Update firmware of device Ox10002CA Restart device	0x10002CA
	Status signal	F		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
410	Data transfer		1. Check connection	0x100008B
			2. Retry data transfer	
	Status signal	F		
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
412	Processing download		Download active, please wait	0x2000204
	Status signal	С		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
431	Trim 1 to n		Carry out trim	0x2000004
	Status signal	С		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	nort text		information (hex)
437	Configuration incompatible		Restart device Contact service	0x1000060
	Status signal	F		
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	hort text		information (hex)
438	Dataset			0x400006A
			2. Check device configuration	
	Status signal	M	Up- and download new configuration	
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
441	Current output 1 to n		1. Check process 2. Check current output settings • 0x8000099 • 0x80000B6	
	Status signal	S		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	hort text		information (hex)
442	Frequency output 1 to n		1. Check process	• 0x800008A
			2. Check frequency output settings	• 0x8000122
	Status signal	S		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
443	Pulse output 1 to n		Check process Check pulse output settings	■ 0x800008C ■ 0x8000121
	Status signal	S		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	nort text		information (hex)
444	Current input 1 to n		1. Check process	0x80001EB
			2. Check current input settings	
	Status signal	S		
	Diagnostic behavior	Warning		

No.	1	Diagnostic information Short text		Coding of diagnostic information (hex)
453	Flow override		Deactivate flow override	0x2000094
	Status signal	С		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	nort text		information (hex)
484	Failure mode simulation		Deactivate simulation	0x2000090
	Status signal	С		
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
485	Measured variable simulation		Deactivate simulation	0x2000093
	Status signal	С		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	nort text		information (hex)
486	Current input 1 to n simulation		Deactivate simulation	0x20001EC
	Status signal	С		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
491	Current output 1 to n simulation		Deactivate simulation	0x200000E
	Status signal	С		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	hort text		information (hex)
492	Simulation frequency output 1 to n		Deactivate simulation frequency	0x200008D
			output	
	Status signal	С		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	S	hort text		information (hex)
493	Simulation pulse output 1 to n		Deactivate simulation pulse output	0x200008E
	Status signal	С		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	hort text		information (hex)
494	Switch output simulation 1 to n		Deactivate simulation switch output	0x200008F
	Status signal	С		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
495	Diagnostic event simulation		Deactivate simulation	0x200015E
	Status signal	С		
	Diagnostic behavior	Warning		

	Diagnostic i	information	Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
496	Status input simulation		Deactivate simulation status input	0x2000170
	Status signal	С		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	nort text		information (hex)
520	20 I/O 1 to n hardware configuration invalid		1. Check I/O hardware 0x1000276 configuration	0x1000276
	Status signal	F	Replace wrong I/O module Plug the module of double pulse output on correct slot	
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Sł	nort text		information (hex)
528	8 Concentration settings faulty		Check concentration settings Check input values e.g. pressure,	0x8000387
	Status signal	al S temperature		
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	hort text		information (hex)
529	Concentration settings faulty		Check concentration settings	0x8000389
			2. Check input values e.g. pressure,	
	Status signal	S	temperature	
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
537	Configuration		Check IP addresses in network Change IP address	0x100014A
	Status signal	F	-	
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	. Short text			information (hex)
594	Relay output simulation		Deactivate simulation switch output	0x20002BA
	Status signal	С		
	Diagnostic behavior	Warning		

12.8.4 Diagnostic of process

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	nort text		information (hex)
803	Current loop		1. Check wiring	0x10000AD
			2. Change I/O module	
	Status signal	F		
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	S	Short text		information (hex)
830	Sensor temperature too high		Reduce ambient temp. around the	0x80000C0
			sensor housing	
	Status signal	S		
	Diagnostic behavior [from the factory] ¹⁾	Warning		

	Diagnostic	information	Remedy instructions	Coding of diagnostic
No.	s	hort text		information (hex)
831	Sensor temperature too low		Increase ambient temp. around the sensor housing 0x80000C2	0x80000C2
	Status signal	S		
	Diagnostic behavior [from the factory] 1)	Warning		

1) Diagnostic behavior can be changed.

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	S	hort text		information (hex)
832	Electronic temperature too high		P	• 0x80000C3 • 0x80002D4
	Status signal	S		
	Diagnostic behavior [from the factory] 1)	Warning		

1) Diagnostic behavior can be changed.

	Diagnostic	information	Remedy instructions	Coding of diagnostic
No.	S	Short text		information (hex)
833	Electronic temperature too low		ncrease ambient temperature	
	Status signal	S		
	Diagnostic behavior [from the factory] 1)	Warning		

1) Diagnostic behavior can be changed.

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	S	Short text		information (hex)
834	Process temperature too high		Reduce process temperature	0x80000C5
	Status signal	S		
	Diagnostic behavior [from the factory] $^{1)}$	Warning		

1) Diagnostic behavior can be changed.

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	S	hort text		information (hex)
835	Process temperature too low	Process temperature too low		0x80000C6
	Status signal	S		
	Diagnostic behavior [from the factory] 1)	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	nort text		information (hex)
842	342 Process limit		Low flow cut off active!	0x8000091
			1. Check low flow cut off	
	Status signal	S	configuration	
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
862	Partly filled pipe		1. Check for gas in process	0x8000092
			2. Adjust detection limits	
	Status signal	S		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	nort text		information (hex)
882	32 Input signal		Check input configuration	• 0x1000031
			2. Check external device or process	■ 0x1000257
	Status signal	F	conditions	
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	. Short text			information (hex)
910	Tubes not oscillating		Check electronic Inspect sensor	0x1000050
	Status signal	F	•	
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	S	hort text		information (hex)
912			1. Check process cond. 2. Increase system pressure • 0x80000C4 • 0x80000DF	
	Status signal S	S		0x80001150x8000162
	Diagnostic behavior [from the factory] 1)	Warning		- 0.0000102

1) Diagnostic behavior can be changed.

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	S	hort text		information (hex)
913	913 Medium unsuitable		Check process conditions Check electronic modules or	0x80000CD
	Status signal	S	sensor	
	Diagnostic behavior [from the factory] 1)	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	hort text		information (hex)
941	API temperature out of specification		F	0x8000380
			selected API commodity group	
	tatus signal S 2. Check API related parameters	2. Check API related parameters		
	Diagnostic behavior	Alarm		

	Diagnostic information		Remedy instructions	Coding of diagnostic
No.	SI	nort text		information (hex)
942	API density out of specification		Check process density with selected API commodity group	0x800033B
	Status signal	S	2. Check API related parameters	
	Diagnostic behavior	Alarm		

	Diagnostic	information	Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
943	API pressure out of specification		Check process pressure with	0x800037F
			selected API commodity group	
	Status signal	S	2. Check API related parameters	
	Diagnostic behavior	Alarm		

	Diagnostic	information	Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
944	Monitoring failed		Check process conditions for Heartbeat Monitoring	0x80001C6
	Status signal	S	_	
	Diagnostic behavior [from the factory] 1)	Warning		

1) Diagnostic behavior can be changed.

	Diagnostic i	information	Remedy instructions	Coding of diagnostic
No.	Short text			information (hex)
948	Oscillation damping too high		Check process conditions	0x8000168
	Status signal	S		
	Diagnostic behavior	Warning		

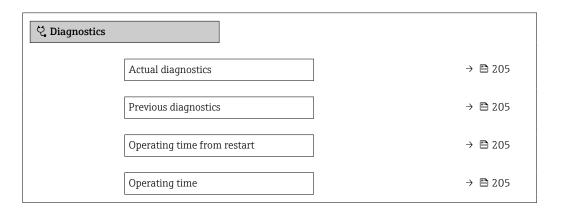
12.9 Pending diagnostic events

The **Diagnostics** menu allows the user to view the current diagnostic event and the previous diagnostic event separately.

- Accessing the remedial action for a diagnostic event:
 - Via local display \rightarrow $\stackrel{\triangle}{=}$ 186
 - Via web browser → 188
 Via "FieldCare" operating tool → 189
- Other pending diagnostic events can be displayed in the **Diagnostic list** submenu $\rightarrow \stackrel{\triangle}{=} 205$.

Navigation

"Diagnostics" menu



Parameter overview with brief description

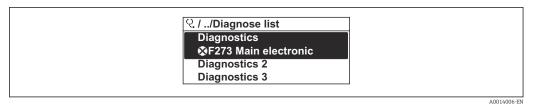
Parameter	Prerequisite	Description	User interface
		Shows the current occured diagnostic event along with its diagnostic information.	Symbol for diagnostic behavior, diagnostic code and short message.
		If two or more messages occur simultaneously, the message with the highest priority is shown on the display.	
Previous diagnostics Two diagnostic events have already occurred.		Shows the diagnostic event that occurred prior to the current diagnostic event along with its diagnostic information.	Symbol for diagnostic behavior, diagnostic code and short message.
Operating time from restart	-	Shows the time the device has been in operation since the last device restart.	Days (d), hours (h), minutes (m) and seconds (s)
Operating time	-	Indicates how long the device has been in operation.	Days (d), hours (h), minutes (m) and seconds (s)

12.10 Diagnostic list

Up to 5 currently pending diagnostic events are displayed in the **Diagnostic list** submenu along with the associated diagnostic information. If more than 5 diagnostic events are pending, the events with the highest priority are shown on the display.

Navigation path

Diagnostics → Diagnostic list



■ 38 Using the example of the local display

Accessing the remedial action for a diagnostic event:

- Via local display →

 186
- Via "FieldCare" operating tool → 🖺 189

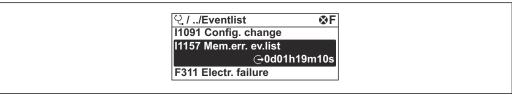
12.11 Event logbook

12.11.1 Reading out the event logbook

A chronological overview of the event messages that have occurred is provided in the **Event logbook** submenu.

Navigation path

Diagnostics menu → **Event logbook** submenu → Event logbook



A0014008-EN

■ 39 Using the example of the local display

- A maximum of 20 event messages can be displayed in chronological order.
- If the **Extended HistoROM** application package (order option) is enabled in the device, the event logbook can contain up to 100 entries.

The event history includes entries for:

- Diagnostic events → 🖺 191
- Information events → 🖺 207

In addition to the operating time when the event occurred, each event is also assigned a symbol that indicates whether the event has occurred or is finished:

- Diagnostic event
 - ①: Occurrence of the event
 - 🕒: End of the event
- Information event
 - €: Occurrence of the event
- Accessing the remedial action for a diagnostic event:
 - Via local display $\rightarrow \blacksquare 186$
 - Via web browser \rightarrow 🗎 188
 - Via "FieldCare" operating tool → 189
- Filtering the displayed event messages $\rightarrow \triangle 207$

12.11.2 Filtering the event logbook

Using the **Filter options** parameter you can define which category of event message is displayed in the **Events list** submenu.

Navigation path

 $Diagnostics \rightarrow Event logbook \rightarrow Filter options$

Filter categories

- All
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- Information (I)

12.11.3 Overview of information events

Unlike a diagnostic event, an information event is displayed in the event logbook only and not in the diagnostic list.

Info number	Info name	
I1000	(Device ok)	
I1079	Sensor changed	
I1089	Power on	
I1090	Configuration reset	
I1091	Configuration changed	
I1092	HistoROM backup deleted	
I1111	Density adjust failure	
I1137	Electronic changed	
I1151	History reset	
I1155	Reset electronic temperature	
I1156	Memory error trend	
I1157	Memory error event list	
I1184	Display connected	
I1209	Density adjustment ok	
I1221	Zero point adjust failure	
I1222	Zero point adjustment ok	
I1256	Display: access status changed	
I1278	I/O module reset detected	
I1335	Firmware changed	
I1361	Web server: login failed	
I1397	Fieldbus: access status changed	
I1398	CDI: access status changed	
I1444	Device verification passed	
I1445	Device verification failed	
I1447	Record application reference data	
I1448	Application reference data recorded	
I1449	Recording application ref. data failed	
I1450	Monitoring off	

Info number	Info name	
I1451	Monitoring on	
I1457	Measured error verification failed	
I1459	I/O module verification failed	
I1460	HBSI verification failed	
I1461	Sensor verification failed	
I1462	Sensor electronic module verific. failed	
I1512	Download started	
I1513	Download finished	
I1514	Upload started	
I1515	Upload finished	
I1618	I/O module 2 replaced	
I1619	I/O module 3 replaced	
I1621	I/O module 4 replaced	
I1622	Calibration changed	
I1624	Reset all totalizers	
I1625	Write protection activated	
I1626	Write protection deactivated	
I1627	Web server: login successful	
I1628	Display: login successful	
I1629	CDI: login successful	
I1631	Web server access changed	
I1632	Display: login failed	
I1633	CDI: login failed	
I1634	Reset to factory settings	
I1635	Reset to delivery settings	
I1639	Max. switch cycles number reached	
I1649	Hardware write protection activated	
I1650	Hardware write protection deactivated	
I1712	New flash file received	
I1725	Sensor electronic module (ISEM) changed	
I1726	Configuration backup failed	

12.12 Resetting the device

The entire device configuration or some of the configuration can be reset to a defined state with the **Device reset** parameter ($\Rightarrow \triangleq 160$).

12.12.1 Function scope of the "Device reset" parameter

Options Description	
Cancel	No action is executed and the user exits the parameter.
To delivery settings	Every parameter for which a customer-specific default setting was ordered is reset to the customer-specific value. All other parameters are reset to the factory setting.

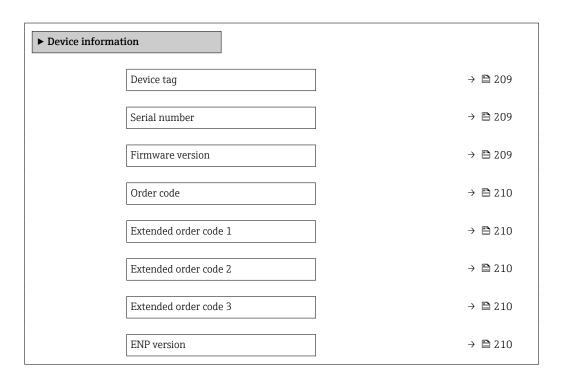
Options	Description		
Restart device	The restart resets every parameter with data stored in volatile memory (RAM) to the factory setting (e.g. measured value data). The device configuration remains unchanged.		
Restore S-DAT backup	Restores the data that is saved on the S-DAT. Additional information: This function can be used to resolve the memory issue "083 Memory content inconsistent" or to restore the S-DAT data when a new S-DAT has been installed. This option is displayed only in an alarm condition.		

12.13 Device information

The **Device information** submenu contains all parameters that display different information for device identification.

Navigation

"Diagnostics" menu \rightarrow Device information



Parameter overview with brief description

Parameter	Parameter Description		Factory setting
Device tag	Shows name of measuring point.	me of measuring point. Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /).	
Serial number	Shows the serial number of the measuring device.	Max. 11-digit character string comprising letters and numbers.	-
Firmware version	Shows the device firmware version installed.	Character string in the format xx.yy.zz	_
Device name		Max. 32 characters such as letters or numbers.	-

Parameter	Description User interface		Factory setting
Order code	Shows the device order code. The order code can be found on the nameplate of the sensor and transmitter in the "Order code" field.	The order code can be found on the nameplate of the sensor and	
Extended order code 1	Shows the 1st part of the extended order code. The extended order code can also be found on the nameplate of the sensor and transmitter in the "Ext. ord. cd." field.		-
Extended order code 2	Shows the 2nd part of the extended order code. The extended order code can also be found on the nameplate of the sensor and transmitter in the "Ext. ord. cd." field.	Character string	-
Extended order code 3	Shows the 3rd part of the extended order code. The extended order code can also be found on the nameplate of the sensor and transmitter in the "Ext. ord. cd." field.	Character string	-
ENP version	Shows the version of the electronic nameplate (ENP).		-

12.14 Firmware history

Release date	Firmware version	Order code for "Firmware version"	Firmware Changes	Documentation type	Documentation
10.2017	01.00.zz	Option 77	Original firmware	Operating instructions	BA01752D

- It is possible to flash the firmware to the current version or an existing previous version via the service interface.
- For the compatibility of the firmware version with the previous version, the installed device description files and operating tools, observe the information about the device in the "Manufacturer's information" document.
- The manufacturer's information is available:
 - \blacksquare In the Download Area of the Endress+Hauser Web site: www.endress.com \to Downloads
 - Specify the following details:
 - Product root: e.g. 8I5B
 The product root is the first part of the order code: see the nameplate on the device.
 - Text search: Manufacturer's information
 - Media type: Documentation Technical Documentation

13 Maintenance

13.1 Maintenance work

No special maintenance work is required.

13.1.1 Cleaning

Cleaning of surfaces not in contact with the medium

- 1. Recommendation: Use a lint-free cloth that is either dry or slightly dampened using water.
- 2. Do not use sharp objects or aggressive cleaning agents that could damage surfaces (e.g. displays, housing) and seals.
- 3. Do not use high-pressure steam.
- 4. Ensure compliance with the protection class of the device.

NOTICE

Cleaning agents can damage the surfaces!

Incorrect cleaning agents can damage the surfaces!

▶ Do not use cleaning agents containing concentrated mineral acids, alkalis or organic solvents e.g. benzyl alcohol, methylene chloride, xylene, concentrated glycerol cleaners or acetone.

Cleaning of surfaces in contact with the medium

Note the following for cleaning and sterilization in place (CIP/SIP):

- Use only cleaning agents to which the materials in contact with the medium are sufficiently resistant.
- Observe the permitted maximum medium temperature.

13.2 Measuring and test equipment

Endress+Hauser offers a variety of measuring and testing equipment, such as Netilion or device tests.

Your Endress+Hauser Sales Center can provide detailed information on the services.

List of some of the measuring and testing equipment: $\rightarrow \stackrel{\triangle}{=} 216$

13.3 Maintenance services

Endress+Hauser offers a wide variety of services for maintenance such as recalibration, maintenance service or device tests.

Your Endress+Hauser Sales Center can provide detailed information on the services.

14 Repair

14.1 General notes

14.1.1 Repair and conversion concept

The Endress+Hauser repair and conversion concept provides for the following:

- The measuring devices have a modular design.
- Spare parts are grouped into logical kits with the associated Installation Instructions.
- Repairs are carried out by Endress+Hauser Service or by appropriately trained customers.
- Certified devices can only be converted to other certified devices by Endress+Hauser Service or at the factory.

14.1.2 Notes for repair and conversion

For repair and conversion of a measuring device, observe the following notes:

- ▶ Use only original Endress+Hauser spare parts.
- ► Carry out the repair according to the Installation Instructions.
- ► Observe the applicable standards, federal/national regulations, Ex documentation (XA) and certificates.
- ▶ Document all repairs and conversions and enter the details in Netilion Analytics.

14.2 Spare parts

Device Viewer (www.endress.com/deviceviewer):

All the spare parts for the measuring device, along with the order code, are listed here and can be ordered. If available, users can also download the associated Installation Instructions.

- Measuring device serial number:
 - Is located on the nameplate of the device.

14.3 Repair services

Endress+Hauser offers a wide range of services.

Your Endress+Hauser Sales Center can provide detailed information on the services.

14.4 Return

The requirements for safe device return can vary depending on the device type and national legislation.

- 1. Refer to the web page for information: https://www.endress.com
- 2. If returning the device, pack the device in such a way that it is reliably protected against impact and external influences. The original packaging provides the best protection.

14.5 **Disposal**



If required by the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), the product is marked with the depicted symbol in order to minimize the disposal of WEEE as unsorted municipal waste. Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to the manufacturer for disposal under the applicable conditions.

14.5.1 Removing the measuring instrument

1. Switch off the device.

WARNING

Danger to persons from process conditions!

- ▶ Beware of hazardous process conditions such as pressure in the measuring instrument, high temperatures or aggressive media.
- 2. Carry out the installation and connection steps from the "Installing the device" and "Connecting the device" sections in reverse order. Observe the safety instructions.

14.5.2 Disposing of the measuring instrument

A WARNING

Danger to personnel and environment from fluids that are hazardous to health.

▶ Ensure that the measuring device and all cavities are free of fluid residues that are hazardous to health or the environment, e.g. substances that have permeated into crevices or diffused through plastic.

Observe the following notes during disposal:

- Observe valid federal/national regulations.
- ▶ Ensure proper separation and reuse of the device components.

15 Accessories

Various accessories, which can be ordered with the device or subsequently from Endress +Hauser, are available for the device. Detailed information on the order code in question is available from your local Endress+Hauser sales center or on the product page of the Endress+Hauser website: www.endress.com.

15.1 Device-specific accessories

15.1.1 For the transmitter

Accessory	Description	
Transmitter Proline 500 – digital Proline 500	Transmitter for replacement or storage. Use the order code to define the following specifications: Approvals Output Input Display/operation Housing Software Proline 500 – digital transmitter: Order number: 8X5BXX-******* Proline 500 transmitter: Order number: 8X5BXX-******* Proline 500 transmitter: Order number: 8X5BXX-******* Proline 500 transmitter for replacement: It is essential to specify the serial number of the current transmitter when ordering. On the basis of the serial number, the device-specific data (e.g. calibration factors) of the replaced device can be used for the new transmitter. Proline 500 – digital transmitter: Installation Instructions EA01151D Proline 500 transmitter: Installation Instructions EA01152D	
External WLAN antenna	External WLAN antenna with 1.5 m (59.1 in) connecting cable and two angle brackets. Order code for "Accessory enclosed", option P8 "Wireless antenna wide area". ■ The external WLAN antenna is not suitable for use in hygienic applications. ■ Further information on the WLAN interface → 93. Order number: 71351317 Installation Instructions EA01238D	
Pipe mounting set Pipe mounting set for transmitter. Proline 500 – digital transmitter Order number: 71346427 Installation Instructions EA01195D Proline 500 transmitter Order number: 71346428		
Protective cover Transmitter Proline 500 – digital Proline 500	Is used to protect the measuring instrument from the effects of the weather: e.g. rainwater, excess heating from direct sunlight. • Proline 500 – digital transmitter Order number: 71343504 • Proline 500 transmitter Order number: 71343505 Installation Instructions EA01191D	

Display guard Proline 500 – digital	Is used to protect the display against impact or scoring, for example from sand in desert areas. Order number: 71228792 Installation Instructions EA01093D
Connecting cable Proline 500 – digital Sensor – Transmitter	The connecting cable can be ordered directly with the measuring instrument (order code for "Cable, sensor connection") or as an accessory (order number DK8012). The following cable lengths are available: order code for "Cable, sensor connection" Option B: 20 m (65 ft) Option E: User-configurable up to max. 50 m Option F: User-configurable up to max. 165 ft Maximum possible cable length for a Proline 500 – digital connecting cable: 300 m (1000 ft)
Connecting cable Proline 500 Sensor – Transmitter	The connecting cable can be ordered directly with the measuring instrument (order code for "Cable, sensor connection") or as an accessory (order number DK8012). The following cable lengths are available: order code for "Cable, sensor connection" Option 1: 5 m (16 ft) Option 2: 10 m (32 ft) Option 3: 20 m (65 ft) Possible cable length for a Proline 500 connecting cable: max. 20 m (65 ft)

15.1.2 For the sensor

Accessories	Description
Heating jacket	Is used to stabilize the temperature of the fluids in the sensor. Water, water vapor and other non-corrosive liquids are permitted for use as fluids.
	If using oil as a heating medium, please consult with Endress+Hauser.
	Use the order code with the product root DK8003.
	Special Documentation SD02158D

15.2 Communication-specific accessories

Accessories	Description
Fieldgate FXA42	Transmission of the measured values of connected 4 to 20 mA analog measuring instruments, as well as digital measuring instruments
	 Technical Information TI01297S Operating Instructions BA01778S Product page: www.endress.com/fxa42
Field Xpert SMT50	The Field Xpert SMT50 tablet PC for device configuration enables mobile plant asset management in non-hazardous areas. It is suitable for commissioning and maintenance staff to manage field instruments with a digital communication interface and to record progress. This tablet PC is designed as an all-in-one solution with a preinstalled driver library and is an easy-to-use, touch-sensitive tool which can be used to manage field instruments throughout their entire life cycle.
	 Technical Information TI01555S Operating Instructions BA02053S Product page: www.endress.com/smt50

Field Xpert SMT70	The Field Xpert SMT70 tablet PC for device configuration enables mobile plant asset management in hazardous and non-hazardous areas. It is suitable for commissioning and maintenance staff to manage field instruments with a digital communication interface and to record progress. This tablet PC is designed as an all-in-one solution with a preinstalled driver library and is an easy-to-use, touch-sensitive tool which can be used to manage field instruments throughout their entire life cycle.
	 Technical Information TI01342S Operating Instructions BA01709S Product page: www.endress.com/smt70
Field Xpert SMT77	The Field Xpert SMT77 tablet PC for device configuration enables mobile plant asset management in areas categorized as Ex Zone 1.
	 Technical Information TI01418S Operating Instructions BA01923S Product page: www.endress.com/smt77

15.3 Service-specific accessories

Accessory	Description
Applicator	Software for selecting and sizing Endress+Hauser measuring instruments: Choice of measuring instruments for industrial requirements Calculation of all the necessary data for identifying the optimum flowmeter: e.g. nominal diameter, pressure loss, flow velocity and measurement accuracy. Graphic display of the calculation results Determining the partial order code. Administration, documentation and access to all project-related data and parameters over the entire life cycle of a project. Applicator is available: Via the Internet: https://portal.endress.com/webapp/applicator
Netilion	lloT ecosystem: Unlock knowledge With the Netilion IIoT ecosystem, Endress+Hauser allows you to optimize your plant performance, digitize workflows, share knowledge, and enhance collaboration. Based on decades of experience in process automation, Endress+Hauser offers the process industry an lloT ecosystem that enables you to gain useful insights from data. These insights can be used to optimize processes, leading to increased plant availability, efficiency, and reliability - ultimately resulting in a more profitable plant. www.netilion.endress.com
FieldCare	FDT-based plant asset management tool from Endress+Hauser. It can configure all intelligent field units in your system and helps you manage them. By using the status information, it is also a simple but effective way of checking their status and condition. Operating Instructions BA00027S and BA00059S
DeviceCare	Tool to connect and configure Endress+Hauser field devices. Technical Information: TI01134S Innovation brochure: IN01047S

15.4 System components

Accessories	Description
Memograph M graphic data manager	The Memograph M graphic data manager provides information on all the relevant measured variables. Measured values are recorded correctly, limit values are monitored and measuring points analyzed. The data are stored in the 256 MB internal memory and also on a SD card or USB stick.
	 Technical Information TI00133R Operating Instructions BA00247R
Cerabar M	The pressure transmitter for measuring the absolute and gauge pressure of gases, steam and liquids. It can be used to read in the operating pressure value.
	 Technical Information TI00426P and TI00436P Operating Instructions BA00200P and BA00382P
Cerabar S	The pressure transmitter for measuring the absolute and gauge pressure of gases, steam and liquids. It can be used to read in the operating pressure value.
	 Technical Information TI00383P Operating Instructions BA00271P
iTEMP	The temperature transmitters can be used in all applications and are suitable for the measurement of gases, steam and liquids. They can be used to read in the medium temperature.
	"Fields of Activity" document FA00006T

16 Technical data

16.1 Application

The measuring device is intended only for the flow measurement of liquids and gases.

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

To ensure that the device remains in proper operating condition for its service life, use the measuring device only for media against which the process-wetted materials are sufficiently resistant.

16.2 Function and system design

Measuring principle	Mass flow measurement based on the Coriolis measuring principle
Measuring system	The measuring system consists of a transmitter and a sensor. The transmitter and sensor are mounted in physically separate locations. They are interconnected by connecting cables.
	For information on the structure of the measuring instrument $\rightarrow \implies 13$

16.3 Input

Measured variable

Direct measured variables

- Mass flow
- Density
- Temperature
- Viscosity

Calculated measured variables

- Volume flow
- Corrected volume flow
- Reference density

Measuring range

Measuring range for liquids

DN		Measuring range full scale values $\dot{m}_{min(F)}$ to $\dot{m}_{max(F)}$	
[mm]	[in]	[kg/h]	[lb/min]
8	3/8	0 to 2 000	0 to 73.50
15	1/2	0 to 6 500	0 to 238.9
15 FB	½ FB	0 to 18000	0 to 661.5
25	1	0 to 18000	0 to 661.5
25 FB	1 FB	0 to 45 000	0 to 1654
40	1½	0 to 45 000	0 to 1654
40 FB	1½ FB	0 to 70 000	0 to 2 573
50	2	0 to 70 000	0 to 2 573
50 FB	2 FB	0 to 180 000	0 to 6615
80	3	0 to 180 000	0 to 6615
FB = Full bore			

Measuring range for gases

The full scale value depends on the density and the speed of sound of the gas used. The full scale value can be calculated with the following formulas:

- $\dot{m}_{max(G)}$ = minimum ($\dot{m}_{max(F)} \cdot \rho_G : x$)
- $\dot{m}_{max(G)}$ = minimum $(\rho_G \cdot (c_G/2) \cdot d_i^2 \cdot (\pi/4) \cdot 3600 \cdot n)$

m _{max(G)}	Maximum full scale value for gas [kg/h]
m _{max(F)}	Maximum full scale value for liquid [kg/h]
$\dot{m}_{\max(G)} < \dot{m}_{\max(F)}$	$\dot{m}_{\mathrm{max}(G)}$ can never be greater than $\dot{m}_{\mathrm{max}(F)}$
$ ho_{G}$	Gas density in [kg/m³] at operating conditions
х	Limitation constant for max. gas flow [kg/m³]
\mathbf{c}_{G}	Speed of sound (gas) [m/s]
d _i	Measuring tube internal diameter [m]
π	Pi
n = 1	Number of measuring tubes

DN		х
[mm]	[in]	[kg/m³]
8	3/8	60
15	1/2	80
15 FB	½ FB	90
25	1	90
25 FB	1 FB	90
40	1½	90
40 FB	1½ FB	90
50	2	90
50 FB	2 FB	110
80	3	110
FB = Full bore		

If calculating the full scale value using the two formulas:

- 1. Calculate the full scale value with both formulas.
- 2. The smaller value is the value that must be used.

Recommended measuring range

Flow limit $\rightarrow \triangleq 237$

Operable flow range

Over 1000:1.

Flow rates above the preset full scale value do not override the electronics unit, with the result that the totalizer values are registered correctly.

Input signal

External measured values

To increase the measurement accuracy of certain measured variables or to calculate the corrected volume flow for gases, the automation system can continuously write different measured values to the measuring instrument:

- Operating pressure to increase measurement accuracy (Endress+Hauser recommends the use of a pressure measuring instrument for absolute pressure, e.g. Cerabar M or Cerabar S)
- Medium temperature to increase measurement accuracy (e.g. iTEMP)
- Reference density for calculating the corrected volume flow for gases
- Various pressure and temperature measuring devices can be ordered from Endress +Hauser: see "Accessories" section → 🖺 217

It is recommended to read in external measured values to calculate the corrected volume flow.

Current input

Digital communication

The measured values are written by the automation system via Ethernet/IP.

Current input 0/4 to 20 mA

Current input	0/4 to 20 mA (active/passive)
Current span	 4 to 20 mA (active) 0/4 to 20 mA (passive)
Resolution	1 μΑ
Voltage drop	Typically: 0.6 to 2 V for 3.6 to 22 mA (passive)
Maximum input voltage	≤ 30 V (passive)
Open-circuit voltage	≤ 28.8 V (active)
Possible input variables	PressureTemperatureDensity

Status input

Maximum input values	■ DC -3 to 30 V ■ If status input is active (ON): $R_i > 3 \text{ k}\Omega$
Response time	Configurable: 5 to 200 ms
Input signal level	 Low signal: DC -3 to +5 V High signal: DC 12 to 30 V
Assignable functions	 Off Reset the individual totalizers separately Reset all totalizers Flow override

16.4 Output

Output signal

EtherNet/IP

Standards	In accordance with IEEE 802.3

Current output 4 to 20 mA

Signal mode	Can be set to: Active Passive
Current range	Can be set to: 4 to 20 mA NAMUR 4 to 20 mA US 4 to 20 mA 0 to 20 mA (only if the signal mode is active) Fixed current
Maximum output values	22.5 mA
Open-circuit voltage	DC 28.8 V (active)
Maximum input voltage	DC 30 V (passive)
Load	0 to 700Ω
Resolution	0.38 μΑ
Damping	Configurable: 0 to 999.9 s
Assignable measured variables	 Mass flow Volume flow Corrected volume flow Density Reference density Temperature Electronics temperature Oscillation frequency 0 Oscillation damping 0 Signal asymmetry Exciter current 0 The range of options increases if the measuring device has one or more application packages.

Current output 4 to 20 mA Ex i passive

Order code	"Output; input 2" (21), "Output; input 3" (022): Option C: current output 4 to 20 mA Ex i passive
Signal mode	Passive
Current range	Can be set to: 4 to 20 mA NAMUR 4 to 20 mA US 4 to 20 mA Fixed current
Maximum output values	22.5 mA
Maximum input voltage	DC 30 V
Load	0 to $700~\Omega$
Resolution	0.38 μΑ

Damping	Configurable: 0 to 999 s
Assignable measured variables	 Mass flow Volume flow Corrected volume flow Density Reference density Temperature Electronics temperature Oscillation frequency 0 Oscillation damping 0 Signal asymmetry Exciter current 0 The range of options increases if the measuring device has one or more application packages.

Pulse/frequency/switch output

Function	Can be configured as pulse, frequency or switch output
Version	Open collector Can be set to: • Active • Passive • Passive NAMUR • Ex-i, passive
Maximum input values	DC 30 V, 250 mA (passive)
Open-circuit voltage	DC 28.8 V (active)
Voltage drop	For 22.5 mA: ≤ DC 2 V
Pulse output	
Maximum input values	DC 30 V, 250 mA (passive)
Maximum output current	22.5 mA (active)
Open-circuit voltage	DC 28.8 V (active)
Pulse width	Configurable: 0.05 to 2 000 ms
Maximum pulse rate	10 000 Impulse/s
Pulse value	Configurable
Assignable measured variables	 Mass flow Volume flow Corrected volume flow The range of options increases if the measuring device has one or more application packages.
Frequency output	
Maximum input values	DC 30 V, 250 mA (passive)
Maximum output current	22.5 mA (active)
Open-circuit voltage	DC 28.8 V (active)
Output frequency	Configurable: end value frequency 2 to 10000Hz (f $_{\text{max}}$ = 12500Hz)
Damping	Configurable: 0 to 999.9 s
Pulse/pause ratio	1:1

Assignable measured variables	 Mass flow Volume flow Corrected volume flow Density Reference density Temperature Electronics temperature Oscillation frequency 0 Oscillation damping 0 Signal asymmetry Exciter current 0 The range of options increases if the measuring device has one or more application packages.
Switch output	
Maximum input values	DC 30 V, 250 mA (passive)
Open-circuit voltage	DC 28.8 V (active)
Switching behavior	Binary, conductive or non-conductive
Switching delay	Configurable: 0 to 100 s
Number of switching cycles	Unlimited
Assignable functions	 Disable On Diagnostic behavior Limit Mass flow Volume flow Corrected volume flow Density Reference density Temperature Totalizer 1-3 Flow direction monitoring Status Partially filled pipe detection Low flow cut off The range of options increases if the measuring device has one or more application packages.

Relay output

Function	Switch output
Version	Relay output, galvanically isolated
Switching behavior	Can be set to: NO (normally open), factory setting NC (normally closed)

224

Maximum switching capacity (passive)	■ DC 30 V, 0.1 A ■ AC 30 V, 0.5 A
Assignable functions	 Disable On Diagnostic behavior Limit Mass flow Volume flow Corrected volume flow Density Reference density Temperature Totalizer 1-3 Flow direction monitoring Status Partially filled pipe detection Low flow cut off The range of options increases if the measuring device has one or more application packages.

User-configurable input/output

One specific input or output is assigned to a user-configurable input/output (configurable I/O) during device commissioning.

The following inputs and outputs are available for assignment:

- Choice of current output: 4 to 20 mA (active), 0/4 to 20 mA (passive)
- Pulse/frequency/switch output
- Choice of current input: 4 to 20 mA (active), 0/4 to 20 mA (passive)
- Status input

Signal on alarm

Depending on the interface, failure information is displayed as follows:

EtherNet/IP

Device diagnostics	Device condition can be read out in Input Assembly
--------------------	--

Current output

Current output 4-20 mA		
Failure mode	Configurable: 4 to 20 mA in accordance with NAMUR recommendation NE 43 4 to 20 mA in accordance with US Min. value: 3.59 mA Max. value: 22.5 mA Definable value between: 3.59 to 22.5 mA Actual value Last valid value	
Current output 4-20 mA	Current output 4-20 mA	
Failure mode	Configurable: • Maximum alarm: 22 mA • Definable value between: 0 to 20.5 mA	

Pulse/frequency/switch output

Pulse output	
Failure mode	Configurable: Actual value No pulses

Frequency output	
Failure mode	Configurable: • Actual value • 0 Hz • Definable value between: 2 to 12 500 Hz
Switch output	
Failure mode	Configurable: Current status Open Closed

Relay output

Failure mode	Choose from:
	Current status
	■ Open
	■ Closed

Local display

Plain text display	With information on cause and remedial measures
Backlight	Red lighting indicates a device error.



Status signal as per NAMUR recommendation NE 107

Interface/protocol

- Via digital communication: EtherNet/IP
- Via service interface
 - Service interface CDI-RJ45
 - WLAN interface
- Plain text display

With information on cause and remedial actions

Web browser

Plain text display	With information on cause and remedial measures
--------------------	---

LEDs

Status information	Status indicated by various LEDs
	The following information is displayed depending on the device version: ■ Supply voltage active ■ Data transmission active ■ Device alarm/error has occurred ■ Network available ■ Connection established ■ Diagnostic information via LEDs → ■ 182

Low flow cut off

The switch points for low flow cut off are user-selectable.

Galvanic isolation

The outputs are galvanically isolated:

- from the power supply
- from one another
- from the protective ground connection (PE)

Protocol-specific data

Protocol	 The CIP Networks Library Volume 1: Common Industrial Protocol The CIP Networks Library Volume 2: EtherNet/IP Adaptation of CIP
Communication type	■ 10Base-T ■ 100Base-TX
Device profile	Generic device (product type: 0x2B)
Manufacturer ID	0x000049E
Device type ID	0x103B
Baud rates	Automatic ¹⁰ / ₁₀₀ Mbit with half-duplex and full-duplex detection
Polarity	Auto-polarity for automatic correction of crossed TxD and RxD pairs
Supported CIP connections	Max. 3 connections
Explicit connections	Max. 6 connections
I/O connections	Max. 6 connections (scanner)
Configuration options for measuring device	 DIP switches on the electronics module for IP addressing Manufacturer-specific software (FieldCare) Add-on Profile Level 3 for Rockwell Automation control systems Web browser Electronic Data Sheet (EDS) integrated in the measuring device
Configuration of the EtherNet interface	 Speed: 10 MBit, 100 MBit, auto (factory setting) Duplex: half-duplex, full-duplex, auto (factory setting)
Configuration of the device address	 DIP switches on the electronics module for IP addressing (last octet) DHCP Manufacturer-specific software (FieldCare) Add-on Profile Level 3 for Rockwell Automation control systems Web browser EtherNet/IP tools, e.g. RSLinx (Rockwell Automation)
Device Level Ring (DLR)	Yes
System integration	Information regarding system integration → ₱ 97. Cyclic data transmission Block model Input and output groups

16.5 Power supply

Terminal assignment $\rightarrow \stackrel{\triangle}{=} 39$

Available device plugs $\rightarrow \stackrel{ riangle}{\Rightarrow} 39$

Supply voltage

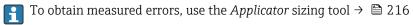
Order code for "Power supply"	Terminal voltage		Frequency range
Option D	DC 24 V	±20%	_
Option E	AC 100 to 240 V	-15 to 10%	50/60 Hz
Option I	DC 24 V	±20%	-
Option I	AC 100 to 240 V	-15 to 10%	50/60 Hz

Power consumption	Transmitter			
	Max. 10 W (active p	ower)		
	switch-on current	Max. 36 A (<5 ms) (as per NAMUR Recommendation NE 21	
Current consumption	Transmitter			
	Max. 400 mA (24Max. 200 mA (110	V) 0 V, 50/60 Hz; 230 \	V, 50/60 Hz)	
Power supply failure	 Depending on the in the plug-in men 	 Totalizers stop at the last value measured. Depending on the device version, the configuration is retained in the device memory or in the plug-in memory (HistoROM DAT). Error messages (incl. total operated hours) are stored. 		
Overcurrent protection element	The device must be operated with a dedicated circuit breaker, as it does not have an ON/OFF switch of its own. The circuit breaker must be easy to reach and labeled accordingly. Permitted nominal current of the circuit breaker: 2 A up to maximum 10 A.			
Electrical connection	■ → 🖺 41 ■ → 🖺 51			
Potential equalization	→ 🖺 59			
Terminals	Spring-loaded terminals: Suitable for strands and strands with ferrules. Conductor cross-section 0.2 to 2.5 mm ² (24 to 12 AWG).			
Cable entries	 Cable gland: M20 × 1.5 with cable Ø 6 to 12 mm (0.24 to 0.47 in) Thread for cable entry: NPT ½" G ½" M20 Device plug for digital communication: M12 Device plug for connecting cable: M12 A device plug is always used for the device version with the order code for "Sensor connection housing", option C "Ultra-compact, hygienic, stainless". 			
Cable specification	→ 🖺 35			
Overvoltage protection	Mains voltage fluctuati	ons	→ 🗎 227	
	Overvoltage category		Overvoltage category II	
	Short-term, temporary	overvoltage	Between cable and ground up to 1200 V, for max. 5 s	
	Long-term, temporary of	overvoltage	Between cable and ground up to 500 V	

16.6 Performance characteristics

Reference operating conditions

- Error limits based on ISO 11631
- Water
 - +15 to +45 °C (+59 to +113 °F)
 - 2 to 6 bar (29 to 87 psi)
- Data as indicated in the calibration protocol
- Accuracy based on accredited calibration rigs according to ISO 17025



Maximum measurement error

o.r. = of reading; $1 \text{ g/cm}^3 = 1 \text{ kg/l}$; T = medium temperature

Base accuracy

Pesign fundamentals → 🖺 232

Mass flow and volume flow (liquids)

±0.10 % o.r.

Mass flow (gases)

±0.50 % o.r.

Density (liquids)

Under reference conditions	Standard density calibration 1)	Wide-range Density specification ^{2) 3)}
[g/cm³]	[g/cm³]	[g/cm³]
±0.0005	±0.02	±0.004

- 1) Valid over the entire temperature and density range
- Valid range for special density calibration: 0 to 2 g/cm³, +10 to +80 °C (+50 to +176 °F)
- 3) order code for "Application package", option EE "Special density"

Temperature

 $\pm 0.5 \,^{\circ}\text{C} \pm 0.005 \cdot \text{T} \,^{\circ}\text{C} \, (\pm 0.9 \,^{\circ}\text{F} \pm 0.003 \cdot (\text{T} - 32) \,^{\circ}\text{F})$

Zero point stability

D	N	Zero poin	t stability
[mm]	[in]	[kg/h]	[lb/min]
8	3/8	0.150	0.0055
15	1/2	0.488	0.0179
15 FB	½ FB	1.350	0.0496
25	1	1.350	0.0496
25 FB	1 FB	3.375	0.124
40	11/2	3.375	0.124
40 FB	1½ FB	5.25	0.193
50	50 2		0.193
50 FB	2 FB	13.5	0.496

D	N	Zero point stability		
[mm] [in]		[kg/h]	[lb/min]	
80	3	13.5	0.496	
FB = Full bore				

Flow values

Flow values as turndown parameters depending on nominal diameter.

SI units

DN	1:1	1:10	1:20	1:50	1:100	1:500
[mm]	[kg/h]	[kg/h]	[kg/h]	[kg/h]	[kg/h]	[kg/h]
8	2 000	200	100	40	20	4
15	6500	650	325	130	65	13
15 FB	18000	1800	900	360	180	36
25	18000	1800	900	360	180	36
25 FB	45 000	4500	2 2 5 0	900	450	90
40	45 000	4500	2 2 5 0	900	450	90
40 FB	70000	7 000	3 500	1400	700	140
50	70000	7 000	3 500	1400	700	140
50 FB	180 000	18000	9000	3 600	1800	360
80	180 000	18000	9000	3 600	1800	360
FB = Full bore	FB = Full bore					

US units

DN	1:1	1:10	1:20	1:50	1:100	1:500
[inch]	[lb/min]	[lb/min]	[lb/min]	[lb/min]	[lb/min]	[lb/min]
3/8	73.50	7.350	3.675	1.470	0.735	0.147
1/2	238.9	23.89	11.95	4.778	2.389	0.478
½ FB	661.5	66.15	33.08	13.23	6.615	1.323
1	661.5	66.15	33.08	13.23	6.615	1.323
1 FB	1654	165.4	82.70	33.08	16.54	3.308
1½	1654	165.4	82.70	33.08	16.54	3.308
1½ FB	2 573	257.3	128.7	51.46	25.73	5.146
2	2 573	257.3	128.7	51.46	25.73	5.146
2 FB	6 6 1 5	661.5	330.8	132.3	66.15	13.23
3	6 6 1 5	661.5	330.8	132.3	66.15	13.23
FB = Full bore						

Accuracy of outputs

The outputs have the following base accuracy specifications:

Current output

Accuracy	±5 μA
----------	-------

Pulse/frequency output

o.r. = of reading

Accuracy

Max. ±50 ppm o.r. (over the entire ambient temperature range)

Repeatability

o.r. = of reading; $1 \text{ g/cm}^3 = 1 \text{ kg/l}$; T = medium temperature

Base repeatability



Design fundamentals \rightarrow $\stackrel{\triangle}{=}$ 232

Mass flow and volume flow (liquids)

±0.05 % o.r.

Mass flow (gases)

±0.25 % o.r.

Density (liquids)

 $\pm 0.00025 \text{ g/cm}^3$

Temperature

 ± 0.25 °C ± 0.0025 · T °C (± 0.45 °F ± 0.0015 · (T-32) °F)

Response time

The response time depends on the configuration (damping).

Influence of ambient temperature

Current output

Temperature coefficient	Max. 1 μA/°C
-------------------------	--------------

Pulse/frequency output

	Temperature	coefficient
--	-------------	-------------

No additional effect. Included in accuracy.

Influence of medium temperature

Mass flow

o.f.s. = of full scale value

If there is a difference between the temperature during zero adjustment and the process temperature, the additional measurement error of the sensors is typically ± 0.0002 %o.f.s./°C (± 0.0001 % o.f.s./°F).

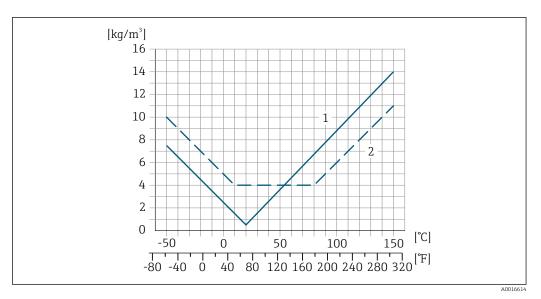
The influence is reduced when the zero adjustment is performed at process temperature.

Density

If there is a difference between the density calibration temperature and the process temperature, the measurement error of the sensors is typically $\pm 0.0001 \text{ g/cm}^3/^{\circ}\text{C}$ ($\pm 0.00005 \text{ g/cm}^3/^{\circ}\text{F}$). Field density adjustment is possible.

Wide-range density specification (special density calibration)

If the process temperature is outside the valid range ($\rightarrow \triangleq 229$) the measurement error is $\pm 0.0001 \text{ g/cm}^3$ /°C ($\pm 0.00005 \text{ g/cm}^3$ /°F)



- 1 Field density adjustment, for example at +20 °C (+68 °F)
- 2 Special density calibration

Temperature

 $\pm 0.005 \cdot \text{T °C } (\pm 0.005 \cdot (\text{T} - 32) \text{ °F})$

Influence of medium pressure

The following shows how the process pressure (gauge pressure) affects the accuracy of the mass flow.

o.r. = of reading



It is possible to compensate for the effect by:

- Reading in the current pressure measured value via the current input or a digital input.
- Specifying a fixed value for the pressure in the device parameters.

Operating Instructions .

DN		[% o.r./bar]	[% o.r./psi]	
[mm]	[in]			
8	3/8	no effect	no effect	
15	1/2	no effect	no effect	
15 FB	½ FB	+0.003	+0.0002	
25	1	+0.003	+0.0002	
25 FB	1 FB	no effect	no effect	
40	11/2	no effect	no effect	
40 FB	1½ FB	no effect	no effect	
50	2	no effect	no effect	
50 FB	2 FB	no effect	no effect	
80	3	no effect	no effect	
FB = Full bore				

Design fundamentals

o.r. = of reading, o.f.s. = of full scale value

BaseAccu = base accuracy in % o.r., BaseRepeat = base repeatability in % o.r.

MeasValue = measured value; ZeroPoint = zero point stability

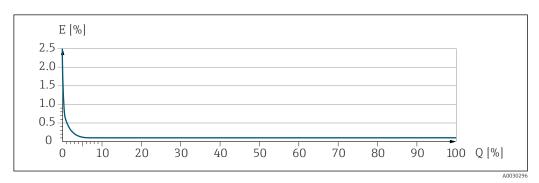
Calculation of the maximum measured error as a function of the flow rate

Flow rate		Maximum measured error in % o.r.
$\geq \frac{\text{ZeroPoint}}{\text{BaseAccu}} \cdot 100$		± BaseAccu
	A0021332	10002177
$< \frac{\text{ZeroPoint}}{\text{BaseAccu}} \cdot 100$		$\pm \frac{\text{ZeroPoint}}{\text{MeasValue}} \cdot 100$
	A0021333	A0021334

Calculation of the maximum repeatability as a function of the flow rate

Flow rate	Maximum repeatability in % o.r.
$\geq \frac{\frac{1}{2} \cdot ZeroPoint}{BaseRepeat} \cdot 100$	± BaseRepeat
A0021335	A0021340
$< \frac{\frac{1}{2} \cdot ZeroPoint}{BaseRepeat} \cdot 100$	± ½ · ZeroPoint MeasValue · 100
A0021336	A0021337

Example of maximum measurement error



- E Maximum measurement error in % o.r. (example)
- Q Flow rate in % of maximum full scale value

16.7 Installation

Installation requirements

→ 🖺 21

16.8 Environment

Ambient temperature range

→ 🖺 23

Temperature tables

Observe the interdependencies between the permitted ambient and fluid temperatures when operating the device in hazardous areas.

For detailed information on the temperature tables, see the separate document entitled "Safety Instructions" (XA) for the device.

Storage temperature

 $-50 \text{ to } +80 \,^{\circ}\text{C} \, (-58 \text{ to } +176 \,^{\circ}\text{F})$

Climate class	DIN EN 60068-2-38 (test Z/AD)
Relative humidity	The device is suitable for use in outdoor and indoor areas with a relative humidity of 4 to 95%.
Operating height	According to EN 61010-1 ≤ 2 000 m (6 562 ft)
Degree of protection	Transmitter
	 IP66/67, Type 4X enclosure, suitable for pollution degree 4 When the housing is open: IP20, Type 1 enclosure, suitable for pollution degree 2 Display module: IP20, Type 1 enclosure, suitable for pollution degree 2
	Sensor
	 IP66/67, Type 4X enclosure, suitable for pollution degree 4 When the housing is open: IP20, Type 1 enclosure, suitable for pollution degree 2
	Optional
	Order code for "Sensor options", option CM "IP69"
	External WLAN antenna
	IP66/67, type 4X enclosure

Vibration resistance and shock resistance

Sinusoidal vibration similar to IEC 60068-2-6

Sensor

- 2 to 8.4 Hz, 3.5 mm peak
- 8.4 to 2000 Hz, 1 g peak

Transmitter

- 2 to 8.4 Hz, 7.5 mm peak
- 8.4 to 2000 Hz, 2 g peak

Broadband random vibration similar to IEC 60068-2-64

Sensor

- 10 to 200 Hz, $0.003 \text{ g}^2/\text{Hz}$
- 200 to 2000 Hz, $0.001 g^2/Hz$
- Total: 1.54 g rms

Transmitter

- 10 to 200 Hz, $0.01 g^2/Hz$
- 200 to 2000 Hz, 0.003 g²/Hz
- Total: 2.70 g rms

Half-sine shocks similar to IEC 60068-2-27

- Sensor
 - 6 ms 30 g
- Transmitter6 ms 50 g

Rough handling shocks similar to IEC 60068-2-31

Mechanical load

Transmitter housing and sensor connection housing:

- Protect against mechanical effects, such as shock or impact
- Do not use as a ladder or climbing aid

Electromagnetic compatibility (EMC)

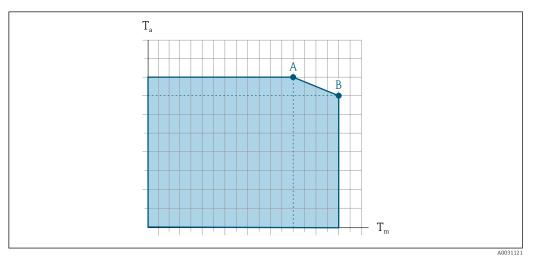
- As per IEC/EN 61326 and NAMUR Recommendation 21 (NE 21), NAMUR Recommendation 21 (NE 21) is fulfilled when the device is installed in accordance with NAMUR Recommendation 98 (NE 98).
- As per IEC/EN 61000-6-2 and IEC/EN 61000-6-4
- Details are provided in the Declaration of Conformity.
- This unit is not intended for use in residential environments and cannot guarantee adequate protection of the radio reception in such environments.

16.9 Process

Medium temperature range

-50 to +150 °C (−58 to +302 °F)

Dependency of ambient temperature on medium temperature



■ 40 Exemplary representation, values in the table below.

T_a Ambient temperature

 T_m Medium temperature

- A Maximum permitted medium temperature T_m at $T_{a max} = 60$ °C (140 °F); higher medium temperatures T_m require a reduction in the ambient temperature T_a
- B Maximum permitted ambient temperature T_a for the maximum specified medium temperature T_m of the sensor
- Values for devices that are used in the hazardous area: Separate Ex documentation (XA) for the device $\Rightarrow \triangleq 249$.

Not insulated			Insulated					
	A		В		A		В	
Version	Ta	T _m	Ta	T _m	Ta	T_{m}	T _a	T _m
Promass I 500 – digital	60°C	140 °C	55 ℃ (1.21 °E)	150 ℃	60 °C	90 ℃	45 °C	150 °C
Promass I 500	(140°F)	(284°F)	(131°F)	(302°F)	(140°F)	(194°F)	(113°F)	(302 °F)

Medium density

0 to 5000 kg/m^3 (0 to 312 lb/cf)

Pressure/temperature ratings



For an overview of the pressure/temperature ratings for the process connections, see the Technical Information

Sensor housing

The sensor housing is filled with dry nitrogen gas and protects the electronics and mechanics inside.

If a measuring tube fails (e.g. due to process characteristics like corrosive or abrasive fluids), the fluid will initially be contained by the sensor housing.

If the sensor is to be purged with gas (gas detection), it should be equipped with purge connections.

Do not open the purge connections unless the containment can be filled immediately with a dry, inert gas. Use only low pressure to purge.

Maximum pressure: 5 bar (72.5 psi)

Burst pressure of the sensor housing

The following sensor housing burst pressures are only valid for standard devices and/or devices equipped with closed purge connections (not opened/as delivered).

If a device fitted with purge connections (order code for "Sensor option", option CH "Purge connection") is connected to the purge system, the maximum pressure is determined by the purge system itself or by the device, depending on which component has the lower pressure classification.

The sensor housing burst pressure refers to a typical internal pressure which is reached prior to mechanical failure of the sensor housing and which was determined during type testing. The corresponding type test declaration can be ordered with the device (order code for "Additional approval", option LN "Sensor housing burst pressure, type test").

DN		Sensor housing burst pressure	
[mm]	[in]	[bar]	[psi]
8	3/8	220	3 190
15	1/2	220	3 190
15 FB	⅓ FB	235	3 4 0 8
25	1	235	3 408
25 FB	1 FB	220	3 190
40	1½	220	3 190
40 FB	1 ½ FB	235	3 4 0 8
50	2	235	3 408
50 FB	2 FB	460	6670
80	3	460	6670
FB = Full bore			

For information on the dimensions: see the "Mechanical construction" section of the "Technical Information" document

Internal cleaning

- CIP cleaning
- SIP cleaning
- Cleaning with pigs

236

Options

Oil- and grease-free version for wetted parts, without declaration Order code for "Service", option HA $^{2)}$

Flow limit

Select the nominal diameter by optimizing between the required flow range and permissible pressure loss.

- The minimum recommended full scale value is approx. 1/20 of the maximum full scale value
- For the most common applications, 20 to 50 % of the maximum full scale value can be considered ideal
- A low full scale value must be selected for abrasive media (such as liquids with entrained solids): flow velocity < 1 m/s (< 3 ft/s).
- For gas measurement the following rules apply:
 - The flow velocity in the measuring tubes should not exceed half the speed of sound (0.5 Mach)
 - The maximum mass flow depends on the density of the gas: formula $\rightarrow \triangleq 219$

Pressure loss

System pressure

→ 🖺 24

16.10 Mechanical construction

Design, dimensions



For the dimensions and installed lengths of the device, see the "Technical Information" document, "Mechanical construction" section

Weight

All values (weight exclusive of packaging material) refer to devices with EN/DIN PN 40 flanges.

Transmitter

- Proline 500 digital polycarbonate: 1.4 kg (3.1 lbs)
- Proline 500 digital aluminum: 2.4 kg (5.3 lbs)
- Proline 500 aluminum: 6.5 kg (14.3 lbs)
- Proline 500 cast, stainless: 15.6 kg (34.4 lbs)

Sensor

- Sensor with cast connection housing version, stainless: +3.7 kg (+8.2 lbs)
- Sensor with aluminum connection housing version:

Weight in SI units

DN [mm]	Weight [kg]
8	11
15	13

²⁾ Cleaning only refers to the measuring instrument. Any accessories that have been supplied are not cleaned.

DN [mm]	Weight [kg]
15 FB	19
25	20
25 FB	39
40	40
40 FB	65
50	67
50 FB	118
80	122
FB = Full bore	

Weight in US units

DN [in]	Weight [lbs]
3/8	24
1/2	29
½ FB	42
1	44
1 FB	86
1½	88
1½ FB	143
2	148
2 FB	260
3	269
FB = Full bore	

Materials

Transmitter housing

Housing of Proline 500 – digital transmitter

Order code for "Transmitter housing":

- Option A "Aluminum coated": aluminum, AlSi10Mq, coated
- Option **D** "Polycarbonate": polycarbonate

Housing of Proline 500 transmitter

Order code for "Transmitter housing":

- Option A "Aluminum coated": aluminum, AlSi10Mq, coated
- Option **L** "Cast, stainless": cast, stainless steel, 1.4409 (CF3M) similar to 316L

Window material

Order code for "Transmitter housing":

- Option A "Aluminum, coated": glass
- Option **D** "Polycarbonate": plastic
- Option **L** "Cast, stainless": glass

Fixing components for pipe mounting

- Screws, threaded bolts, washers, nuts: stainless A2 (chrome-nickel steel)
- Metal plates: stainless steel, 1.4301 (304)

Sensor connection housing

Order code for "Sensor connection housing":

- Option A "Aluminum coated": aluminum, AlSi10Mg, coated
- Option **B** "Stainless":
 - Stainless steel 1.4301 (304)
 - Optional: Order code for "Sensor feature", option **CC** "Hygienic version, for maximum corrosion resistance": stainless steel, 1.4404 (316L)
- Option **C** "Ultra-compact, stainless":
 - Stainless steel 1.4301 (304)
 - Optional: Order code for "Sensor feature", option **CC** "Hygienic version, for maximum corrosion resistance": stainless steel, 1.4404 (316L)
- Option L "Cast, stainless": 1.4409 (CF3M) similar to 316L

Cable entries/cable glands

Cable entries and adapters	Material
Cable gland M20 × 1.5	Plastic
 Adapter for cable entry with female thread G ½" Adapter for cable entry with female thread NPT ½" 	Nickel-plated brass
Only available for certain device versions: Order code for "Transmitter housing": Option A "Aluminum, coated" Option D "Polycarbonate" Order code for "Sensor connection housing": Proline 500 – digital: Option A "Aluminum coated" Option B "Stainless" Option L "Cast, stainless" Proline 500: Option B "Stainless" Option L "Cast, stainless"	
 Adapter for cable entry with female thread G ½" Adapter for cable entry with female thread NPT ½" 	Stainless steel, 1.4404 (316L)
Only available for certain device versions: Order code for "Transmitter housing": Option L "Cast, stainless" Order code for "Sensor connection housing": Option L "Cast, stainless"	

Connecting cable



UV radiation can impair the cable outer sheath. Protect the cable from exposure to sun as much as possible.

Connecting cable for sensor - Proline 500 – digital transmitter

PVC cable with copper shield

Connecting cable for sensor - Proline 500 transmitter

PVC cable with copper shield

Sensor housing

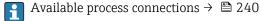
- Acid and alkali-resistant outer surface
- Stainless steel 1.4301 (304)

Measuring tubes

Grade 9 titanium

Process connections

- Flanges similar to EN 1092-1 (DIN 2501)/similar to ASME B16.5/similar to JIS:
 - Stainless steel 1.4301 (304)
 - Wetted parts: Grade 2 titanium
- ullet All other process connections:
- Grade 2 titanium



Seals

Welded process connections without internal seals

Accessories

Protective cover

Stainless steel, 1.4404 (316L)

External WLAN antenna

- Antenna: ASA plastic (acrylonitrile styrene acrylate) and nickel-plated brass
- Adapter: Stainless steel and nickel-plated brass
- Cable: Polyethylene
- Plug: Nickel-plated brass
- Angle bracket: Stainless steel

Process connections

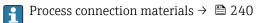
- Fixed flange connections:
 - EN 1092-1 (DIN 2501) flange
 - EN 1092-1 (DIN 2512N) flange
 - ASME B16.5 flange
 - JIS B2220 flange
 - DIN 11864-2 Form A flange, DIN 11866 series A, flange with notch
- Clamp connections:

Tri-Clamp (OD tubes), DIN 11866 series C

• Eccentric clamp connections:

Eccen. Tri-Clamp, DIN 11866 series C

- Thread:
 - DIN 11851 thread, DIN 11866 series A
 - SMS 1145 thread
 - ISO 2853 thread, ISO 2037
 - DIN 11864-1 Form A thread, DIN 11866 series A



Surface roughness

All data relate to parts in contact with medium.

The following surface roughness categories can be ordered:

Category	Method	Option(s)/Order code "Measuring tube mat., wetted surface"
Not polished	_	CA
Ra ≤ 0.76 μm (30 μin) ¹⁾	Mechanically polished ²⁾	СВ
Ra ≤ 0.38 μm (15 μin) 1)	Mechanically polished ²⁾	CD

- 1) Ra according to ISO 21920
- 2) Inaccessible weld seams between pipe and manifold are excluded

16.11 User interface

Languages

Can be operated in the following languages:

- Via local operation
 English, German, French, Spanish, Italian, Dutch, Portuguese, Polish, Russian, Turkish,
 Chinese, Japanese, Korean, Vietnamese, Czech, Swedish
- Via web browser
 English, German, French, Spanish, Italian, Dutch, Portuguese, Polish, Russian, Turkish,
 Chinese, Japanese, Vietnamese, Czech, Swedish
- Via "FieldCare", "DeviceCare" operating tool: English, German, French, Spanish, Italian, Chinese, Japanese

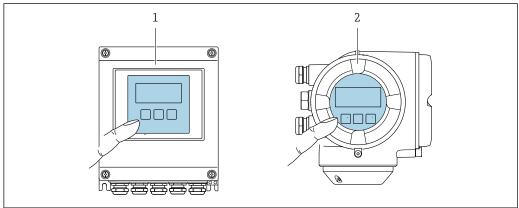
Onsite operation

Via display module

Equipment level:

- Order code for "Display; operation", option F "4-line, illuminated, graphic display; touch control"
- Order code for "Display; operation", option G "4-line, illuminated, graphic display; touch control + WLAN"
- Information about WLAN interface →

 93



A00282

■ 41 Operation with touch control

- 1 Proline 500 digital
- 2 Proline 500

Display elements

- 4-line, illuminated, graphic display
- White background lighting; switches to red in event of device errors
- Format for displaying measured variables and status variables can be individually configured

Operating elements

- External operation via touch control (3 optical keys) without opening the housing: \boxdot , \boxdot ,
- Operating elements also accessible in the various zones of the hazardous area

Supported operating tools

Different operating tools can be used for local or remote access to the measuring device. Depending on the operating tool used, access is possible with different operating units and via a variety of interfaces.

Supported operating tools	Operating unit	Interface	Additional information
Web browser	Notebook, PC or tablet with web browser	 Service interface CDI-RJ45 WLAN interface Ethernet-based fieldbus (EtherNet/IP, PROFINET, Modbus TCP over Ethernet-APL) 	Special Documentation for device → 🗎 250
DeviceCare SFE100	Notebook, PC or tablet with Microsoft Windows system	 Service interface CDI- RJ45 WLAN interface Fieldbus protocol 	→ 🖺 216
FieldCare SFE500	Notebook, PC or tablet with Microsoft Windows system	 Service interface CDI- RJ45 WLAN interface Fieldbus protocol 	→ 🖺 216
Field Xpert	SMT70/77/50	 All fieldbus protocols WLAN interface Bluetooth Service interface CDI-RJ45 	Operating Instructions BA01202S Device description files: Use update function of handheld terminal

- Other operating tools based on FDT technology with a device driver such as DTM/iDTM or DD/EDD can be used for device operation. These operating tools are available from the individual manufacturers. Integration into the following operating tools, among others, is supported:
 - Emersons TREX → www.emerson.com
 - Field Device Manager (FDM) from Honeywell → www.process.honeywell.com
 - FieldMate from Yokogawa → www.yokogawa.com
 - PACTWare → www.pactware.com

The related device description files are available: www.endress.com → Download Area

Web server

The integrated web server can be used to operate and configure the device via a web browser via service interface (CDI-RJ45) or via WLAN interface. The structure of the operating menu is the same as for the local display. In addition to the measured values, status information on the device is displayed and can be used to monitor device health. Furthermore the device data can be managed and the network parameters can be configured.

A device that has a WLAN interface (can be ordered as an option) is required for the WLAN connection: order code for "Display; Operation", option G "4-line, illuminated; touch control + WLAN". The device acts as an Access Point and enables communication by computer or a mobile handheld terminal.

Supported functions

Data exchange between the operating unit (such as a notebook, for example,) and measuring instrument:

- Upload the configuration from the measuring instrument (XML format, configuration backup)
- Save the configuration to the measuring instrument (XML format, restore configuration)
- Export event list (.csv file)

- Export parameter settings (.csv file or PDF file, document the measuring point configuration)
- Export the Heartbeat Technology verification report (PDF file, only available with the **Heartbeat Verification** → 🗎 247 application package)
- Flash firmware version for device firmware upgrade, for example
- Download driver for system integration

HistoROM data management

The measuring instrument features HistoROM data management. HistoROM data management comprises both the storage and import/export of key device and process data, making operation and servicing far more reliable, secure and efficient.



When the device is delivered, the factory settings of the configuration data are stored as a backup in the device memory. This memory can be overwritten with an updated data record, for example after commissioning.

Additional information on the data storage concept

There are different types of data storage units in which device data are stored and used by the device:

	HistoROM backup	T-DAT	S-DAT
Available data	 Event logbook, e.g. diagnostic events Parameter data record backup Device firmware package Driver for system integration for exporting via web server, e.g.: EDS for EtherNet/IP 	 Measured value logging ("Extended HistoROM" order option) Current parameter data record (used by firmware at run time) Indicator (minimum/maximum values) Totalizer value 	 Sensor data: e.g. nominal diameter Serial number Calibration data Device configuration (e.g. SW options, fixed I/O or multi I/O)
Storage location	Fixed on the user interface PC board in the connection compartment	Can be plugged into the user interface PC board in the connection compartment	In the sensor plug in the transmitter neck part

Data backup

Automatic

- The most important device data (sensor and transmitter) are automatically saved in the DAT modules
- If the transmitter or measuring device is replaced: once the T-DAT containing the previous device data has been exchanged, the new measuring device is ready for operation again immediately without any errors
- If the sensor is replaced: once the sensor has been replaced, new sensor data are transferred from the S-DAT in the measuring device and the measuring device is ready for operation again immediately without any errors
- If exchanging the electronics module (e.g. I/O electronics module): Once the electronics module has been replaced, the software of the module is compared against the current device firmware. The module software is upgraded or downgraded where necessary. The electronics module is available for use immediately afterwards and no compatibility problems occur.

Manual

Additional parameter data record (complete parameter settings) in the integrated device memory HistoROM backup for:

- Data backup function
 Backup and subsequent restoration of a device configuration in the device memory
 HistoROM backup
- Data comparison function
 Comparison of the current device configuration with the device configuration saved in the device memory HistoROM backup

Data transmission

Manual

- Transfer of a device configuration to another device using the export function of the specific operating tool, e.g. with FieldCare, DeviceCare or web server: to duplicate the configuration or to store in an archive (e.g. for backup purposes)
- Transmission of the drivers for system integration via web server, e.g.: EDS for Ethernet/IP

Event list

Automatic

- Chronological display of up to 20 event messages in the events list
- If the Extended HistoROM application package (order option) is enabled: up to 100 event messages are displayed in the events list along with a time stamp, plain text description and remedial measures
- The events list can be exported and displayed via a variety of interfaces and operating tools e.g. DeviceCare, FieldCare or Web server

Data logging

Manual

If the **Extended HistoROM** application package (order option) is enabled:

- Recording of 1 to 4 channels of up to 1000 measured values (up to 250 measured values per channel)
- User configurable recording interval
- Export the measured value log via a variety of interfaces and operating tools e.g.
 FieldCare. DeviceCare or web server

16.12 Certificates and approvals

Current certificates and approvals for the product are available at www.endress.com on the relevant product page:

- 1. Select the product using the filters and search field.
- 2. Open the product page.
- 3. Select **Downloads**.

CE mark

The device meets the legal requirements of the applicable EU Directives. These are listed in the corresponding EU Declaration of Conformity along with the standards applied.

Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.

UKCA marking

The device meets the legal requirements of the applicable UK regulations (Statutory Instruments). These are listed in the UKCA Declaration of Conformity along with the designated standards. By selecting the order option for UKCA marking, Endress+Hauser confirms a successful evaluation and testing of the device by affixing the UKCA mark.

Contact address Endress+Hauser UK:

Endress+Hauser Ltd.

Floats Road

Manchester M23 9NF

United Kingdom

www.uk.endress.com

RCM marking

The measuring system meets the EMC requirements of the "Australian Communications and Media Authority (ACMA)".

Hygienic compatibility

- 3-A approval
 - Only measuring instruments with the order code for "Additional approval", option LP "3A" have 3-A approval.
 - The 3-A approval refers to the measuring instrument.
 - When installing the measuring instrument, ensure that no liquid can accumulate on the outside of the measuring instrument.
 - A remote display module must be installed in accordance with the 3-A Standard.
 - Accessories (e.g. heating jacket, weather protection cover, wall holder unit) must be installed in accordance with the 3-A Standard.
 - Each accessory can be cleaned. Disassembly may be necessary under certain circumstances.
- EHEDG-tested (Type EL Class I)
 - Only devices with the order code for "Additional approval", option LT "EHEDG" have been tested and meet the requirements of the EHEDG.

To meet the requirements for EHEDG certification, the device must be used with process connections in accordance with the EHEDG position paper entitled "Easy cleanable Pipe couplings and Process connections" (www.ehedg.org).

To meet the requirements for EHEDG certification, the orientation of the device must ensure drainability.

Test criteria for cleanability according to EHEDG is a flow velocity of 1.5 m/s in the process line. This speed must be ensured for EHEDG-compliant cleaning.

- FDA CFR 21
- Food Contact Materials Regulation (EC) 1935/2004
- Food Contact Materials Regulation GB 4806
- The requirements of the Food Contact Material regulations must be observed when selecting the material versions.



Observe special installation instructions

Pharmaceutical compatibility

- FDA 21 CFR 177
- USP <87>
- USP <88> Class VI 121 °C
- TSE/BSE Certificate of Suitability
- cGMP

Devices with the order code for "Test, certificate", option JG "Conformity with cGMP-derived requirements, declaration" comply with the requirements of cGMP with regard to the surfaces of parts in contact with the medium, design, FDA 21 CFR material conformity, USP Class VI tests and TSE/BSE conformity.

A serial number-specific declaration is generated.

EtherNet/IP certification

The measuring device is certified and registered by the ODVA (Open Device Vendor Association). The measuring system meets all the requirements of the following specifications:

- Certified in accordance with the ODVA Conformance Test
- EtherNet/IP Performance Test
- EtherNet/IP PlugFest compliance
- The device can also be operated with certified devices of other manufacturers (interoperability)

Pressure Equipment Directive

- With the marking
 - a) PED/G1/x (x = category) or
 - b) PESR/G1/x (x = category)

on the sensor nameplate, Endress+Hauser confirms compliance with the "Essential Safety Requirements"

- a) specified in Annex I of the Pressure Equipment Directive 2014/68/EU or
- b) Schedule 2 of Statutory Instruments 2016 No. 1105.
- Devices not bearing this marking (without PED or PESR) are designed and manufactured according to sound engineering practice. They meet the requirements of
 - a) Art. 4. Section 3 of the Pressure Equipment Directive 2014/68/EU or
 - b) Part 1, Section 8 of Statutory Instruments 2016 No. 1105.

The scope of application is indicated

- a) in diagrams 6 to 9 in Annex II of the Pressure Equipment Directive 2014/68/EU or
- b) in Schedule 3, Section 2 of Statutory Instruments 2016 No. 1105.

Radio approval

The measuring instrument has radio approval.



For detailed information on the radio approval, see the Special Documentation → 🖺 250

Additional certification

CRN approval

Some device versions have CRN approval. A CRN-approved process connection with a CSA approval must be ordered for a CRN-approved device.

Tests and certificates

- EN10204-3.1 material certificate, wetted parts and sensor housing (order code for "Test, certificate", option JA)
- Pressure test, internal process, test report (order code for "Test, certificate", option JB)
- Surface roughness test ISO4287/Ra, (wetted parts), test report (option JE)
- Compliance with requirements derived from cGMP, Declaration (option JG)

External standards and quidelines

■ EN 60529

Degrees of protection provided by enclosure (IP code)

■ IEC/EN 60068-2-6

Environmental influences: Test procedure - Test Fc: vibrate (sinusoidal).

■ IEC/EN 60068-2-31

Environmental influences: Test procedure - Test Ec: shocks due to rough handling, primarily for devices.

■ EN 61010-1

Safety requirements for electrical equipment for measurement, control and laboratory use - general requirements

■ GB 30439.5

Safety requirements for industrial automation products - Part 5: Flowmeter safety requirements

■ EN 61326-1/-2-3

EMC requirements for electrical equipment for measurement, control and laboratory use

■ NAMUR NE 21

Electromagnetic compatibility (EMC) of industrial process and laboratory control equipment

■ NAMUR NE 32

Data retention in the event of a power failure in field and control instruments with microprocessors

■ NAMUR NE 43

Standardization of the signal level for the breakdown information of digital transmitters with analog output signal.

■ NAMUR NE 53

Software of field devices and signal-processing devices with digital electronics

NAMUR NE 80

The application of the pressure equipment directive to process control devices

■ NAMUR NE 105

Specifications for integrating fieldbus devices in engineering tools for field devices

NAMUR NE 107

Self-monitoring and diagnostics of field devices

■ NAMUR NE 131

Requirements for field devices for standard applications

■ NAMUR NE 132

Coriolis mass meter

■ ETSI EN 300 328

Guidelines for 2.4 GHz radio components.

■ EN 301489

Electromagnetic compatibility and radio spectrum matters (ERM).

16.13 Application packages

Many different application packages are available to enhance the functionality of the device. Such packages might be needed to address safety aspects or specific application requirements.

The application packages can be ordered with the device or subsequently from Endress+Hauser. Detailed information on the order code in question is available from your local Endress+Hauser sales center or on the product page of the Endress+Hauser website: www.endress.com.



Detailed information on the application packages:

Special Documentation →

249

Diagnostic functionality

Order code for "Application package", option EA "Extended HistoROM"

Comprises extended functions concerning the event log and the activation of the measured value memory.

Event log:

Memory volume is extended from 20 message entries (standard version) to up to 100 entries.

Data logging (line recorder):

- Memory capacity for up to 1000 measured values is activated.
- 250 measured values can be output via each of the 4 memory channels. The recording interval can be defined and configured by the user.
- Measured value logs can be accessed via the local display or operating tool e.g. FieldCare, DeviceCare or Web server.



For detailed information, see the Operating Instructions for the device.

Heartbeat Technology

Order code for "Application package", option EB "Heartbeat Verification + Monitoring"

Heartbeat Verification

Meets the requirement for traceable verification in accordance with DIN ISO 9001:2015 Clause 7.6 a) "Control of monitoring and measuring equipment".

- Functional testing in the installed state without interrupting the process.
- Traceable verification results on request, including a report.
- Simple testing process via local operation or other operating interfaces.
- Clear measuring point assessment (pass/fail) with high total test coverage within the framework of manufacturer specifications.
- Extension of calibration intervals according to operator's risk evaluation.

Heartbeat Monitoring

Continuously supplies data, which are characteristic of the measuring principle, to an external condition monitoring system for the purpose of preventive maintenance or process analysis. These data enable the operator to:

- Draw conclusions using these data and other information about the impact the process influences (e.g. corrosion, abrasion, deposit buildup etc.) have on measuring performance over time.
- Schedule servicing in time.
- Monitor the process or product quality, e.g. gas pockets.



Concentration measurement

Order code for "Application package", option ED "Concentration"

Calculation and outputting of fluid concentrations.

The measured density is converted to the concentration of a substance of a binary mixture using the "Concentration" application package:

- Choice of predefined fluids (e.g. various sugar solutions, acids, alkalis, salts, ethanol etc.).
- Common or user-defined units (*Brix, *Plato, % mass, % volume, mol/l etc.) for standard applications.
- Concentration calculation from user-defined tables.



For detailed information, see the Special Documentation for the device.

Viscosity

Order code for "Application package", option EG "Viscosity"

In-line and real-time viscosity measurement

Promass I with the "Viscosity" application package also measures the real-time viscosity of the fluid directly in the process, in addition to measuring the mass flow/volume flow/temperature and density.

The following viscosity measurements are performed on liquids:

- Dynamic viscosity
- Kinematic viscosity
- Temperature-compensated viscosity (kinematic and dynamic) in relation to the reference temperature

Viscosity measurement can be used for Newtonian and non-Newtonian applications and supplies accurate measured data irrespective of the flow, even under difficult conditions.



For detailed information, see the Special Documentation for the device.

Special density

Order code for "Application package", option EE "Special density"

Many applications use density as a key measured value for monitoring quality or controlling processes. The device measures the density of the fluid as standard and makes this value available to the control system.

The "Special Density" application package offers high-precision density measurement over a wide density and temperature range particularly for applications subject to varying process conditions.

The following information can be found in the calibration certificate supplied:

- Density performance in air
- Density performance in liquids with different density
- Density performance in water with different temperatures

For detailed information, see the Operating Instructions for the device.

16.14 Accessories



16.15 Documentation



For an overview of the scope of the associated Technical Documentation, refer to the following:

- *Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from the nameplate
- *Endress+Hauser Operations app*: Enter serial number from nameplate or scan matrix code on nameplate.

Standard documentation

Brief Operating Instructions

Brief Operating Instructions for the sensor

Measuring instrument	Documentation code
Proline Promass I	KA01284D

Brief operating instructions for transmitter

Measuring instrument	Documentation code
Proline 500 – digital	KA01346D
Proline 500	KA01347D

Technical information

Measuring instrument	Documentation code
Promass I 500	TI01284D

Description of Device Parameters

Measuring instrument	Documentation code
Promass 500	GP01120D

Device-dependent additional documentation

Safety instructions

Safety instructions for electrical equipment for hazardous areas.

Contents	Documentation code
	Measuring instrument
ATEX/IECEx Ex ia	XA01473D
ATEX/IECEx Ex ec	XA01474D
cCSAus IS	XA01475D
cCSAus Ex ia	XA01509D
cCSAus Ex ec	XA01510D
EAC Ex ia	XA01658D
EAC Ex ec	XA01659D
JPN Ex ia	XA01780D

Contents	Documentation code
	Measuring instrument
KCs Ex ia	XA03287D
INMETRO Ex ia	XA01476D
INMETRO Ex ec	XA01477D
NEPSI Ex ia	XA01478D
NEPSI Ex nA	XA01479D
UKEX Ex ia	XA02570D
UKEX Ex ec	XA02572D

Special Documentation

Contents	Documentation code
Information on the Pressure Equipment Directive	SD01614D
Radio approvals for WLAN interface for A309/A310 display module	SD01793D
Web server	SD01970D
Heartbeat Technology	SD01983D
Concentration measurement	SD02006D
Viscosity measurement	SD01994D

Installation Instructions

Contents	Note
Installation instructions for spare part sets and accessories	 Access the overview of all the available spare part sets via <i>Device Viewer</i> → ¹ 212 Accessories available for order with Installation Instructions → ¹ 214

Index

AACeess authorization to parameters Read access	0 9	Connecting the signal cable/supply voltage cable
Access authorization to parameters Read access. 81 Read access. 81 Recas access. 81 Connection testup voltage cables 55 Connection see Electrical connection See Electrical connection Connection tool 35 Connection tool 35 Connection tool 35 Connection tool 35 Connecting the dign of Connection tool 35 Connecting the device 93 Connection fool 77 Closing 77 Current consumption 22a Cycle data transmission 97 Sexplanation 77 Declinage of protection 65 Page approach 82 Politation 32 Advanting the device 91 Politation 32 Relative humidity 32 Declaration of Conformity 10 Defining the access code 163 Degree of protection 65 Recative humidity 82 Politation 77 Closing 79 Configuring dev	3-A approval	Proline 500 – digital transmitter 46
Access authorization to parameters Read access 81		
Read access	A	
Write access code 81 Connection cable 35 Access code 81 Connection preparations 40 Incorrect input 81 Connection preparations 40 Additional certification 246 Connection preparations 40 Ambient conditions Calling up 77 Operating height 234 Connection suble 77 Storage temperature 233 Vibration resistance and shock resistance 233 Application 234 Application packages 247 Application packages 247 Degree of protection 65 Application packages 247 Measurement error 232 Application packages 247 Measurement error 232 Application packages 247 Measurement error 232 Proline 500 transmitter 54 Degree of protection 65 Cable entries 10 Device example 10 Degree of protection 65 Emark 10 Check 10 Post-installa		
Access code		
Incorrect input		
Adapting the diagnostic behavior 1911 Additional certification 246 Calling up 77 77 77 78 77 78 77 78 78 77 78 78 77 78 78 78 79 77 78 78		
Additional certification 246 Ambient tenditions 234 Relative humidity 234 Storage temperature 233 Vibration resistance and shock resistance 234 Ambient temperature ange 234 Application 218 Application 218 Application 218 Application 218 Application 219 Approvals 244 Application 219 Approvals 244 Application 219 Approvals 244 Application 219 Approvals 244 Calling up 77 Closing 77 Closing 77 Closing 77 Current consumption 228 Current consumption 218 Current consumption 218 Declaration of Conformity 10 Defining the access code 163 Degree of protection 65, 234 Design Measuring device 13 Design fundamentals Measurement error 232 Repeatability 232 Device Configuring 6electrical connection 40 Device components 114 Preparing for electrical connection 40 Device components 167 Device description files 96 Device locking, status 167 Device repair 212 Device repair 212 Check 245 Connection 6ck 65 Post-installation check 65 Post-onnection check 65 Post-installation check 65 Post-installation check 65 Post-installation check 65 Post-onnection check 65 Post-onnecting the connecting 69 Device query 60 Device viewer 91 Device description file 96 Device query 60 Device viewer 91 Device description file 96 Device		
Closing		
Mechanical load		
Operating height 234 Storage temperature 233 Vibration resistance and shock resistance 234 Ambient temperature 234 Ambient temperature range 234 Application 218 Application 218 Application 218 Application 218 Application 218 Application 218 Approvals 244 Approvals 244 Approvals 244 Approvals 245 Attaching the connecting cable Proline 500 transmitter 246 Cable entries 247 Acable entry Degree of protection 258 Cable entries Device components 13 Device description files 296 Cable entries Device description files 96 Cable entry Degree of protection 246 Cable entry Degree of protection 246 Cable entry Degree of protection 246 Cable entry Degree of protection 247 Cable entry Degree of protection 248 Cable entry Degree of protection 249 Cable entry Degree of protection 240 Cable entries Device description files 96 Device description files 96 Device revision 96 Device revision 96 Device viewer 212 Device easer 240 Device eas		
Relative humidity		
Storage temperature 234 Ambient temperature 101 102 103 10		_
Vibration resistance and shock resistance 234 Ambient temperature Influence 231 Ambient temperature 234 Ambient temperature ange 234 Application 218 Application packages 247 Application packages 247 Approvals 249 Approvals 244 Attaching the connecting cable Proline 500 transmitter 54 Cable entries Technical data 228 Cable entry Degree of protection 65 Camark 10, 244 Certificates 244 Certificates 244 Certificates 245 Certificates 246 Connection 65 Connection 65 Connection 65 Connection 65 Device revision 96 Device repair 212 Device Post-installation check 65 Device description file 96 Device very ecode 96 Device Vipe code		Cyclic data transmission
Ambient temperature 234 Declaration of Conformity 10 Influence 231 Defining the access code 163 Ambient temperature range 234 Degree of protection 65, 234 Application packages 247 Application packages 247 Applicator 219 Approvals 244 Attaching the connecting cable Proline 500 transmitter 54 Cable entries Device of protection 232 Design fundamentals Technical data 228 Device Configuring for electrical connection 40 Device of protection 65 Device description files 96 Cable entry Degree of protection 65 Device of protection 65 Device of protection 65 CE mark 10, 244 Certificates 244 Transmitter 16 Certificates 244 Transmitter 16 Certificates 244 Transmitter 16 Certificates 245 Device revision 96 Connection 65 Device revision 96 Connection 65 Device ode 96 Received goods 15 Device Ode 96 Post-installation check 34 Device ode 96 Post-installation check 34 Device ode 96 Configuring the device 114 Device Care 95 Device description file 96 Device revision 96 Device description file 96 Device revision 96 Device description file 96 Device revision 96 Device description file 96 Device ode 96 Device description file 96 De		ח
Influence 231 Defining the access code 163 Ambient temperature range 234 Degree of protection 65, 234 Application packages 247 Design 13 Applicator 219 Measuring device 13 Approvals 244 Measuring device 13 Attaching the connecting cable Proline 500 transmitter 54 Measurement error 232 Repeatability 232 Repeatability 232 Coffiguring 114 Preparing for electrical connection 86 <td></td> <td></td>		
Ambient temperature range 234 Design 65, 234 Application 218 Application packages 247 Applicator 219 Measuring device 13 Approvals 244 Measurement error 232 Attaching the connecting cable Proline 500 transmitter 54 Repeatability 232 Proline 500 transmitter 54 Device Configuring 114 C Cable entries 13 Device components 13 Technical data 228 Device description files 96 Cable entry Degree of protection 65 Device components 13 Degree of protection 65 Device coking, status 167 Device name Sensor 18 CE mark 10, 244 Transmitter 16 CBMP 245 Device repair 212 Check Device revision 96 Connection 65 Device repair 212 Device revision 96 Device revision 9		
Application 218		
Application packages 247 Applicator 219 Approvals 244 Approvals 244 Attaching the connecting cable Proline 500 transmitter 54 C Repeatability 232 Cable entries 26 Technical data 228 Device Configuring 114 Preparing for electrical connection 40 Device components 13 Degree of protection 65 Device description files 96 Degree of protection 65 Device name 66 CE mark 10, 244 Sensor 18 Certificates 244 Transmitter 16 CGMP 245 Device repair 212 Check Device repair 212 Checklist Device repair 212 Checklist Device viewer 212 Checklist 34 Device description file 96 Post-connection check 65 Device repair 212 Checklist Device repa		
Applicator	= =	
Approvals		
Repeatability 232		
Proline 500 transmitter		
Configuring 114 Preparing for electrical connection 40 Device components 13 Technical data 228 Device description files 96 Device of protection 65 Dev		
Cable entries Preparing for electrical connection 40 Cable entry Device components 13 Technical data 228 Device description files 96 Cable entry 65 Device locking, status 167 Degree of protection 65 Device name 167 CE mark 10, 244 Sensor 18 Certificates 244 Transmitter 16 CGMP 245 Device repair 212 Check Device repair 212 Check Beceived goods 15 Device revision 96 Received goods 15 Device Viewer 212 Checklist Device Viewer 212 Device description file 96 Post-connection check 65 Device description file 96 CIP cleaning 236 Device description file 96 CIP cleaning 236 Symbols 187 Climate class 234 Symbols 187 Configuring the device	Profile 500 transmitter	
Device components	С	
Technical data 228 Device description files 96 Cable entry Device locking, status 167 Degree of protection 65 Device name CE mark 10, 244 Sensor 18 Certificates 244 Transmitter 16 CGMP 245 Device repair 212 Check Device revision 96 Connection 65 Device type code 96 Received goods 15 Device Viewer 212 Checklist Device Viewer 212 Post-connection check 65 Device description file 96 Post-connection check 65 Device Viewer 212 Climate class 34 Diagnostic behavior Explanation 187 Commissioning 113 Diagnostic information 187 Comfiguring the device 114 Design, description interface 191 Connecting the connecting cable FieldCare 189 Proline 500 – digital transmitter 45 <t< td=""><td>_</td><td></td></t<>	_	
Cable entry Degree of protection 65 Degree of protection 65 CE mark 10, 244 Sensor 18 Certificates 244 Transmitter 16 CGMP 245 Device repair 212 Check Device revision 96 Received goods 15 Device type code 96 Received goods 15 Device Viewer 212 Checklist Device description file 96 Post-connection check 65 Device description file 96 Post-installation check 34 Diagnostic behavior CIP cleaning 236 Explanation 187 Climate class 234 Symbols 187 Commissioning 113 Advanced settings 143 Communication interface 191 Connecting the device 114 Design, description 187, 190 Connecting the connecting cable Proline 500 - digital transmitter 45 FieldCare 189 Proline 500 terminal assignment 51 LED 182 Sensor connection housing		
Degree of protection 65 Device name CE mark 10, 244 Sensor 18 Certificates 244 Transmitter 16 CGMP 245 Device repair 212 Check Device vevision 96 Connection 65 Device type code 96 Received goods 15 Device Viewer 212 Checklist Device Queer 95 Post-connection check 65 Device description file 96 Post-installation check 34 Explanation 187 CIP cleaning 236 Explanation 187 Climate class 234 Symbols 187 Commissioning 113 Diagnostic information 187 Advanced settings 143 Communication interface 191 Connecting the device 114 Design, description 187, 190 Connecting the connecting cable FieldCare 189 Proline 500 digital transmitter 45 FieldCare 189 <td></td> <td></td>		
CE mark 10, 244 Sensor 18 Certificates 244 Transmitter 16 cGMP 245 Device repair 212 Check Device revision 96 Connection 65 Device type code 96 Received goods 15 Device Viewer 212 Checklist Device Viewer 212 Post-connection check 65 Device description file 96 Post-installation check 34 Device description file 96 CIP cleaning 236 Explanation 187 Climate class 234 Symbols 187 Commissioning 113 Diagnostic information 187 Advanced settings 143 Communication interface 191 Configuring the device 114 Design, description 187, 190 Connecting the connecting cable FieldCare 189 Proline 500 - digital transmitter 45 FieldCare 189 Proline 500 terminal assignment 51 Local display 186 Sensor connection housing, Proline 500	•	
Certificates 244 Transmitter 16 cGMP 245 Device repair 212 Check Device revision 96 Connection 65 Device type code 96 Received goods 15 Device Viewer 212 Checklist Device Care 95 Post-connection check 65 Device description file 96 Post-installation check 34 Diagnostic behavior CIP cleaning 236 Explanation 187 Climate class 234 Symbols 187 Commissioning 113 Diagnostic information 187 Configuring the device 114 Design, description 187, 190 Connecting the connecting cable DeviceCare 189 Proline 500 – digital transmitter 45 FieldCare 189 Proline 500 terminal assignment 51 LED 182 Sensor connection housing, Proline 500 51 Local display 186 Sensor connection housing, Proline 500 - digital	CE mark	Sensor
cGMP 245 Device repair 212 Check Device revision 96 Received goods 15 Device type code 96 Received goods 15 Device Viewer 212 Checklist Device Viewer 212 Post-connection check 65 Device description file 96 Post-installation check 34 Diagnostic behavior 187 CIP cleaning 236 Explanation 187 Climate class 234 Symbols 187 Commissioning 113 Diagnostic information 187 Configuring the device 114 Communication interface 191 Connecting the connecting cable DeviceCare 189 Proline 500 – digital transmitter 45 FieldCare 189 Proline 500 terminal assignment 51 Local display 186 Sensor connection housing, Proline 500 – digital 41 Overview 191 Terminal assignment of Proline 500 – digital 41 Overview 191 <t< td=""><td>Certificates</td><td>Transmitter</td></t<>	Certificates	Transmitter
Check Device revision 96 Connection 65 Device type code 96 Received goods 15 Device Viewer 212 Checklist Device Gescription file 95 Post-connection check 34 Device description file 96 CIP cleaning 236 Explanation 187 Climate class 234 Symbols 187 Commissioning 113 Diagnostic information 187 Configuring the device 114 Design, description interface 191 Connecting the connecting cable DeviceCare 189 Proline 500 – digital transmitter 45 FieldCare 189 Proline 500 terminal assignment 51 LED 182 Sensor connection housing, Proline 500 – digital 41 Overview 191 Sensor connection housing, Proline 500 – digital 41 Remedial measures 191 Connecting the device Web browser 188	cGMP	Device repair
Received goods	Check	Device revision
ChecklistDeviceCare95Post-connection check65Device description file96Post-installation check34Diagnostic behaviorCIP cleaning236Explanation187Climate class234Symbols187Commissioning113Diagnostic informationAdvanced settings143Communication interface191Configuring the device114Design, description187, 190Connecting the connecting cableDeviceCare189Proline 500 – digital transmitter45FieldCare189Proline 500 terminal assignment51LED182Sensor connection housing, Proline 50051Local display186Sensor connection housing, Proline 500 – digital41Overview191Terminal assignment of Proline 500 – digital41Remedial measures191Connecting the deviceWeb browser188	Connection	Device type code
Post-connection check65Device description file96Post-installation check34Diagnostic behaviorCIP cleaning236Explanation187Climate class234Symbols187Commissioning113Diagnostic informationAdvanced settings143Communication interface191Configuring the device114Design, description187, 190Connecting the connecting cableDeviceCare189Proline 500 - digital transmitter45FieldCare189Proline 500 terminal assignment51LED182Sensor connection housing, Proline 50051Local display186Sensor connection housing, Proline 500 - digital41Overview191Terminal assignment of Proline 500 - digital41Remedial measures191Connecting the deviceWeb browser188	Received goods	Device Viewer
Post-installation check	Checklist	
CIP cleaning		Device description file
Climate class234Symbols187Commissioning113Diagnostic informationAdvanced settings143Communication interface191Configuring the device114Design, description187, 190Connecting the connecting cableDeviceCare189Proline 500 – digital transmitter45FieldCare189Proline 500 terminal assignment51LED182Sensor connection housing, Proline 50051Local display186Sensor connection housing, Proline 500 – digital41Overview191Terminal assignment of Proline 500 – digital41Remedial measures191Connecting the deviceWeb browser188		
Commissioning113Diagnostic informationAdvanced settings143Communication interface191Configuring the device114Design, description187, 190Connecting the connecting cableDeviceCare189Proline 500 – digital transmitter45FieldCare189Proline 500 terminal assignment51LED182Sensor connection housing, Proline 50051Local display186Sensor connection housing, Proline 500 – digital41Overview191Terminal assignment of Proline 500 – digital41Remedial measures191Connecting the deviceWeb browser188	-	
Advanced settings		
Configuring the device114Design, description187, 190Connecting the connecting cableDeviceCare189Proline 500 – digital transmitter45FieldCare189Proline 500 terminal assignment51LED182Sensor connection housing, Proline 50051Local display186Sensor connection housing, Proline 500 – digital41Overview191Terminal assignment of Proline 500 – digital41Remedial measures191Connecting the deviceWeb browser188		
Connecting the connecting cableDeviceCare189Proline 500 – digital transmitter45FieldCare189Proline 500 terminal assignment51LED182Sensor connection housing, Proline 50051Local display186Sensor connection housing, Proline 500 – digital41Overview191Terminal assignment of Proline 500 – digital41Remedial measures191Connecting the deviceWeb browser188		
Proline 500 – digital transmitter45FieldCare189Proline 500 terminal assignment51LED182Sensor connection housing, Proline 50051Local display186Sensor connection housing, Proline 500 - digital41Overview191Terminal assignment of Proline 500 - digital41Remedial measures191Connecting the deviceWeb browser188		
Proline 500 terminal assignment		
Sensor connection housing, Proline 500 51 Sensor connection housing, Proline 500 - digital 41 Terminal assignment of Proline 500 - digital 41 Connecting the device Local display		
Sensor connection housing, Proline 500 - digital 41 Terminal assignment of Proline 500 - digital 41 Connecting the device Overview		
Terminal assignment of Proline 500 - digital 41 Remedial measures		
Connecting the device Web browser		
Proune Suu STELDIAGNOSTICUST 205		
Proline 500 – digital	Fromite 200 – digital	Diagnostic message

Diagnostics	Firmware
Symbols	Release date
DIP switch	Version
see Write protection switch	Firmware history
Direct access	Fix assembly
Disabling write protection	Flow direction
Display	Flow limit
see Local display	Food Contact Materials Regulation 245
Display area	Functions
For operational display	see Parameter
In the navigation view	
Display values	G
For locking status	Galvanic isolation
Displaying the measured value history	
Disposal	H
Document	Hardware write protection
Function 6	Help text
Symbols 6	Calling up
	Closing
Document function	Explanation
Documentation	HistoROM
Down pipe	Hygienic compatibility
T.	Trygletiic companionity
E	I
Editing view	Identifying the measuring instrument
Input screen	· · ·
Using operating elements 75, 76	Incoming acceptance
EHEDG-tested	
Electrical connection	Current diagnostic event
Degree of protection	Previous diagnostic event 205
Measuring instrument	Influence
Operating tools	Ambient temperature
Via Ethernet network 91	Medium pressure
Via service interface (CDI-RJ45) 92	Medium temperature 231
Via WLAN interface	Information about this document 6
RSLogix 5000	Inlet runs
Web server	Input variables
WLAN interface	Inspection
Electromagnetic compatibility	Installation
Electronics module	Installation
Enabling write protection	Installation dimensions 23
Enabling/disabling the keypad lock 82	Installation requirements
Error messages	Down pipe
see Diagnostic messages	Inlet and outlet runs
EtherNet/IP	Installation dimensions 23
Diagnostic information	Mounting location 21
EtherNet/IP certification	Orientation
Event logbook	Sensor heating
Extended order code	Thermal insulation
	Vibrations
Sensor	Intended use
Transmitter	Internal cleaning
F	internal cleaning
	L
FDA	Languages, operation options
Field of application	Line recorder
Residual risks	Local display
FieldCare	
Device description file	Navigation view
Function	see Diagnostic message
Filtering the event logbook 207	see In alarm condition
	see Operational display

252

Text editor	Netilion
Low flow cut off	Numeric editor
M	0
Main electronics module	Onsite display
Maintenance work	Numeric editor
Managing the device configuration	Operable flow range
Manufacturer ID	Operating elements
Manufacturing date	Operating height
Materials	Operating keys
Maximum measurement error	see Operating elements
Measured variables	Operating menu
see Process variables	Menus, submenus 68
Measurement accuracy	Structure
Measuring and test equipment	Submenus and user roles 69
Measuring device	Operating philosophy
Conversion	Operation
Design	Operation options
Repairs	Operational display
Measuring instrument	Operational safety
Disposal	Order code
Installing the sensor	Orientation (vertical, horizontal)
Preparing for mounting	Outlet runs
Removing	Output signal
Switch on	Output variables
Measuring principle	Output variables
Measuring range	P
For gases	Packaging disposal
For liquids	Parameter
Measuring range, recommended 237	Changing
Measuring system	Entering values or text 80
Mechanical load	Parameter settings
Medium density	Administration (Submenu) 160
Medium pressure	Advanced setup (Submenu) 144
Influence	Communication (Submenu)
Medium temperature	Configuration backup (Submenu) 157
Influence	Corrected volume flow calculation (Submenu) 144
Menu	Current input
Diagnostics	Current input (Wizard)
Setup	Current input 1 to n (Submenu)
Menus	Current output
For device configuration	Current output (Wizard)
For specific settings	Data logging (Submenu)
Mounting dimensions	Define access code (Wizard)
see Installation dimensions	Diagnostics (Menu)
Mounting location	Display (Submenu)
Mounting preparations	Display (Wizard)
Mounting requirements Static pressure	I/O configuration
Mounting tool	I/O configuration (Submenu)
ividuiting tool	Low flow cut off (Wizard)
N	Measured variables (Submenu) 168
Nameplate	Medium selection (Wizard) 119
Sensor	Partially filled pipe detection (Wizard) 142
Transmitter	Pulse/frequency/switch output 127
Navigation path (navigation view)	Pulse/frequency/switch output (Wizard)
Navigation view	
In the submenu	Pulse/frequency/switch output 1 to n (Submenu) 173
In the wizard	Relay output

Relay output 1 to n (Submenu) 174	Replacement
Relay output 1 to n (Wizard)	Device components
Reset access code (Submenu)	Requirements for personnel
Sensor adjustment (Submenu)	Response time
Setup (Menu)	Return
Simulation (Submenu)	S
Status input	
Status input 1 to n (Submenu) 172	Safety
Status input 1 to n (Wizard)	Sensor
System units (Submenu)	Installing
Totalizer (Submenu)	Sensor heating
Totalizer 1 to n (Submenu)	Sensor housing
Totalizer handling (Submenu) 175	Serial number
Value current output 1 to n (Submenu) 173	Services
Web server (Submenu)	Maintenance
WLAN settings (Wizard)	Repair
Zero adjustment (Wizard)	Setting the operating language
Zero verification (Wizard) 146	Settings
Performance characteristics	Adapting the measuring device to the process
Pharmaceutical compatibility	conditions
Post-connection check	Administration
Post-connection check (checklist)	Advanced display configurations 151
Post-installation check	Communication interface
Post-installation check (checklist)	Current input
	Current output
Potential equalization	I/O configuration
Power consumption	Local display
Power supply failure	Low flow cut off
Pressure Equipment Directive	
Pressure loss	Managing the device configuration
Pressure/temperature ratings	
Process connections	Operating language
Process variables	Partially filled pipe detection
Calculated	Pulse output
Measured	Pulse/frequency/switch output 127, 129
Product safety	Relay output
Proline 500 – digital transmitter	Resetting the device
Connecting the signal cable/supply voltage cable 46	Resetting the totalizer
Proline 500 connecting cable terminal assignment	Sensor adjustment
Sensor connection housing 51	Simulation
Protecting parameter settings 162	Status input
	Switch output
R	System units
Radio approval	Tag name
RCM marking	Totalizer
Read access	Totalizer reset
Reading off measured values 167	WLAN
Reading out diagnostic information, EtherNet/IP 191	Signal on alarm
Recalibration	SIP cleaning
Reference operating conditions	Software release
Registered trademarks	Spare part
Remedial actions	Spare parts
Calling up	Special connection instructions 60
Closing	Special mounting instructions
Remote operation	Hygienic compatibility
Repair	Standards and guidelines
Notes	Static pressure
Repair of a device	Status area
Repeatability	For operational display
	in the havigation view

Status signals	System file
Storage concept	Release date
Storage conditions	Source
Storage temperature	Version
Storage temperature range	System integration
Structure	T
Operating menu	_
Submenu	Technical data, overview
Administration	Temperature range
Advanced setup	Ambient temperature for display 241
Calculated values	Medium temperature
Communication	Storage temperature
Configuration backup	Terminal assignment
Corrected volume flow calculation 144	Terminal assignment of connecting cable for Proline
Current input 1 to n	500- digital
Data logging	Sensor connection housing 41
Device information	Terminals
Display	Tests and certificates
Event logbook	Text editor
I/O configuration	Thermal insulation
Input values	Tool
Measured values	For electrical connection
Measured variables	For mounting
Output values	Transportation
Overview	Tool tip
Process variables	see Help text
Pulse/frequency/switch output 1 to n	Totalizer
Relay output 1 to n	Configuring
Reset access code	Transmitter
Sensor adjustment	Turning the display module
Simulation	Turning the housing
Status input 1 to n	Transporting the measuring instrument 20
	Troubleshooting
System units	General
Totalizer	TSE/BSE Certificate of Suitability
Totalizer 1 to n	Turning the display module
Totalizer handling	Turning the electronics housing
Value current output 1 to n	
Web server	see Turning the transmitter housing Turning the transmitter housing
Supply voltage	running the transmitter flousing
Surface roughness	U
Switch output	UKCA marking
Symbols	Use of measuring instrument
Controlling data entries	Borderline cases
For communication	Incorrect use
For diagnostic behavior	see Intended use
For locking	User roles
For measured variable	USP Class VI
For measurement channel number	USP Class VI
For menus	V
For parameters	Version data for the device
For status signal	Vibration resistance and shock resistance
For submenu	Vibrations
For wizards	VIDIALIONS
In the status area of the local display 70	W
Input screen	W@M Device Viewer
Operating elements	Weight
System design	SI units
Measuring system	Transport (notes)
see Measuring device design	US units
	00 uma

Wizard Pulse/frequency/switch output 127, 129, 132 Write protection Via write protection switch 164



www.addresses.endress.com

