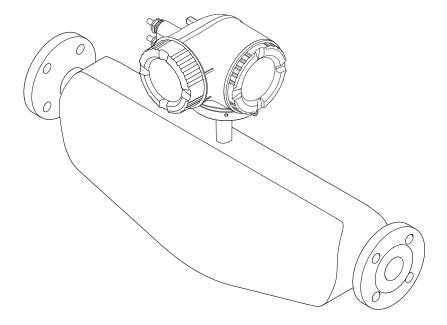
Valid as of version 01.00.zz (Device firmware) Products

Operating Instructions **Proline Promass S 300**

Coriolis flowmeter FOUNDATION Fieldbus







- 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 Center will supply you with current information and updates to these instructions.

Table of contents

1	About this document	6	6	Installation	21
1.1 1.2	Document function Symbols 1.2.1 Safety symbols 1.2.2 Electrical symbols 1.2.3 Communication symbols 1.2.4 Tool symbols 1.2.5 Symbols for certain types of information 1.2.6 Symbols in graphics	6 6 6 6 7	6.1	Installation conditions	21 23 25 26 26 26
1.3	Documentation	8	6.3	6.2.4 Turning the transmitter housing 6.2.5 Turning the display module Post-installation check	27 27
1.4	Registered trademarks	8 8	7	Electrical connection	29
2.1 2.2 2.3 2.4 2.5 2.6 2.7	Safety instructions10Requirements for the personnel10Designated use10Workplace safety1Operational safety1Product safety1IT security1Device-specific IT security12.7.1Protecting access via hardware write protection2.7.2Protecting access via a password2.7.3Access via Web server	0 0 1 1 1 2 2 2	7.1 7.2 7.3	Connection conditions	29 32 32 32 32 33 34 34 37
3	Product description	4	7.4	Special connection instructions	38
3.1	Product design	4	7.5 7.6	7.4.1 Connection examples	41
4	Incoming acceptance and product				
	identification		8	Operation options	
4.1 4.2	Incoming acceptance	5 6 7	8.1 8.2 8.3	Overview of operation options	42 43 43 44
5 5.1 5.2 5.3	Storage and transport	9 9 9 0 0		display	45 47 49 51 53 53 54 54

	8.3.11 Disabling write protection via ac code	55		10.6.4 Configuring the totalizer	
	lock			10.6.6 WLAN configuration	
3.4	Access to the operating menu via the Webrowser	eb		10.6.7 Configuration management10.6.8 Using parameters for device	109
	8.4.1 Function range			administration	110
	8.4.2 Prerequisites		10.7	Simulation	
	8.4.3 Establishing a connection		10.8	Protecting settings from unauthorized access	114
	8.4.4 Logging on			10.8.1 Write protection via access code	114
	8.4.5 User interface			10.8.2 Write protection via write protection	116
	8.4.6 Disabling the Web server			switch	116
) E	8.4.7 Logging out	62		10.8.3 Write protection via block operation	116
3.5	Access to the operating menu via the operating tool	63			
	8.5.1 Connecting the operating tool.		11	Operation	117
	8.5.2 Field Xpert SFX350, SFX370		11.1	Reading the device locking status	117
	8.5.3 FieldCare		11.2	Adjusting the operating language	
	8.5.4 DeviceCare		11.3	Configuring the display	
	8.5.5 AMS Device Manager		11.4	Reading measured values	
	8.5.6 Field Communicator 475			11.4.1 "Measured variables" submenu	
				11.4.2 "Totalizer" submenu	
9	System integration	69		11.4.3 "Input values" submenu	120
	5		44.5	11.4.4 Output values	121
9.1	Overview of device description files		11.5	Adapting the measuring device to the process	
	9.1.1 Current version data for the dev		11 (conditions	
. .	9.1.2 Operating tools		11.6	Performing a totalizer reset	123
9.2	Cyclic data transmission			11.6.1 Function scope of the "Control	124
	9.2.1 Block model			Totalizer" parameter	124
	9.2.3 Execution times			totalizers" parameter	12/
	7.2.7 Execution times	••••• /)			
	9.2.4 Methods	74	11.7	Showing data logging	124
10	9.2.4 Methods		11.7 12	Showing data logging	124 128
	Commissioning	75		Diagnostics and troubleshooting	128
10 10.1 10.2	Commissioning	75	12	Diagnostics and troubleshooting General troubleshooting	128
10.1	Commissioning	75	12 12.1	Diagnostics and troubleshooting	128
10.1 10.2	Commissioning	75 75 75 75	12 12.1	Diagnostics and troubleshooting General troubleshooting	128 128 130
10.1 10.2 10.3	Commissioning	75 75 75 75 75 76	12 12.1	Diagnostics and troubleshooting General troubleshooting	128 128 130 130
10.1 10.2 10.3 10.4	Commissioning	75 75 75 75 75 76 77	12 12.1 12.2	Diagnostics and troubleshooting General troubleshooting	128 128 130 130 131
10.1 10.2 10.3 10.4	Commissioning	75 75 75 75 76 77	12 12.1 12.2	Diagnostics and troubleshooting General troubleshooting	128 128 130 130 131 131 133
10.1 10.2 10.3 10.4	Commissioning	75 75 75 75 76 77 77 m 80	12 12.1 12.2	Diagnostics and troubleshooting General troubleshooting	128 128 130 130 131 131 133 133
10.1 10.2 10.3 10.4	Commissioning	75 75 75 75 75 76 77 77 m 80 81	12 12.1 12.2 12.3	Diagnostics and troubleshooting General troubleshooting	128 128 130 130 131 131 133 133
10.1 10.2 10.3 10.4	Commissioning	75 75 75 75 76 77 77 m 80 81	12.1 12.2 12.3 12.4	Diagnostics and troubleshooting General troubleshooting Diagnostic information via light emitting diodes 12.2.1 Transmitter Diagnostic information on local display 12.3.1 Diagnostic message 12.3.2 Calling up remedial measures Diagnostic information in the Web browser. 12.4.1 Diagnostic options 12.4.2 Calling up remedy information	128 128 130 130 131 131 133 133
10.1 10.2 10.3 10.4	Function check	75 75 75 75 76 77 77 77 80 81 81	12 12.1 12.2 12.3	Diagnostics and troubleshooting General troubleshooting	128 130 130 131 131 133 133 133
10.1 10.2 10.3 10.4	Function check	75 75 75 75 76 77 77 77 80 81 81 82 83	12.1 12.2 12.3 12.4	Diagnostics and troubleshooting General troubleshooting Diagnostic information via light emitting diodes 12.2.1 Transmitter Diagnostic information on local display 12.3.1 Diagnostic message 12.3.2 Calling up remedial measures Diagnostic information in the Web browser. 12.4.1 Diagnostic options 12.4.2 Calling up remedy information Diagnostic information in FieldCare or DeviceCare	128 130 130 131 131 133 133 134
10.1 10.2 10.3 10.4	Function check	75 75 75 75 76 77 77 m 80 81 81 82 83	12.1 12.2 12.3 12.4	Diagnostics and troubleshooting General troubleshooting	128 130 130 131 131 133 133 134 134
10.1 10.2 10.3 10.4	Function check	75 75 75 75 76 77 77 m 80 81 81 82 83 84	12.1 12.2 12.3 12.4 12.5	Diagnostics and troubleshooting General troubleshooting	128 130 130 131 131 133 133 134 134 134 135
10.1 10.2 10.3 10.4	Function check	75 75 75 75 76 77 77 m 80 81 81 81 82 83 84 //	12.1 12.2 12.3 12.4	Diagnostics and troubleshooting General troubleshooting Diagnostic information via light emitting diodes 12.2.1 Transmitter Diagnostic information on local display 12.3.1 Diagnostic message 12.3.2 Calling up remedial measures Diagnostic information in the Web browser. 12.4.1 Diagnostic options 12.4.2 Calling up remedy information Diagnostic information in FieldCare or DeviceCare 12.5.1 Diagnostic options 12.5.2 Calling up remedy information Adapting the diagnostic information	128 130 130 131 131 133 133 134 134 134 135 136
10.1 10.2 10.3 10.4	Function check	75 75 75 75 76 77 77 m 80 81 81 81 82 83 84 // 87	12.1 12.2 12.3 12.4 12.5	Diagnostics and troubleshooting General troubleshooting Diagnostic information via light emitting diodes 12.2.1 Transmitter Diagnostic information on local display 12.3.1 Diagnostic message 12.3.2 Calling up remedial measures Diagnostic information in the Web browser. 12.4.1 Diagnostic options 12.4.2 Calling up remedy information Diagnostic information in FieldCare or DeviceCare 12.5.1 Diagnostic options 12.5.2 Calling up remedy information Adapting the diagnostic information 12.6.1 Adapting the diagnostic behavior	128 130 130 131 131 133 133 134 134 134 135 136 136
10.1 10.2 10.3 10.4	Function check	75 75 75 75 76 77 77 m 80 81 81 82 83 84 // 87	12.1 12.2 12.3 12.4 12.5	Diagnostics and troubleshooting General troubleshooting Diagnostic information via light emitting diodes 12.2.1 Transmitter Diagnostic information on local display 12.3.1 Diagnostic message 12.3.2 Calling up remedial measures Diagnostic information in the Web browser 12.4.1 Diagnostic options 12.4.2 Calling up remedy information Diagnostic information in FieldCare or DeviceCare 12.5.1 Diagnostic options 12.5.2 Calling up remedy information Adapting the diagnostic information Adapting the diagnostic behavior 12.6.1 Adapting the status signal	128 130 130 131 131 133 133 134 134 134 135 136 136 136
10.1 10.2 10.3 10.4	Function check	75 75 75 75 76 77 77 77 81 81 82 83 84 87 87 94 96 98	12.1 12.2 12.3 12.4 12.5	Diagnostics and troubleshooting General troubleshooting Diagnostic information via light emitting diodes	128 130 130 131 131 133 133 134 134 135 136 136 136 140
10.1 10.2 10.3 10.4	Function check	75 75 75 75 75 76 77 77 m 80 81 81 82 83 84 87 96 96 98	12.1 12.2 12.3 12.4 12.5	Diagnostics and troubleshooting General troubleshooting	128 130 130 131 131 133 133 134 134 135 136 136 140 141
10.1 10.2 10.3 10.4 10.5	Function check	75 75 75 75 76 77 77 m 80 81 81 82 83 84 87 87 96 96 98	12.1 12.2 12.3 12.4 12.5	Diagnostics and troubleshooting General troubleshooting	128 130 130 131 131 133 133 134 134 134 135 136 136 140 141 143
10.1 10.2 10.3 10.4	Function check	75 75 75 75 75 76 77 77 m 80 81 81 82 83 84 // 87 94 96 98 98 99 100	12.1 12.2 12.3 12.4 12.5	Diagnostics and troubleshooting General troubleshooting	128 130 130 131 131 133 133 134 134 135 136 136 140 141 143 149
10.1 10.2 10.3 10.4 10.5	Function check	75 75 75 75 76 77 77 80 81 82 83 84 87 94 96 98 98 98 99 100 e	12.1 12.2 12.3 12.4 12.5	Diagnostics and troubleshooting General troubleshooting	128 130 130 131 131 133 133 134 134 135 136 136 140 141 143 149
10.1 10.2 10.3 10.4 10.5	Function check	75 75 75 75 76 77 77 80 81 82 83 84 87 94 96 98 98 98 98 98 99 100 100 101	12.1 12.2 12.3 12.4 12.5 12.6 12.7	Diagnostics and troubleshooting General troubleshooting	128 130 130 131 131 133 133 134 134 135 136 136 140 141 143 149 156
10.1 10.2 10.3 10.4 10.5	Function check	75 75 75 75 76 77 77 80 81 82 83 84 87 94 96 98 98 98 99 100 101 101	12.1 12.2 12.3 12.4 12.5 12.6 12.7	Diagnostics and troubleshooting. General troubleshooting Diagnostic information via light emitting diodes 12.2.1 Transmitter Diagnostic information on local display 12.3.1 Diagnostic message 12.3.2 Calling up remedial measures Diagnostic information in the Web browser 12.4.1 Diagnostic options 12.4.2 Calling up remedy information Diagnostic information in FieldCare or DeviceCare 12.5.1 Diagnostic options 12.5.2 Calling up remedy information Adapting the diagnostic information Adapting the diagnostic information 12.6.1 Adapting the diagnostic behavior 12.6.2 Adapting the status signal Overview of diagnostic information 12.7.1 Diagnostic of sensor 12.7.2 Diagnostic of electronic 12.7.3 Diagnostic of configuration Pending diagnostic events	128 130 130 131 131 133 133 134 134 134 136 136 140 141 143 149 156 161

	Diagnostic list	162
12.11	Event logbook	163
	12.11.1 Reading out the event logbook	163
	12.11.2 Filtering the event logbook 12.11.3 Overview of information events	164 164
12 12	Resetting the measuring device	165
12.12	12.12.1 Function scope of the "Restart"	105
	parameter	165
	12.12.2 Function scope of the "Service reset"	166
12 12	parameter	166
	Firmware history	168
13	Maintenance	169
13.1	Maintenance tasks	169
	13.1.1 Exterior cleaning	169
100	13.1.2 Interior cleaning	169
13.2	Measuring and test equipment	169 169
13.3	Endress+Hauser services	169
14	Repair	170
14.1	General notes	170
	14.1.1 Repair and conversion concept	170
	14.1.2 Notes for repair and conversion	170
14.2	Spare parts	170
14.3	Endress+Hauser services	170
14.4	Return	170
14.5	Disposal	171
	14.5.1 Removing the measuring device	171
	14.5.2 Disposing of the measuring device	171
15	Accessories	172
15.1	Device-specific accessories	172
	15.1.1 For the transmitter	172
	15.1.2 For the sensor	173
15.2	Communication-specific accessories	173
15.3	Service-specific accessories	174
15.4	System components	174
16	Technical data	175
16.1	Application	175
16.2	Function and system design	175
16.3	Input	176
16.4	Output	178
16.5	Power supply	183
16.6	Performance characteristics	185
16.7	Installation	189
16.8	Environment	189
16.9	Process	190
	Mechanical construction	192
	Human interface	194
	Certificates and approvals	199
	Application packages	201 202
10.14	Accessories	
16 15	Supplementary documentation	202

Index	205
-------	-----

1 About this document

1.1 Document function

These 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.

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 dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

A CAUTION

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

NOTICE

This symbol contains information on procedures and other facts which do not result in personal injury.

1.2.2 Electrical symbols

Symbol	Meaning
===	Direct current
~	Alternating current
$\overline{}$	Direct current and alternating current
=	Ground connection A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.
	Protective Earth (PE) A terminal which must be connected to ground prior to establishing any other connections.
	The ground terminals are situated inside and outside the device: Inner ground terminal: Connects the protectiv earth to the mains supply. Outer ground terminal: Connects the device to the plant grounding system.

1.2.3 Communication symbols

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

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

1.2.4 Tool symbols

Symbol Meaning	
Flat blade screwdriver	
06	Allen key
Ó	Open-ended 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.
Ţ <u>i</u>	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

- For an overview of the scope of the associated Technical Documentation, refer to the following:
 - *W@M Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from nameplate
 - *Endress+Hauser Operations App*: Enter the serial number from the nameplate or scan the 2D matrix code (QR code) on the nameplate
- Detailed list of the individual documents along with the documentation code $\Rightarrow \stackrel{\cong}{=} 202$

1.3.1 Standard documentation

Document type	Purpose and content of the document
Technical Information	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.
Sensor Brief Operating Instructions	Guides you quickly to the 1st measured value - Part 1 The Sensor Brief Operating Instructions are aimed at specialists with responsibility for installing the measuring device.
	 Incoming acceptance and product identification Storage and transport Installation
Transmitter Brief Operating Instructions	Guides you quickly to the 1st measured value - Part 2 The Transmitter Brief Operating Instructions are aimed at specialists with responsibility for commissioning, configuring and parameterizing the measuring device (until the first measured value).
	 Product description Installation Electrical connection Operation options System integration Commissioning Diagnostic information
Description of Device Parameters	Reference for your parameters The document provides a detailed explanation of each individual parameter in the Expert operating menu. The description is aimed at those who work with the device over the entire life cycle and perform specific configurations.

1.3.2 Supplementary device-dependent documentation

Additional documents are supplied depending on the device version ordered: Always comply strictly with the instructions in the supplementary documentation. The supplementary documentation is an integral part of the device documentation.

1.4 Registered trademarks

FOUNDATION™ Fieldbus

Registration-pending trademark of the FieldComm Group, Austin, Texas, USA

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 Designated use

Application and media

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

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

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

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

- ► Keep within the specified pressure and temperature range.
- ▶ Only use the measuring device in full compliance with the data on the nameplate and the general conditions listed in the Operating Instructions and supplementary documentation.
- ► Based on the nameplate, check whether the ordered device is permitted for the intended use in the hazardous area (e.g. explosion protection, pressure vessel safety).
- ► Use the measuring device only for media to which the process-wetted materials are sufficiently resistant.
- ▶ If the ambient temperature of the measuring device is outside the atmospheric temperature, it is absolutely essential to comply with the relevant basic conditions as specified in the device documentation → 🖺 8.
- ► Protect the measuring device permanently against corrosion from environmental influences.

Incorrect use

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

A 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 fluid-wetted materials in the process.
- ▶ Keep within the specified pressure and temperature range.

NOTICE

Verification for borderline cases:

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

Residual risks

A WARNING

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

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

2.3 Workplace safety

For work on and with the device:

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

For welding work on the piping:

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

If working on and with the device with wet hands:

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

2.4 Operational safety

Risk of injury.

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

Conversions to the device

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

▶ If, despite this, modifications are required, consult with Endress+Hauser.

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 repair of an electrical device.
- ▶ Use original spare parts and accessories from Endress+Hauser only.

2.5 Product safety

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

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

2.6 IT security

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

IT security measures, which provide additional protection for the device 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. An overview of the most important functions is provided in the following section.

Function/interface	Factory setting	Recommendation
Write protection via hardware write protection switch → 🖺 12	Not enabled.	On an individual basis following risk assessment.
Access code (also applies for Web server login or FieldCare connection) → 🖺 13	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) → 🖺 13	Serial number	Assign an individual WLAN passphrase during commissioning.
WLAN mode	Access Point	On an individual basis following risk assessment.
Web server→ 🖺 13	Enabled.	On an individual basis following risk assessment.
CDI-RJ45 service interface	-	On an individual basis following risk assessment.

2.7.1 Protecting access via hardware write protection

Write access to the device parameters 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 motherboard). 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 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

When the device is delivered, the device does not have an access code and is equivalent to 0000 (open).

WLAN passphrase: Operation as WLAN access point

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 $(\rightarrow \implies 109)$.

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.
- 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.

2.7.3 Access via Web server

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

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:

The "Description of Device Parameters" document $\rightarrow \stackrel{\triangle}{=} 203$.

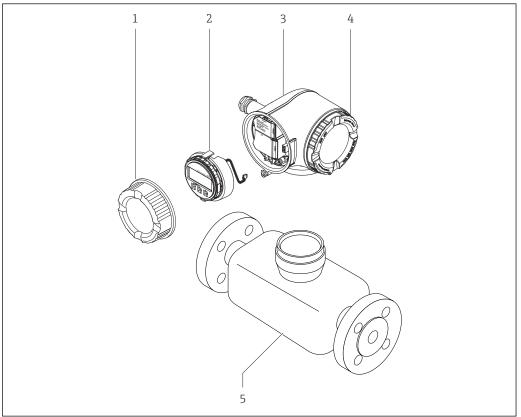
3 Product description

The device consists of a transmitter and a sensor.

The device is available as a compact version:

The transmitter and sensor form a mechanical unit.

3.1 Product design

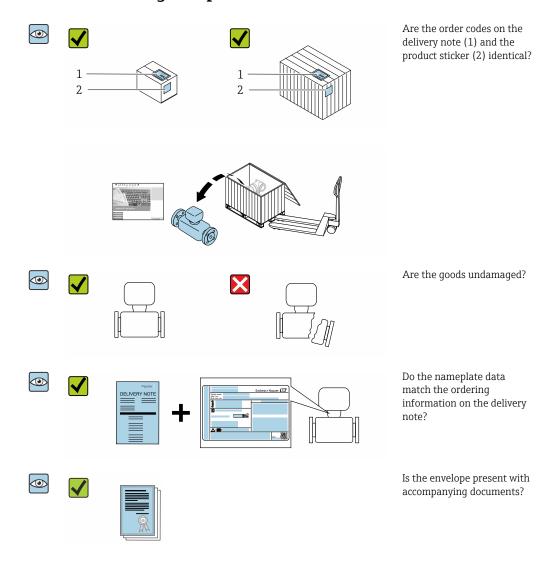


A002958

- $\blacksquare 1$ Important components of a measuring device
- 1 Connection compartment cover
- 2 Display module
- 3 Transmitter housing
- 4 Electronics compartment cover
- 5 Sensor

4 Incoming acceptance and product identification

4.1 Incoming acceptance



- If one of the conditions is not satisfied, contact your Endress+Hauser Sales Center.
 - Depending on the device version, the CD-ROM might not be part of the delivery!
 The Technical Documentation is available via the Internet or via the Endress+Hauser Operations App, see the "Product identification" section → 16.

4.2 Product identification

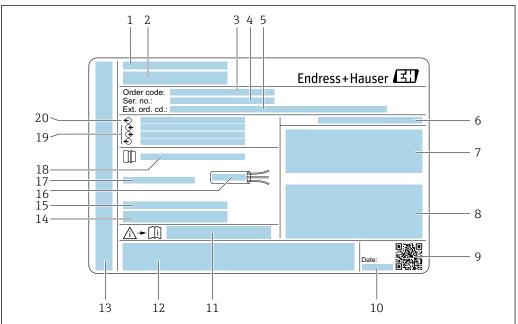
The following options are available for identification of the device:

- Nameplate specifications
- Order code with breakdown of the device features on the delivery note
- Enter serial numbers from nameplates in the *W@M Device Viewer* (www.endress.com/deviceviewer): All information about the device is displayed.
- Enter the serial number from nameplates in the *Endress+Hauser Operations App* or scan the 2-D matrix code (QR code) on the nameplate using the *Endress+Hauser Operations App*: All information about the device is displayed.

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

- The "Additional standard documentation on the device" → 🖺 8 and "Supplementary device-dependent documentation" → 🖺 8 sections
- The *W@M 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 2-D matrix code (QR code) on the nameplate.

4.2.1 Transmitter nameplate

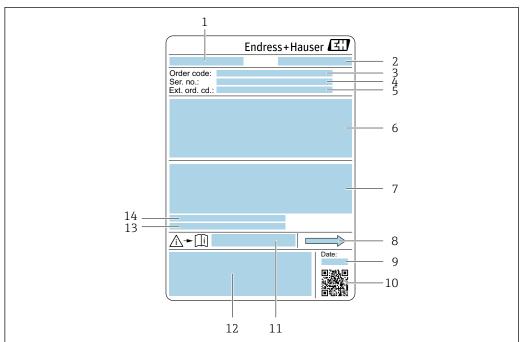


A00291

■ 2 Example of a transmitter nameplate

- 1 Manufacturing location
- 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, C-Tick
- $13 \quad \textit{Space for degree of protection of connection and electronics compartment when used in hazardous areas}$
- 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



A0029199

■ 3 Example of a sensor nameplate

- 1 Name of the sensor
- 2 Manufacturing location
- 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, C-Tick
- 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 measuring 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.
<u> </u>	Reference to documentation Refers to the corresponding device documentation.
	Protective ground connection A terminal which must be connected to ground prior to establishing any other connections.

5 Storage and transport

5.1 Storage conditions

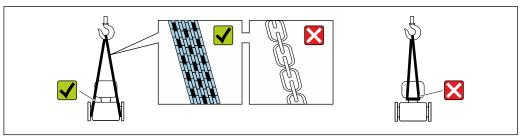
Observe the following notes for storage:

- ► 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 to avoid unacceptably high surface temperatures.
- ► Store in a dry and dust-free place.
- ▶ Do not store outdoors.

Storage temperature → 189

5.2 Transporting the product

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



A0029252

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.

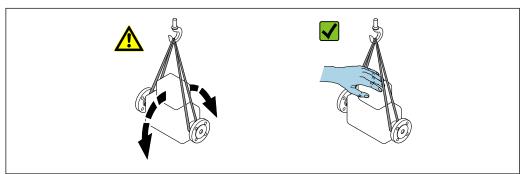
5.2.1 Measuring devices without lifting lugs

A WARNING

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:

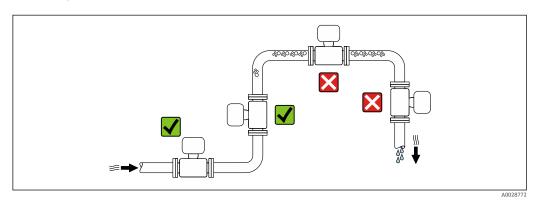
- Outer packaging of device
 Polymer stretch wrap that complies with EU Directive 2002/95/EC (RoHS)
- Packaging
 - Wooden crate treated in accordance with ISPM 15 standard, confirmed by IPPC logo
 - Cardboard box in accordance with European packaging guideline 94/62EC, recyclability confirmed by Resy symbol
- Carrying and securing materials
 - Disposable plastic pallet
 - Plastic straps
 - Plastic adhesive strips
- Filler material Paper pads

6 Installation

6.1 Installation conditions

6.1.1 Mounting position

Mounting location

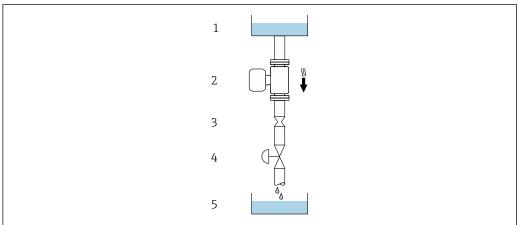


To prevent measuring errors arising from accumulation of gas bubbles in the measuring tube, avoid the following mounting locations in the pipe:

- 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.



400202

- \blacksquare 4 Installation in a down pipe (e.g. for batching applications)
- 1 Supply tank
- 2 Sensor
- 3 Orifice plate, pipe restriction
- 4 Valve
- 5 Batching tank

DN		Ø orifice plate, pipe restriction		
[mm]	[in]	[mm]	[in]	
8	3/8	6	0.24	
15	15 ½ 10		0.40	
25	1	14	0.55	
40	1½	22	0.87	
50	2	28	1.10	

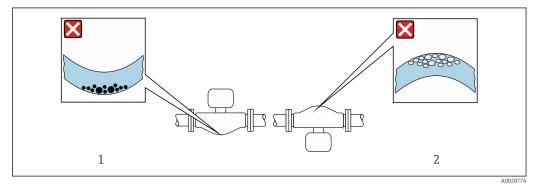
Orientation

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).

	Orientation				
A	Vertical orientation	A0015591	√ √ 1)		
В	Horizontal orientation, transmitter at top	A0015589	Exceptions: $\rightarrow \square$ 5, \square 22		
С	Horizontal orientation, transmitter at bottom	A0015590	Exceptions: $\rightarrow \square$ 5, \square 22		
D	Horizontal orientation, transmitter at side	A0015592	\checkmark		

- 1) This orientation is recommended to ensure self-draining.
- 2) Applications with low process temperatures may decrease 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.

If a sensor is installed horizontally with a curved measuring tube, match the position of the sensor to the fluid properties.



■ 5 Orientation of sensor with curved measuring tube

- 1 Avoid this orientation for fluids with entrained solids: Risk of solids accumulating.
- 2 Avoid this orientation for outgassing fluids: Risk of gas accumulating.

Inlet and outlet runs



Installation dimensions

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

6.1.2 Environmental and process requirements

Ambient temperature range

Measuring device	 −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.

- P Dependency of ambient temperature on medium temperature→ 🖺 190
- ► If operating outdoors: Avoid direct sunlight, particularly in warm climatic regions.

System pressure

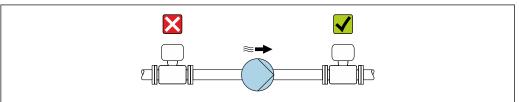
It is important that cavitation does not occur, or that gases entrained in the liquids do not outgas.

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 system 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)



A0028777

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.

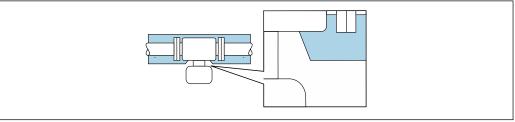
The following device versions are recommended for versions with thermal insulation: Version with extended neck for insulation:

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, transmitter housing pointing downwards.
- ▶ Do not insulate the transmitter housing .
- ▶ Maximum permissible temperature at the lower end of the transmitter housing: $80 \,^{\circ}\text{C} (176 \,^{\circ}\text{F})$
- ► Thermal insulation with extended neck free: We recommend that you do not insulate the extended neck in order to ensure optimum dissipation of heat.



A003439

 \blacksquare 6 Thermal insulation with extended neck free

Heating

NOTICE

Electronics can overheat due to elevated ambient temperature!

- ▶ Observe maximum permitted ambient temperature for the transmitter .
- ► Depending on the fluid 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 °C (176 °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.

Heating options

If a fluid 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
- Via pipes carrying hot water or steam
- Via heating jackets

24

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 mounting instructions

Drainability

The measuring tubes can be completely drained and protected against solids build-up in vertical orientation.

Sanitary compatibility

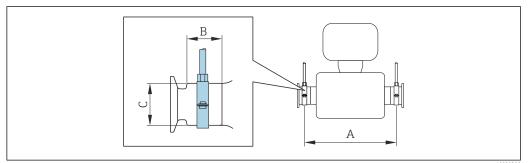


- When installing in hygienic applications, please refer to the information in the "Certificates and approvals/hygienic compatibility" section $\rightarrow \implies 199$
- In the case of measuring devices with the order code for "Housing", option B "Stainless, hygienic", to seal the connection compartment cover, screw it closed finger-tight and then tighten it by another 45° (corresponds to 15 Nm).

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	3/8	298	11.73	33	1.3	28	1.1
15	1/2	402	15.83	33	1.3	28	1.1
25	1	542	21.34	33	1.3	38	1.5
40	1 1/2	658	25.91	36.5	1.44	56	2.2
50	2	772	30.39	44.1	1.74	75	2.95

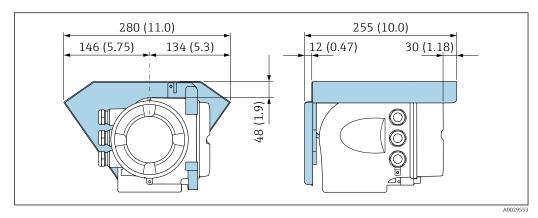
Zero point adjustment

All measuring devices are calibrated in accordance with state-of-the-art technology. Calibration takes place under reference conditions $\Rightarrow \triangleq 185$. Therefore, a zero point adjustment in the field is generally not required.

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

- To achieve maximum measuring accuracy even with low flow rates.
- Under extreme process or operating conditions (e.g. very high process temperatures or very high-viscosity fluids).

Protective cover



■ 7 Engineering unit mm (in)

6.2 Mounting the measuring device

6.2.1 Required tools

For sensor

For flanges and other process connections: Corresponding mounting tools

6.2.2 Preparing the measuring device

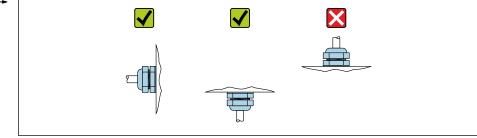
- 1. Remove all remaining transport packaging.
- 2. Remove any protective covers or protective caps present from the sensor.
- 3. Remove stick-on label on the electronics compartment cover.

6.2.3 Mounting the measuring device

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 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 fluid.
- 2. Install the measuring device or turn the transmitter housing so that the cable entries do not point upwards.

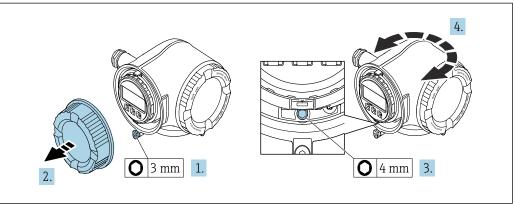


A0029263

26

6.2.4 Turning the transmitter housing

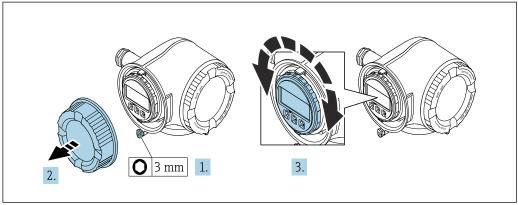
To provide easier access to the connection compartment or display module, the transmitter housing can be turned.



- 1. Depending on the device version: Loosen the securing clamp of the connection compartment cover.
- 2. Unscrew the connection compartment cover.
- 3. Release the fixing screw.
- 4. Turn the housing to the desired position.
- 5. Firmly tighten the securing screw.
- 6. Screw on the connection compartment cover.
- 7. Depending on the device version: Attach the securing clamp of the connection compartment cover.

6.2.5 Turning the display module

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



- 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 device conform to the measuring point specifications? For example: Process temperature → 🖺 190 Process pressure (refer to the section on "Pressure-temperature ratings" in the "Technical Information" document) Ambient temperature Measuring range	
Has the correct orientation for the sensor been selected? According to sensor type According to medium temperature According to medium properties (outgassing, with entrained solids)	
Does the arrow on the sensor nameplate match the direction of flow of the fluid through the piping \rightarrow $\ \ \ \ \ \ \ \ \ $	
Are the measuring point identification and labeling correct (visual inspection)?	
Is the device adequately protected from precipitation and direct sunlight?	
Are the securing screw and securing clamp tightened securely?	

7 Electrical connection

NOTICE

The measuring device does not have an internal circuit breaker.

- ► For this reason, assign the measuring device a switch or power-circuit breaker so that the power supply line can be easily disconnected from the mains.
- ▶ Although the measuring device is equipped with a fuse, additional overcurrent protection (maximum 10 A) should be integrated into the system installation.

7.1 Connection conditions

7.1.1 Required tools

- For cable entries: Use corresponding tools
- 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)

7.1.2 Requirements for connecting cable

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

Electrical safety

In accordance with applicable federal/national regulations.

Protective ground cable

Cable $\geq 2.08 \text{ mm}^2 \text{ (14 AWG)}$

The grounding impedance must be less than 1 Ω .

Permitted temperature range

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

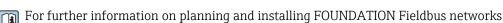
Power supply cable

Standard installation cable is sufficient.

Signal cable

FOUNDATION Fieldbus

Twisted, shielded two-wire cable.



- see:
- Operating Instructions for "FOUNDATION Fieldbus Overview" (BA00013S)
- FOUNDATION Fieldbus Guideline
- IEC 61158-2 (MBP)

Current output 0/4 to 20 mA

Standard installation cable is sufficient.

Pulse/frequency/switch output

Standard installation cable is sufficient.

Relay output

Standard installation cable is sufficient.

Current input 0/4 to 20 mA

Standard installation cable is sufficient.

Status input

Standard installation cable is sufficient.

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).

Requirements for the connecting cable – Remote display and operating module ${\tt DKX001}$

Optionally available connecting cable

A cable is supplied depending on the order option

- Order code for measuring device: order code 030 for "Display; operation", option 0
- Order code for measuring device: order code 030 for "Display; operation", option M
 and
- Order code for DKX001: order code **040** for "Cable", option **A, B, D, E**

Standard cable	$2\times2\times0.34~\text{mm}^2$ (22 AWG) PVC cable 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 \geq 85 %
Capacitance: core/shield	≤200 pF/m
L/R	<24 μH/Ω
Available cable length	5 m (15 ft)/10 m (35 ft)/20 m (65 ft)/30 m (100 ft)
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)

Standard cable - customer-specific cable

No cable is supplied, and it must be provided by the customer (up to max.

300 m (1000 ft)) for the following order option:

Order code for DKX001: Order code $\bf 040$ for "Cable", option $\bf 1$ "None, provided by customer, max 300 m"

A standard cable can be used as the connecting cable.

Standard cable 4 cores (2 pairs); pair-stranded with common shield	
Shielding Tin-plated copper-braid, optical cover ≥ 85 %	
Capacitance: core/shield	Maximum 1000 nF for Zone 1, Class I, Division 1

L/R	Maximum 24 $\mu H/\Omega$ for Zone 1, Class I, Division 1		
Cable length	Maximum 300 m (1000 ft), see the following table		

Cross-section	Max. cable length for use in Non-hazardous area, Ex Zone 2, Class I, Division 2 Ex Zone 1, Class I, Division 1		
0.34 mm ² (22 AWG)	80 m (270 ft)		
0.50 mm ² (20 AWG)	120 m (400 ft)		
0.75 mm ² (18 AWG)	180 m (600 ft)		
1.00 mm ² (17 AWG)	240 m (800 ft)		
1.50 mm ² (15 AWG)	300 m (1000 ft)		

7.1.3 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 voltage		Input/output 1		Input/o	utput 2	tput 2 Input/output	
1 (+)	2 (-)	26 (A)	27 (B)	24 (+)	25 (-)	22 (+)	23 (-)
		Device-specific terminal assignment: adhesive label in terminal cover.					

7.1.4 Device plugs available

Poevice plugs may not be used in hazardous areas!

Order code for "Input; output 1", option SA "FOUNDATION Fieldbus"

Order code for	Cable entry/connection				
"Electrical connection"	2	3			
M, 3, 4, 5	7/8" connector	-			

7.1.5 Pin assignment of device plug

	Pin	Assignment		Coding	Plug/socket
2 / 6	3 1	+	Signal +	A	Plug
1	4 2	-	Signal -		
	3		Grounding		
	4		Not assigned		

7.1.6 Shielding and grounding

Optimal electromagnetic compatibility (EMC) of the fieldbus system can be guaranteed only if the system components and, in particular, the lines are shielded and the shield forms as complete a cover as possible. A shield coverage of 90 %is ideal.

- 1. To ensure optimal EMC protection, connect the shield to the reference ground as often as possible.
- 2. For reasons concerning explosion protection, it is recommended that grounding be dispensed with.

To comply with both requirements, there are basically three different types of shielding in the fieldbus system:

- Shielding at both ends
- Shielding at one end on the feed side with capacitance termination at the field device
- Shielding at one end on the feed side

Experience shows that the best results with regard to EMC are achieved in most cases in installations with one-sided shielding on the feed side (without capacitance termination at the field device). Appropriate measures with regard to input wiring must be taken to allow

unrestricted operation when EMC interference is present. These measures have been taken into account for this device. Operation in the event of disturbance variables as per NAMUR NE21 is thus quaranteed.

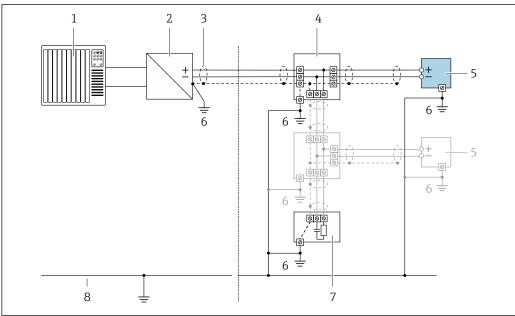
- 1. Observe national installation requirements and quidelines during installation.
- 2. Where there are large differences in potential between the individual grounding points,
 - connect only one point of the shielding directly to the reference ground.
- 3. In systems without potential equalization, the cable shielding of fieldbus systems should be grounded on one side only, for example at the fieldbus supply unit or at safety barriers.

NOTICE

In systems without potential matching, the multiple grounding of the cable shield causes mains frequency equalizing currents!

Damage to the bus cable shield.

- ▶ Only ground the bus cable shield to either the local ground or the protective ground at one end.
- ▶ Insulate the shield that is not connected.



A0028768

■ 8 Connection example for FOUNDATION Fieldbus

- 1 Control system (e.g. PLC)
- 2 Power conditioner (FOUNDATION Fieldbus)
- 3 Cable shield: the cable shield must be grounded at both ends to comply with EMC requirements; observe cable specifications
- 4 T-box
- 5 Measuring device
- 6 Local grounding
- 7 Bus terminator
- 8 Potential equalization conductor

7.1.7 Preparing the measuring device

NOTICE

Insufficient sealing of the housing!

Operational reliability of the measuring device could be compromised.

- ▶ Use suitable cable glands corresponding to the degree of protection.
- 1. Remove dummy plug if present.

- 2. If the measuring device is supplied without cable glands:
 Provide suitable cable gland for corresponding connecting cable.

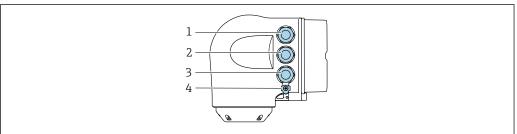
7.2 Connecting the measuring device

NOTICE

Limitation of electrical safety due to incorrect connection!

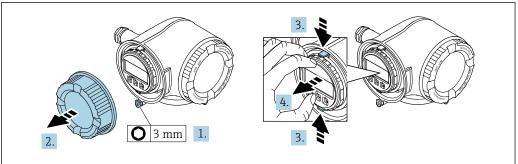
- ► Have electrical connection work carried out by appropriately trained specialists only.
- ▶ Observe applicable federal/national installation codes and regulations.
- ► Comply with local workplace safety regulations.
- ► Always connect the protective ground cable ⊕ before connecting additional cables.
- ► For use in potentially explosive atmospheres, observe the information in the device-specific Ex documentation.

7.2.1 Connecting the transmitter



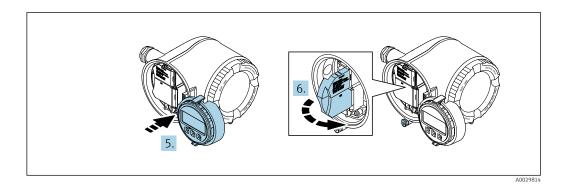
A002678

- 1 Terminal connection for supply voltage
- 2 Terminal connection for signal transmission, input/output
- 3 Terminal connection for signal transmission, input/output or terminal connection for network connection via service interface (CDI-RJ45); optional: connection for external WLAN antenna or remote display and operating module DKX001
- 4 Protective earth (PE)

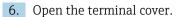


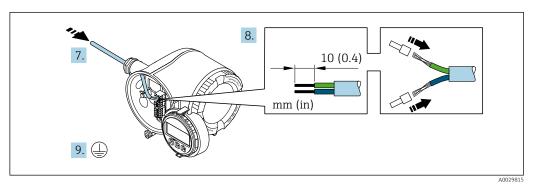
A0029813

- 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.

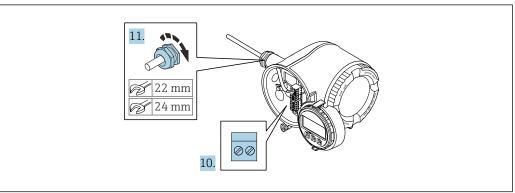


5. Attach the holder to the edge of the electronics compartment.





- 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. In the case of stranded cables, also fit ferrules.
- 9. Connect the protective ground.



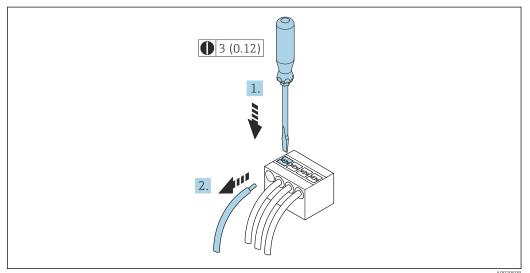
A002981

- 10. Connect the cable in accordance with 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

→ 🖺 32.

- 11. Firmly tighten the cable glands.
 - ► This concludes the cable connection process.
- 12. Close the terminal cover.
- 13. Fit the display module holder in the electronics compartment.
- 14. Screw on the connection compartment cover.
- 15. Secure the securing clamp of the connection compartment cover.

Removing a cable



A00295

Endress+Hauser

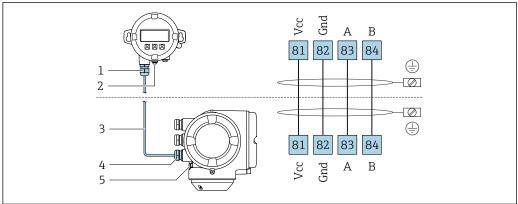
- **■** 9 Engineering unit mm (in)
- 1. To remove a cable from the terminal, use a flat-blade screwdriver to push the slot between the two terminal holes
- 2. while simultaneously pulling the cable end out of the terminal.

36

7.2.2 Connecting the remote display and operating module DKX001

The remote display and operating module DKX001 is available as an optional extra $\Rightarrow \implies 172$.

- The remote display and operating module DKX001 is only available for the following housing version: order code for "Housing": option A "Aluminum, coated"
- The measuring device is always supplied with a dummy cover when the remote display and operating module DKX001 is ordered directly with the measuring device. Display or operation at the transmitter is not possible in this case.
- If ordered subsequently, the remote display and operating module DKX001 may not be connected at the same time as the existing measuring device display module.
 Only one display or operation unit may be connected to the transmitter at any one time.



Δ0027518

- 1 Remote display and operating module DKX001
- 2 Protective earth (PE)
- 3 Connecting cable
- 4 Measuring device
- 5 Protective earth (PE)

7.3 Ensuring potential equalization

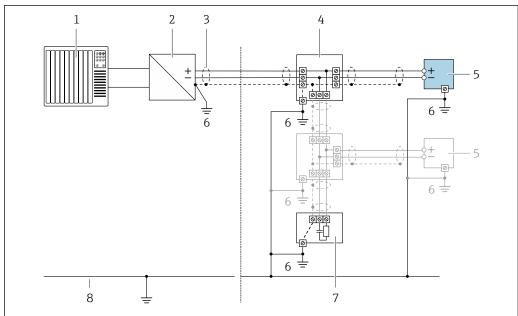
7.3.1 Requirements

No special measures for potential equalization are required.

7.4 Special connection instructions

7.4.1 Connection examples

FOUNDATION Fieldbus

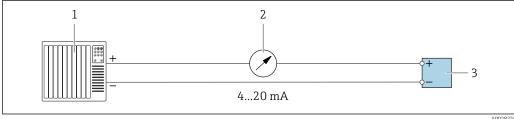


A002876

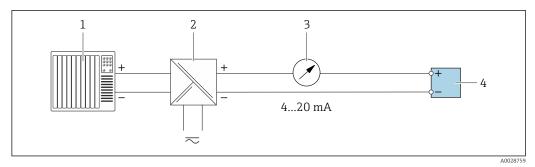
■ 10 Connection example for FOUNDATION Fieldbus

- 1 Control system (e.g. PLC)
- 2 Power Conditioner (FOUNDATION Fieldbus)
- 3 Cable shield provided at one end. The cable shield must be grounded at both ends to comply with EMC requirements; observe cable specifications
- 4 T-box
- 5 Measuring device
- 6 Local grounding
- 7 Bus terminator
- 8 Potential matching line

Current output 4-20 mA

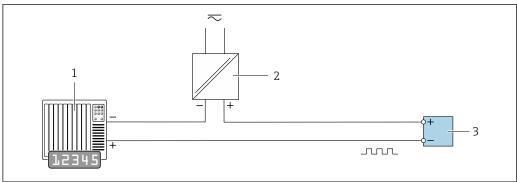


- 11 Connection example for 4-20 mA current output (active)
- 1 Automation system with current input (e.g. PLC)
- 2 Analog display unit: observe maximum load
- 3 Transmitter



- **■** 12 Connection example for 4-20 mA current output (passive)
- Automation system with current input (e.g. PLC)
- 2 Active barrier for power supply (e.g. RN221N)
- Analog display unit: observe maximum load
- Transmitter

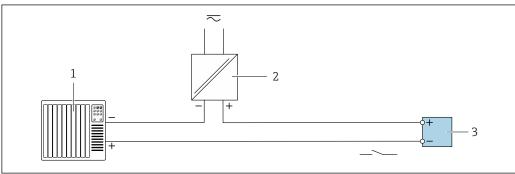
Pulse/frequency output



A0028761

- Connection example for pulse/frequency output (passive)
- Automation system with pulse/frequency input (e.g. PLC)
- Power supply 2
- *Transmitter: Observe input values* → 🖺 179

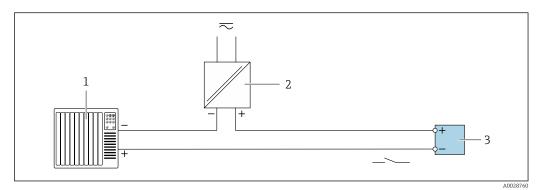
Switch output



Connection example for switch output (passive)

- Automation system with switch input (e.g. PLC)
- *Transmitter: Observe input values → 🖺 179*

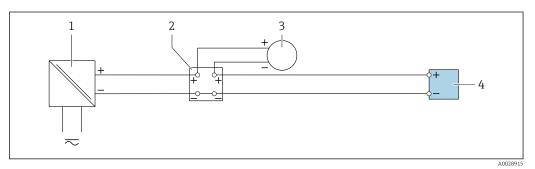
Relay output



■ 15 Connection example for relay output (passive)

- 1 Automation system with relay input (e.g. PLC)
- 2 Power supply
- *3* Transmitter: Observe input values → 🖺 180

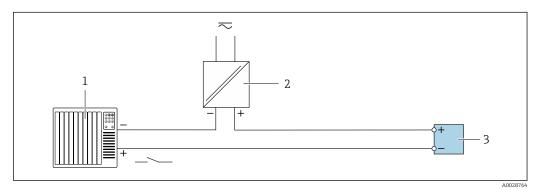
Current input



■ 16 Connection example for 4 to 20 mA current input

- 1 Power supply
- 2 Terminal box
- 3 External measuring device (to read in pressure or temperature, for instance)
- 4 Transmitter

Status input



■ 17 Connection example for status input

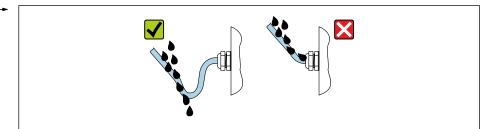
- 1 Automation system with status output (e.g. PLC)
- 2 Power supply
- 3 Transmitter

7.5 Ensuring the degree of protection

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

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

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



A002927

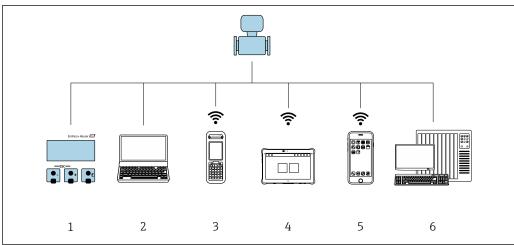
6. Insert dummy plugs into unused cable entries.

7.6 Post-connection check

Are cables or the device undamaged (visual inspection)?	
Do the cables used meet the requirements?	
Do the cables have adequate strain relief?	
Are all the cable glands installed, firmly tightened and leak-tight? Cable run with "water trap" → 🖺 41?	
If supply voltage is present, do values appear on the display module?	

8 Operation options

8.1 Overview of operation options



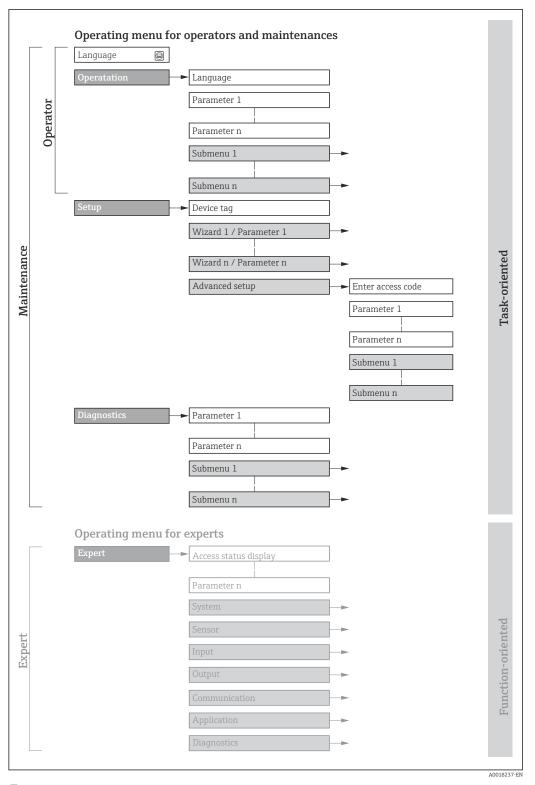
A003451

- 1 Local operation via display module
- 2 Computer with Web browser (e.g. Internet Explorer) or with 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 Control system (e.g. PLC)

8.2 Structure and function of the operating menu

8.2.1 Structure of the operating menu

For an overview of the operating menu for experts: "Description of Device Parameters" document supplied with the device $\rightarrow \cong 203$



 \blacksquare 18 Schematic structure of the operating menu

8.2.2 Operating philosophy

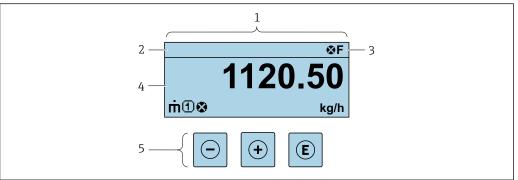
The individual parts of the operating menu are assigned to certain user roles (operator, maintenance etc.). Each user role contains typical tasks within the device lifecycle.

Menu	ı/parameter	User role and tasks	Content/meaning
Language	task-oriented	Role "Operator", "Maintenance" Tasks during operation: Configuring the operational display Reading measured values	 Defining the operating language Defining the Web server operating language Resetting and controlling totalizers
Operation			 Configuring the operational display (e.g. display format, display contrast) Resetting and controlling totalizers
Setup		"Maintenance" role Commissioning: Configuration of the measurement Configuration of the inputs and outputs Configuration of the communication interface	Wizards for fast commissioning: Setting the system units Configuration of the communication interface Defining the medium Displaying the I/O/configuration Configuring the inputs Configuring the outputs Configuration of the operational display Setting the low flow cut off Configuring partial and empty pipe detection Advanced setup For more customized configuration of the measurement (adaptation to special measuring conditions) Configuration of totalizers Configuring the WLAN settings Administration (define access code, reset measuring device)
Diagnostics		"Maintenance" role Fault elimination: 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 "Extended HistoROM" order option Storage and visualization of measured values Heartbeat The functionality of the device is checked on demand and the verification results are documented. Simulation Is used to simulate measured values or output values.

Men	u/parameter	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-order device parameters which do not concern the measurement or the communication interface. Sensor Configuration of the measurement. Output Configure the pulse/frequency/switch output. Input Configuration of the status input. Output Configuration of the analog current outputs as well as the pulse/frequency and switch output. Communication Configuration of the digital communication interface and the Web server. Submenus for function blocks (e.g. "Analog Inputs") Configuration of function blocks. Application Configuration of 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 Heartbeat Technology.

8.3 Access to the operating menu via the local display

8.3.1 Operational display



A0029348

- 1 Operational display
- 2 Device tag
- 3 Status area
- 4 Display area for measured values (4-line)
- 5 Operating elements → 🖺 51

Status area

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

- Status signals → 🗎 131
 - **F**: Failure
 - **C**: Function check
 - **S**: Out of specification
 - M: Maintenance required
- Diagnostic behavior → 🗎 132
 - 🐼: Alarm
 - <u></u> : Warning
- 🛱: Locking (the device is locked via the hardware)
- ←: Communication (communication via remote operation is active)

Display area

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

Measured values

Symbol	Meaning
ṁ	Mass flow
Ü	Volume flowCorrected volume flow
P	DensityReference density
4	Temperature
Σ	Totalizer The measurement channel number indicates which of the three totalizers is displayed.
€	Status input

Measurement channel numbers

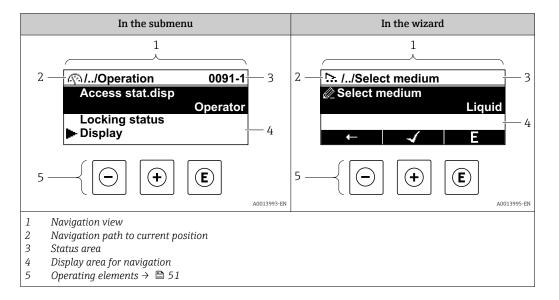
Symbol	Meaning
14	Measurement channel 1 to 4

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

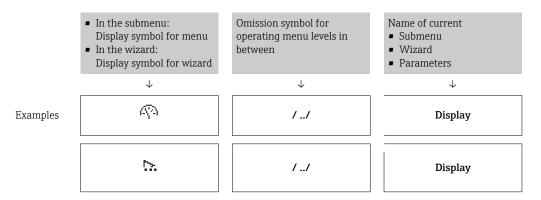
The number and display format of the measured values can be configured via the **Format display** parameter ($\rightarrow \implies 97$).

8.3.2 Navigation view



Navigation path

The navigation path - displayed at the top left in the navigation view - consists of the following elements:

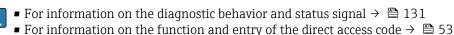


Status area

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

- In the submenu
 - The direct access code for the parameter you are navigating to (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



Display area

Menus

Symbol	Meaning
ক্ষ	Operation Appears: In the menu next to the "Operation" selection At the left in the navigation path in the Operation menu
۶	Setup Appears: In the menu next to the "Setup" selection At the left in the navigation path in the Setup menu
્ય	Diagnostics Appears: ■ In the menu next to the "Diagnostics" selection ■ At the left in the navigation path in the Diagnostics menu
÷.	Expert Appears: 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
55.	Wizard
Ø.	Parameters within a wizard No display symbol exists for parameters in submenus.

Locking

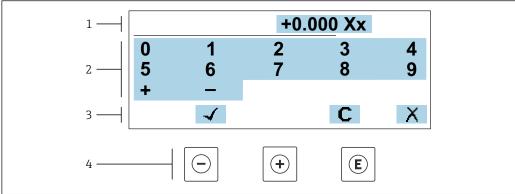
Symbol	Meaning
û	Parameter locked When displayed in front of a parameter name, indicates that the parameter is locked. ■ By a user-specific access code ■ By the hardware write protection switch

Wizard operation

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

8.3.3 **Editing view**

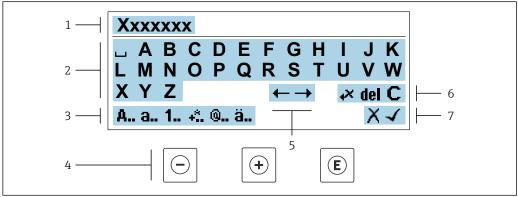
Numeric editor



■ 19 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



For entering text in parameters (e.g. tag name)

- Entry display area
- 2 Current input screen
- 3 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(s)	Meaning
	Minus key Move the entry position to the left.
+	Plus key Move the entry position to the right.

Operating key(s)	Meaning
E	 Enter key Press the key briefly: confirm your selection. Press the key for 2 s: confirm the entry.
-++	Escape key combination (press keys simultaneously) Close the editing view without accepting the changes.

Input screens

Symbol	Meaning
А	Upper case
a	Lower case
1	Numbers
+*.	Punctuation marks and special characters: = + - * / 2 3 4 4 4 2 3 4 () [] < > { }
0	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

8.3.4 Operating elements

Operating key(s)	Meaning
	Minus key
	In a menu, submenu Moves the selection bar upwards in a picklist.
	With a Wizard Confirms the parameter value and goes to the previous parameter.
	With a text and numeric editor Move the entry position to the left.
	Plus key
	In a menu, submenu Moves the selection bar downwards in a picklist.
(+)	With a Wizard Confirms the parameter value and goes to the next parameter.
	With a text and numeric editor Move the entry position to the right.
	Enter key
	For operational display Pressing the key briefly opens the operating menu.
Œ	 In a 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 for parameter: If present, opens the help text for the function of the parameter.
	With a Wizard Opens the editing view of the parameter.
	 With a text and numeric editor Press the key briefly: confirm your selection. Press the key for 2 s: confirm the entry.
	Escape key combination (press keys simultaneously)
<u></u> ++	 In a 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").
	With a Wizard Exits the wizard and takes you to the next higher level.
	With a text and numeric editor Close the editing view without accepting the changes.
	Minus/Enter key combination (press the keys simultaneously)
-+E	 If the keypad lock is active: Press the key for 3 s: deactivate the keypad lock. If the keypad lock is not active: Press the key for 3 s: the context menu opens along with the option for activating the keypad lock.

8.3.5 Opening the context menu

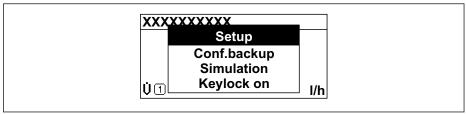
Using the context menu, the user can call up the following menus quickly and directly from the operational display:

- 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.

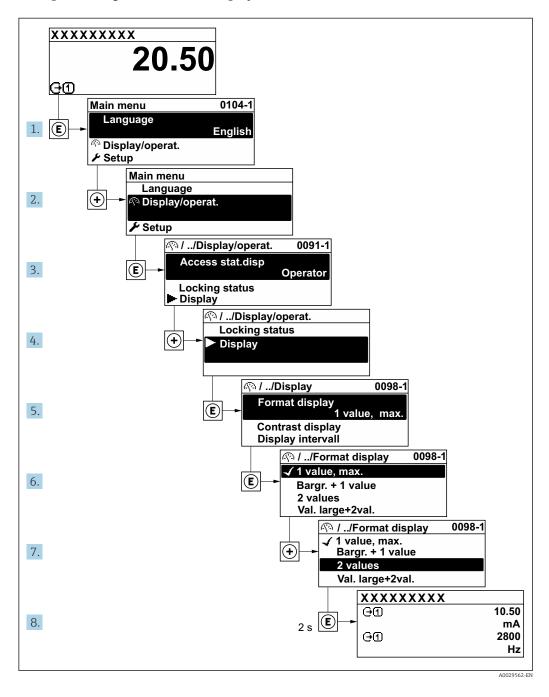
52

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 $\Rightarrow \triangleq 47$

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



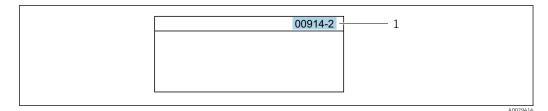
8.3.7 Calling the parameter directly

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 accessed automatically. Example: Enter 00914 → Assign process variable parameter
- If a different channel is accessed: 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

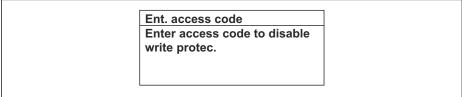
8.3.8 Calling up help text

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

- 21 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 $\rightarrow \bigcirc$ 49, for a description of the operating elements $\rightarrow \bigcirc$ 51

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 $\rightarrow \blacksquare 114$.

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)

- Despite the defined access code, certain parameters can always be modified and thus are excepted from the write protection, as they do not affect the measurement. Refer to the "Write protection via access code" section
- The user role with which the user is currently logged on is indicated by the **Access** status parameter. Navigation path: Operation \rightarrow Access status

8.3.11 Disabling write protection via access code

If the a-symbol appears on the local display in front of a parameter, the parameter is write-protected by a user-specific access code and its value cannot be changed at the moment using local operation $\Rightarrow \textcircled{a}$ 114.

Parameter write protection via local operation can be disabled by entering the user-specific access code in the **Enter access code** parameter ($\rightarrow \implies 101$) via the respective access option.

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

- 2. Enter the access code.
 - → The 🗈-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 the operating menu via the Web browser

8.4.1 Function range

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

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, refer to the Special Documentation for the device $\rightarrow \stackrel{\triangle}{=} 204$

8.4.2 Prerequisites

Computer hardware

Hardware	Interface	
	CDI-RJ45	WLAN
Interface	The computer must have an RJ45 interface.	The operating unit must have a WLAN interface.
Connection	Standard Ethernet cable with RJ45 connector.	Connection via Wireless LAN.
Screen	Recommended size: ≥12" (depends on the screen resolution)	

Computer software

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

Computer settings

Settings	Interface	
	CDI-RJ45	WLAN
User rights	Appropriate user rights (e.g. administrator rights) for TCP/IP and proxy server settings are necessary (for adjusting the IP address, subnet mask etc.).	
Proxy server settings of the Web browser	The Web browser setting <i>Use a Proxy Server for Your LAN</i> must be deselected .	
JavaScript	JavaScript must be enabled.	
	If JavaScript cannot be enabled: enter http://192.168.1.212/basic.html in the address line of the Web browser. A fully functional but simplified version of the operating menu structure starts in the Web browser. When installing a new firmware version: To enable correct data display, clear the temporary memory (cache) of the Web browser under Interne options.	
Network connections	Only the active network connections to the measuring device should be used.	
	Switch off all other network connections such as WLAN.	Switch off all other network connections.

In the event of connection problems: $\rightarrow \stackrel{\triangle}{=} 129$

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 $\rightarrow \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	

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 → 62

8.4.3 Establishing a connection

Via service interface (CDI-RJ45)

Preparing the measuring device

- 1. Depending on the housing version:

 Release the securing clamp or securing screw of the housing cover.
- 2. Depending on the housing version: Unscrew or 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 connector via the standard Ethernet connecting cable .

Configuring the Internet protocol of the computer

The following information refers to the default Ethernet settings of the device.

IP address of the device: 192.168.1.212 (factory setting)

- 1. Switch on the measuring device.
- 2. Connect to the computer using a cable $\rightarrow \triangleq 63$.
- 3. 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.
- 4. Close any open Internet browsers.
- 5. 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	192.168.1.212 or leave cells empty

Via WLAN interface

Configuring the Internet protocol of the mobile terminal

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

In principle, avoid simultaneous access to the measuring device via the service interface (CDI-RJ45) and the WLAN interface from the same mobile terminal. This could cause a network conflict.

- ▶ Only activate one service interface (CDI-RJ45 service interface 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 reception on the mobile terminal.

Establishing a 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_300_A802000).
- 2. If necessary, select the WPA2 encryption method.
- 3. Enter the password: serial number of the measuring device ex-works (e.g. L100A802000).
 - LED on 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.

Disconnecting

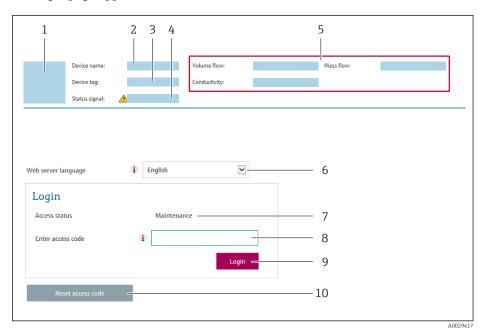
► After configuring the device:

Terminate the WLAN connection between the operating unit 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.



- 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 ($\rightarrow \blacksquare$ 111)
- If a login page does not appear, or if the page is incomplete $\rightarrow \stackrel{ riangle}{=} 129$

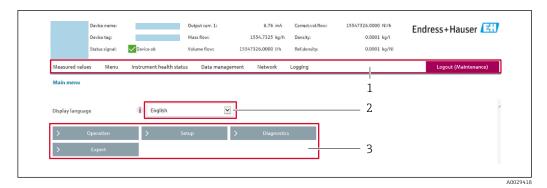
8.4.4 Logging on

- 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 → 🖺 134
- Current measured values

Function row

Functions	Meaning	
Measured values	Displays the measured values of the measuring device	
Menu	 Access to the operating menu from the measuring device The structure of the operating menu is the same as for the local display For detailed information on the structure of the operating menu, see the Operating Instructions for the measuring device 	
Device status	Displays the diagnostic messages currently pending, listed in order of priority	
Data management	Data exchange between PC and measuring device: ■ 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 device: FOUNDATION Fieldbus: DD file ■ Firmware update - Flashing a firmware version	
Network configuration	Configuration and checking of all the parameters required for establishing the connection to the measuring device: 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

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

Working area

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

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

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.
On	 The complete functionality of the web server 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 modified properties of the Internet protocol (TCP/IP) \rightarrow \bigcirc 58.

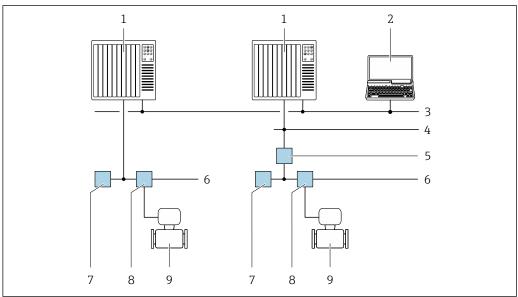
8.5 Access to the operating menu via the operating tool

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

8.5.1 Connecting the operating tool

Via FOUNDATION Fieldbus network

This communication interface is available in device versions with FOUNDATION Fieldbus.



A00288

■ 22 Options for remote operation via FOUNDATION Fieldbus network

- Automation system
- 2 Computer with FOUNDATION Fieldbus network card
- 3 Industry network
- 4 High Speed Ethernet FF-HSE network
- 5 Segment coupler FF-HSE/FF-H1
- 6 FOUNDATION Fieldbus FF-H1 network
- 7 Power supply FF-H1 network
- 8 T-box
- 9 Measuring device

Service interface

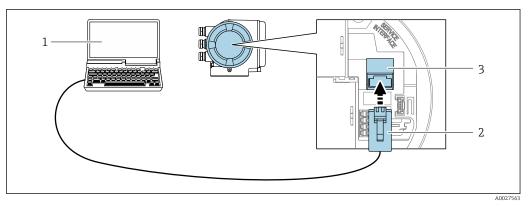
Via service interface (CDI-RJ45)

A point-to-point connection can be established to configure the device onsite. With the housing open, the connection is established directly via the service interface (CDI-RJ45) of the device.



An adapter for RJ45 and the M12 connector 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 connector mounted in the cable entry. Therefore the connection to the service interface can be established via an M12 connector without opening the device.

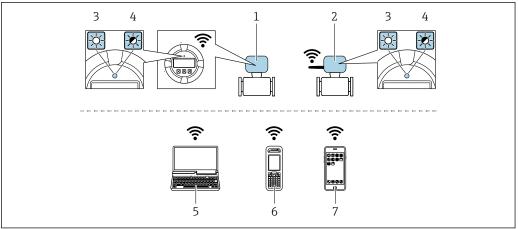


₽ 23 Connection via service interface (CDI-RJ45)

- Computer with Web browser (e.g. Microsoft Internet Explorer, Microsoft Edge) for accessing the integrated device Web server or with "FieldCare", "DeviceCare" operating tool with COM DTM "CDI Communication TCP/IP"
- 2 Standard Ethernet connecting cable with RJ45 connector
- Service interface (CDI-RJ45) of the measuring device 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"



- Transmitter with integrated WLAN antenna
- 2 Transmitter with external WLAN antenna
- 3 LED lit constantly: WLAN reception is enabled on measuring device
- LED flashing: WLAN connection established between operating unit and measuring device
- Computer with WLAN interface and Web browser (e.g. Microsoft Internet Explorer, Microsoft Edge) for accessing the integrated device Web server or with operating tool (e.g. FieldCare, DeviceCare)
- Mobile handheld terminal with WLAN interface and Web browser (e.g. Microsoft Internet Explorer, Microsoft Edge) for accessing the integrated device Web server or operating tool (e.g. FieldCare, DeviceCare)
- Smart phone or tablet (e.g. Field Xpert SMT70)

Function	WLAN: IEEE 802.11 b/g (2.4 GHz)
Encryption	WPA2-PSK AES-128 (in accordance with IEEE 802.11i)
Configurable WLAN channels	1 to 11
Degree of protection	IP67
Available antennas	 Internal antenna External antenna (optional) In the event of poor transmission/reception conditions at the place of installation. Only one antenna active in each case!

Range	 Internal antenna: typically 10 m (32 ft) External antenna: typically 50 m (164 ft) 		
Materials (external antenna)	 Antenna: ASA plastic (acrylic ester-styrene-acrylonitrile) and nickel-plated brass Adapter: Stainless steel and nickel-plated brass Cable: Polyethylene Connector: Nickel-plated brass Angle bracket: Stainless steel 		

Configuring the Internet protocol of the mobile terminal

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

In principle, avoid simultaneous access to the measuring device via the service interface (CDI-RJ45) and the WLAN interface from the same mobile terminal. This could cause a network conflict.

- ▶ Only activate one service interface (CDI-RJ45 service interface 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 reception on the mobile terminal.

Establishing a 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_300_A802000).
- 2. If necessary, select the WPA2 encryption method.
- 3. Enter the password: serial number of the measuring device ex-works (e.g. L100A802000).
 - LED on 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.

Disconnecting

► After configuring the device:

Terminate the WLAN connection between the operating unit and measuring device.

8.5.2 Field Xpert SFX350, SFX370

Function range

Field Xpert SFX350 and Field Xpert SFX370 are mobile computers for commissioning and maintenance. They enable efficient device configuration and diagnostics for HART and FOUNDATION Fieldbus devices in the **non-hazardous area** (SFX350, SFX370) and **hazardous area** (SFX370).

For details, see Operating Instructions BA01202S

Source for device description files

See information $\rightarrow \triangleq 69$

8.5.3 FieldCare

Function scope

FDT-based plant asset management tool from Endress+Hauser. It can configure all smart field devices 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 → 🗎 63
- WLAN interface → 🖺 64

Typical functions:

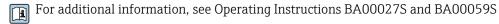
- Configuring parameters of transmitters
- Loading and saving device data (upload/download)
- Documentation of the measuring point
- Visualization of the measured value memory (line recorder) and event logbook



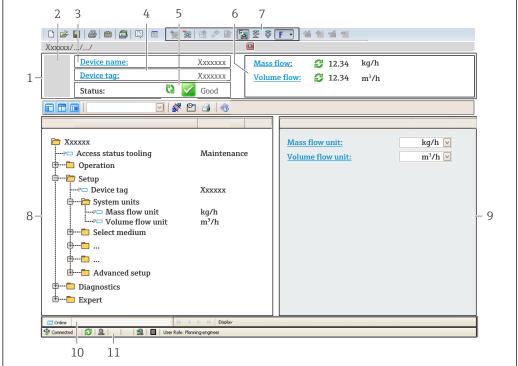
Source for device description files

See information $\rightarrow \triangleq 69$

Establishing a connection



User interface



A00210E1 EX

- 1 Header
- 2 Picture of device
- 3 Device name
- 4 Device tag
- 5 Status area with status signal→ 🖺 134
- 6 Display area for current measured values
- 7 Edit toolbar with additional functions such as save/restore, event list and create documentation
- 8 Navigation area with operating menu structure
- 9 Working area
- 10 Range of action
- 11 Status area

8.5.4 DeviceCare

Function scope

Tool to connect and configure 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.



For details, see Innovation Brochure IN01047S

Source for device description files

See information $\rightarrow \triangleq 69$

8.5.5 AMS Device Manager

Function scope

Program from Emerson Process Management for operating and configuring measuring devices via FOUNDATION Fieldbus H1 protocol.

Source for device description files

See data → 🖺 69

8.5.6 Field Communicator 475

Function scope

Industrial handheld terminal from Emerson Process Management for remote configuration and measured value display via FOUNDATION Fieldbus H1 protocol.

Source for device description files

See data $\rightarrow \triangleq 69$

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 Operating instructions On the transmitter nameplate Firmware version Diagnostics → Device information → Firmware version 	
Release date of firmware version	02.2017		
Manufacturer ID	0x452B48 (hex)	Manufacturer ID Diagnostics → Device information → Manufacturer ID	
Device type ID	0x103B (hex)	Device type Diagnostics → Device information → Device type	
Device revision	1	 On the transmitter nameplate Device revision Diagnostics → Device information → Device revision 	
DD revision	Information and files under: www.endress.com www.fieldbus.org		
CFF revision			

For an overview of the different firmware versions for the device $\rightarrow \triangleq 168$

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 FOUNDATION Fieldbus	Sources for obtaining device descriptions	
FieldCare	 www.endress.com → Download Area CD-ROM (contact Endress+Hauser) DVD (contact Endress+Hauser) 	
DeviceCare	 www.endress.com → Download Area CD-ROM (contact Endress+Hauser) DVD (contact Endress+Hauser) 	
Field Xpert SFX350Field Xpert SFX370	Use update function of handheld terminal	
AMS Device Manager (Emerson Process Management)	www.endress.com → Download Area	
Field Communicator 475 (Emerson Process Management)	Use update function of handheld terminal	

9.2 Cyclic data transmission

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

9.2.1 Block model

The block model shows which input and output data the measuring device makes available for cyclic data exchange. Cyclic data exchange takes place with a FOUNDATION Fieldbus master (Class 1), e.g. a control system etc.

Display text (xxxx = serial number)	Base index	Description
RESOURCE_ xxxxxxxxxxx	400	Resource block
SETUP_xxxxxxxxxxx	600	"Setup" Transducer block
TRDDISP_ xxxxxxxxxx	800	"Display" Transducer block
TRDHROM_ xxxxxxxxxxx	1000	"HistoROM" Transducer block
TRDDIAG_ xxxxxxxxxx	1200	"Diagnostic" Transducer block
EXPERT_CONFIG_xxxxxxxxxxx	1400	"Expert configuration" Transducer block
SERVICE_SENSOR_xxxxxxxxxxx	1600	"Service sensor" Transducer block
TRDTIC_xxxxxxxxxx	1800	"Totalizer" Transducer block
TRDHBT_ xxxxxxxxxxx	2000	Transducer block "Heartbeat results"
ANALOG_INPUT_1_xxxxxxxxxxx	3400	Analog Input function block 1 (AI)
ANALOG_INPUT_2_xxxxxxxxxxx	3600	Analog Input function block 2 (AI)
ANALOG_INPUT_3_xxxxxxxxxxx	3800	Analog Input function block 3 (AI)
ANALOG_INPUT_4_xxxxxxxxxxx	4000	Analog Input function block 4 (AI)
ANALOG_INPUT_5_xxxxxxxxxxx	4200	Analog Input function block 5 (AI)
ANALOG_INPUT_6_xxxxxxxxxxx	4400	Analog Input function block 6 (AI)
ANALOG_INPUT_7_xxxxxxxxxxx	4600	Analog Input function block 7 (AI)
ANALOG_INPUT_8_xxxxxxxxxxx	4800	Analog Input function block 8 (AI)
MAO_ xxxxxxxxxx	5000	Multiple Analog Output block (MAO)
DIGITAL_INPUT_1_ xxxxxxxxxxx	5200	Digital Input function block 1 (DI)
DIGITAL_INPUT_2_xxxxxxxxxx	5400	Digital Input function block 2 (DI)
MDO_xxxxxxxxxx	5600	Multiple Digital Output block (MDO)
PID_ xxxxxxxxxx	5800	PID function block (PID)
INTEGRATOR_xxxxxxxxxxx	6000	Integrator function block (INTG)

9.2.2 Description of the modules

The input value of a module/function block is defined via the CHANNEL parameter.

AI module (Analog Input)

Eight Analog Input blocks are available.

CHANNEL	Measured variable
0	Uninitialized (factory setting)
7	Temperature
9	Volume flow
10	Concentration 1)
11	Mass flow
13	Corrected volume flow
14	Density
15	Reference density
16	Totalizer 1
17	Totalizer 2
18	Totalizer 3
33	Oscillation frequency 1)

CHANNEL	Measured variable
43	Frequency fluctuation ¹⁾
51	Carrier pipe temperature 1)
57	Carrier mass flow 1)
58	Target mass flow 1)
63	Oscillation damping ¹⁾
65	Electronic temperature
66	Tube damping fluctuation ¹⁾
68	Exciter current 1)
81	HBSI 1)
99	Current input 1 1)

1) Visible depending on the order options or device settings

MAO module (Multiple Analog Output)

Channel	Description
121	Channel_0

Structure

Channel_0							
Value 1	Value 2	Value 3	Value 4	Value 5	Value 6	Value 7	Value 8

Values	Measured variable	
Value 1	External pressure 1)	
Value 2	External temperature 1)	
Value 3	External reference density 1)	
Value 4	Not assigned	
Value 5	Not assigned	
Value 6	Not assigned	
Value 7	Not assigned	
Value 8	Not assigned	

- 1) The external measured values must be transmitted to the device in the SI basic unit
- The selection is made via: Expert \rightarrow Sensor \rightarrow External compensation

DI module (Discrete Input)

Two Discrete Input blocks are available.

CHANNEL	Device function	State
0	Uninitialized (factory setting)	-
101	Switch output state	0 = off, 1 = active
103	Low flow cut off	0 = off, 1 = active

CHANNEL	Device function	State
104	Empty pipe detection	0 = off, 1 = active
105	Verification status ¹⁾	Overall result of the verification Verification: • 16 = Failed • 32 = Passed • 64 = Not performed
		Verification status Verification: 1 = Not performed 2 = Failed 4 = Being performed 8 = Finished
		Status; result 17 = Status: not performed; Result: failed 18 = Status: failed; Result: failed 20 = Status: being performed; Result: failed 24 = Status: finished; Result: failed 33 = Status: not performed; Result: passed 34 = Status: failed; Result: passed 36 = Status: being performed; Result: passed 40 = Status: finished; Result: passed 40 = Status: finished; Result: passed 65 = Status: not performed; Result: not performed 66 = Status: failed; Result: not performed 68 = Status: being performed; Result: not performed 72 = Status: finished; Result: not performed

1) Only available with the Heartbeat Verification application package

MDO module (Multiple Discrete Output)

Channel	Description
122	Channel_DO

Structure

Channel_DO							
Value 1	Value 2	Value 3	Value 4	Value 5	Value 6	Value 7	Value 8

Value	Device function	State
Value 1	Reset totalizer 1	0 = off, 1 = execute
Value 2	Reset totalizer 2	0 = off, 1 = execute
Value 3	Reset totalizer 3	0 = off, 1 = execute
Value 4	Flow override	0 = off, 1 = active
Value 5	Start heartbeat verification 1)	0 = off, 1 = start
Value 6	Status output	0 = off, 1 = active

Value	Device function	State
Value 7	Zero point adjustment	0 = off, 1 = on
Value 8	Not assigned	-

1) Only available with the Heartbeat Verification application package

9.2.3 Execution times

Function block	Execution time (ms)
Analog Input function block (AI)	6
Digital Input function block (DI)	4
PID function block (PID)	5
Multiple Analog Output block (MAO)	4
Multiple Digital Output block (MDO)	4
Integrator function block (INTG)	5

9.2.4 Methods

Method	Block	Navigation	Description
Set to "AUTO" mode	Resource block	Via menu: Expert → Communication → Resource block → Target mode	This method sets the Resource Block and all the Transducer Blocks to the AUTO (Automatic) mode.
Set to "OOS" mode	Resource block	Via menu: Expert → Communication → Resource block → Target mode	This method sets the Resource Block and all the Transducer Blocks to the OOS (Out of service) mode.
Restart Resource block Via menu: Expert → Communication → Resource block → Restart		Expert \rightarrow Communication \rightarrow Resource block	This method is used to select the configuration for the Restart parameter in the Resource Block. This resets device parameters to a specific value.
			The following options are supported: Uninitialized Run Resource Defaults Processor To delivery settings
ENP parameter	Resource block	Via menu: Actions → Methods→ Calibrate → ENP parameter	This method is used to display and configure the parameters of the electronic nameplate (ENP).
Overview diagnostics - Remedy information	Diagnostic Transducer Block	Via link: Namur symbol	This method is used to display the diagnostic event with the highest priority that is currently active and the corresponding remedial measures.
Actual diagnostics – Remedy information	Diagnostic Transducer Block	Via menu: ■ Configure/Setup → Diagnostics → Actual diagnostics ■ Device/Diagnostics → Diagnostics	This method is used to display remedial measures for the diagnostic event with the highest priority that is currently active. This method is available only if an appropriate diagnostic event has occurred.
Previous diagnostics – Remedy information	Diagnostic Transducer Block	Via menu: ■ Configure/Setup → Diagnostics → Previous diagnostics ■ Device/Diagnostics → Diagnostics	This method is used to display remedial measures for the previous diagnostic event. This method is available only if an appropriate diagnostic event has occurred.

74

10 Commissioning

10.1 Function check

Before commissioning the measuring device:

- ▶ Make sure that the post-installation and post-connection checks have been performed.
- "Post-installation check" checklist → 🗎 28
- "Post-connection check" checklist → 🖺 41

10.2 Switching on the measuring device

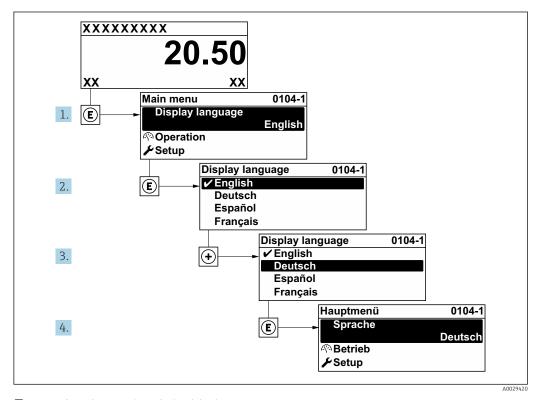
- ▶ After a successful function check, switch on the measuring device.
 - After a successful startup, the local display switches automatically from the startup display to the operational display.
- If nothing appears on the local display or a diagnostic message is displayed, refer to the section on "Diagnostics and troubleshooting" $\rightarrow \blacksquare 128$.

10.3 Connecting via FieldCare

- For FieldCare → 🖺 63 connection
- For connecting via FieldCare → 🗎 66
- For the FieldCare → 🖺 67 user interface

10.4 Setting the operating language

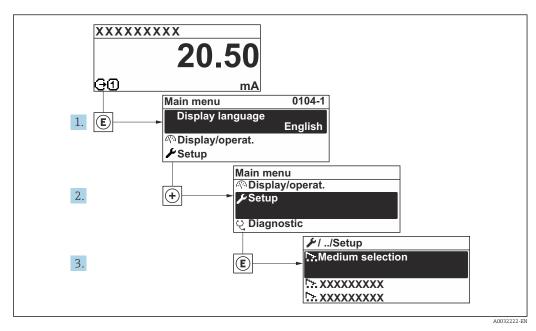
Factory setting: English or ordered local language



 \blacksquare 24 Taking the example of the local display

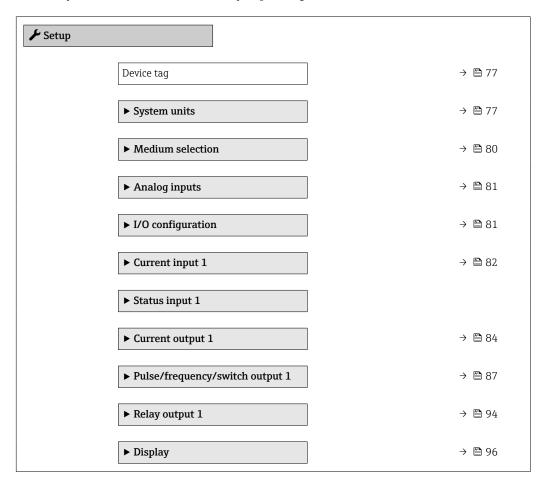
10.5 Configuring the measuring device

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



25 Taking the example of the local display

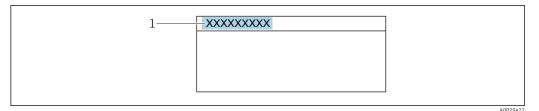
Depending on the device version, not all submenus and parameters are available in every device. The selection can vary depending on the order code.



► Low flow cut off	→ 🖺 98
▶ Partially filled pipe detection	→ 🖺 99
► Advanced setup	→ 🖺 100

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 26 Header of the operational display with tag name

1 Tag name

Enter the tag name in the "FieldCare" operating tool $\rightarrow \triangleq 67$

Navigation

"Setup" menu → Device tag

Parameter overview with brief description

Parameter	Description	User entry
Device tag	3.1	Max. 32 characters such as letters, numbers or special characters (e. g. @, %, /)

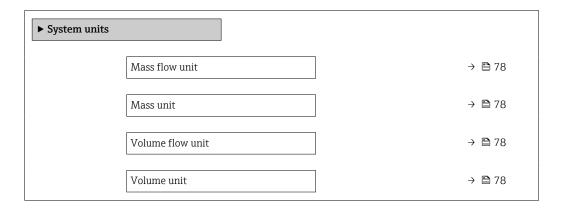
10.5.2 Setting the system units

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

Depending on the device version, not all submenus and parameters are available in every device. The selection can vary depending on the order code.

Navigation

"Setup" menu \rightarrow System units



Corrected volume flow unit	→ 🖺 78
Corrected volume unit	→ 🖺 78
Density unit	→ 🖺 78
Reference density unit	→ 🖺 78
Temperature unit	→ 🖺 79
Pressure unit	→ 🖺 79

Parameter	Description	Selection	Factory setting
Mass flow unit	Select mass flow unit. Result The selected unit applies for: 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. Result The selected unit applies for: 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: • 1 (DN > 150 (6"): m³ option) • gal (us)
Corrected volume flow unit	Select corrected volume flow unit. Result The selected unit applies for: Corrected volume flow parameter $(\rightarrow \ \ \)$ 118)	Unit choose list	Country-specific: NI/h Sft³/min
Corrected volume unit	Select corrected volume unit.	Unit choose list	Country-specific: NI Sft³
Density unit	Select density unit. Result The selected unit applies for: Output Simulation process variable Density adjustment (Expert menu)	Unit choose list	Country-specific: • kg/l • lb/ft ³
Reference density unit	Select reference density unit.	Unit choose list	Country-dependent • kg/Nl • lb/Sft³

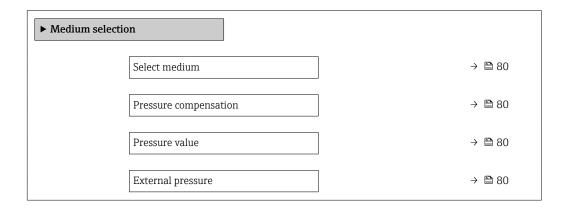
Parameter	Description	Selection	Factory setting
Temperature unit	Select temperature unit. Result The selected unit applies for: Electronic temperature parameter (6053) Maximum value parameter (6051) Minimum value parameter (6052) Maximum value parameter (6108) Minimum value parameter (6109) Carrier pipe temperature parameter (6027) Maximum value parameter (6029) Minimum value parameter (6030) Reference temperature parameter (1816) Temperature parameter	Unit choose list	Country-specific: ■ °C ■ °F
Pressure unit	Select process pressure unit. Result The unit is taken from: Pressure value parameter (→ 🖺 80) External pressure parameter (→ 🖺 80) Pressure value	Unit choose list	Country-specific: • bar a • psi a

10.5.3 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 Select medium



Parameter overview with brief description

Parameter	Prerequisite	Description	Selection / User entry / User interface
Select medium	-	Select medium type.	Liquid
Pressure compensation	-	Select pressure compensation type.	 Off Fixed value External value Current input 1*
Pressure value	The Fixed value option or the Current input 1n option is selected in the Pressure compensation parameter.	Enter process pressure to be used for pressure correction.	Positive floating-point number
External pressure	The Fixed value option or the Current input 1n option is selected in the Pressure compensation parameter.	Shows the external process pressure value.	Positive floating-point number

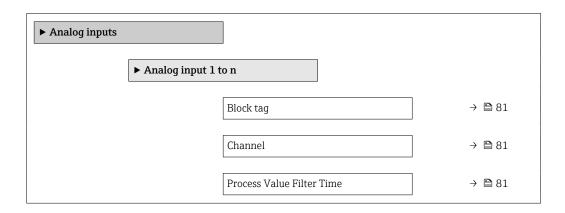
Visibility depends on order options or device settings

10.5.4 Configuring the analog inputs

The **Analog inputs** submenu guides the user systematically to the individual **Analog input 1 to n** submenu. From here you get to the parameters of the individual analog input.

Navigation

"Setup" menu \rightarrow Analog inputs



Parameter overview with brief description

Parameter	Description	User entry / Selection	Factory setting
Block tag	Unique name of the measuring device.	Max. 32 characters such as letters, numbers or special characters (e. g. @, %, /).	ANALOG_INPUT_1 4_Serial number
Channel	Use this function to select the process variable.	Mass flow Volume flow Corrected volume flow Target mass flow Density Reference density Concentration Temperature Carrier pipe temperature Carrier pipe temperature Carrier pipe temperature Oscillation frequency 0 Oscillation amplitude 0 Frequency fluctuation 0 Oscillation damping fluctuation 0 Signal asymmetry Exciter current 0 HBSI Totalizer 1 Totalizer 2 Totalizer 3 Current input 1 Uninitialized	
Process Value Filter Time	Enter the filter time specification for the filtering of the unconverted input value (PV).	Positive floating-point number	-

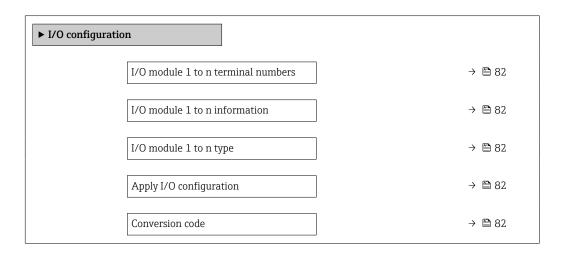
Visibility depends on order options or device settings

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 → I/O configuration



Parameter overview with brief description

Parameter	Description	User interface / Selection / User entry
I/O module terminal numbers	Shows the terminal numbers used by the I/O module.	 Not used 26-27 (I/O 1) 24-25 (I/O 2)
I/O module information	Shows information of the plugged I/O module.	 Not plugged Invalid Not configurable Configurable Fieldbus
I/O module type	Shows the I/O module type.	 Off Current output * Current input * Status input * Pulse/frequency/switch output *
Apply I/O configuration	Apply parameterization of the freely configurable I/O module.	■ No ■ Yes
Conversion code	Enter the code in order to change the I/O configuration.	Positive integer

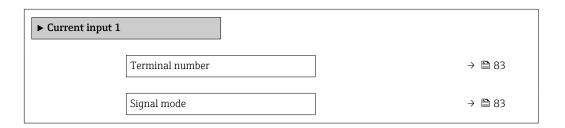
^{*} Visibility depends on order options or device settings

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



82

0/4 mA value	→ 🖺 83
20 mA value	→ 🖺 83
Current span	→ 🖺 83
Failure mode	→ 🖺 83
Failure value	→ 🖺 83

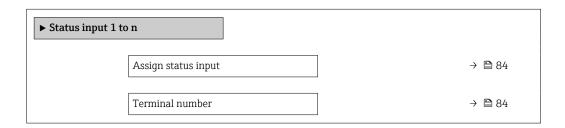
Parameter	Prerequisite	Description	User interface / Selection / User entry	Factory setting
Terminal number	-	Shows the terminal numbers used by the current input module.	Not used24-25 (I/O 2)	-
Signal mode	The measuring device is not approved for use in the hazardous area with type of protection Ex-i.	Select the signal mode for the current input.	Passive Active	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
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 	Country-specific: 420 mA NAMUR 420 mA US
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	_

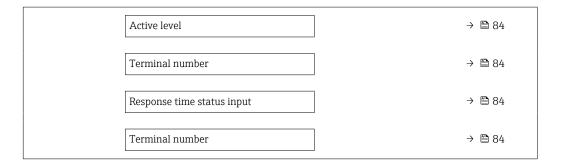
10.5.7 Configuring the status input

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





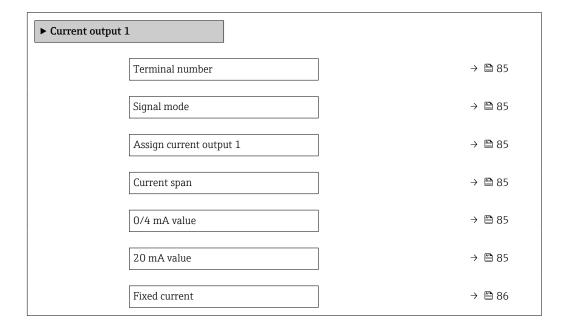
Parameter	Description	User interface / Selection / User entry
Terminal number	Shows the terminal numbers used by the status input module.	Not used24-25 (I/O 2)
Assign status input	Select function for the status input.	 Off Reset totalizer 1 Reset totalizer 2 Reset totalizer 3 Reset all totalizers Flow override
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

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



Failure mode	→ 🖺 86
Failure current	→ 🖺 86

Parameter	Prerequisite	Description	User interface / Selection / User entry	Factory setting
Terminal number	-	Shows the terminal numbers used by the current output module.	Not used24-25 (I/O 2)	-
Signal mode	-	Select the signal mode for the current output.	Passive Active	Active
Assign current output		Select process variable for current output.	Off Mass flow Volume flow Corrected volume flow Target mass flow Density Reference density Concentration Temperature Carrier pipe temperature Carrier pipe temperature Carrier pipe temperature Oscillation frequency 0 Oscillation amplitude 0 Frequency fluctuation 0 Oscillation damping 0 Oscillation damping 0 Oscillation damping fluctuation 0 Signal asymmetry Exciter current 0 HBSI*	
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 	Country-specific: 420 mA NAMUR 420 mA US
0/4 mA value	One of the following options is selected in the Current span parameter (→ 🖺 85): 420 mA NAMUR 420 mA US 420 mA 020 mA	Enter 4 mA value.	Signed floating-point number	Country-specific: • 0 kg/h • 0 lb/min
20 mA value	One of the following options is selected in the Current span parameter (→ 🖺 85): • 420 mA NAMUR • 420 mA US • 420 mA • 020 mA	Enter 20 mA value.	Signed floating-point number	Depends on country and nominal diameter

Parameter	Prerequisite	Description	User interface / Selection / User entry	Factory setting
Fixed current	The Fixed current option is selected in the Current span parameter (→ 🖺 85).	Defines the fixed output current.	0 to 22.5 mA	22.5 mA
Damping output	A process variable is selected in the Assign current output parameter (→ 🖺 85) and one of the following options is selected in the Current span parameter (→ 🖺 85): 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 (→ 🖺 85) and one of the following options is selected in the Current span parameter (→ 🖺 85): 420 mA NAMUR 420 mA US 420 mA 020 mA	Define output behavior in alarm condition.	 Min. Max. Last valid value Actual value Defined 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



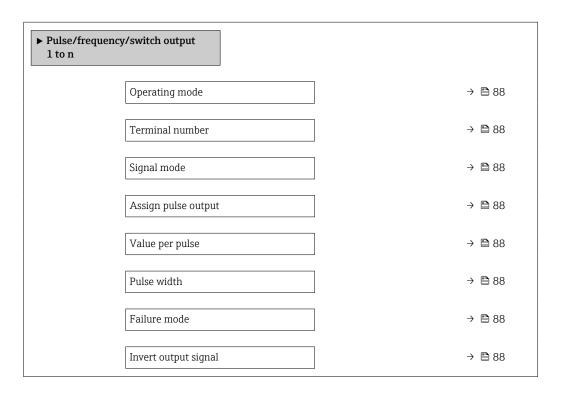
Parameter overview with brief description

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 used24-25 (I/O 2)	-
Signal mode	-	Select the signal mode for the PFS output.	PassiveActive	-
Assign pulse output 1 to n	The Pulse option is selected in the Operating mode parameter parameter.	Select process variable for pulse output.	 Off Mass flow Volume flow Corrected volume flow Target mass flow * Carrier mass flow * 	-
Value per pulse	The Pulse option is selected in the Operating mode parameter (→ 🖺 87) and a process variable is selected in the Assign pulse output parameter (→ 🖺 88).	Enter measured value at which a pulse is output.	Signed floating-point number	Depends on country and nominal diameter
Pulse width	The Pulse option is selected in the Operating mode parameter (→ 🖺 87) and a process variable is selected in the Assign pulse output parameter (→ 🖺 88).	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 ($\rightarrow \boxminus 87$) and a process variable is selected in the Assign pulse output parameter ($\rightarrow \boxminus 88$).	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

Configuring the frequency output

Navigation

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

► Pulse/frequency/switch output 1 to n	
Operating mode	→ 🖺 89
Terminal number	→ 🖺 89
Signal mode	→ 🖺 89

Assign frequency output	→ 🖺 90
Minimum frequency value	→ 🖺 90
Maximum frequency value	→ 🖺 90
Measuring value at minimum frequency	→ 🖺 90
Measuring value at maximum frequency	→ 🖺 90
Failure mode	→ 🖺 90
Failure frequency	→ 🖺 91
Invert output signal	→ 🗎 91

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 used24-25 (I/O 2)	-
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 the Operating mode parameter (→ 🖺 87) parameter.	Select process variable for frequency output.	Off Mass flow Volume flow Corrected volume flow Target mass flow * Carrier mass flow * Density Reference density Concentration * Temperature Carrier pipe temperature * Electronic temperature Oscillation frequency 0 Oscillation amplitude 0 Frequency fluctuation 0 Oscillation damping 0 Oscillation damping 0 Oscillation damping fluctuation 0 Signal asymmetry Exciter current 0 HBSI *	
Minimum frequency value	The Frequency option is selected in the Operating mode parameter ($\rightarrow \cong 87$) and a process variable is selected in the Assign frequency output parameter ($\rightarrow \cong 90$).	Enter minimum frequency.	0.0 to 10 000.0 Hz	-
Maximum frequency value	The Frequency option is selected in the Operating mode parameter ($\rightarrow \triangleq 87$) and a process variable is selected in the Assign frequency output parameter ($\rightarrow \triangleq 90$).	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 (→ 🖺 87) and a process variable is selected in the Assign frequency output parameter (→ 🖺 90).	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 ($\rightarrow \cong 87$) and a process variable is selected in the Assign frequency output parameter ($\rightarrow \cong 90$).	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 (→ 🖺 87) and a process variable is selected in the Assign frequency output parameter (→ 🖺 90).	Define output behavior in alarm condition.	Actual valueDefined value0 Hz	_

Parameter	Prerequisite	Description	Selection / User interface / User entry	Factory setting
Failure frequency	The Frequency option is selected in the Operating mode parameter ($\rightarrow \triangleq 87$) and a process variable is selected in the Assign frequency output parameter ($\rightarrow \triangleq 90$).	Enter frequency output value in alarm condition.	0.0 to 12 500.0 Hz	-
Invert output signal	-	Invert the output signal.	NoYes	-

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

Configuring the switch output

Navigation

"Setup" menu → Pulse/frequency/switch output

► Pulse/frequency 1 to n	uency/switch output	
	Operating mode	→ 🖺 92
	Terminal number	→ 🖺 92
	Signal mode	→ 🖺 92
	Switch output function	→ 🖺 93
	Assign diagnostic behavior	→ 🖺 93
	Assign limit	→ 🗎 93
	Assign flow direction check	→ 🖺 93
	Assign status	→ 🖺 93
	Switch-on value	→ 🖺 93
	Switch-off value	→ 🖺 93
	Switch-on delay	→ 🖺 93
	Switch-off delay	→ 🖺 94
	Failure mode	→ 🖺 94
	Invert output signal	→ 🖺 94

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 used24-25 (I/O 2)	-
Signal mode	-	Select the signal mode for the PFS output.	Passive Active	-

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 the Operating mode parameter parameter. The Limit option is selected in the Switch output function parameter parameter. 	Select process variable for limit function.	 Mass flow Volume flow Corrected volume flow Target mass flow * Carrier mass flow * Density Reference density Concentration * Temperature Totalizer 1 Totalizer 2 Totalizer 3 Oscillation damping 	_
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.	OffVolume flowMass flowCorrected volume flow	-
Assign status	 The Switch option is selected in the Operating mode parameter. The Status option is selected in the Switch output function parameter. 	Select device status for switch output.	 Partially filled pipe detection Low flow cut off Digital output 6 	-
Switch-on value	 In the Operating mode parameter, the Switch option is selected. In the Switch output function parameter, the Limit option is selected. 	Enter measured value for the switch-on point.	Signed floating-point number	Country-specific: • 0 kg/h • 0 lb/min
Switch-off value	 In the Operating mode parameter, the Switch option is selected. In the Switch output function parameter, the Limit option is selected. 	Enter measured value for the switch-off point.	Signed floating-point number	Country-specific: • 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	-

Parameter	Prerequisite	Description	Selection / User interface / User entry	Factory setting
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

▶ RelaisOutput 1 t	to n		
	Switch output function	-	→ 🖺 95
	Assign flow direction check	-	→ 🖺 95
	Assign limit	-	→ 🖺 95
	Assign diagnostic behavior	-	→ 🖺 95
	Assign status	-	→ 🖺 95
	Switch-off value	-	→ 🖺 95
	Switch-on value	-	→ 🖺 95
	Failure mode	-	→ 🖺 95

Parameter	Prerequisite	Description	Selection / User interface / User entry	Factory setting
Relay output function	_	Select the function for the relay output.	 Closed Open Diagnostic behavior Limit Flow direction check Digital Output 	-
Terminal number	-	Shows the terminal numbers used by the relay output module.	Not used24-25 (I/O 2)	-
Assign flow direction check	In the Relay output function parameter, the Flow direction check option is selected.	Select process variable for flow direction monitoring.	OffVolume flowMass flowCorrected volume flow	-
Assign limit	The Limit option is selected in the Relay output function parameter parameter.	Select process variable for limit function.	Mass flow Volume flow Corrected volume flow Target mass flow Carrier mass flow Density Reference density Concentration Temperature Totalizer 1 Totalizer 2 Totalizer 3 Oscillation damping	-
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 offDigital output 6	-
Switch-off value	In the Relay output function parameter, the Limit option is selected.	Enter measured value for the switch-off point.	Signed floating-point number	Country-specific: 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	In the Relay output function parameter, the Limit option is selected.	Enter measured value for the switch-on point.	Signed floating-point number	Country-specific: 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	-

^{*} 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 → 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 	-
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 Target mass flow Target mass flow Density Reference density Concentration Temperature Carrier pipe temperature Electronic temperature Oscillation frequency 0 Oscillation amplitude 0 Frequency fluctuation 0 Oscillation damping 0 Oscillation damping fluctuation 0 Signal asymmetry Exciter current 0 Totalizer 1 Totalizer 2 Totalizer 3 Current output 1	
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 the Value 1 display parameter	-
Value 3 display	A local display is provided.	Select the measured value that is shown on the local display.	For the picklist, see the Value 1 display parameter (→ 🖺 97)	-
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 the Value 1 display parameter (→ 🖺 97)	_

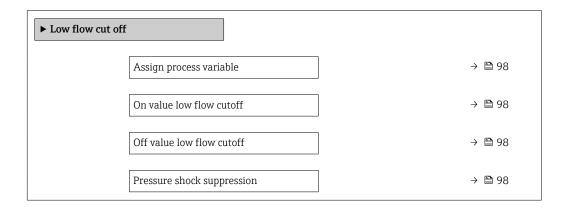
^{*} Visibility depends on order options or device settings

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

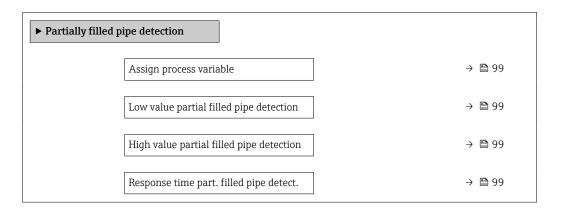
Parameter	Prerequisite	Description	Selection / User entry	Factory setting
Assign process variable	-	Select process variable for low flow cut off.	OffMass flowVolume flowCorrected volume flow	-
On value low flow cutoff	A process variable is selected in the Assign process variable parameter ($\rightarrow \implies 98$).	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 ($\rightarrow \implies 98$).	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 (→ 🖺 98).	Enter time frame for signal suppression (= active pressure shock suppression).	0 to 100 s	-

10.5.13 Configuring the partial 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



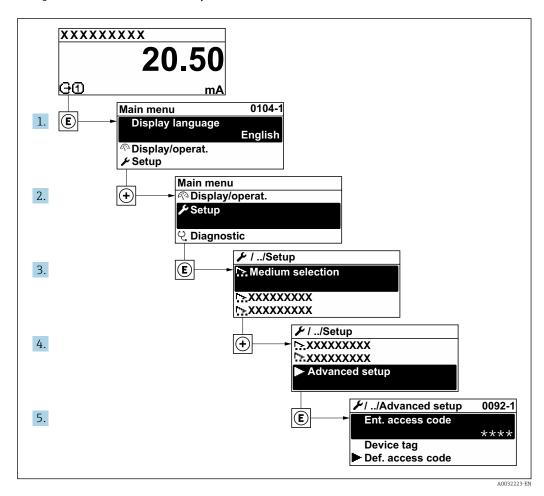
Parameter overview with brief description

Parameter	Prerequisite	Description	Selection / User entry
Assign process variable	-	Select process variable for partially filled pipe detection.	 Off Density Reference density
Low value partial filled pipe detection	A process variable is selected in the Assign process variable parameter (→ 🖺 99).	Enter lower limit value for deactivating partialy filled pipe detection.	Signed floating-point number
High value partial filled pipe detection	A process variable is selected in the Assign process variable parameter (→ 🖺 99).	Enter upper limit value for deactivating partialy filled pipe detection.	Signed floating-point number
Response time part. filled pipe detect.	A process variable is selected in the Assign process variable parameter $(\rightarrow \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	Enter time before diagnostic message is displayed for partially filled pipe detection.	0 to 100 s

10.6 Advanced settings

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

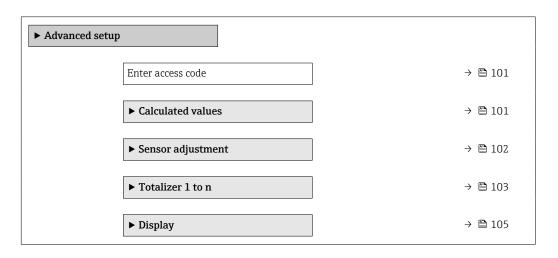
Navigation to the "Advanced setup" submenu

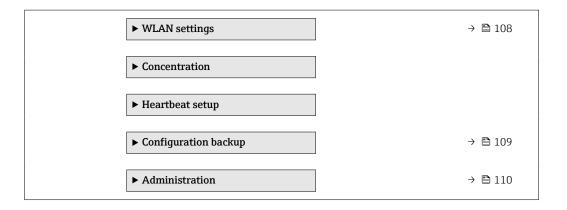


The number of submenus can vary depending on the device version. Some submenus are not dealt with in the Operating Instructions. These submenus and the parameters they contain are explained in the Special Documentation for the device.

Navigation

"Setup" menu \rightarrow Advanced setup





10.6.1 Using the parameter to enter the access code

Navigation

"Setup" menu → Advanced setup

Parameter overview with brief description

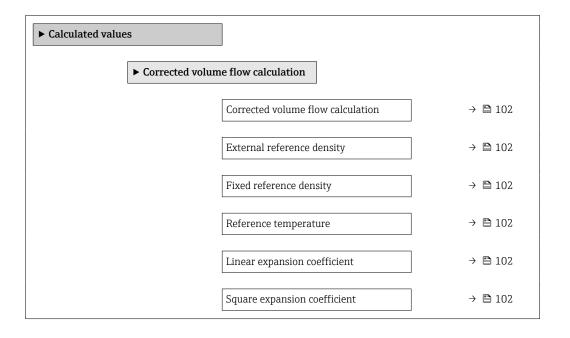
Parameter	Description	User entry
Enter access code	Enter access code to disable write protection of parameters.	0 to 9 999

10.6.2 Calculated values

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

Navigation

"Setup" menu \rightarrow Advanced setup \rightarrow Calculated values



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 Reference density by API table 53 External reference density Current input 1* 	-
External reference density	-	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	-

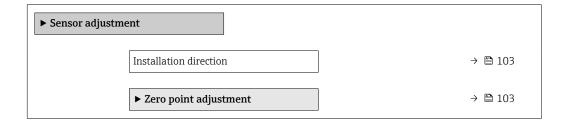
^{*} Visibility depends on order options or device settings

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



102

Parameter	Description	Selection
Installation direction		
	the sensor.	Flow against arrow direction

Zero point adjustment

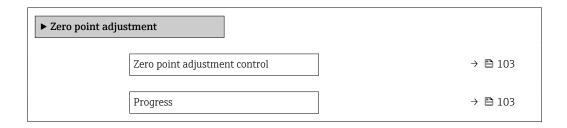
All measuring devices are calibrated in accordance with state-of-the-art technology. Calibration takes place under reference conditions $\Rightarrow \triangleq 185$. Therefore, a zero point adjustment in the field is generally not required.

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

- To achieve maximum measuring accuracy even with low flow rates.
- Under extreme process or operating conditions (e.g. very high process temperatures or very high-viscosity fluids).

Navigation

"Setup" menu → Advanced setup → Sensor adjustment → Zero point adjustment



Parameter overview with brief description

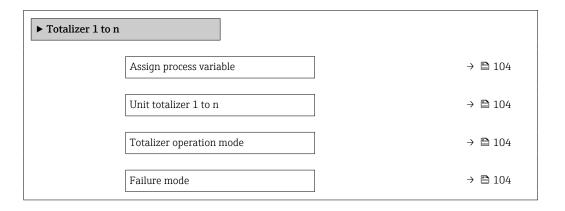
Parameter	Description	Selection / User interface	Factory setting
Zero point adjustment control	Start zero point adjustment.	CancelBusyZero point adjust failureStart	-
Progress	Shows the progress of the process.	0 to 100 %	-

10.6.4 Configuring the totalizer

In the **"Totalizer 1 to n" submenu** the individual totalizer can be configured.

Navigation

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



Parameter	Prerequisite	Description	Selection	Factory setting
Assign process variable	-	Select process variable for totalizer.	 Off Volume flow Mass flow Corrected volume flow Target mass flow * Carrier mass flow * 	-
Unit totalizer 1 to n	A process variable is selected in the Assign process variable parameter ($\rightarrow \boxminus 104$) of the Totalizer 1 to n submenu.	Select process variable totalizer unit.	Unit choose list	Country-specific: • kg • lb
Totalizer operation mode	A process variable is selected in the Assign process variable parameter ($\rightarrow \boxminus 104$) of the Totalizer 1 to n submenu.	Select totalizer calculation mode.	Net flow totalForward flow totalReverse flow total	-
Failure mode	A process variable is selected in the Assign process variable parameter ($\rightarrow \boxtimes 104$) 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

► Display		
	Format display	→ 🖺 106
	Value 1 display	→ 🖺 106
	0% bargraph value 1	→ 🖺 106
	100% bargraph value 1	→ 🖺 106
	Decimal places 1	→ 🖺 106
	Value 2 display	→ 🖺 106
	Decimal places 2	→ 🖺 106
	Value 3 display	→ 🖺 106
	0% bargraph value 3	→ 🖺 107
	100% bargraph value 3	→ 🖺 107
	Decimal places 3	→ 🖺 107
	Value 4 display	→ 🖺 107
	Decimal places 4	→ 🖺 107
	Display language	→ 🖺 107
	Display interval	→ 🖺 107
	Display damping	→ 🖺 107
	Header	→ 🖺 107
	Header text	→ 🖺 107
	Separator	→ 🖺 108
	Backlight	→ 🖺 108

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 	-
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 Target mass flow Density Reference density Concentration Temperature Carrier pipe temperature Electronic temperature Oscillation frequency 0 Oscillation amplitude 0 Frequency fluctuation 0 Oscillation damping 0 Oscillation damping 0 Signal asymmetry Exciter current 0 Totalizer 1 Totalizer 2 Totalizer 3 Current output 1	
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 the Value 1 display parameter	-
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 the Value 1 display parameter (→ 🗎 97)	_

Parameter	Prerequisite	Description	Selection / User entry	Factory setting
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.XXX	-
Value 4 display	A local display is provided.	Select the measured value that is shown on the local display.	For the picklist, see the Value 1 display parameter (→ 🖺 97)	-
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.xxx	-
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)* ■ Bahasa Indonesia* ■ 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	In the Header parameter, the Free text option is selected.	Enter display header text.	Max. 12 characters such as letters, numbers or special characters (e.g. @, %, /)	_

Parameter	Prerequisite	Description	Selection / User entry	Factory setting
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" Order code for "Display; operation", option O "Separate 4-line display, illum.; 10m/30ft cable; touch control"	Switch the local display backlight on and off.	■ Disable ■ Enable	_

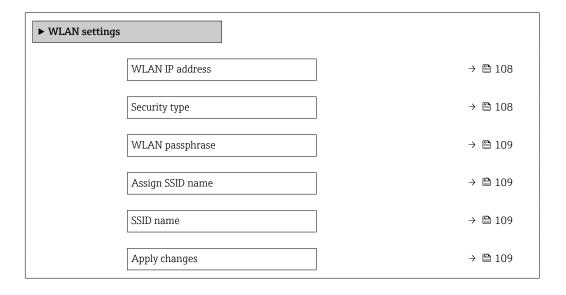
^{*} Visibility depends on order options or device settings

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



Parameter overview with brief description

Parameter	Prerequisite	Description	User entry / Selection	Factory setting
WLAN IP address	-	Enter IP address of the device WLAN interface.	4 octet: 0 to 255 (in the particular octet)	-
Security type	-	Select the security type of the WLAN interface.	UnsecuredWPA2-PSK	-

Parameter	Prerequisite	Description	User entry / Selection	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	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_300_A 802000)
Apply changes	_	Use changed WLAN settings.	■ Cancel ■ Ok	-

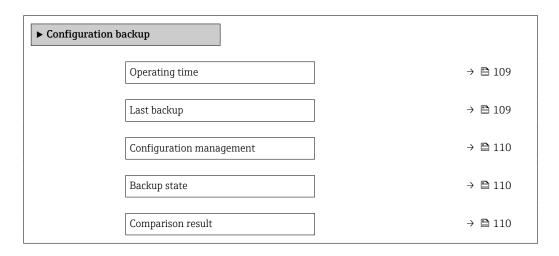
10.6.7 Configuration management

After commissioning, you can save the current device configurationor restore the previous device configuration.

You can do so using the **Configuration management** parameter and the related options found in the **Configuration backup** submenu.

Navigation

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



Parameter overview with brief description

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 embedded HistoROM.	Days (d), hours (h), minutes (m) and seconds (s)

Parameter	Description	User interface / Selection
Configuration management	Select action for managing the device data in the embedded HistoROM.	 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 embedded HistoROM.	 Settings identical Settings not identical No backup available Backup settings corrupt Check not done Dataset incompatible

Function scope of the "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 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.

Navigation

"Setup" menu \rightarrow Advanced setup \rightarrow Administration

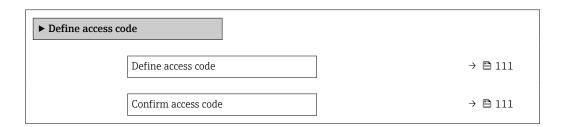


► Reset access code	→ 🖺 111
Device reset	→ 🖺 112

Using the parameter to define the access code

Navigation

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



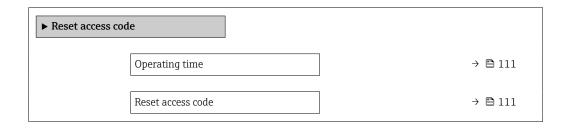
Parameter overview with brief description

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 overview with brief description

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 service interface CDI-RJ45) 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 ENP restart

10.7 Simulation

The **Simulation** submenu enables you to simulate, without a real flow situation, various process variables in the process and the device alarm mode and to verify downstream signal chains (switching valves or closed-control loops).

Navigation

"Diagnostics" menu \rightarrow Simulation

► Simulation		
	Assign simulation process variable	→ 🖺 113
	Process variable value	→ 🖺 113
	Status input simulation	→ 🖺 113
	Input signal level	→ 🖺 113
	Current input 1 to n simulation	→ 🖺 113
	Value current input 1 to n	→ 🖺 113
	Current output 1 to n simulation	→ 🖺 113
	Value current output 1 to n	→ 🖺 113
	Frequency output simulation 1 to n	→ 🖺 113
	Frequency value 1 to n	→ 🖺 113
	Pulse output simulation 1 to n	→ 🖺 113
	Pulse value 1 to n	→ 🖺 114
	Switch output simulation 1 to n	→ 🖺 114

Switch status 1 to n	→ 🖺 114
Relay output 1 to n simulation	→ 🖺 114
Switch status 1 to n	→ 🖺 114
Device alarm simulation	→ 🖺 114
Diagnostic event category	→ 🖺 114
Diagnostic event simulation	→ 🗎 114

Parameter overview with brief description

Parameter	Prerequisite	Description	Selection / User entry / User interface
Assign simulation process variable	-	Select a process variable for the simulation process that is activated.	 Off Mass flow Volume flow Corrected volume flow Density Reference density Temperature Target mass flow * Carrier mass flow * Concentration *
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
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
Current input simulation	-	Switch simulation of the current input on and off.	Off On
Value current input	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
Current output simulation	-	Switch the simulation of the current output on and off.	• Off • On
Value current output	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	In the Operating mode parameter, the Frequency option is selected.	Switch the simulation of the frequency output on and off.	• Off • On
Frequency value	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	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 (> \equiv 88) defines the pulse width of the pulses output.	OffFixed valueDown-counting value

Parameter	Prerequisite	Description	Selection / User entry / User interface
Pulse value	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	In the Operating mode parameter, the Switch option is selected.	Switch the simulation of the switch output on and off.	• Off • On
Switch status	-	Select the status of the status output for the simulation.	OpenClosed
Relay output simulation	-	Switch simulation of the relay output on and off.	Off On
Switch status	The On option is selected in the Switch output simulation 1 to n parameter parameter.	Select status of the relay output for the simulation.	■ Open ■ Closed
Pulse output simulation	-	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	In the Pulse output simulation parameter, the Down-counting value option is selected.	Set and switch off the pulse output simulation.	0 to 65 535
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)
Logging interval	-	Define the logging interval tlog for data logging. This value defines the time interval between the individual data points in the memory.	1.0 to 3 600.0 s

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 →

 ☐ 114
- Protect access to measuring device via write protection switch $\rightarrow \triangleq 116$

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 local display

- 1. Navigate to the **Define access code** parameter ($\Rightarrow \triangleq 111$).
- 2. Define a max. 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 ($\rightarrow \implies 111$) to confirm the code.
 - ► The 🗈-symbol appears in front of all write-protected parameters.

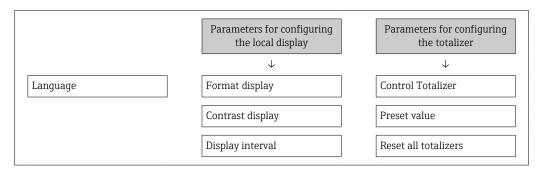
The device automatically locks the write-protected parameters again if a key is not pressed for 10 minutes in the navigation and editing view. The device locks the write-protected parameters automatically after 60 s if the user skips back to the operational display mode from the navigation and editing view.



- The user role with which the user is currently logged on via the local display is indicated by the → 🖺 55 **Access status** parameter. Navigation path: Operation → Access status

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 ($\rightarrow \equiv 111$).
- 2. Define a max. 16-digit numeric code as an access code.
- 3. Enter the access code again in the **Confirm access code** parameter ($\rightarrow \triangleq 111$) to confirm the code.
 - ► The Web browser switches to the login page.
- If no action is performed for 10 minutes, the Web browser automatically returns to the login page.
- If parameter write protection is activated via an access code, it can also only be deactivated via this access code $\rightarrow \triangleq 55$.
 - The user role with which the user is currently logged on via Web browser is indicated by the Access status parameter. Navigation path: Operation → Access status

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

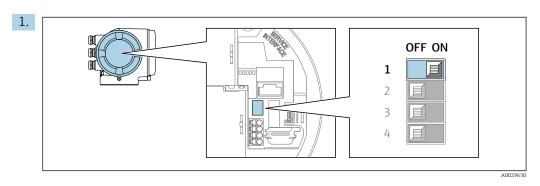
- For a reset code, contact your Endress+Hauser service organization.
- 1. Navigate to the **Reset access code** parameter ($\rightarrow \triangleq 111$).
- 2. Enter the reset code.
 - The access code has been reset to the factory setting **0000**. It can be redefined $\rightarrow \boxminus 115$.

10.8.2 Write protection via write protection switch

Unlike parameter write protection via a user-specific access code, this allows write access to the entire operating menu - except for the **"Contrast display" parameter** - to be locked.

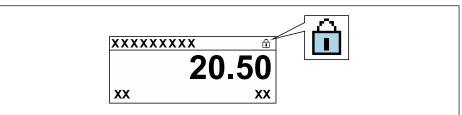
The parameter values are now read only and cannot be edited any more (exception "Contrast display" parameter):

- Via local display
- Via FOUNDATION Fieldbus



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 $\rightarrow \boxminus 117$. In addition, on the local display the \bar{\mathbb{\math



- A0029425
- 2. Setting the write protection (WP) switch on the main electronics module to the **OFF** position (factory setting) disables hardware write protection.

10.8.3 Write protection via block operation

Locking via block operation:

- Block: **DISPLAY (TRDDISP)**; parameter: **Define access code**
- Block: **EXPERT CONFIG (TRDEXP)**; parameter: **Enter access code**

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 status displayed in the Access status parameter applies $\rightarrow \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $
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) .
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 once again.

11.2 Adjusting the operating language



Petailed information:

- To configure the operating language → 🗎 75
- For information on the operating languages supported by the measuring device → 🖺 194

11.3 Configuring the display

Detailed information:

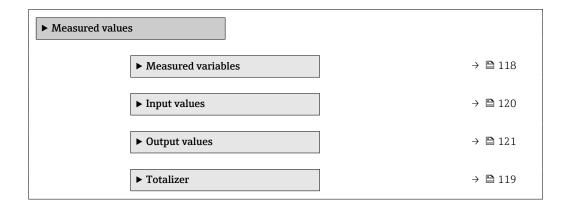
- On the advanced settings for the local display $\rightarrow \implies 105$

11.4 Reading 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	l variables	
	Mass flow	→ 🖺 118
	Volume flow	→ 🖺 118
	Corrected volume flow	→ 🗎 118
	Density	→ 🖺 118
	Reference density	→ 🖺 119
	Temperature	→ 🖺 119
	Pressure value	→ 🖺 119
	Concentration	→ 🖺 119
	Target mass flow	→ 🖺 119
	Carrier mass flow	→ 🖺 119

Parameter overview with brief description

Parameter	Prerequisite	Description	User interface
Mass flow	_	Displays the mass flow currently measured.	Signed floating-point number
		Dependency The unit is taken from the Mass flow unit parameter (→ 🖺 78).	
Volume flow	_	Displays the volume flow currently calculated.	Signed floating-point number
		Dependency The unit is taken from the Volume flow unit parameter (→ 🖺 78).	
Corrected volume flow	_	Displays the corrected volume flow currently calculated.	Signed floating-point number
		Dependency The unit is taken from the Corrected volume flow unit parameter (→ 🖺 78).	
Density	-	Shows the density currently measured. Dependency The unit is taken from the Density unit parameter $(\rightarrow \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \)$.	Signed floating-point number

Parameter	Prerequisite	Description	User interface
Reference density	-	Displays the reference density currently calculated.	Signed floating-point number
		Dependency The unit is taken from the Reference density unit parameter (→ 12 78).	
Temperature	-	Shows the medium temperature currently measured.	Signed floating-point number
		Dependency The unit is taken from the Temperature unit parameter $(\rightarrow \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	
Pressure value	-	Displays either a fixed or external pressure value.	Signed floating-point number
		Dependency The unit is taken from the Pressure unit parameter (→ 🖺 79).	
Concentration	For the following order code: Order code for "Application package",	Displays the concentration currently calculated.	Signed floating-point number
	option ED "Concentration" The software options currently enabled are displayed in the Software option overview parameter.	Dependency The unit is taken from the Concentration unit parameter.	
Target mass flow	With the following conditions: Order code for "Application package", option ED "Concentration"	Displays the mass flow currently measured for the target medium.	Signed floating-point number
	The software options currently enabled are displayed in the Software option overview parameter.	Dependency The unit is taken from the Mass flow unit parameter ($\rightarrow \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	
Carrier mass flow	With the following conditions: Order code for "Application package",	Displays the mass flow currently measured for the carrier medium.	Signed floating-point number
	option ED "Concentration"	Dependency	
	The software options currently enabled are displayed in the Software option overview parameter.	The unit is taken from the Mass flow unit parameter ($\rightarrow \implies 78$).	

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

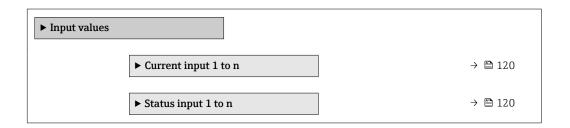
Parameter	Prerequisite	Description	User interface
Totalizer value 1 to n	A process variable is selected in the Assign process variable parameter (→ 🖺 104) of the Totalizer 1 to n submenu.	Displays the current totalizer counter value.	Signed floating-point number
Totalizer overflow 1 to n	A process variable is selected in the Assign process variable parameter (→ 🖺 104) 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

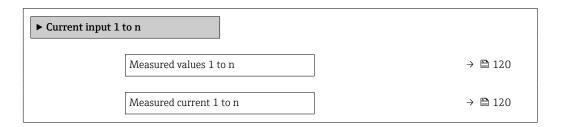


Input values of current input

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	Displays the current input value.	Signed floating-point number
Measured current	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

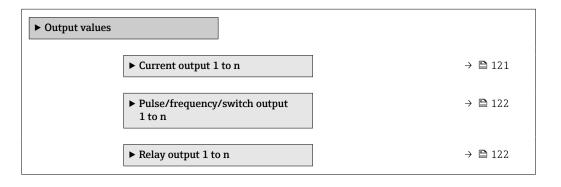
Parameter	Description	User interface
Value status input	Shows the current input signal level.	■ High ■ Low

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 → Measured values → Output values

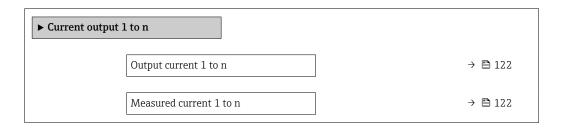


Output values of current output

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

Navigation

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



Parameter overview with brief description

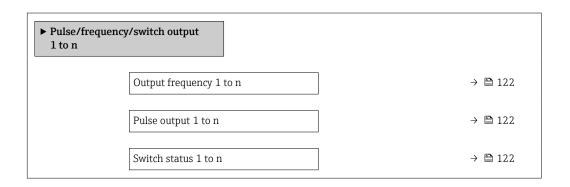
Parameter	Description	User interface
Output current 1	Displays the current value currently calculated for the current output.	3.59 to 22.5 mA
Measured current	Displays the current value currently measured for the current output.	0 to 30 mA

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

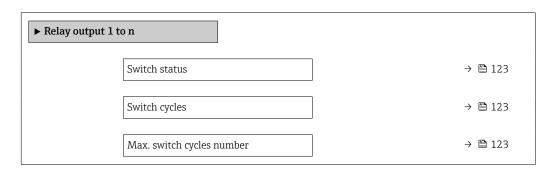
Parameter	Prerequisite	Description	User interface
Output frequency	In the Operating mode parameter, the Frequency option is selected.	Displays the value currently measured for the frequency output.	0.0 to 12 500.0 Hz
Pulse output	The Pulse option is selected in the Operating mode parameter parameter.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

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



122

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 🗎 76)
- Advanced settings using the Advanced setup submenu (→ 🗎 100)

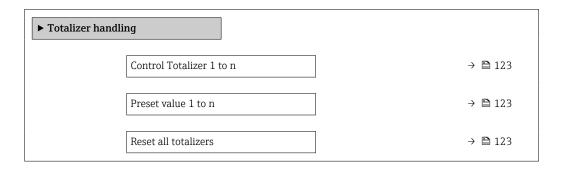
11.6 Performing a totalizer reset

The totalizers are reset in the **Operation** submenu:

- Control Totalizer
- Reset all totalizers

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 ($\rightarrow \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	Control totalizer value.	 Totalize Reset + hold Preset + hold Reset + totalize Preset + totalize Hold 	-
Preset value 1 to n	A process variable is selected in the Assign process variable parameter ($\rightarrow \boxminus 104$) of the Totalizer 1 to n submenu.	Specify start value for totalizer. Dependency The unit of the selected process variable is specified for the totalizer in the Unit totalizer parameter (→ 104).	Signed floating-point number	Country-specific: 0 kg 0 lb
Reset all totalizers	-	Reset all totalizers to 0 and start.	CancelReset + totalize	-

11.6.1 Function scope of the "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	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.	
Preset + totalize	The totalizer is set to the defined start value from the Preset value parameter and the totaling process is restarted.	
Hold	Totalizing is stopped.	

11.6.2 Function scope of the "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 flow values previously totalized.

11.7 Showing data logging

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.

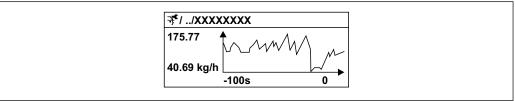


Data logging is also available via:

- Web browser

Function range

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



A0016

■ 27 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.

 $\begin{array}{l} \textbf{Navigation} \\ \text{"Diagnostics" menu} \rightarrow \text{Data logging} \end{array}$

► Data logging		
Ass	ign channel 1	→ 🖺 126
Ass	ign channel 2	→ 🖺 126
Ass	ign channel 3	→ 🖺 126
Ass	ign channel 4	→ 🖺 126
Log	ging interval	→ 🖺 126
Clea	ar logging data	→ 🖺 126
Dat	a logging	→ 🖺 126
Log	ging delay	→ 🖺 126
Dat	a logging control	→ 🖺 126
Dat	a logging status	→ 🖺 127
Ent	ire logging duration	→ 🖺 127
▶ □	Display channel 1	
▶ □	Display channel 2	
▶ □	Display channel 3	
▶ E	Display channel 4	

Parameter overview with brief description

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 Target mass flow* Carrier mass flow* Density Reference density Concentration* Temperature Carrier pipe temperature Oscillation frequency 0 Frequency fluctuation 0 Oscillation amplitude* Oscillation damping fluctuation 0 Signal asymmetry Exciter current 0 Current output 1 Current output 3 Current output 4 HBSI*
Assign channel 2	The Extended HistoROM application package is available. The software options currently enabled are displayed in the Software option overview parameter.	Assign process variable to logging channel.	Picklist, see Assign channel 1 parameter (→ 🖺 126)
Assign channel 3	The Extended HistoROM application package is available. The software options currently enabled are displayed in the Software option overview parameter.	Assign process variable to logging channel.	Picklist, see Assign channel 1 parameter (→ 🖺 126)
Assign channel 4	The Extended HistoROM application package is available. The software options currently enabled are displayed in the Software option overview parameter.	Assign process variable to logging channel.	Picklist, see Assign channel 1 parameter (→ 🖺 126)
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 999.0 s
Clear logging data	The Extended HistoROM application package is available.	Clear the entire logging data.	Cancel Clear data
Data logging	_	Select the data logging method.	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

Parameter	Prerequisite	Description	Selection / User entry / User interface
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

Error	Possible causes	Solution
Local display dark and no output signals	Supply voltage does not match the value indicated on the nameplate.	Apply the correct supply voltage → 🖺 34.
Local display dark and no output signals	The polarity of the supply voltage is wrong.	Correct the polarity.
Local display dark and no output signals	No contact between connecting cables and terminals.	Check the connection of the cables 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 → 🖺 170.
Local display is dark, but signal output is within the valid range	Display is set too bright or too dark.	 Set the display brighter by simultaneously pressing ± + E. Set the display darker by simultaneously pressing □ + E.
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 is dark, but signal output is within the valid range	Display module is defective.	Order spare part → 🖺 170.
Backlighting of local display is red	Diagnostic event with "Alarm" diagnostic behavior has occurred.	Take remedial measures → 🖺 140
Text on local display appears in a foreign language and cannot be understood.	Incorrect operating language is configured.	1. Press □ + ⊕ for 2 s ("home position"). 2. Press □. 3. Set the desired language in the Display language parameter (→ 圖 107).
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 → 170.

For output signals

Error	Possible causes	Solution
Signal output outside the valid range	Main electronics module is defective.	Order spare part → 🖺 170.
Device shows correct value on local display, but signal output is incorrect, though in the valid range.	Configuration error	Check and correct the parameter configuration.
Device measures incorrectly.	Configuration error or device is operated outside the application.	Check and correct parameter configuration. Observe limit values specified in the "Technical Data".

For access

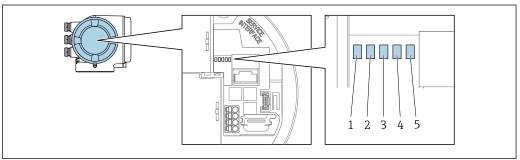
Error	Possible causes	Solution
No write access to parameters	Hardware write protection enabled	Set the write protection switch on main electronics module to the OFF position $\rightarrow \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $
No write access to parameters	Current user role has limited access authorization	1. Check user role → 🖺 55. 2. Enter correct customer-specific access code → 🖺 55.
No connection via FOUNDATION Fieldbus	Device plug connected incorrectly	Check the pin assignment of the connector .
Not connecting to Web server	Web server disabled	Using the "FieldCare" or "DeviceCare" operating tool, check whether the Web server of the measuring device is enabled, and enable it if necessary → 🖺 62.
	Incorrect setting for the Ethernet interface of the computer	1. Check the properties of the Internet protocol (TCP/IP) → 🖺 58→ 🗎 58. 2. Check the network settings with the IT manager.
Not connecting to Web server	Incorrect IP address	Check the IP address: 192.168.1.212 → 🖺 58→ 🖺 58
Not connecting to Web server	Incorrect WLAN access data	 Check WLAN network status. Log on to the device again using WLAN access data. Verify that WLAN is enabled on the measuring device and operating device →
	WLAN communication disabled	-
Not connecting to Web server, FieldCare or DeviceCare	No WLAN network 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 device is outside of reception range: Check network status on operating device. 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 frozen and operation no longer possible	Data transfer 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.
Content of Web browser incomplete or difficult to read	Not using optimum version of Web server.	1. Use the correct Web browser version → 🗎 57. 2. Clear the Web browser cache and restart the Web browser.
	Unsuitable view settings.	Change the font size/display ratio of the Web browser.
No or incomplete display of contents in the Web browser	JavaScript not enabledJavaScript cannot be enabled	Enable JavaScript. Enter http://XXX.XXX.X.XXX/basic.html as the IP address.

Error	Possible causes	Solution
Operation with FieldCare or DeviceCare via CDI-RJ45 service interface (port 8000)	Firewall of computer or network is preventing communication	Depending on the settings of the firewall used on the computer or in the network, the firewall must be adapted or disabled to allow FieldCare/DeviceCare access.
Flashing of firmware with FieldCare or DeviceCare via CDI-RJ45 service interface (via port 8000 or TFTP ports)	Firewall of computer or network is preventing communication	Depending on the settings of the firewall used on the computer or in the network, the firewall must be adapted or disabled to allow FieldCare/DeviceCare access.

12.2 Diagnostic information via light emitting diodes

12.2.1 Transmitter

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



A0029629

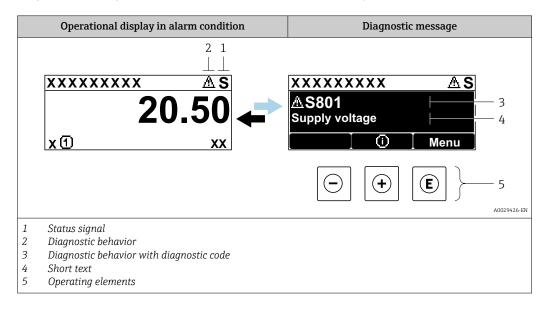
- Supply voltage
- 2 Device status
- 3 Not used
- 4 Communication
- 5 Service interface (CDI) active

LED		Color	Meaning
1	Supply voltage	Green	Supply voltage is ok.
		Off	Supply voltage is off or too low.
2	Device status (normal	Red	Problem
	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	Not used	_	-
4	Communication	White	Communication active.
5	Service interface (CDI)	Yellow	Connection established.
		Flashing yellow	Communication active.
		Off	No connection.

12.3 Diagnostic information on local display

12.3.1 Diagnostic message

Faults detected by the self-monitoring system of the measuring device 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 submenus \rightarrow 🗎 162

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 according to VDI/VDE 2650 and NAMUR Recommendation NE 107: F = Failure, C = Function Check, S = Out of Specification, M = Maintenance Required

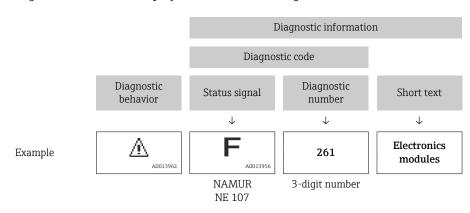
Symbol	Meaning
F	Failure A device error has occurred. The measured value is no longer valid.
С	Function check The device is in service mode (e.g. during a simulation).
S	Out of specification The device is operated: Outside its technical specification limits (e.g. outside the process temperature range)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

Diagnostic behavior

Symbol	Meaning
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.

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

Key	Meaning
(+)	Plus key In a menu, submenu Opens the message about remedy information.
E	Enter key In a menu, submenu Opens the operating menu.

XXXXXXXX AS XXXXXXXX **AS801** Supply voltage x ① 1. $(\mathbf{+})$ Diagnostic list Δ S Diagnostics 1 ∆ S801 Supply voltage Diagnostics 2 **Diagnostics 3** 2. Œ Supply voltage (ID:203) △ S801 0d00h02m25s **—** 5 Increase supply voltage 3. $| \ominus | + | \oplus |$

12.3.2 Calling up remedial measures

- 28 Message about remedial measures
- 1 Diagnostic information
- 2 Short text
- 3 Service ID
- 4 Diagnostic behavior with diagnostic code
- 5 Operation time of occurrence
- 6 Remedial measures
- 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.

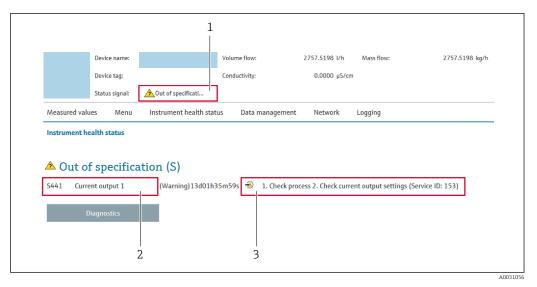
The user is in the **Diagnostics** menu at an entry for a diagnostics event, e.g. in the **Diagnostic list** submenu or **Previous diagnostics** parameter.

- 1. Press E.
 - └ The message for the remedial measures for the selected diagnostic event opens.
- 2. Press \Box + \pm simultaneously.
 - ► The message for the remedial measures 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 Remedy information with Service ID
- In addition, diagnostic events which have occurred can be shown in the **Diagnostics** menu:

 - Via submenu → 🖺 162

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.
w/	Function check The device is in service mode (e.g. during a simulation).
<u>^</u> ?	Out of specification The device is operated: Outside its technical specification limits (e.g. outside the process temperature range)
&	Maintenance required Maintenance is required. The measured value is still valid.

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

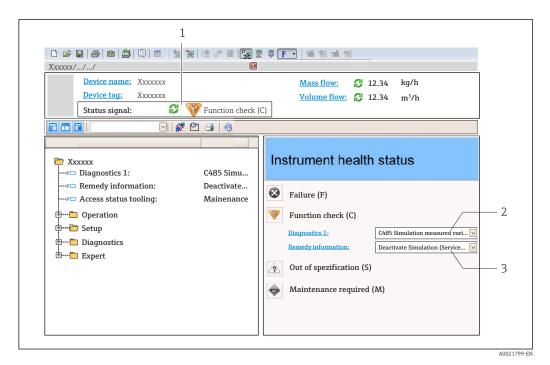
12.4.2 Calling up remedy information

Remedy information is provided for every diagnostic event to ensure that problems can be rectified quickly. These measures are displayed in red along with the diagnostic event and the related diagnostic information.

12.5 Diagnostic information in FieldCare or DeviceCare

12.5.1 Diagnostic options

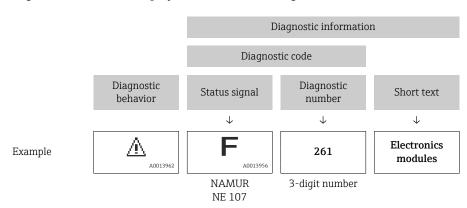
Any faults detected by the measuring device are displayed on the home page of the operating tool once the connection has been established.



- 1 Status area with status signal → 131
- 2 Diagnostic information → 🖺 132
- 3 Remedy information with Service ID
- In addition, diagnostic events which have occurred can be shown in the **Diagnostics** menu:
 - Via parameter \rightarrow 🖺 161
 - Via submenu → 🖺 162

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.

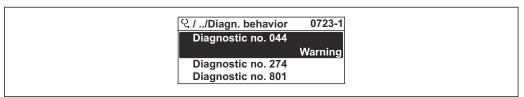
- 1. Call up the desired parameter.
- 2. On the right in the working area, mouse over the parameter.
 - ► A tool tip with remedy information for the diagnostic event appears.

12.6 Adapting the diagnostic information

12.6.1 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.

Expert \rightarrow System \rightarrow Diagnostic handling \rightarrow Diagnostic behavior



A0014048-E

■ 29 Taking the example of the local display

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

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

12.6.2 Adapting the status signal

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

Expert → Communication → Diagnostic event category

Available status signals

Configuration as per FOUNDATION Fieldbus Specification (FF912), in accordance with NAMUR NE107.

Symbol	Meaning
A0013956	Failure A device error is present. The measured value is no longer valid.
C	Function check The device is in service mode (e.g. during a simulation).

Symbol	Meaning
S	Out of specification The device is being operated: Outside its technical specification limits (e.g. outside the process temperature range) Outside of the configuration carried out by the user (e.g. maximum flow in parameter 20 mA value)
A0013957	Maintenance required Maintenance is required. The measured value is still valid.

Enabling the configuration of the diagnostic information according to FF912

For compatibility reasons, the configuration of the diagnostic information according to FOUNDATION Fieldbus Specification FF912 is not enabled when the device is delivered from the factory.

Enabling the configuration of the diagnostic information according to FOUNDATION Fieldbus Specification FF912

- 1. Open the Resource block.
- 2. In **Feature Selection** parameter, select **Multi-bit Alarm (Bit-Alarm) Support** option.
 - The diagnostic information can be configured according to FOUNDATION Fieldbus Specification FF912.

Grouping the diagnostic information

Diagnostic information is assigned to different groups. The groups differ depending on the weighting (severity) of the diagnostic event:

- Highest weighting
- High weighting
- Low weighting

Assignment of the diagnostic information (factory setting)

The assignment of the diagnostic information ex-works is indicated in the following tables.

Some diagnostic information can be assigned individually, irrespective of their range $\rightarrow \blacksquare 139$.

lacksquare Overview and description of all diagnostic information ightarrow 🗎 140

Weighting	Status signal (factory setting)	Allocation	Diagnostic information range
Highest	Failure (F)	Sensor	F000 to 199
		Electronics	F200 to 399
		Configuration	F400 to 700
		Process	F800 to 999

Weighting	Status signal (factory setting)	Allocation	Diagnostic information range
High	Function check (C)	Sensor	C000 to 199
		Electronics	C200 to 399

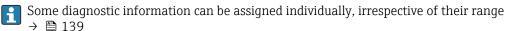
Weighting	Status signal (factory setting)	Allocation	Diagnostic information range
		Configuration	C400 to 700
		Process	C800 to 999

Weighting	Status signal (factory setting)	Allocation	Diagnostic information range
Low	Out of specification (S)	Sensor	S000 to 199
		Electronics	S200 to 399
		Configuration	S400 to 700
		Process	S800 to 999

Weighting	Status signal (factory setting)	Allocation	Diagnostic information range
Low	Maintenance required (M)	Sensor	M000 to 199
		Electronics	M200 to 399
		Configuration	M400 to 700
		Process	M800 to 999

Changing the assignment of the diagnostic information

The individual ranges of the diagnostic information can be assigned to another status signal. This is done by changing the bit in the associated parameter. The bit change always applies for the entire range of the diagnostic information.



Each status signal has a parameter in the Resource Block in which it is possible to define the diagnostic event for which the status signal is transmitted:

- Failure (F): **FD_FAIL_MAP** parameter
- Function check (C): **FD_CHECK_MAP** parameter
- Out of specification (S): **FD_OFFSPEC_MAP** parameter
- Maintenance required (M): **FD_MAINT_MAP** parameter

Structure and assignment of the parameters for the status signals (factory setting)

Weighting	Allocation	Bit	FD_ FAIL_ MAP	FD_ CHECK_ MAP	FD_ OFFSPEC_ MAP	FD_ MAINT_ MAP
Highest	Sensor	31	1	0	0	0
	Electronics	30	1	0	0	0
	Configuration	29	1	0	0	0
	Process	28	1	0	0	0
High	Sensor	27	0	1	0	0
	Electronics	26	0	1	0	0
	Configuration	25	0	1	0	0
	Process	24	0	1	0	0
Low	Sensor	23	0	0	1	0
	Electronics	22	0	0	1	0
	Configuration	21	0	0	1	0

Weighting	Allocation	Bit	FD_ FAIL_ MAP	FD_ CHECK_ MAP	FD_ OFFSPEC_ MAP	FD_ MAINT_ MAP
	Process	20	0	0	1	0
Low	Sensor	19	0	0	0	1
	Electronics	18	0	0	0	1
	Configuration	17	0	0	0	1
	Process	16	0	0	0	1
Configurable range → 🗎 139		15 to 1	0	0	0	0
Reserved (Fieldbus Foundat	ion)	0	0	0	0	0

Changing the status signal for a range of diagnostic information

Example: The status signal for the diagnostic information for electronics with the "Highest" weighting is to be changed from failure (F) to function check (C).

- 1. Set the Resource Block to the **OOS** block mode.
- 2. Open the **FD FAIL MAP** parameter in the Resource Block.
- 3. Change **Bit 30** to **0** in the parameter.
- 4. Open the **FD_CHECK_MAP** parameter in the Resource Block.
- 5. Change **Bit 26** to **1** in the parameter.
 - If a diagnostic event occurs for electronics with the "Highest weighting", the diagnostic information to this effect is displayed with the function check (C) status signal.
- 6. Set the Resource Block to the **AUTO** block mode.

NOTICE

No status signal is assigned to an area of diagnostic information.

If a diagnostic event occurs in this area, no status signal is transmitted to the control system.

- ▶ If you are changing the parameters, make sure that a status signal is assigned to all areas.
- If FieldCare is used, the status signal is enabled and disabled using the check box of the particular parameter.

Assigning diagnostic information individually to a status signal

Some diagnostic information can be individually assigned to a status signal, irrespective of their original range.

Assigning diagnostic information individually to a status signal via FieldCare.

- 1. In the FieldCare navigation window: **Expert** → **Communication** → **Field diagnostics** → **Alarm detection enable**
- 2. Select the desired diagnostic information from one of the fields **Configurable Area Bits 1** to **Configurable Area Bits 15**.
- 3. Press Enter to confirm.
- 4. When selecting the desired status signal (e.g. Offspec Map), also select the **Configurable Area Bit 1** to **Configurable Area Bit 15** that was assigned previously to the diagnostic information (step 2).
- 5. Press Enter to confirm.
 - ► The diagnostic event of the selected diagnostic information is recorded.

- 6. In the FieldCare navigation window: **Expert** → **Communication** → **Field diagnostics** → **Alarm broadcast enable**
- 7. Select the desired diagnostic information from one of the fields **Configurable Area Bits 1** to **Configurable Area Bits 15**.
- 8. Press Enter to confirm.
- 9. When selecting the desired status signal (e.g. Offspec Map), also select the **Configurable Area Bit 1** to **Configurable Area Bit 15** that was assigned previously to the diagnostic information (step 7).
- 10. Press Enter to confirm.
 - The selected diagnostic information is transmitted over the bus when a diagnostic event to this effect occurs.
- A change in the status signal does not affect diagnostic information that already exists. The new status signal is only assigned if this error occurs again after the status signal has changed.

Transmitting the diagnostic information over the bus

Prioritizing diagnostic information for transmission over the bus

Diagnostic information is only transmitted over the bus if its priority is between 2 and 15. Priority 1-events are displayed but are not transmitted over the bus. Diagnostic information with priority 0 (factory setting) is ignored.

It is possible to change the priority individually for the different status signals. The following parameters of the Resource Block are used for this purpose:

- FD FAIL PRI
- FD CHECK PRI
- FD OFFSPEC PRI
- FD_MAINT_PRI

Suppressing certain diagnostic information

It is possible to suppress certain events during transmission over the bus using a mask. While these events are displayed they are not transmitted over the bus. This mask is in FieldCare **Expert** \rightarrow **Communication** \rightarrow **Field diagnostics** \rightarrow **Alarm broadcast enable**. The mask is a negative selection mask, i.e. if a field is selected the associated diagnostic information is not transmitted over the bus.

12.7 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 status signal and the diagnostic behavior can be changed. Change the diagnostic information $\rightarrow \implies 136$

12.7.1 Diagnostic of sensor

	Diagnostic i	information	Remedy instructions	Influenced measured		
No.	. Short text			variables		
022	Temperature sensor defective		Check or replace sensor	■ Empty pipe detection		
	Measured variable status		electronic module (ISEM) 2. If available: Check connection	optionLow flow cut off option		
	Quality	Bad	cable between sensor and	cable between sensor and transmitter		 Switch output status option
	Quality substatus	Sensor failure	3. Replace sensor	 Pressure option 		
	Status signal [from the factory] 1) F					
	3 .	I'				
	Diagnostic behavior	Alarm				

1) Status signal can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	SI	nort text		variables
046	Sensor limit exceeded		1. Inspect sensor	■ Empty pipe detection
	Measured variable status [from the factory] 1)		2. Check process condition	optionLow flow cut off option
	Quality	Good		Switch output status optionPressure option
	Quality substatus	Non specific		
	2			
	Status signal [from the factory] 2)	5		
	Diagnostic behavior [from the factory] ³⁾	Warning		

- 1) Quality can be changed. This causes the overall status of the measured variable to change.
- 2) Status signal can be changed.
- 3) Diagnostic behavior can be changed.

Diagnostic i	nformation	Remedy instructions	Influenced measured
SI	nort text		variables
Sensor connection faulty		Check or replace sensor	■ Empty pipe detection
Measured variable status		electronic module (ISEM) 2. If available: Check connection	option • Low flow cut off option
Quality	Bad	cable between sensor and transmitter 3. Replace sensor	Switch output status optionPressure option
Quality substatus	Sensor failure		
Status signal [from the factory] 1)	F		
Diagnostic behavior	Alarm		
	Sensor connection faulty Measured variable status Quality Quality substatus Status signal [from the factory] 1)	Measured variable status Quality Bad Quality substatus Sensor failure Status signal [from the factory] 1) F	Sensor connection faulty Measured variable status Quality Bad Quality substatus Sensor failure Status signal [from the factory] 1) F 1. Check or replace sensor electronic module (ISEM) 2. If available: Check connection cable between sensor and transmitter 3. Replace sensor

1) Status signal can be changed.

	Diagnostic :	information	Remedy instructions	Influenced measured
No.	SI	nort text		variables
063	Exciter current faulty		1. Check or replace sensor	■ Empty pipe detection
	Measured variable status		electronic module (ISEM) 2. If available: Check connection	optionLow flow cut off option
	Quality	Bad	cable between sensor and transmitter 3. Replace sensor	
	Quality substatus	Sensor failure		
	Status signal [from the factory] 1)	c		
	Status signal [from the factory]	3		
	Diagnostic behavior	Alarm		

Status signal can be changed. 1)

	Diagnostic i	nformation	Remedy instructions	Influenced measured
No.	Short text			variables
082	Data storage		1. Check module connections	 Empty pipe detection option Low flow cut off option Switch output status option
	Measured variable status		2. Contact service	
	Quality	Bad		
	Quality substatus	Sensor failure		■ Pressure option
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic i	nformation	Remedy instructions	Influenced measured
No.	SI	nort text		variables
083	Memory content		1. Restart device	■ Empty pipe detection
	Measured variable status		2. Restore HistoROM S-DAT backup ('Device reset' parameter)	optionLow flow cut off option
	Quality	Bad	3. Replace HistoROM S-DAT	 Switch output status option
	Quality substatus	Sensor failure		• Pressure option
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic :	information	Remedy instructions	Influenced measured
No.	SI	nort text		variables
140	Sensor signal asymmetrical		Check or replace sensor	■ Empty pipe detection
	Measured variable status [from	the factory] ¹⁾	electronic module (ISEM) 2. If available: Check connection	option • Low flow cut off option
	Quality	Good	cable between sensor and transmitter	 Switch output status option
	Quality substatus	Non specific	3. Replace sensor	• Pressure option
	Status signal [from the factory] 2)	S		
	Diagnostic behavior [from the factory] 3)	Alarm		

- Quality can be changed. This causes the overall status of the measured variable to change. Status signal can be changed. 1)
- 2) Diagnostic behavior can be changed.

142

	Diagnostic i	nformation	Remedy instructions	Influenced measured
No.	SI	nort text		variables
144	Measuring error too high		Check or change sensor	■ Empty pipe detection
	Measured variable status [from the f	the factory] ¹⁾	2. Check process conditions	 option Low flow cut off option Switch output status option Pressure option
	Quality	Good		
	Quality substatus	Non specific		
	Status signal [from the factory] 2)	F		
	Diagnostic behavior [from the	Alarm		
	factory] 3)	Aldilli		

- 1) Quality can be changed. This causes the overall status of the measured variable to change.
- 2) Status signal can be changed.
- 3) Diagnostic behavior can be changed.

12.7.2 Diagnostic of electronic

No.	Diagnostic information		Remedy instructions	Influenced measured variables
	Short text		Restart device	
201	Device failure	Device failure		■ Empty pipe detection
	Measured variable status		2. Contact service	option • Low flow cut off option
	Quality	Bad		Switch output status option
	Quality substatus	Device failure		• Pressure option
		_		
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

No.	Diagnostic information Short text		Remedy instructions	Influenced measured variables
242	T		Check software Flash or change main electronics	 Empty pipe detection option Low flow cut off option
	Measured variable status		module	
	Quality	Bad		Switch output status optionPressure option
	Quality substatus	Device failure		
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic :	information	Remedy instructions	Influenced measured
No.	Short text			variables
252	Modules incompatible		Check electronic modules	■ Empty pipe detection
	Measured variable status		2. Change electronic modules	 option Low flow cut off option Switch output status option
	Quality	Bad		
	Quality substatus	Device failure		 Pressure option
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic	nformation	Remedy instructions	Influenced measured
No.	SI	nort text		variables
262	Sensor electronic connection fault	у	Check or replace connection	■ Empty pipe detection
	Measured variable status		cable between sensor electronic module (ISEM) and main	option • Low flow cut off option
	Quality	Bad	electronics 2. Check or replace ISEM or main electronics	 Pressure option
	Quality substatus	Device failure		
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	SI	hort text		variables
270	Main electronic failure		Change main electronic module	■ Empty pipe detection
	Measured variable status			option Low flow cut off option
	Quality	Bad		 Switch output status option
	Quality substatus	Device failure		• Pressure option
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

Diagnostic information			Remedy instructions	Influenced measured
No.	Short text			variables
271	Main electronic failure		Restart device Change main electronic module	 Empty pipe detection option Low flow cut off option
	Measured variable status			
	Quality	Bad		 Switch output status option Pressure option
	Quality substatus	Device failure		
	2	_		
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

No.	Diagnostic information No. Short text		Remedy instructions	Influenced measured variables
110.	Si	iori text		
272	272 Main electronic failure		1. Restart device	 Empty pipe detection
	Measured variable status		2. Contact service	optionLow flow cut off option
	Quality	Bad		Switch output status optionPressure option
	Quality substatus	Device failure		
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

	Diagnostic i	nformation	Remedy instructions	Influenced measured
No.	SI	nort text		variables
273	Main electronic failure		Change electronic	■ Empty pipe detection
	Measured variable status			option • Low flow cut off option
	Quality	Bad		Switch output status option
	Quality substatus	Device failure		• Pressure option
	. 1)			
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	Sł	nort text		variables
275	I/O module 1 to n defective		Change I/O module	■ Empty pipe detection
	Measured variable status			option • Low flow cut off option
	Quality	Bad		 Switch output status option
	Quality substatus	Device failure		 Pressure option
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	SI	nort text		variables
276	I/O module 1 to n faulty		Restart device	■ Empty pipe detection
	Measured variable status		2. Change I/O module	option • Low flow cut off option
	Quality	Uncertain		Switch output status option
	Quality substatus	Non specific		 Pressure option
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic :	information	Remedy instructions	Influenced measured
No.	Short text			variables
276		1. Restart device	■ Empty pipe detection	
			2. Change I/O module	 option Low flow cut off option Switch output status option Pressure option
	Quality	Bad		
	Quality substatus	Device failure		
	Status signal [from the factory] 1)	F		
	Status signal [Hom the factory]	I'		
	Diagnostic behavior	Alarm		

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	SI	hort text		variables
283	Memory content		1. Reset device	■ Empty pipe detection
	Measured variable status		2. Contact service	option • Low flow cut off option
	Quality	Bad		• Switch output status option
	Quality substatus	Device failure		 Pressure option
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic information		Remedy instructions	Influenced measured
No.	SI	nort text		variables
302	Device verification active		Device verification active, please	■ Empty pipe detection
	Measured variable status		wait.	option • Low flow cut off option
	Quality	Bad		 Switch output status option
	Quality substatus	Device failure		• Pressure option
	Status signal [from the factory] 1)	C		
	Diagnostic behavior	Warning		

1) Status signal can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured	
No.	SI	hort text		variables	
311	Electronic failure		1. Do not reset device	■ Empty pipe detection	
	Measured variable status		2. Contact service	 Dow flow cut off option Switch output status option Pressure option 	1 *
	Quality	Bad			
	Quality substatus	Device failure			
	Status signal [from the factory] 1)	M			
	Diagnostic behavior	Warning			

1) Status signal can be changed.

No.	Diagnostic information o. Short text		Remedy instructions	Influenced measured variables
332	Writing in embedded HistoROM fa	Writing in embedded HistoROM failed Replace user interface board	*	■ Empty pipe detection
	Measured variable status		Ex d/XP: replace transmitter	option Low flow cut off option
	Quality	Bad		Switch output status optionPressure option
	Quality substatus	Device failure		
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

	Diagnostic i	nformation	Remedy instructions	Influenced measured
No.	SI	nort text		variables
361	I/O module 1 to n faulty		Restart device	■ Empty pipe detection
	Measured variable status		1	optionLow flow cut off option
	Quality	Bad	electronics	Switch output status optionPressure option
	Quality substatus	Device failure		
	. 1)			
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	SI	nort text		variables
372	Sensor electronic (ISEM) faulty		1. Restart device	■ Empty pipe detection
	Measured variable status		2. Check if failure recurs3. Replace sensor electronic module	option Low flow cut off option
	Quality	Bad	(ISEM)	Switch output status option
	Quality substatus	Device failure		 Pressure option
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	SI	nort text		variables
373	Sensor electronic (ISEM) faulty		Transfer data or reset device	■ Empty pipe detection
	Measured variable status		2. Contact service	optionLow flow cut off option
	Quality	Bad		 Switch output status option
	Quality substatus	Device failure		 Pressure option
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	Short text			variables
374	Sensor electronic (ISEM) faulty		1. Restart device	■ Empty pipe detection
	Measured variable status [from t	the factory] 1)	Check if failure recurs Replace sensor electronic module (ISEM)	option • Low flow cut off option
	Quality	Good		Switch output status option
	Quality substatus	Non specific		 Pressure option
	Status signal [from the factory] 2)	c		
	Status signal [Hom the factory]	J		
	Diagnostic behavior [from the factory] ³⁾	Warning		

- Quality can be changed. This causes the overall status of the measured variable to change. Status signal can be changed. 1)
- 2) 3)
- Diagnostic behavior can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	SI	nort text		variables
375	I/O- 1 to n communication failed		1. Restart device	■ Empty pipe detection
	Measured variable status		2. Check if failure recurs option 3. Replace module rack inclusive Low flow cut off optio	
	Quality	Bad	electronic modules	 Switch output status option
	Quality substatus	Device failure		• Pressure option
	4)			
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

	Diagnostic i	nformation	Remedy instructions	Influenced measured
No.	Short text			variables
382	Data storage		1. Insert T-DAT	■ Empty pipe detection
	Measured variable status		2. Replace T-DAT	option • Low flow cut off option
	Quality	Bad		• Pressure option
	Quality substatus	Device failure		
	C+++	F		
	Status signal [from the factory] 1)	r		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

No.	Diagnostic information No. Short text		Remedy instructions	Influenced measured variables
383			Restart device Delete T-DAT via 'Reset device'	Empty pipe detection option
	Quality Quality	Bad	parameter 3. Replace T-DAT	Low flow cut off optionSwitch output status option
	Quality substatus Status signal [from the factory] 1)	Device failure		■ Pressure option
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic	information	Remedy instructions	Influenced measured
No.	SI	nort text		variables
387	Embedded HistoROM failed		Contact service organization	■ Empty pipe detection
	Measured variable status			option • Low flow cut off option
	Quality	Bad		Switch output status optionPressure option
	Quality substatus	Device failure		
	Status signal [from the factory] 1)	E		
	Status signal [from the factory]	r		
	Diagnostic behavior	Alarm		

12.7.3 Diagnostic of configuration

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	SI	nort text		variables
303	I/O 1 to n configuration changed	3 3	_	
	Measured variable status		(parameter 'Apply I/O configuration')	
	Quality	Good	Afterwards reload device description and check wiring	
	Quality substatus	Non specific		
	Status signal [from the factory] 1)	M		
	Diagnostic behavior	Warning		

1) Status signal can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	Short text			variables
330	Flash file invalid		Update firmware of device	■ Empty pipe detection
	Measured variable status		2. Restart device	optionLow flow cut off option
	Quality	Bad		Switch output status optionPressure option
	Quality substatus	Configuration error		
	2			
	Status signal [from the factory] 1)	M		
	Diagnostic behavior	Warning		

1) Status signal can be changed.

	Diagnostic i	nformation	Remedy instructions	Influenced measured
No.	. Short text			variables
331	Firmware update failed		Update firmware of device	■ Empty pipe detection
	Measured variable status		2. Restart device	option Low flow cut off option
	Quality	Bad		 Switch output status option Pressure option
	Quality substatus	Configuration error		
	C	F		
	Status signal [from the factory] 1)	r		
	Diagnostic behavior	Warning		

1) Status signal can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	Short text			variables
410		1. Check connection	■ Empty pipe detection	
	Measured variable status		2. Retry data transfer	try data transfer option • Low flow cut off option
	Quality	Bad		Switch output status optionPressure option
	Quality substatus	Configuration error		
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	Short text			variables
412	Processing download		Download active, please wait	■ Empty pipe detection
	Measured variable status			option • Low flow cut off option
	Quality	Uncertain		 Switch output status option
	Quality substatus	Non specific		■ Pressure option
	Status signal [from the factory] 1)	С		
	Diagnostic behavior	Warning		

1) Status signal can be changed.

	Diagnostic i	nformation	Remedy instructions	Influenced measured
No.	Short text			variables
431	Trim 1 to n		Carry out trim	-
	Measured variable status			
	Quality	Good		
	Quality substatus	Non specific		
	C+++	C		
	Status signal [from the factory] 1)	C		
	Diagnostic behavior	Warning		

1) Status signal can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	SI	nort text		variables
437	Configuration incompatible		1. Restart device	■ Empty pipe detection
	Measured variable status		2. Contact service option • Low flow (optionLow flow cut off option
	Quality	Bad		 Switch output status option
	Quality substatus	Configuration error		• Pressure option
		_		
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured variables
No.	Short text			variables
438			1. Check data set file	■ Empty pipe detection
	Measured variable status		2. Check device configuration 3. Up- and download new configuration configuration - Low flow cut off option Switch output status option Pressure option	
	Quality	Uncertain		option
	Quality substatus	Non specific		
	. 1)			
	Status signal [from the factory] 1)	M		
	Diagnostic behavior	Warning		

	Diagnostic i	nformation	Remedy instructions	Influenced measured
No.	SI	nort text		variables
441	Current output 1 to n		1. Check process	_
	Measured variable status		2. Check current output settings	
	Quality	Good		
	Quality substatus	Non specific		
	. 1)			
	Status signal [from the factory] 1)	S		
	Diagnostic behavior [from the factory] ²⁾	Warning		

- 1)
- Status signal can be changed. Diagnostic behavior can be changed. 2)

	Diagnostic i	nformation	Remedy instructions	Influenced measured
No.	SI	nort text		variables
442	Frequency output 1 to n		1. Check process	_
	Measured variable status		2. Check frequency output settings	
	Quality	Good		
	Quality substatus	Non specific		
	(2)			
	Status signal [from the factory] 1)	5		
	Diagnostic behavior [from the factory] ²⁾	Warning		

- 1)
- Status signal can be changed. Diagnostic behavior can be changed. 2)

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	SI	hort text		variables
443	Pulse output 1 to n		1. Check process	_
	Measured variable status		2. Check pulse output settings	
	Quality	Good		
	Quality substatus	Non specific		
	Status signal [from the factory] 1)	S		
	Diagnostic behavior [from the factory] ²⁾	Warning		

- 1)
- Status signal can be changed. Diagnostic behavior can be changed. 2)

	Diagnostic :	information	Remedy instructions	Influenced measured
No.	SI	hort text		variables
444	Current input 1 to n		Check process	_
	Measured variable status		2. Check current input settings	
	Quality	Good		
	Quality substatus	Non specific		
	Status signal [from the factory] 1)	S		
	Diagnostic behavior [from the factory] ²⁾	Warning		

- 1)
- Status signal can be changed. Diagnostic behavior can be changed. 2)

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	SI	nort text		variables
453	Flow override		Deactivate flow override	■ Empty pipe detection
	Measured variable status			optionLow flow cut off option
	Quality	Good		• Switch output status option
	Quality substatus	Non specific		• Pressure option
	Status signal [from the factory] 1)	С		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Influenced measured
No.	SI	nort text		variables
463	Analog input 1 to n selection inva	lid	1. Check module/channel	■ Empty pipe detection
	Measured variable status configuration 2. Check I/O mo	2. Check I/O module configuration	variables	
	Quality	Bad		· •
	Quality substatus	Configuration error		1
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

	Diagnostic i	nformation	Remedy instructions	Influenced measured
No.	o. Short text			variables
484	Failure mode simulation		Deactivate simulation	■ Empty pipe detection
	Measured variable status		- I	optionLow flow cut off option
	Quality	Bad		1
	Quality substatus	Configuration error		
	. 1)			
	Status signal [from the factory] 1)	C		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic information		Remedy instructions	Influenced measured
No.	SI	nort text		variables
485	Measured variable simulation		Deactivate simulation	■ Empty pipe detection
	Measured variable status			optionLow flow cut off option
	Quality	Good		 Switch output status option
	Quality substatus	Non specific		■ Pressure option
	Status signal [from the factory] 1)	C		
	Diagnostic behavior	Warning		

1) Status signal can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	Sì	nort text		variables
486	Current input 1 to n simulation		Deactivate simulation	-
	Measured variable status			
	Quality	Good		
	Quality substatus	Non specific		
	Status signal [from the factory] 1)	C		
	Diagnostic behavior	Warning		

1) Status signal can be changed.

	Diagnostic information		Remedy instructions	Influenced measured variables
No.	Short text			
491	Current output 1 to n simulation		Deactivate simulation	_
	Measured variable status			
	Quality	Good		
	Quality substatus	Non specific		
	1)			
	Status signal [from the factory] 1)	C		
	Diagnostic behavior	Warning		

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	SI	hort text		variables
492	Simulation frequency output 1 to 1	n	Deactivate simulation frequency	-
	Measured variable status		output	
	Quality	Good		
	Quality substatus	Non specific		
	Status signal [from the factory] 1)	C		
	Diagnostic behavior	Warning		

1) Status signal can be changed.

	Diagnostic information		Remedy instructions	Influenced measured
No.	SI	nort text		variables
493	Simulation pulse output 1 to n		Deactivate simulation pulse output	-
	Measured variable status			
	Quality	Good		
	Quality substatus	Non specific		
	2 1 2 1 2 1 2 1 1			
	Status signal [from the factory] 1)	C		
	Diagnostic behavior	Warning		

1) Status signal can be changed.

	Diagnostic information		Remedy instructions	Influenced measured
No.	SI	nort text		variables
494	Switch output simulation 1 to n		Deactivate simulation switch output	-
	Measured variable status			
	Quality	Good		
	Quality substatus	Non specific		
	Status signal [from the factory] 1)	С		
	Diagnostic behavior	Warning		

1) Status signal can be changed.

	Diagnostic information		Remedy instructions	Influenced measured
No.	SI	nort text		variables
495	Diagnostic event simulation		Deactivate simulation	_
	Measured variable status			
	Quality	Good		
	Quality substatus	Non specific		
	C	C		
	Status signal [from the factory] 1)	C		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Influenced measured
No.	SI	nort text		variables
496	Status input simulation		Deactivate simulation status input	-
	Measured variable status			
	Quality	Good		
	Quality substatus	Non specific		
	1)			
	Status signal [from the factory] 1)	C		
	Diagnostic behavior	Warning		

1) Status signal can be changed.

	Diagnostic i	nformation	Remedy instructions	Influenced measured
No.	SI	nort text		variables
497	Simulation block output		Deactivate simulation	-
	Measured variable status			
	Quality	Good		
	Quality substatus	Non specific		
	- 1)			
	Status signal [from the factory] 1)	C		
	Diagnostic behavior	Warning		

1) Status signal can be changed.

	Diagnostic	information	Remedy instructions	Influenced measured
No.	SI	nort text		variables
520	I/O 1 to n hardware configuration	invalid	1. Check I/O hardware	_
	Measured variable status		1. Check I/O hardware configuration 2. Replace wrong I/O module 3. Plug the module of double pulse output on correct slot	
	Quality	Good	2	
	Quality substatus	Non specific		
	. 1)			
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic information		Remedy instructions	Influenced measured
No.	SI	hort text		variables
537	537 Configuration		Check IP addresses in network	-
	Measured variable status		2. Change IP address	
	Quality	Good		
	Quality substatus	Non specific		
	. 1)			
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Warning		

	Diagnostic information		Remedy instructions	Influenced measured
No.	SI	nort text		variables
594	Relay output simulation		Deactivate simulation switch output	_
	Measured variable status			
	Quality	Good		
	Quality substatus	Non specific		
	. 1)			
	Status signal [from the factory] 1)	С		
	Diagnostic behavior	Warning		

1) Status signal can be changed.

12.7.4 Diagnostic of process

	Diagnostic i	information	Remedy instructions	Influenced measured variables
No.	SI	hort text		variables
803	Current loop 1 to n		1. Check wiring	-
	Measured variable status		2. Change I/O module	
	Quality	Good		
	Quality substatus	Non specific		
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic information		Remedy instructions	Influenced measured
No.	SI	nort text		variables
830	Sensor temperature too high		Reduce ambient temp. around the	■ Empty pipe detection
	Measured variable status [from	the factory] 1)	sensor housing	optionLow flow cut off option
	Quality	Good		Switch output status optionPressure option
	Quality substatus	Non specific		
	Status signal [from the factory] 2)	ς		
	3 1			
	Diagnostic behavior [from the factory] 3)	Warning		

- 1) Quality can be changed. This causes the overall status of the measured variable to change.
- 2) Status signal can be changed.
- 3) Diagnostic behavior can be changed.

	Diagnostic information		Remedy instructions	Influenced measured
No.	SI	nort text		variables
831	1		Increase ambient temp. around the	■ Empty pipe detection
	Measured variable status [from	the factory] ¹⁾	sensor housing	option Low flow cut off option
	Quality	Good		Switch output status optionPressure option
	Quality substatus	Non specific		
	(1)	C		
	Status signal [from the factory] 2)	5		
	Diagnostic behavior [from the factory] ³⁾	Warning		

- 1) Quality can be changed. This causes the overall status of the measured variable to change.
- 2) Status signal can be changed.
- 3) Diagnostic behavior can be changed.

No.	Diagnostic information No. Short text		Remedy instructions	Influenced measured variables
NO.	Si	iori text		
832	Electronic temperature too high		Reduce ambient temperature	 Empty pipe detection
	Measured variable status [from t	the factory] 1)		optionLow flow cut off option
	Quality	Good		Switch output status optionPressure option
	Quality substatus	Non specific		
	Status signal [from the factory] 2)	c		
	Status signal [Hom the factory]	3		
	Diagnostic behavior [from the factory] ³⁾	Warning		

- 1) Quality can be changed. This causes the overall status of the measured variable to change.
- 2) Status signal can be changed.
- 3) Diagnostic behavior can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured	
No.	SI	hort text		variables	
833	Electronic temperature too low		Increase ambient temperature	■ Empty pipe detection	
	Measured variable status [from the	the factory] ¹⁾	*	option Low flow cut of	option • Low flow cut off option
	Quality	Good		 Switch output status option 	
	Quality substatus	Non specific		■ Pressure option	
	C	6			
	Status signal [from the factory] 2)	5			
	Diagnostic behavior [from the factory] ³⁾	Warning			

- 1) Quality can be changed. This causes the overall status of the measured variable to change.
- 2) Status signal can be changed.
- 3) Diagnostic behavior can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	SI	nort text		variables
834	Process temperature too high		Reduce process temperature	■ Empty pipe detection
	Measured variable status [from	the factory] ¹⁾		option • Low flow cut off option
	Quality	Good		 Switch output status option
	Quality substatus	Non specific		 Pressure option
	. 2)			
	Status signal [from the factory] 2)	Š		
	Diagnostic behavior [from the factory] ³⁾	Warning		

- 1) Quality can be changed. This causes the overall status of the measured variable to change.
- 2) Status signal can be changed.
- 3) Diagnostic behavior can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	SI	hort text		variables
835	Process temperature too low		Increase process temperature	■ Empty pipe detection
	Measured variable status [from the	the factory] ¹⁾		option • Low flow cut off option
	Quality	Good		 Switch output status option
	Quality substatus	Non specific		 Pressure option
	Status signal [from the factory] 2)	S		
	Diagnostic behavior [from the factory] ³⁾	Warning		

- 1) Quality can be changed. This causes the overall status of the measured variable to change.
- 2) Status signal can be changed.
- 3) Diagnostic behavior can be changed.

No.	Diagnostic information No. Short text		Remedy instructions	Influenced measured variables
842	Process limit		Low flow cut off active!	■ Empty pipe detection option
	Measured variable status		configuration	 Low flow cut off option
	Quality	Good		 Switch output status option
	Quality substatus	Non specific		• Pressure option
	2)			
	Status signal [from the factory] 1)	S		
	Diagnostic behavior	Warning		

	Diagnostic i	nformation	Remedy instructions	Influenced measured
No.	SI	nort text		variables
843	Process limit		Check process conditions	■ Empty pipe detection
	Measured variable status			option Low flow cut off option
	Quality	Good		Switch output status option
	Quality substatus	Non specific		• Pressure option
	. 1)			
	Status signal [from the factory] 1)	Š		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic	information	Remedy instructions	Influenced measured
No.	SI	ort text		variables
862	Partly filled pipe		Check for gas in process	-
	Measured variable status [from th	the factory] 1)	2. Adjust detection limits	
	Quality	Good		
	Quality substatus	Non specific		
	Status signal [from the factory] ²⁾	S		
	Diagnostic behavior [from the factory] 3)	Warning		

- 1) Quality can be changed. This causes the overall status of the measured variable to change.
- 2) Status signal can be changed.
- 3) Diagnostic behavior can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	SI	nort text		variables
882	1 3		Check input configuration	-
	Measured variable status		2. Check external device or process conditions	
	Quality	Bad		
	Quality substatus	Non specific		
	2			
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

1) Status signal can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	SI	hort text		variables
910	Tubes not oscillating		1. Check electronic	■ Empty pipe detection
	Measured variable status		2. Inspect sensor	• Low flow cut off option
	Quality	Bad		Switch output status optionPressure option
	Quality substatus	Non specific		
	Status signal [from the factory] 1)	F		
	Diagnostic behavior	Alarm		

	Diagnostic i	information	Remedy instructions	Influenced measured
No.	SI	hort text		variables
912	Medium inhomogeneous		1. Check process cond.	■ Empty pipe detection
	Measured variable status [from t	the factory] ¹⁾	2. Increase system pressure	option • Low flow cut off option
	Quality	Good		Switch output status option
	Quality substatus	Non specific		 Pressure option
	C+++	c		
	Status signal [from the factory] 2)	5		
	Diagnostic behavior [from the factory] ³⁾	Warning		

- 1) Quality can be changed. This causes the overall status of the measured variable to change.
- Status signal can be changed.
- 2) Diagnostic behavior can be changed.

	Diagnostic i	information	Remedy instructions	Influenced measured variables
No.	SI	hort text		variables
913	Medium unsuitable		Check process conditions	■ Empty pipe detection
	Measured variable status [from t	the factory] 1)	Check electronic modules or sensor	option • Low flow cut off option
	Quality	Good		 Switch output status option
	Quality substatus	Non specific		 Pressure option
	Status signal [from the factory] 2)	S		
	Diagnostic behavior [from the factory] 3)	Warning		

- Quality can be changed. This causes the overall status of the measured variable to change. Status signal can be changed. 1)
- 2)
- 3) Diagnostic behavior can be changed.

	Diagnostic i	nformation	Remedy instructions	Influenced measured	
No.	SI	nort text		variables	
944	944 Monitoring failed		Check process conditions for	■ Empty pipe detection	
	Measured variable status [from	the factory] ¹⁾	Heartbeat Monitoring	option • Low flow cut off option	
	Quality	Good		Switch output status optionPressure option	
	Quality substatus	Non specific			
	Status signal [from the factory] 2)	S			
	Status signar [from the factory]	3			
	Diagnostic behavior [from the factory] ³⁾	Warning			

- 1) Quality can be changed. This causes the overall status of the measured variable to change.
- 2) Status signal can be changed.
- 3) Diagnostic behavior can be changed.

	Diagnostic i	nformation	Remedy instructions	Influenced measured
No.	SI	nort text		variables
948	Oscillation damping too high		Check process conditions	■ Empty pipe detection
	Measured variable status [from t	the factory] ¹⁾		 option Low flow cut off option Switch output status option Pressure option
	Quality	Good		
	Quality substatus	Non specific		
	Status signal [from the factory] 2)	S		
	Diagnostic behavior [from the factory] ³⁾	Warning		

- 1) Quality can be changed. This causes the overall status of the measured variable to change.
- 2) Status signal can be changed.
- 3) Diagnostic behavior can be changed.

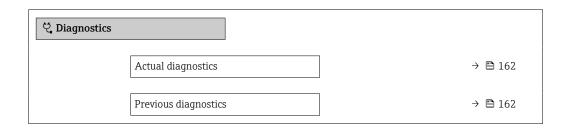
12.8 Pending diagnostic events

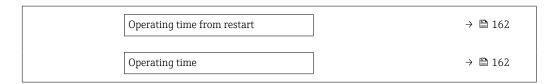
The **Diagnostics** menu allows the user to view the current diagnostic event and the previous diagnostic event separately.

- To call up the measures to rectify a diagnostic event:
 - Via local display → 🗎 133
 - Via Web browser → 🖺 134
 - Via "FieldCare" operating tool → 🖺 135
 - Via "DeviceCare" operating tool \rightarrow 🖺 135
- Other pending diagnostic events can be displayed in the **Diagnostic list** submenu $\rightarrow \stackrel{ riangle}{=} 162$

Navigation

"Diagnostics" menu





Parameter overview with brief description

Parameter	Prerequisite	Description	User interface
Actual diagnostics	A diagnostic event has occurred.	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)

12.9 Diagnostic messages in the DIAGNOSTIC Transducer Block

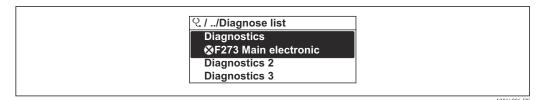
- The Actual diagnostics parameter (actual diagnostics) displays the message with the highest priority.
- A list of the active alarms can be viewed via the Diagnostics 1 parameter (diagnostics_1) to Diagnostics 5 (diagnostics 5). If more than 5 messages are pending, the messages with the highest priority are shown on the display.
- You can view the last alarm that is no longer active via the **Previous diagnostics** parameter (**previous diagnostics**).

12.10 Diagnostic list

Up to 5 currently pending diagnostic events can be 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



■ 30 Taking the example of the local display

To call up the measures to rectify a diagnostic event:

- Via local display →

 133
- Via Web browser → 🖺 134
- Via "FieldCare" operating tool → 🖺 135

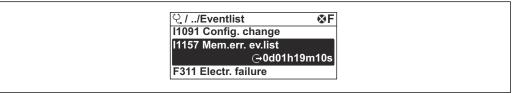
12.11 Event logbook

12.11.1 Reading out the event logbook

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

Navigation path

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



A0014008-EN

■ 31 Taking 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 list can contain up to 100 entries.

The event history includes entries for:

- Diagnostic events → 🖺 140
- Information events \rightarrow \blacksquare 164

In addition to the operation time of its occurrence, each event is also assigned a symbol that indicates whether the event has occurred or is ended:

- Diagnostic event
 - ①: Occurrence of the event
 - 🕒: End of the event
- Information event
 - €: Occurrence of the event
- To call up the measures to rectify a diagnostic event:
 - Via local display → 🗎 133
 - Via Web browser →

 134
 - Via "FieldCare" operating tool →

 135
 - Via "DeviceCare" operating tool →

 135

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	Embedded HistoROM 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 replaced
I1619	I/O module replaced
I1621	I/O module 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	Parameter factory reset
I1635	Parameter delivery reset
I1637	FOUNDATION Fieldbus specific reset done
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 measuring device

Using the **Restart** parameter it is possible to reset the entire device configuration or some of the configuration to a defined state.

12.12.1 Function scope of the "Restart" parameter

Options	Description
Uninitialized	The selection has no effect on the device.
Run	The selection has no effect on the device.
Resource	The selection has no effect on the device.

Options	Description
Defaults	All FOUNDATION Fieldbus blocks are reset to their factory settings. Example: Analog Input Channel to the Uninitialized option.
Processor	The device is restarted.
To delivery settings	Advanced FOUNDATION Fieldbus parameters (FOUNDATION Fieldbus blocks, schedule information) and device parameters for which a customer-specific default setting was ordered are reset to this customer-specific value.

12.12.2 Function scope of the "Service reset" parameter

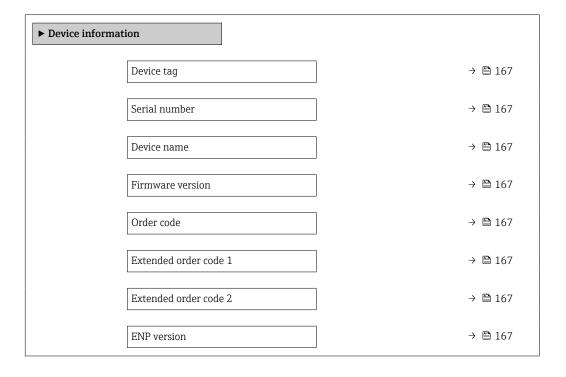
Options	Description
Uninitialized	The selection has no effect on the device.
To delivery settings + MIB	Advanced FOUNDATION Fieldbus parameters (FOUNDATION Fieldbus blocks, schedule information, device tag and device address) and the device parameters for which a customer-specific default setting was ordered, are reset to this customer-specific value.
ENP restart	The parameters of the electronic name plate are reset. The device is restarted.

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	Description	User entry / User interface	Factory setting
Device tag	Enter the name for the measuring point.	Max. 32 characters such as letters, numbers or special characters (e. g. @, %, /)	-
Serial number	Displays the serial number of the measuring device.	Max. 11-digit character string comprising letters and numbers.	-
Device name	Shows the name of the transmitter. The name can be found on the nameplate of the transmitter.	Promass 300/500	-
Firmware version	Shows the device firmware version installed.	Character string with the following format: xx.yy.zz	-
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.	Character string composed of letters, numbers and certain punctuation marks	-
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.	Character string	-
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	-
ENP version	Shows the version of the electronic nameplate (ENP).	Character string in the format xx.yy.zz	-

12.14 Firmware history

Release date	Firmware version	Order code for "Firmware version"	Firmware changes	Documentation type	Documentation
02.2017	01.00.zz	Option 74	Original firmware	Operating Instructions	BA01524D/06/EN/01.16

- It is possible to flash the firmware to the current version or the previous version using 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. 8S3B
 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 tasks

No special maintenance work is required.

13.1.1 Exterior cleaning

When cleaning the exterior of measuring devices, always use cleaning agents that do not attack the surface of the housing or the seals.

13.1.2 Interior cleaning

Observe the following points for CIP and SIP cleaning:

- Use only cleaning agents to which the process-wetted materials are adequately resistant.

Observe the following point for cleaning with pigs:

Observe the inside diameter of the measuring tube and process connection.

13.2 Measuring and test equipment

Endress+Hauser offers a wide variety of measuring and test equipment, such as W@M or device tests.

Your Endress+Hauser Sales Center can provide detailed information on the services.

List of some of the measuring and testing equipment: $\rightarrow \implies 172 \rightarrow \implies 174$

13.3 Endress+Hauser 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 modification 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 every repair and each conversion and enter them into the *W@M* life cycle management database.

14.2 Spare parts

W@M 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.
 - Can be read out via the Serial number parameter in the Device information submenu.

14.3 Endress+Hauser 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 website for more information: http://www.endress.com/support/return-material
- 2. Return the device if repairs or a factory calibration are required, or if the wrong device was ordered or delivered.

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 Endress+Hauser for disposal under the applicable conditions.

14.5.1 Removing the measuring device

1. Switch off the device.

A WARNING

Danger to persons from process conditions.

- ▶ Beware of hazardous process conditions such as pressure in the measuring device, high temperatures or aggressive fluids.
- 2. Carry out the mounting and connection steps from the "Mounting the measuring device" and "Connecting the measuring device" sections in reverse order. Observe the safety instructions.

14.5.2 Disposing of the measuring device

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

Accessories	Description
Proline 300 transmitter	Transmitter for replacement or storage. Use the order code to define the following specifications: Approvals Output Input Display/operation Housing Software Order code: 8X3BXX Installation Instructions EA01200D
Remote display and operating module DKX001	 If ordered directly with the measuring device: Order code for "Display; operation", option O "Remote display 4-line illum.; 10 m (30 ft) Cable; touch control" If ordered separately: Measuring device: order code for "Display; operation", option M "W/o, prepared for remote display" DKX001: Via the separate product structure DKX001 If ordered subsequently: DKX001: Via the separate product structure DKX001 Mounting bracket for DKX001 If ordered directly: order code for "Accessory enclosed", option RA "Mounting bracket, pipe 1/2" If ordered subsequently: order number: 71340960 Connecting cable (replacement cable) Via the separate product structure: DKX002
	Further information on display and operating module DKX001→ 195. Special Documentation SD01763D
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 → ● 64. ■ Order number: 71351317 ■ Installation Instructions EA01238D
Protective cover	Is used to protect the measuring device from the effects of the weather: e.g. rainwater, excess heating from direct sunlight. Order number: 71343505 Installation Instructions EA01160D

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.
	If ordered together with the measuring device:
	order code for "Enclosed accessories"
	■ Option RB "heating jacket, G 1/2" internal thread"
	Option RC "heating jacket, G 3/4" internal thread"
	Option RD "Heating jacket, NPT 1/2" internal thread"
	Option RE "Heating jacket, NPT 3/4" internal thread"
	■ If ordered subsequently:
	Use the order code with the product root DK8003.
	Special Documentation SD02162D

15.2 Communication-specific accessories

Accessories	Description	
Fieldgate FXA42	Is used to transmit the measured values of connected 4 to 20 mA analog measuring devices, as well as digital measuring devices	
	 Technical Information TI01297S Operating Instructions BA01778S Product page: www.endress.com/fxa42 	
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

Accessories	Description
Applicator	Software for selecting and sizing Endress+Hauser measuring devices: Choice of measuring devices for industrial requirements Calculation of all the necessary data for identifying the optimum flowmeter: e.g. nominal diameter, pressure loss, flow velocity and accuracy. Graphic illustration of the calculation results Determination of 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 • As a downloadable DVD for local PC installation.
W@M	W@M Life Cycle Management Improved productivity with information at your fingertips. Data relevant to a plant and its components is generated from the first stages of planning and during the asset's complete life cycle. W@M Life Cycle Management is an open and flexible information platform with online and on-site tools. Instant access for your staff to current, in-depth data shortens your plant's engineering time, speeds up procurement processes and increases plant uptime. Combined with the right services, W@M Life Cycle Management boosts productivity in every phase. For more information, visit www.endress.com/lifecyclemanagement
FieldCare	FDT-based plant asset management tool from Endress+Hauser. It can configure all smart 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. 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 Tl00426P and Tl00436P 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.

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 device consists of a transmitter and a sensor.
	The device is available as a compact version: The transmitter and sensor form a mechanical unit.
	For information on the structure of the device $\rightarrow \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $

16.3 Input

Measured variable

Direct measured variables

- Mass flow
- Density
- Temperature

Calculated measured variables

- Volume flow
- Corrected volume flow
- Reference density

Measuring range

Measuring range for liquids

DN		Measuring range full scal	e 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 6500	0 to 238.9
25	1	0 to 18 000	0 to 661.5
40	11/2	0 to 45 000	0 to 1654
50	2	0 to 70 000	0 to 2573

Recommended measuring range



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 accuracy of certain measured variables, the automation system can continuously write various measured values to the measuring device:

- Operating pressure to increase accuracy (Endress+Hauser recommends the use of a pressure measuring device for absolute pressure, e.g. Cerabar M or Cerabar S)
- Medium temperature to increase accuracy (e.g. iTEMP)
- Various pressure and temperature measuring devices can be ordered from Endress +Hauser: see "Accessories" section → 🖺 174

Current input

Digital communication

The measured values are written from the automation system to the measuring device via FOUNDATION Fieldbus.

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

FOUNDATION Fieldbus

FOUNDATION Fieldbus	H1, IEC 61158-2, galvanically isolated
Data transfer	31.25 kbit/s
Current consumption	10 mA
Permitted supply voltage	9 to 32 V
Bus connection	With integrated reverse polarity protection

Current output 4 to 20 mA

Signal mode	Can be set to: Active Passive
Current span	Can be set to: 4 to 20 mA NAMUR 4 to 20 mA US 4 to 20 mA 0 to 20 mA incomparison of 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 span	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 Ω
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 set to 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	Adjustable
Assignable measured variables	Mass flowVolume flowCorrected volume flow
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	Adjustable: end value frequency 2 to $10000Hz$ (f $_{max}$ = $12500Hz$)
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	 Off On Diagnostic behavior Limit value 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)

Maximum switching capacity (passive)	■ DC 30 V, 0.1 A ■ AC 30 V, 0.5 A
Assignable functions	 Off On Diagnostic behavior Limit value 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:

FOUNDATION Fieldbus

Status and alarm messages	Diagnostics in accordance with FF-891
Failure current FDE (Fault Disconnection Electronic)	0 mA

Current output 0/4 to 20 mA

4 to 20 mA

Failure mode	Choose from: 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 Freely definable value between: 3.59 to 22.5 mA
	Actual valueLast valid value

0 to 20 mA

Failure mode	Choose from:
	Maximum alarm: 22 mA Tracks definely such a tracking 0 to 20 5 m. A.
	■ Freely definable value between: 0 to 20.5 mA

Pulse/frequency/switch output

Pulse output		
Failure mode	Choose from: Actual value No pulses	
Frequency output		
Failure mode	Choose from: Actual value O Hz Defined value (f max 2 to 12 500 Hz)	
Switch output		
Failure mode	Choose from: 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 backlighting indicates a device error.



Status signal as per NAMUR recommendation NE 107

Interface/protocol

- Via digital communication: FOUNDATION Fieldbus
- Via service interface
 - CDI-RJ45 service interface
 - WLAN interface

Plain text display	With information on cause and remedial measures
--------------------	---

Web browser

Plain text display	With information on cause and remedial measures
--------------------	---

Light emitting diodes (LED)

Status information	Status indicated by various light emitting diodes					
	The following information is displayed depending on the device version: ■ Supply voltage active ■ Data transmission active ■ Device alarm/error has occurred ■ Diagnostic information via light emitting diodes → ■ 130					

Low flow cut off	The switch points for low f	The switch points for low flow cut off are user-selectable.				
Galvanic isolation	The outputs are galvanical	The outputs are galvanically isolated from one another and from earth (PE).				
Protocol-specific data	Manufacturer ID	0x452B48 (hex)				
	Ident number	0x103B (hex)				
	Device revision	1				
	DD revision	Information and files under:				
	CFF revision	www.endress.comwww.fieldbus.org				
	Interoperability Test Kit (ITK)	Version 6.2.0				
	ITK Test Campaign Number	Information: www.endress.com www.fieldbus.org				
	Link Master capability (LAS)	Yes				
	Choice of "Link Master" and "Basic Device"	Yes Factory setting: Basic Device				
	Node address	Factory setting: 247 (0xF7)				
	Supported functions	The following methods are supported: Restart ENP Restart Diagnostic Set to OOS Set to AUTO Read trend data Read event logbook				
	Virtual Communication Relationships (VCRs)					
	Number of VCRs	44				
	Number of link objects in VFD	50				
	Permanent entries	1				
	Client VCRs	0				
	Server VCRs	10				
	Source VCRs	43				
	Sink VCRs	0				
	Subscriber VCRs	43				
	Publisher VCRs	43				
	Device Link Capabilities	Device Link Capabilities				
	Slot time	4				
	Min. delay between PDU	8				
	Max. response delay	16				
	System integration	Information regarding system integration → 🗎 69. Cyclic data transmission Description of the modules Execution times				

16.5 Power supply

Terminal assignment $\rightarrow \stackrel{\triangle}{=} 32$

Device plugs available	→ 🖺 32					
Pin assignment, device plug	→ 🖺 32					
Supply voltage	Order code for "Power supply"		Terminal voltage		Frequency range	
	Option D	DC	24 V	±20%	-	
	Option E	AC	2 100 to 240 V	-15 to +10%	50/60 Hz	
	Option I	DC	24 V	±20%	-	
	option 1	AC	2 100 to 240 V	-15 to +10%	50/60 Hz	
Power consumption	Transmitter					
	Max. 10 W (active pow	wer)				
	switch-on current	Max. 36 A	. (<5 ms) as per	NAMUR Recomi	mendation NE 21	
Current consumption	Transmitter					
	 Max. 400 mA (24 V) Max. 200 mA (110 V, 50/60 Hz; 230 V, 50/60 Hz) 					
Power supply failure	 Totalizers stop at the last value measured. Depending on the device version, the configuration is retained in the device memoryor in the pluggable data memory (HistoROM DAT). Error messages (incl. total operated hours) are stored. 					
Electrical connection	→ 🖺 34					
Potential equalization	→ 🖺 37					
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 Thread for cable entremarks of 1/2" G 1/2" M20 Device plug for digital 	ry:			o 0.47 in)	

Cable specification

→ 🖺 29

16.6 Performance characteristics

Reference operating conditions

- Error limits based on ISO 11631
- Water with +15 to +45 °C (+59 to +113 °F) at 2 to 6 bar (29 to 87 psi)
- Specifications as per calibration protocol
- Accuracy based on accredited calibration rigs that are traced to ISO 17025.
- To obtain measured errors, use the *Applicator* sizing tool $\rightarrow \triangleq 174$

Maximum measured error

o.r. = of reading; $1 \text{ g/cm}^3 = 1 \text{ kg/l}$; T = medium temperature

Base accuracy

Properties Properties

Mass flow and volume flow (liquids)

 ± 0.10 % 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	±0.01	±0.002

- Valid over the entire temperature and density range
- 2) Valid range for special density calibration: 0 to 2 g/cm³, +10 to +80 $^{\circ}$ C (+50 to +176 $^{\circ}$ 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

DN		Zero point stability	
[mm]	[in]	[kg/h]	[lb/min]
8	3/8	0.20	0.007
15	1/2	0.65	0.024
25	1	1.80	0.066
40	11/2	4.50	0.165
50	2	7.0	0.257

Flow values

Flow values as turndown parameter 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
25	18000	1800	900	360	180	36
40	45 000	4500	2 250	900	450	90
50	70 000	7 000	3 500	1400	700	140

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
1	661.5	66.15	33.08	13.23	6.615	1.323
1½	1654	165.4	82.70	33.08	16.54	3.308
2	2 5 7 3	257.3	128.7	51.46	25.73	5.146

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 → 🖺 188

Mass flow and volume flow (liquids)

±0.05 % 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 and volume flow

o.f.s. = of full scale value

When there is a difference between the temperature for zero point adjustment and the process temperature, the additional measured error of the sensor is typically ±0.0002 % o.f.s./°C (±0.0001 % o. f.s./°F).

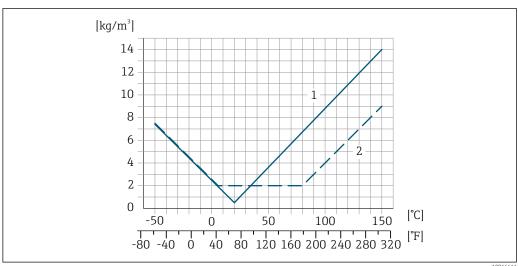
The effect is reduced if zero point adjustment is performed at process temperature.

Density

When there is a difference between the density calibration temperature and the process temperature, the typical measured error of the sensor is ± 0.0001 g/cm³ /°C (± 0.00005 g/cm³ /°F). Field density calibration is possible.

Wide-range density specification (special density calibration)

If the process temperature is outside the valid range ($\rightarrow \equiv 185$) the measured error is $\pm 0.0001 \text{ g/cm}^3 \text{ /°C } (\pm 0.00005 \text{ g/cm}^3 \text{ /°F})$



- Field density calibration, for example at +20 $^{\circ}$ C (+68 $^{\circ}$ F)
- Special density calibration

Temperature

 $\pm 0.005 \cdot \text{T} \,^{\circ}\text{C} \, (\pm 0.005 \cdot (\text{T} - 32) \,^{\circ}\text{F})$

Influence of medium pressure

The table below shows the effect on accuracy of mass flow due to a difference between calibration pressure and process pressure.

o.r. = of reading

- It is possible to compensate for the effect by:
 - Reading in the current pressure measured value via the current 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	-0.002	-0.0001
15	1/2	-0.006	-0.0004
25	1	-0.005	-0.0003
40	1½	-0.007	-0.0005
50	2	-0.006	-0.0004

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

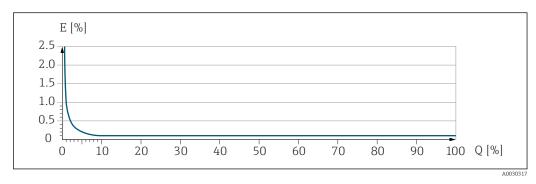
Calculation of the maximum measured error as a function of the flow rate

Flow rate	Maximum measured error in % o.r.
$\geq \frac{\text{ZeroPoint}}{\text{BaseAccu}} \cdot 100$	± BaseAccu
A0021332	A002133
< ZeroPoint · 100	± ZeroPoint MeasValue · 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 for maximum measured error



- E Maximum measured error in % o.r. (example)
- Q Flow rate in % of maximum full scale value

188

1/7	T . 1	1 . •
167	Inctal	Iation
16.7	Instal	ıauvıı

Installation conditions

→ ■ 21

16.8 Environment

Ambient temperature range

 $\rightarrow \implies 23 \rightarrow \implies 23$

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)

Degree of protection

Measuring device

- As standard: IP66/67, type 4X enclosure
- When housing is open: IP20, type 1 enclosure
- Display module: IP20, type 1 enclosure
- With the order code for "Sensor options", option CM: IP69 can also be ordered

External WLAN antenna

IP67

Vibration- and shock-resistance

Vibration sinusoidal, in accordance with IEC 60068-2-6

- 2 to 8.4 Hz, 3.5 mm peak
- 8.4 to 2000 Hz, 1 g peak

Vibration broad-band random, according to IEC 60068-2-64

- 10 to 200 Hz, 0.003 g²/Hz
- 200 to 2000 Hz, 0.001 q²/Hz
- Total: 1.54 g rms

Shock half-sine, according to IEC 60068-2-27

6 ms 30 g

Rough handling shocks, according to IEC 60068-2-31

Mechanical load

Never use the transmitter housing as a ladder or climbing aid.

Electromagnetic compatibility (EMC)



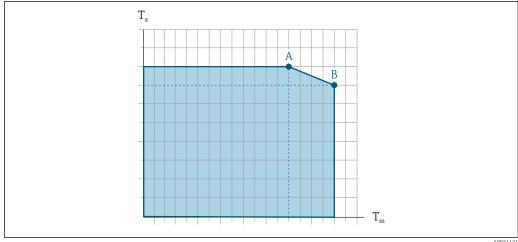
Details are provided in the Declaration of Conformity.

16.9 **Process**

Medium temperature range

-50 to +150 °C (−58 to +302 °F)

Dependency of ambient temperature on medium temperature



- Exemplary representation, values in the table below.
- Ambient temperature range
- T_m Medium temperature
- Maximum permitted medium temperature T_m at $T_{a max}$ = 60 °C (140 °F); higher medium temperatures T_m require a reduced ambient temperature T_a
- Maximum permitted ambient temperature T_a for the maximum specified medium temperature T_m of the sensor
- Values for devices used in the hazardous area: Separate Ex documentation (XA) for the device $\rightarrow \triangleq 203$.

Not insulated			Insulated				
A B			A		В		
T _a	T _m	Ta	T _m	T _a	T _m	T _a	T_{m}
60 °C (140 °F)	150 °C (302 °F)	-	-	60 °C (140 °F)	120 °C (248 °F)	55 °C (131 °F)	150 ℃ (302 ℉)

Density

0 to 5000 kg/m^3 (0 to 312 lb/cf)

Pressure-temperature ratings

An overview of the pressure-temperature ratings for the process connections is provided in the "Technical Information" document

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.

190

If the sensor is to be purged with gas (gas detection), it should be equipped with purge connections.

i

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").

Г	N	Sensor housing burst pressure		
[mm]	[in]	[bar]	[psi]	
8	3/8	190	2 755	
15	1/2	175	2 538	
25	1	165	2 3 9 2	
40	1½	152	2 2 0 4	
50	2	103	1494	

For information on the dimensions: see the "Mechanical construction" section of the "Technical Information" document

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
- ullet In most 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).
- To calculate the flow limit, use the *Applicator* sizing tool $\rightarrow \stackrel{\triangle}{=} 174$

Pressure loss

System pressure

→ 🖺 23

16.10 Mechanical construction

Design, dimensions



For the dimensions and installation 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. Weight specifications including transmitter as per order code for "Housing", option A "Aluminum, coated".

Different values due to different transmitter versions:

- Transmitter version for the hazardous area (Order code for "Housing", option A "Aluminum, coated"; Ex d): +2 kg (+4.4 lbs)
- Transmitter version for hygienic area (Order code for "Housing", option B "Stainless, hygienic"): +0.2 kg (+0.44 lbs)

Weight in SI units

DN [mm]	Weight [kg]
8	13
15	15
25	20
40	38
50	61

Weight in US units

DN [in]	Weight [lbs]
3/8	29
1/2	33
1	44
1½	84
2	134

Materials

Transmitter housing

Order code for "Housing":

- Option **A** "Aluminum, coated": aluminum, AlSi10Mg, coated
- Option **B** "Stainless, hygienic": stainless steel, 1.4404 (316L)

Window material

Order code for "Housing":

- Option A "Aluminum, coated": glass
- Option **B** "Stainless, hygienic": polycarbonate

Seals

Order code for "Housing":

Option **B** "Stainless, hygienic": EPDM and silicone

Cable entries/cable glands

Order code for "Housing", option A "Aluminum, coated"

The various cable entries are suitable for hazardous and non-hazardous areas.

Cable entry/cable gland	Material
Coupling M20 × 1.5	Non-Ex: plastic
Coupling M20 ^ 1.5	Z2, D2, Ex d/de: brass with plastic
Adapter for cable entry with female thread G ½"	Nickel-plated brass
Adapter for cable entry with female thread NPT ½"	

Order code for "Housing", option B "Stainless, hygienic"

The various cable entries are suitable for hazardous and non-hazardous areas.

Cable entry/cable gland	Material
Cable gland M20 × 1.5	Plastic
Adapter for cable entry with female thread G ½"	Nickel-plated brass
Adapter for cable entry with female thread NPT ½"	

Device plug

Electrical connection	Material	
Plug M12x1	 Socket: Stainless steel, 1.4404 (316L) Contact housing: Polyamide Contacts: Gold-plated brass 	

Sensor housing

- Acid and alkali-resistant outer surface
- Stainless steel 1.4301 (304)

Measuring tubes

Stainless steel, 1.4435 (316L)

Process connections

Flange according to EN 1092-1 (DIN 2501)/ASME B16.5/JIS B2220:	Stainless steel, 1.4404 (316/316L)
All other process connections:	Stainless steel, 1.4435 (316L)



Available process connections→ 🗎 194

Seals

Welded process connections without internal seals

Accessories

Protective cover

Stainless steel, 1.4404 (316L)

External WLAN antenna

- Antenna: ASA plastic (acrylic ester-styrene-acrylonitrile) 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
 - DIN 11864-3 Form A clamp, DIN 11866 series A, with notch
 - DIN 32676 clamp, DIN 11866 series A
 - ISO 2852 clamp, ISO 2037
- 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



Process connection materials $\rightarrow \implies 193$

Surface roughness

All data relate to parts in contact with fluid. The following surface roughness quality can be ordered.

- $Ra_{max} = 0.76 \, \mu m \, (30 \, \mu in)$
- $Ra_{max} = 0.38 \, \mu m \, (15 \, \mu in)$

16.11 Human 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, Bahasa (Indonesian), Vietnamese, Czech, Swedish
- Via Web browser
 - English, German, French, Spanish, Italian, Dutch, Portuguese, Polish, Russian, Turkish, Chinese, Japanese, Korean, Bahasa (Indonesian), Vietnamese, Czech, Swedish
- Via "FieldCare", "DeviceCare" operating tool: English, German, French, Spanish, Italian, Chinese, Japanese

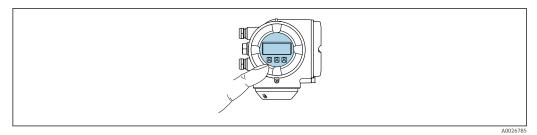
Local operation

Via display module

Equipment:

- 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 → 🖺 64

194



■ 33 Operation with touch control

Display elements

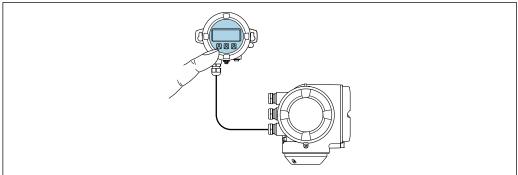
- 4-line, illuminated, graphic display
- White background lighting; switches to red in event of device errors
- Format for displaying measured variables and status variables can be individually configured
- Permitted ambient temperature for the display: -20 to +60 °C (-4 to +140 °F) The readability of the display may be impaired at temperatures outside the temperature range.

Operating elements

- External operation via touch control (3 optical keys) without opening the housing: ±, □. ■
- Operating elements also accessible in the various zones of the hazardous area

Via remote display and operating module DKX001

- The remote display and operating module DKX001 is available as an optional extra $\rightarrow \stackrel{\triangle}{=} 172$.
 - The remote display and operating module DKX001 is only available for the following housing version: order code for "Housing": option A "Aluminum, coated"
 - The measuring device is always supplied with a dummy cover when the remote display and operating module DKX001 is ordered directly with the measuring device. Display or operation at the transmitter is not possible in this case.
 - If ordered subsequently, the remote display and operating module DKX001 may not be connected at the same time as the existing measuring device display module.
 Only one display or operation unit may be connected to the transmitter at any one time.



 \blacksquare 34 Operation via remote display and operating module DKX001

Display and operating elements

Endress+Hauser 195

A002678

Housing material

The housing material of the display and operating module DKX001 depends on the choice of transmitter housing material.

Transmitter housing	Remote display and operating module	
Order code for "Housing"	Material	Material
Option A "Aluminum, coated"	AlSi10Mg, coated	AlSi10Mg, coated

Cable entry

Corresponds to the choice of transmitter housing, order code for "Electrical connection".

Connecting cable

→ 🖺 30

Dimensions

Information on the dimensions:

"Mechanical construction" section of the "Technical Information" document.

Remote operation $\rightarrow \stackrel{\triangle}{=} 63$ Service interface $\rightarrow \stackrel{\triangle}{=} 63$

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	CDI-RJ45 service interfaceWLAN interface	Special Documentation for device → 🖺 204
DeviceCare SFE100	Notebook, PC or tablet with Microsoft Windows system	CDI-RJ45 service interfaceWLAN interfaceFieldbus protocol	→ 🖺 174

Supported operating tools	Operating unit	Interface	Additional information
FieldCare SFE500	Notebook, PC or tablet with Microsoft Windows system	CDI-RJ45 service interfaceWLAN interfaceFieldbus protocol	→ 🖺 174
Device Xpert	Field Xpert SFX 100/350/370	HART and FOUNDATION Fieldbus fieldbus protocol	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:
 - FactoryTalk AssetCentre (FTAC) by Rockwell Automation → www.rockwellautomation.com
 - Asset Management Solutions (AMS) by Emerson → www.emersonprocess.com
 - FieldCommunicator 375/475 by Emerson → www.emersonprocess.com
 - Field Device Manager (FDM) by Honeywell → www.honeywellprocess.com
 - FieldMate by Yokogawa → www.yokogawa.com
 - PACTWare → www.pactware.com

The associated device description files are available at: www.endress.com \rightarrow Downloads

Web server

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

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 the measuring device:

- Upload the configuration from the measuring device (XML format, configuration backup)
- Save the configuration to the measuring device (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 verification log (PDF file, only available with the "Heartbeat Verification" application package)
- Flash firmware version for device firmware upgrade, for instance
- Download driver for system integration

 \bigcirc Web server special documentation \rightarrow $\stackrel{\triangle}{=}$ 204

HistoROM data management

The measuring device 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:

	Device memory	T-DAT	S-DAT
Available data	 Event logbook such as diagnostic events for example Parameter data record backup Device firmware package Driver for system integration for exporting via Web server, e.g: DD for FOUNDATION Fieldbus 	 Measured value logging ("Extended HistoROM" order option) Current parameter data record (used by firmware at run time) Peakhold indicator (min/max values) Totalizer values 	 Sensor data: nominal diameter etc. Serial number Calibration data Device configuration (e.g. SW options, fixed I/O or multi I/O)
Storage location	Fixed on the user interface board in the connection compartment	Attachable to the user interface 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 transfer

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.:
 DD for FOUNDATION Fieldbus

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:

- Record up to 1000 measured values via 1 to 4 channels
- User configurable recording interval
- Record up to 250 measured values via each of the 4 memory channels
- 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



Currently available certificates and approvals can be called up via the product configurator.

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.

RCM-tick symbol

The measuring system meets the EMC requirements of the "Australian Communications and Media Authority (ACMA)".

Ex approval

The devices are certified for use in hazardous areas and the relevant safety instructions are provided in the separate "Safety Instructions" (XA) document. Reference is made to this document on the nameplate.

Sanitary compatibility

- 3-A approval
 - Only measuring devices with the order code for "Additional approval", option LP "3A" have 3-A approval.
 - The 3-A approval refers to the measuring device.
 - When installing the measuring device, ensure that no liquid can accumulate on the outside of the measuring device.
 - Remote transmitters 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

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).

- Food Contact Materials Regulation (EC) 1935/2004

Pharmaceutical compatibility

- FDA 21 CFR 177
- USP <87>
- USP <88> Class VI 121 °C
- TSE/BSE Certificate of Suitability
- cGMP



Devices with order code for "Test, certificate", option JG "Compliance with requirements derived from cGMP, declaration" are in accordance with cGMP requirements relating to the surfaces of wetted parts, design, FDA 21 CFR material conformity, USP Class VI tests and TSE/BSE-compliance.

A manufacturer's declaration specific to the serial number is supplied with the device.

FOUNDATION Fieldbus certification

FOUNDATION Fieldbus interface

The measuring device is certified and registered by the FieldComm Group. The measuring system meets all the requirements of the following specifications:

- Certified in accordance with FOUNDATION Fieldbus H1
- Interoperability Test Kit (ITK), revision version 6.2.0 (certificate available on request)
- Physical Layer Conformance Test
- The device can also be operated with certified devices of other manufacturers (interoperability)

Pressure Equipment Directive

- With the identification PED/G1/x (x = category) on the sensor nameplate, Endress+Hauser confirms conformity with the "Essential Safety Requirements" specified in Appendix I of the Pressure Equipment Directive 2014/68/EU.
- Devices not bearing this marking (PED) are designed and manufactured according to good engineering practice. They meet the requirements of Article 4 paragraph 3 of the Pressure Equipment Directive 2014/68/EU. The range of application is indicated in tables 6 to 9 in Annex II of the Pressure Equipment Directive 2014/68/EU.

Radio approval

The measuring device has radio approval.



For detailed information regarding radio approval, see Special Documentation → 🖺 204

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, parts and sensor housing in contact with medium
- Pressure testing, internal procedure, inspection certificate
- PMI test (XRF), internal procedure, wetted parts, test report
- Compliance with requirements derived from cGMP, Declaration
- EN10204-2.1 confirmation of compliance with the order and EN10204-2.2 test report

Other standards and guidelines

■ EN 60529

Degrees of protection provided by enclosures (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

■ IEC/EN 61326

Emission in accordance with Class A requirements. Electromagnetic compatibility (EMC requirements).

■ 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 diagnosis 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 for the device $\rightarrow \stackrel{\triangle}{=} 203$

Diagnostics functions

Pa	ckage	Description
Ex	tended 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.

Heartbeat Technology	Package	Description
	Heartbeat Verification +Monitoring	Heartbeat Verification Meets the requirement for traceable verification to DIN ISO 9001:2008 Chapter 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 test coverage within the framework of manufacturer specifications. Extension of calibration intervals according to operator's risk assessment.
		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 process influences (such as corrosion, abrasion, buildup etc.) have on the measuring performance over time.

• Schedule servicing in time.

Concentration

Package	Description
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, "M mass, "M volume, mol/l etc.) for standard applications. Concentration calculation from user-defined tables.

• Monitor the process or product quality, e.g. gas pockets.

Special density

Package	Description
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.

16.14 Accessories



16.15 Supplementary documentation



- *W@M Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from nameplate
- *Endress+Hauser Operations App*: Enter the serial number from the nameplate or scan the 2D matrix code (QR code) on the nameplate

Standard documentation Brief Operating Instructions

Brief Operating Instructions for the sensor

Measuring device	Documentation code
Proline Promass S	KA01287D

Brief Operating Instructions for transmitter

Measuring device	Documentation code
Proline 300	KA01229D

Technical Information

Measuring device	Documentation code
Promass S 300	TI01278D

Description of Device Parameters

Measuring device	Documentation code
Promass 300	GP01094D

Device-dependent Safety instructions additional documentation

Safety instructions for electrical equipment for hazardous areas.

Contents	Documentation code
ATEX/IECEx Ex d/Ex de	XA01405D
ATEX/IECEx Ex ec	XA01439D
cCSAus XP	XA01373D
cCSAus Ex d/ Ex de	XA01372D
cCSAus Ex nA	XA01507D
INMETRO Ex d/Ex de	XA01468D
INMETRO Ex ec	XA01470D
NEPSI Ex d/Ex de	XA01469D
NEPSI Ex nA	XA01471D
EAC Ex d/Ex de	XA01656D
EAC Ex nA	XA01657D
JPN Ex d	XA01778D

Remote display and operating module DKX001

Contents	Documentation code
ATEX/IECEx Ex i	XA01494D
ATEX/IECEx Ex ec	XA01498D
cCSAus IS	XA01499D
cCSAus Ex nA	XA01513D
INMETRO Ex i	XA01500D

Contents	Documentation code
INMETRO Ex ec	XA01501D
NEPSI Ex i	XA01502D
NEPSI Ex nA	XA01503D

Special Documentation

Contents	Documentation code
Information on the Pressure Equipment Directive	SD01614D
Remote display and operating module DKX001	SD01763D
Radio approvals for WLAN interface for A309/A310 display module	SD01793D
Web server	SD01665D
Heartbeat Technology	SD01696D
Concentration measurement	SD01706D

Installation Instructions

Contents	Comment		
Installation instructions for spare part sets and accessories	 Access the overview of all the available spare part sets via W@M Device Viewer → ■ 170 Accessories available for order with Installation Instructions → ■ 172 		

. 69

Index

0 9	Cyclic data transmission 69
3-A approval	D
A	Declaration of Conformity
Access authorization to parameters	Define access code
Read access	Degree of protection 41, 189
Write access	Density
Access code	Design fundamentals
Incorrect input	Maximum measured error
Accuracy	Repeatability
Adapting the diagnostic behavior	Designated use
Adapting the status signal	Device components
Additional certification 200	Device description files
Ambient temperature	Device documentation Supplementary documentation
Influence	Device locking, status
AMS Device Manager	Device name Device name
Function	Sensor
Application	Transmitter
Approvals	Device repair
Tipprovais	Device revision
С	Device type ID 69
Cable entries	DeviceCare 67
Technical data	Device description file 69
Cable entry	Diagnostic behavior
Degree of protection	Explanation
CE mark	Symbols
Certificates	Diagnostic information
cGMP	Design, description
Check Installation	FieldCare
Checklist	Light emitting diodes
Post-connection check 41	Local display
Post-installation check	Overview
Cleaning	Remedial measures
Cleaning in place (CIP)	Web browser
Exterior cleaning	Diagnostic list
Interior cleaning	Diagnostic message
Sterilization in place (SIP)	DIAGNOSTIC Transducer Block 162
Climate class	Diagnostics
Commissioning	Symbols
Advanced settings	DIP switches
Configuring the measuring device	see Write protection switch Direct access
Connecting the massuring device	Direct access
Connecting the measuring device	Disabling write protection
Connecting the signal cables	Display
Connection	see Onsite display
see Electrical connection	Display and operating module DKX001 195
Connection preparations	Display area
Connection tools	For operational display
Context menu	In the navigation view 48
Calling up	Display values
Closing	For locking status
Explanation	Disposal
Current consumption	
	I .

Document	Version
Function 6	Firmware history
Symbols 6	Flow direction
Document function 6	Flow limit
Down pipe	Food Contact Materials Regulation 199
F	FOUNDATION Fieldbus certification 200
E	Function check
Editing view	Function range
Input screen	Field Xpert 65
Using operating elements 49, 50	Function scope
EHDEG-certified	AMS Device Manager 67
Electrical connection	Field Communicator 68
Degree of protection	Field Communicator 475 68
Measuring device	Functions
Operating tools	see Parameter
Via FOUNDATION Fieldbus network 63	G
Via service interface (CDI-RJ45) 63	Galvanic isolation
Via WLAN interface	Galvanic isolation
	Н
WLAN interface	Hardware write protection
Electromagnetic compatibility189Electronics module14	Help text
Enabling write protection	Calling up
Enabling write protection	Closing
Endress+Hauser services	Explanation
Maintenance	HistoROM
Repair	
Environment	I
Mechanical load	Identifying the measuring device
Storage temperature	Incoming acceptance
Vibration- and shock-resistance 189	Influence
Error messages	Ambient temperature
see Diagnostic messages	Medium pressure
Event list	Medium temperature
Event logbook	Information on the document 6
Ex approval	Inlet runs
Extended order code	Input
Sensor	Inspection
Transmitter	Received goods
Exterior cleaning	Inspection check
F	Connection
F 100.000	Installation
FDA	Installation conditions
Field Communicator	Down pipe
Function	Installation dimensions
	Mounting location
Field of application Residual risks	Orientation
Field Xpert	Sensor heating
Function 65	System pressure
Field Xpert SFX350	Thermal insulation
FieldCare	Vibrations
Device description file	Installation dimensions
Establishing a connection	Interior cleaning
Function	
User interface	L
Filtering the event logbook	Languages, operation options 194
Firmware	Line recorder
Release date	Local display
	Navigation view 47

206

See Operational display	see Diagnostic message	0
December 2015 Continue 183 Continue 184 Continue 185 Conti	see In alarm condition	Onsite display
Main electronics module Maintenance tasks. 169 Managing the device configuration 109 Manufacturing date 16,17 Materials 1925 Measuring date 16,17 Meserials 1926 Mesauring and test equipment 169 Disposal 171 Mounting the sensor 26 Renoving 171 Repairs 170 Structure 171 Repairs 170 Structure 171 Mesauring quade 171 Repairs 170 Mesauring range 171 Repairs 170 Mesauring range 171 Mesauring		Numeric editor 49
Main electronics module	Low flow cut off	Text editor
Main electronics module	D. f.	Operable flow range
Maintanance tasks 169		Operating elements
Managing the device configuration 109		Operating keys
Manufacturer ID 69 Manufacturing date 16.17 Materials 43 Maximanum measured error 43 Structure 43 Maximum measured error 43 Structure 43 Structure 43 Maximum measured error 43 Submenus and user roles 44 Operation 117 Structure 43 Submenus and user roles 44 Operation 117 Structure 40 Operation options 42 Op		see Operating elements
Manufacturing date 16, 17 Structure 43 Maximum measured error 185 Submenus and user roles 44 44 45 46 46 47 47 47 49 49 44 47 49 49		Operating menu
Maximum measured error 185 Maximum measured error 185 Measured values Operating philosophy 44		Menus, submenus 43
Maximum measured error 185 Measurd values Operating philosophy 44 see Process variables Operation options 42 Measuring device Operation options 42 Configuration .76 Operation al display 45 Conversion .170 Operational safety 16.17 Ombigosal .171 Operation options 22 Mounting the sensor .26 Operational safety 16.17 Preparing for electrical connection .33 Output uns .182 Removing .171 Parameter 178 Removing .171 Parameter Parameter Structure .14 Switch-on .75 Measuring range .17 Parameter Changing .54 Measuring range .17 Administration (Submenu) .11 Mechanical load .189 Administration (Submenu) .11 Mechanical position .16 Administration (Submenu) .10 Medium pressure Influence<	·	Structure
Measuring and test equipment 169 Measuring and test equipment 169 Measuring device Operation options 4.2 Configuration . 76 Conversion 170 Disposal 171 Mounting the sensor 26 Preparing for electrical connection 33 Preparing for mounting 26 Removing 171 Structure 14 Switch-on 75 Measuring principle 175 Measuring range 176 For liquidis 176 Mechanical load 189 Medium pressure 176 Influence 187 Medium temperature 187 Influence 187 Menu 20 Diagnostics 161 Seeup 77 Menus 10 Diagnostics 161 Seel nstallation dimensions 10 See Installation dimensions 26 Mounting preparations <td></td> <td>Submenus and user roles 44</td>		Submenus and user roles 44
Measuring and test equipment 169 Measuring device 0peration options 42 Configuration .76 0perational display 45 Conversion .170 Operational display 45 Disposal .171 Order code 16.17 Mounting the sensor .26 Output code 16.17 Preparing for electrical connection .33 Output signal .178 Preparing for mounting .26 Output signal .178 Removing .171 Packaging disposal .20 Parameter Parameter Changing .54 Entring values or text .54 Entring values or text .54 Measuring principle .175 Advanced setup (Submenu) .101 Measuring principle .175 Advanced setup (Submenu) .101 Measuring system .175 Administration (Submenu) .112 Mecauring range, recommended .191 Advanced setup (Submenu) .101 Medium remperature .187 Current input (Wizard)		Operating philosophy
See Process variables Operation options 42		
Measuring and test equipment 169 Operational display. 45 Measuring device Operational safety. 111 Conversion 176 Orentation (vertical, horizontal) 22 Disposal 171 Outlet runs 23 Mounting the sensor 26 Output 178 Preparing for mounting 26 Output 178 Removing 171 Papering for mounting 26 Removing 171 Paperaing for mounting 26 Removing 171 Paperaing for mounting 26 Removing 170 Packaging disposal 20 Switch-on 75 Changing 54 Measuring principle 175 Parameter 4 Measuring principle 175 Analoging 54 Measuring system 175 Advanced setup (Submenu) 101 Measuring system 175 Analog inputs (Submenu) 101 Medium temperature 16 Calculated values (Submenu) 109 <		Operation options
Measuring device Operational safety 1.1 Configuration 76 Conversion 170 Disposal 171 Mounting the sensor 26 Preparing for electrical connection 33 Preparing for mounting 26 Removing 171 Repairs 170 Structure 14 Switch-on 75 Measuring range 175 Measuring range Parameter For liquids 176 Measuring range, recommended 191 Mechanical load 189 Mechanical load 189 Mechanical load 189 Medium repressure Configuration backup (Submenu) 101 Influence 187 Menu Current input 1 ton (Submenu) 120 Menu Current input (Wizard) 84 Setup 77 Current input 1 ton (Submenu) 120 Mounting preparations 161 Current output (Wizard) 84 Set		
Configuration		
Disposal		
Disposal		
Mounting the sensor		
Preparing for electrical connection 33 26 Removing 26 Removing 171 Repairs 170 Structure 14 Switch-on 75 Measuring principle 175 Measuring principle 175 Measuring range For liquids 176 Measuring system 176 Measuring system 177 Measuring system 178 Mechanical load 189 Mechanical load 189 Medium pressure 187 Medium temperature 187 Medium temperature 187 Menus 189 Menus 189 Menus 189 Menus 189 Menus 189 Menus 189 Menus 180 Menus 189 Menus 180 Menus		
Preparing for mounting		
Repairs	1 0	1 3
Structure		P
Switch-on 75 Measuring principle Changing 54 Entering values or text 54 Entering values or text 54 Entering values or text 54 Parameter settings For liquids 176 Measuring range, recommended 191 Advanced setup (Submenu) 112 Advanced setup (Submenu) 101 Calculated values (Submenu) 101 Calculated values (Submenu) 109 Calculated values (Submenu) 100 Calculated values (Submenu) 100 Calculated values (Submenu) 110 Calculated values (Submenu) 110 Current output (Wizard) 84 Current input (Vizard) 84 Current input (Vizard) 84 Current input (Wizard) 84 Current inpu	=	Packaging disposal 20
Measuring principle175Entering values or text54Measuring rangeParameter settingsAdministration (Submenu)112Measuring range, recommended191Advanced setup (Submenu)101Measuring system175Analog inputs (Submenu)101Medium pressureCalculated values (Submenu)101Influence187Current input82Medium temperature187Current input (Wizard)82Influence187Current output (Wizard)84Setup77Data logging (Submenu)120MenusDefine access code (Wizard)111For measuring device configuration76Diagnostics (Menu)166For specific settings100Diagnostics (Menu)161Mounting dimensionsDisplay (Wizard)96Mounting location21I/O configuration (Submenu)105Mounting preparations26I/O configuration (Submenu)105Mounting tools26I/O configuration (Submenu)81NMeasured variables (Submenu)118Partially filled pipe detection (Wizard)98Measured variables (Submenu)122Relay output 1 to n (Submenu)122 <td></td> <td>Parameter</td>		Parameter
Measuring range For liquids 176 Measuring range, recommended 191 Measuring system 175 Mechanical load 189 Medium pressure Influence 187 Medium temperature Influence 187 Menu 201 Menu 301 Menu 401 Mesturing device configuration 58 Mounting location 58 Mounting location 58 Mounting preparations 58 Mounting preparations 76 Mounting tools 58 Mounting tools 58 Mounting tools 78 Menu 201 Menu 201 Menu 301 Menu 402 Menu 503 Menu 603 Menu 603 Menu 703 Menu 704 Menu 705 Menu 707 Menus 707 Me		Changing
For liquids		Entering values or text
Measuring range, recommended 191 Advanced setup (Submenu) 101 Measuring system 175 Analog inputs (Submenu) 81 Mechanical load 189 Calculated values (Submenu) 101 Medium pressure Configuration backup (Submenu) 109 Influence 187 Current input 82 Medium temperature Enfluence 187 Current input (Wizard) 82 Influence 187 Current input 1 (Wizard) 84 Diagnostics 161 Current output (Wizard) 84 Setup 77 Data logging (Submenu) 124 Menus Define access code (Wizard) 111 For specific settings 100 Diagnostics (Menu) 166 Mounting dimensions Display (Wizard) 96 Mounting preparations 26		Parameter settings
Measuring system175Analog inputs (Submenu)81Mechanical load189Calculated values (Submenu)101Medium pressure187Current input20Influence187Current input (Wizard)82Medium temperature20Current input 1 to n (Submenu)120Menu21Current output84Description backup (Wizard)84Setup161Current output (Wizard)84Setup77Data logging (Submenu)124MenusDefine access code (Wizard)111For measuring device configuration76Desice information (Submenu)166For specific settings100Diagnostics (Menu)161Mounting dimensionsDiagnostics (Menu)161see Installation dimensionsDisplay (Submenu)105see Installation dimensionsDisplay (Wizard)96Mounting preparations26I/O configuration (Submenu)81Mounting tools26I/O configuration (Submenu)81NMeasured variables (Submenu)118NPartially filled pipe detection (Wizard)99Pulse/frequency/switch output (Wizard)87, 88, 92Pulse/frequency/switch output (Wizard)94Navigation view122Relay output 1 to n (Submenu)122In the submenu47Relay output 1 to n (Wizard)94Numeric editor49Relay output 1 to n (Wizard)94Numeric editor49Relay output		Administration (Submenu)
Mechanical load 189 Calculated values (Submenu) 101 Medium pressure 187 Configuration backup (Submenu) 109 Medium temperature 200 Current input (Wizard) 82 Influence 187 Current input (Wizard) 82 Menu Current output (Wizard) 84 Setup 77 Data logging (Submenu) 124 Menus Define access code (Wizard) 111 For measuring device configuration 76 Device information (Submenu) 166 For specific settings 100 Diagnostics (Menu) 161 Mounting dimensions Display (Submenu) 105 see Installation dimensions Display (Wizard) 96 Mounting preparations 26 Low flow cut off (Wizard) 98 Mounting tools 26 Low flow cut off (Wizard) 98 Measured variables (Submenu) 118 Partially filled pipe detection (Wizard) 99 Measured variables (Submenu) 118 Partially filled pipe detection (Wizard) 99	Measuring range, recommended	Advanced setup (Submenu) 101
Medium pressure Configuration backup (Submenu) 109 Influence 187 Current input (Wizard) 82 Medium temperature 187 Current input (Wizard) 82 Influence 187 Current input (Wizard) 84 Menu Current output (Wizard) 84 Setup 77 Data logging (Submenu) 124 Menus Define access code (Wizard) 111 For specific settings 100 Diagnostics (Menu) 166 For specific settings 100 Diagnostics (Menu) 166 Mounting dimensions Display (Submenu) 105 see Installation dimensions Display (Wizard) 96 Mounting preparations 26 Low flow cut off (Wizard) 98 Mounting preparations 26 Low flow cut off (Wizard) 98 N Measured variables (Submenu) 118 Nameplate Pulse/frequency/switch output 87 Sensor 17 Pulse/frequency/switch output (Wizard) 87 Navigation view Pulse		Analog inputs (Submenu) 81
Medium pressureConfiguration backup (Submenu)109Influence187Current input (Wizard)82Medium temperature187Current input 1 to n (Submenu)120Influence187Current output84Diagnostics161Current output (Wizard)84Setup77Data logging (Submenu)124MenusDefine access code (Wizard)111For measuring device configuration76Device information (Submenu)166For specific settings100Diagnostics (Menu)161Mounting dimensionsDisplay (Submenu)105see Installation dimensionsDisplay (Wizard)96Mounting preparations26I/O configuration (Submenu)181Mounting preparations26Low flow cut off (Wizard)98Measured variables (Submenu)118NameplatePartially filled pipe detection (Wizard)99Sensor17Pulse/frequency/switch output87Transmitter16Pulse/frequency/switch output (Wizard)87Navigation path (navigation view)47Relay output 1 to n (Submenu)122In the submenu47Relay output 1 to n (Submenu)122In the wizard47Reset access code (Submenu)111Numeric editor49Select medium (Wizard)80		Calculated values (Submenu) 101
Medium temperatureCurrent input (Wizard)82Influence187Current input 1 to n (Submenu)120MenuCurrent outputMerent output (Wizard)84Setup77Data logging (Submenu)124MenusDefine access code (Wizard)111For measuring device configuration76Device information (Submenu)166For specific settings100Diagnostics (Menu)161Mounting dimensionsDisplay (Submenu)105see Installation dimensionsDisplay (Wizard)96Mounting preparations26I/O configuration81Mounting tools26I/O configuration (Submenu)81NHouse flow cut off (Wizard)98NMeasured variables (Submenu)118Partially filled pipe detection (Wizard)99Pulse/frequency/switch output87Navigation path (navigation view)47Pulse/frequency/switch output (Wizard)87, 88, 92Pulse/frequency/switch output120Navigation view47Relay output 1 to n (Submenu)122In the submenu47Relay output 1 to n (Wizard)94Numeric editor49Reset access code (Submenu)111Select medium (Wizard)80	<u>*</u>	Configuration backup (Submenu) 109
Influence		Current input
MenuCurrent output84Diagnostics161Current output (Wizard)84Setup77Data logging (Submenu)124MenusDefine access code (Wizard)111For measuring device configuration76Device information (Submenu)166For specific settings100Diagnostics (Menu)161Mounting dimensionsDisplay (Submenu)105see Installation dimensionsDisplay (Wizard)96Mounting location21I/O configuration81Mounting preparations26I/O configuration (Submenu)81Mounting tools26Low flow cut off (Wizard)98NameplateLow flow cut off (Wizard)98Sensor17Partially filled pipe detection (Wizard)99Pulse/frequency/switch output87Navigation path (navigation view)47Pulse/frequency/switch output (Wizard)87Navigation viewRelay output94In the submenu47Relay output1 to n (Submenu)111Numeric editor49Reset access code (Submenu)111Numeric editor49Reset access code (Submenu)111	-	Current input (Wizard) 82
Diagnostics 161 Setup 77 Menus Define access code (Wizard) 111 For measuring device configuration 76 For specific settings 100 Mounting dimensions see Installation dimensions 58 Mounting location 21 Mounting preparations 26 Mounting tools 26 N N Nameplate Sensor 17 Transmitter 16 Navigation path (navigation view) 17 Navigation view In the submenu 18 In the submenu 47 In the wizard 47 Numeric editor 49 Data logging (Submenu) 124 Define access code (Wizard) 111 Device information (Submenu) 166 Diagnostics (Menu) 165 Display (Wizard) 96 Lov configuration (Submenu) 81 Lov configuration (Submenu) 81 Low flow cut off (Wizard) 98 Measured variables (Submenu) 118 Partially filled pipe detection (Wizard) 99 Pulse/frequency/switch output (Wizard) 87, 88, 92 Pulse/frequency/switch output (Wizard) 87, 88, 92 Pulse/frequency/switch output 1 to n (Submenu) 122 Relay output 1 to n (Submenu) 122 Relay output 1 to n (Wizard) 94 Reset access code (Submenu) 111 Select medium (Wizard) 80		Current input 1 to n (Submenu) 120
Setup77Data logging (Submenu)124MenusDefine access code (Wizard)111For measuring device configuration76Device information (Submenu)166For specific settings100Diagnostics (Menu)161Mounting dimensionsDisplay (Submenu)105see Installation dimensionsDisplay (Wizard)96Mounting location21I/O configuration81Mounting preparations26I/O configuration (Submenu)81Mounting tools26Low flow cut off (Wizard)98NameplateMeasured variables (Submenu)118Sensor17Partially filled pipe detection (Wizard)99Pulse/frequency/switch output87Navigation path (navigation view)47Pulse/frequency/switch output 1 to n (Submenu)122Relay output1 to n (Submenu)122Relay output1 to n (Wizard)94In the submenu47Relay output 1 to n (Wizard)94In the wizard47Reset access code (Submenu)111Select medium (Wizard)80		Current output
MenusDefine access code (Wizard)111For measuring device configuration76Device information (Submenu)166For specific settings100Diagnostics (Menu)161Mounting dimensionsDisplay (Submenu)105see Installation dimensionsDisplay (Wizard)96Mounting preparations26I/O configuration (Submenu)81Mounting tools26I/O configuration (Submenu)81NameplateLow flow cut off (Wizard)98Sensor17Partially filled pipe detection (Wizard)99Pulse/frequency/switch output87Navigation path (navigation view)47Pulse/frequency/switch output (Wizard)87, 88, 92Navigation viewPulse/frequency/switch output 1 to n (Submenu)122In the submenu47Relay output 1 to n (Submenu)122In the wizard47Relay output 1 to n (Wizard)94Numeric editor49Reset access code (Submenu)111Select medium (Wizard)80		Current output (Wizard) 84
For measuring device configuration 76 For specific settings 100 Mounting dimensions see Installation dimensions Mounting location 21 Mounting preparations 26 Mounting tools 26 Mounting tools 26 Nameplate Sensor 17 Transmitter 16 Navigation path (navigation view) 17 In the submenu 47 In the wizard 19 Numeric editor 49 Device information (Submenu) 166 Diagnostics (Menu) 105 Display (Wizard) 96 Li/O configuration (Submenu) 81 Low flow cut off (Wizard) 98 Measured variables (Submenu) 118 Partially filled pipe detection (Wizard) 99 Pulse/frequency/switch output (Wizard) 87, 88, 92 Pulse/frequency/switch output (Wizard) 87, 88, 92 Relay output 1 to n (Submenu) 122 Relay output 1 to n (Submenu) 122 Relay output 1 to n (Wizard) 94 Reset access code (Submenu) 111 Select medium (Wizard) 80	*	Data logging (Submenu)
For specific settings 100 Mounting dimensions see Installation dimensions Mounting location 21 Mounting preparations 26 Mounting tools 26 Nameplate Sensor 17 Transmitter 16 Navigation path (navigation view) 17 In the submenu 17 In the wizard Numeric editor 47 Numeric editor 47 Numeric editor 49 Diagnostics (Menu) 16 Display (Submenu) 96 Display (Submenu) 105 Display (Submenu) 96 Display (Submenu) 105 Display (Vizard) 96 Di	Menus	Define access code (Wizard) 111
Mounting dimensions see Installation dimensionsDisplay (Submenu)105Mounting location21I/O configuration81Mounting preparations26I/O configuration (Submenu)81Mounting tools26Low flow cut off (Wizard)98Nameplate Sensor17 Transmitter16 Navigation path (navigation view)17 Pulse/frequency/switch output87 Pulse/frequency/switch output (Wizard)87, 88, 92 Pulse/frequency/switch output 1 to n (Submenu)122 Relay outputIn the submenu47 In the wizard47 Reset access code (Submenu)111 Reset access code (Submenu)111 Select medium (Wizard)80		Device information (Submenu) 166
see Installation dimensions Mounting location		Diagnostics (Menu)
Mounting location 21 Mounting preparations 26 Mounting tools 26 Nameplate Sensor 17 Transmitter 16 Navigation path (navigation view) 47 Navigation view In the submenu 47 In the wizard 16 Numeric editor 49 Mounting location 21 I/O configuration (Submenu) 81 I/O configuration (Submenu) 98 Measured variables (Submenu) 99 Pulse/frequency/switch output (Wizard) 87 Pulse/frequency/switch output 1 to n (Submenu) 122 Relay output 1 to n (Submenu) 122 Relay output 1 to n (Wizard) 94 Reset access code (Submenu) 111 Select medium (Wizard) 80		Display (Submenu)
Mounting preparations26I/O configuration (Submenu)81Mounting tools26Low flow cut off (Wizard)98NameplateMeasured variables (Submenu)118Sensor17Partially filled pipe detection (Wizard)99Transmitter16Pulse/frequency/switch output (Wizard)87, 88, 92Navigation path (navigation view)47Relay output122Navigation viewRelay output94In the submenu47Relay output 1 to n (Submenu)122In the wizard47Reset access code (Submenu)111Numeric editor49Reset access code (Submenu)111Select medium (Wizard)80		Display (Wizard)
Mounting tools		I/O configuration
Measured variables (Submenu)	Mounting preparations	I/O configuration (Submenu) 81
Nameplate Sensor	Mounting tools	Low flow cut off (Wizard) 98
Nameplate Sensor	N.Y	Measured variables (Submenu)
NameplatePulse/frequency/switch output87Sensor17Pulse/frequency/switch output (Wizard)87, 88, 92Transmitter16Pulse/frequency/switch output 1 to n (Submenu)122Navigation path (navigation view)47Relay output94In the submenu47Relay output 1 to n (Submenu)122In the wizard47Relay output 1 to n (Wizard)94Numeric editor49Reset access code (Submenu)111Select medium (Wizard)80		
Sensor	-	
Transmitter		
Navigation path (navigation view)47Relay output		
Navigation viewRelay output 1 to n (Submenu)122In the submenu47Relay output 1 to n (Wizard)94In the wizard47Reset access code (Submenu)111Numeric editor49Select medium (Wizard)80	· · · · · · · · · · · · · · · · · · ·	
In the submenu		
In the wizard		* =
Numeric editor		
	Numeric editor	
		Sensor adjustment (Submenu) 102

Setup (Menu)	Sensor heating
Simulation (Submenu)	Sensor housing
Status input	Serial number
Status input (Submenu) 83	Setting the operating language
Status input 1 to n (Submenu) 120	Settings
System units (Submenu)	Adapting the measuring device to the process
Totalizer (Submenu)	conditions
Totalizer 1 to n (Submenu)	Administration
Totalizer handling (Submenu)	Advanced display configurations 105
Value current output 1 to n (Submenu) 121	Analog input
Web server (Submenu) 62	Current input
WLAN Settings (Submenu)	Current output
Zero point adjustment (Submenu)	Device reset
Performance characteristics	Device tag
Pharmaceutical compatibility 200	I/O configuration
Post-connection check (checklist) 41	Local display
Post-installation check	Low flow
Post-installation check (checklist)	Managing the device configuration 109
Potential equalization	Medium
Power consumption	Operating language
Power supply failure	Partial filled pipe detection
Pressure Equipment Directive	Pulse output
Pressure loss	Pulse/frequency/switch output 87, 88
Pressure-temperature ratings	Relay output
Process connections	Resetting the totalizer
Process variables	Restart device
Calculated	Sensor adjustment
Measured	Simulation
Product safety	Status input
Flotecting parameter settings	System units
R	Totalizer
Radio approval	Totalizer reset
RCM-tick symbol	WLAN
Read access	Showing data logging
Reading measured values	Signal on alarm
Recalibration	Software release
Reference operating conditions	Spare part
Registered trademarks	Spare parts
Remedial measures	Special connection instructions
Calling up	
Closing	Special mounting instructions Sanitary compatibility
Remote operation	Standards and quidelines
Repair	Status area
Repair of a device	For operational display
Repairs	In the navigation view
Notes	_
Repeatability	Status signals
Replacement	Storage concept
Device components	Storage conditions
Requirements for personnel	Storage temperature
Response time	Storage temperature range
Return	Structure Measuring device
Actum	Measuring device
S	Operating menu
Safety	Submenu
Sanitary compatibility	Administration
Sensor	Advanced setup
Mounting	Analog inputs
1v10u11tility	Calculated values

208

Configuration backup	Terminals
Current input 1 to n	Tests and certificates
Data logging	Text editor
Device information	Thermal insulation
Display	Tool tip
Event list	see Help text
I/O configuration	Tools
Input values	Electrical connection
Measured values	For mounting
Measured variables	Transport
Output values	Totalizer
Overview	Configuration
Process variables	Transmitter
Pulse/frequency/switch output 1 to n 122	Turning the display module
Relay output 1 to n	Turning the display module
Reset access code	Transporting the measuring device
	Troubleshooting
Sensor adjustment	
Simulation	General
Status input	TSE/BSE Certificate of Suitability
Status input 1 to n	Turning the display module
System units	Turning the electronics housing
Totalizer	see Turning the transmitter housing
Totalizer 1 to n	Turning the transmitter housing 27
Totalizer handling	TT
Value current output 1 to n	U
Web server	Use of the measuring device
WLAN Settings	Borderline cases
Zero point adjustment	Incorrect use
Supply voltage	see Designated use
Surface roughness	User interface
Switch output	Current diagnostic event 161
Symbols	Previous diagnostic event 161
Controlling data entries 50	User roles
For communication	USP Class VI
For diagnostic behavior 46	
For locking	V
For measured variable	Version data for the device 69
For measurement channel number 46	Vibration- and shock-resistance
For menus	Vibrations
For parameters	***
For status signal	W
For submenu	W@M 169, 170
For wizard	W@M Device Viewer
In the status area of the local display 46	Weight
Input screen	SI units
Operating elements	Transport (notes)
System design	US units
Measuring system	Wizard
see Measuring device design	Current input
System integration	Current output 84
System pressure	Define access code
System pressure	Display
Т	Low flow cut off
	Partially filled pipe detection
Technical data, overview	Pulse/frequency/switch output 87, 88, 92
Temperature range	Relay output 1 to n
Ambient temperature range for display 194	Select medium
Medium temperature	WLAN settings
Storage temperature	Workplace safety
Terminal assignment	11
	I

Write access	55
Write protection	
Via access code	14
Via block operation	16
Via write protection switch 1	.16
Write protection switch	.16

210



www.addresses.endress.com