

# Technical Information

## Proline Promag H 500

Electromagnetic flowmeter



Specialist for hygienic applications, as remote version with up to 4 I/Os

### Application

- The bidirectional measuring principle is virtually independent of pressure, density, temperature and viscosity
- For applications with sanitary requirements

### Device properties

- Liner made of PFA
- Sensor housing made of stainless steel (3-A, EHEDG)
- Wetted materials CIP-/SIP-cleanable
- Remote version with up to 4 I/Os
- Backlit display with touch control and WLAN access
- Standard cable between sensor and transmitter

### Your benefits

- Multivariable measurement for flow, temperature and conductivity
- Flexible installation concept – numerous hygienic process connections
- Energy-saving flow measurement – no pressure loss due to cross section constriction
- Maintenance-free – no moving parts
- Full access to process and diagnostic information – numerous, freely combinable I/Os and Ethernet
- Reduced complexity and variety – freely configurable I/O functionality
- Integrated verification – Heartbeat Technology

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

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## About this document

### Symbols









#### Electrical symbols

Symbol	Meaning
	Direct current
	Alternating current
	Direct current and alternating current
	<b>Ground connection</b> A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.
	<b>Potential equalization connection (PE: protective earth)</b> Ground terminals that must be connected to ground prior to establishing any other connections.  The ground terminals are located on the interior and exterior of the device: <ul style="list-style-type: none"> <li>▪ Interior ground terminal: potential equalization is connected to the supply network.</li> <li>▪ Exterior ground terminal: device is connected to the plant grounding system.</li> </ul>

#### Communication-specific symbols




Symbol	Meaning
	<b>Wireless Local Area Network (WLAN)</b> Communication via a wireless, local network.
	<b>LED</b> Light emitting diode is off.
	<b>LED</b> Light emitting diode is on.
	<b>LED</b> Light emitting diode is flashing.

#### Symbols for certain types of information

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



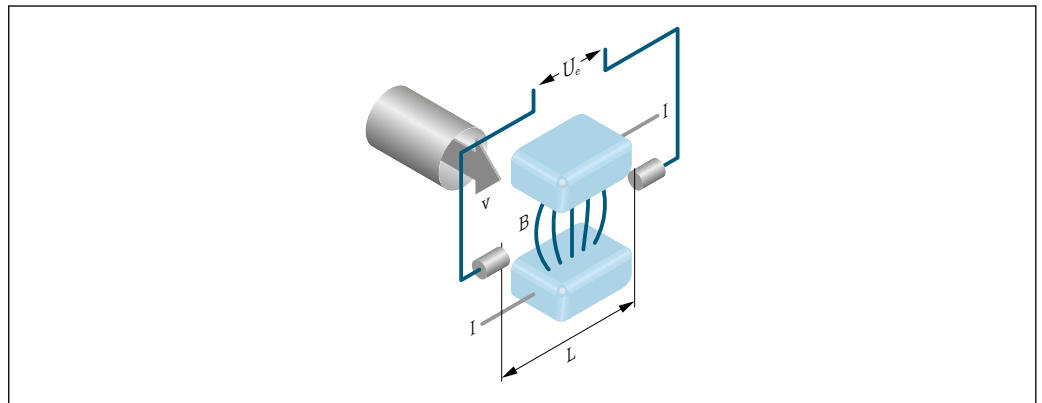
Symbols in graphics

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

Function and system design

Measuring principle

Following *Faraday's law of magnetic induction*, a voltage is induced in a conductor moving through a magnetic field.



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- U<sub>e</sub>* Induced voltage
- B* Magnetic induction (magnetic field)
- L* Electrode spacing
- I* Current
- v* Flow velocity

In the electromagnetic measuring principle, the flowing medium is the moving conductor. The voltage induced ( $U_e$ ) is proportional to the flow velocity ( $v$ ) and is supplied to the amplifier by means of two measuring electrodes. The flow volume ( $Q$ ) is calculated via the pipe cross-section ( $A$ ). The magnetic field is created through a switched direct current of alternating polarity.

**Formulae for calculation**

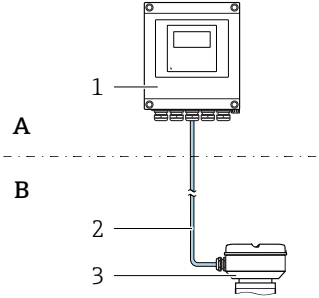
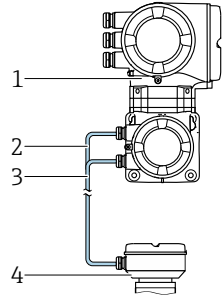
- Induced voltage  $U_e = B \cdot L \cdot v$
- Volume flow  $Q = A \cdot v$

**Measuring system**

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

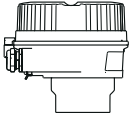

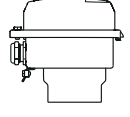

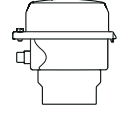

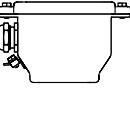

**Transmitter**

Two versions of the transmitter are available.

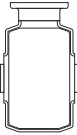
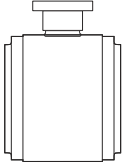
Proline 500 – digital	Proline 500
<p>For use in applications not required to meet special requirements due to ambient or operating conditions.</p>  <p>A Non-hazardous area or Zone 2; Class I, Division 2            B Non-hazardous area or Zone 2; Class I, Division 2 or Zone 1; Class I, Division 1            1 Transmitter            2 Connecting cable: cable, separate, standard            3 Sensor connection housing with integrated ISEM</p> <ul style="list-style-type: none"> <li>Flexible and cost-effective separate installation.</li> <li>A standard cable can be used as the connecting cable.</li> <li>Electronics in the transmitter housing, ISEM (intelligent sensor electronics module) in the sensor connection housing</li> <li>Signal transmission: digital</li> <li>Order code for "Integrated ISEM electronics", option <b>A</b> "Sensor"</li> </ul>	<p>For use in applications required to meet special requirements due to ambient or operating conditions.</p>  <p>Non-hazardous area or Zone 2; Class I, Division 2 or Zone 1; Class I, Division 1            1 Transmitter with integrated ISEM            2 Coil current cable            3 Signal cable            4 Sensor connection housing</p> <ul style="list-style-type: none"> <li>Electronics and ISEM (intelligent sensor electronics module) in the transmitter housing</li> <li>Signal transmission: analog</li> <li>Order code for "Integrated ISEM electronics", option <b>B</b> "Transmitter"</li> </ul>
<p><b>Connecting cable</b> (can be ordered in various lengths → 📄 134 )</p>	
<ul style="list-style-type: none"> <li>Length: max. 300 m (1000 ft)</li> <li>Standard cable with common shield (pair-stranded)</li> <li>Not sensitive to external EMC interference.</li> </ul>	<ul style="list-style-type: none"> <li>Length: max. 200 m (656 ft), depends on the medium conductivity</li> <li>Two connecting cables:               <ul style="list-style-type: none"> <li>One cable for coil current with a common shield (1 pair)</li> <li>One cable for signal transmission with common shield and 4 individual shielded cores (4 coaxial cables)</li> </ul> </li> </ul>
<p><b>Hazardous area</b></p>	
<p>Use in: Zone 2; Class I, Division 2</p> <p>Mixed installation is possible:</p> <ul style="list-style-type: none"> <li>Sensor: Zone 1; Class I, Division 1</li> <li>Transmitter: Zone 2; Class I, Division 2</li> </ul>	<p>Use in: Zone 1; Class I, Division 1 or Zone 2; Class I, Division 2</p>
<p><b>Housing versions and materials</b></p>	
<ul style="list-style-type: none"> <li>Transmitter housing               <ul style="list-style-type: none"> <li>Aluminum, coated: aluminum, AlSi10Mg, coated</li> <li>Material: polycarbonate</li> </ul> </li> <li>Material of window in transmitter housing               <ul style="list-style-type: none"> <li>Aluminum, coated: glass</li> <li>Polycarbonate: plastic</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Transmitter housing               <ul style="list-style-type: none"> <li>Aluminum, coated: aluminum, AlSi10Mg, coated</li> </ul> </li> <li>Window material: glass</li> </ul>
<p><b>Configuration</b></p>	
<ul style="list-style-type: none"> <li>External operation via 4-line, illuminated graphic local display (LCD) with touch control and guided menus ("Make-it-run" wizards) for application-specific commissioning.</li> <li>Via service interface or WLAN interface:               <ul style="list-style-type: none"> <li>Operating tools (e.g. FieldCare, DeviceCare)</li> <li>Web server (access via Web browser, e.g. Microsoft Internet Explorer, Microsoft Edge)</li> </ul> </li> </ul>	

**Sensor connection housing**

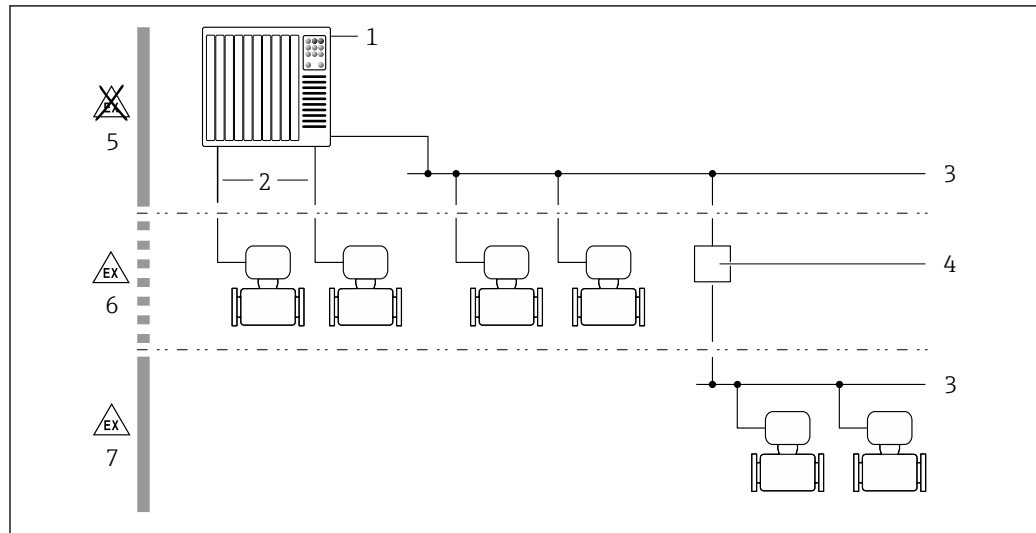
Different versions of the connection housing are available.

	<p>Order code for "Sensor connection housing", option A, "Aluminum, coated": Aluminum, AlSi10Mg, coated</p> <p> This device version is only available in conjunction with the Proline 500 – digital transmitter.</p>
	<p>Order code for "Sensor connection housing", option B, "Stainless": Hygienic version, stainless steel 1.4301 (304)</p> <p> This device version is only available in conjunction with the Proline 500 – digital transmitter.</p>
	<p>Order code for "Sensor connection housing", option C, "Ultra-compact hygienic, stainless": Hygienic version, stainless steel 1.4301 (304)</p> <p> This device version is only available in conjunction with the Proline 500 – digital transmitter.</p>
 <p style="text-align: right; font-size: small;">A0029683</p>	<p>Order code for "Sensor connection housing", option B, "Stainless, hygienic": Hygienic version, stainless steel 1.4301 (304)</p> <p> This device version is only available in conjunction with the Proline 500 transmitter.</p>

**Sensor**

<p><b>Promag H</b></p>  <p style="text-align: right; font-size: small;">A0019897</p>  <p style="text-align: right; font-size: small;">A0019898</p>	<p>Nominal diameter range: DN 2 to 150 (1/12 to 6")</p> <p>Materials:</p> <ul style="list-style-type: none"> <li>■ Sensor housing: stainless steel, 1.4301 (304)</li> <li>■ Measuring tubes: stainless steel, 1.4301 (304)</li> <li>■ Liner: PFA</li> <li>■ Electrodes: stainless steel, 1.4435 (316L); Alloy C22, 2.4602 (UNS N06022); tantalum; platinum (only up to DN 25 (1"))</li> <li>■ Process connections: stainless steel, 1.4404 (F316L); PVDF; PVC adhesive sleeve</li> <li>■ Seals:             <ul style="list-style-type: none"> <li>■ DN 2 to 25 (1/12 to 1"): O-ring seal (EPDM, FKM, Kalrez), aseptic gasket seal (EPDM, FKM, silicone)</li> <li>■ DN 40 to 150 (1 1/2 to 6"): aseptic gasket seal (EPDM, FKM, silicone)</li> </ul> </li> <li>■ Grounding rings: stainless steel, 1.4435 (316L); Alloy C22, 2.4602 (UNS N06022); tantalum</li> </ul>
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## Equipment architecture



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1 Possibilities for integrating measuring devices into a system

- 1 Control system (e.g. PLC)
- 2 Connecting cable (0/4 to 20 mA HART etc.)
- 3 Fieldbus
- 4 Coupler
- 5 Non-hazardous area
- 6 Hazardous area: Zone 2; Class I, Division 2
- 7 Hazardous area: Zone 1; Class I, Division 1

## Security

## IT security

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

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

## 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 in-operation 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 → 9	Not enabled	On an individual basis following risk assessment
Access code (also applies for Web server login or FieldCare connection) → 9	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) → 9	Serial number	Assign a customized WLAN passphrase during commissioning
WLAN mode	Access point	On an individual basis following risk assessment
Web server → 9	Enabled	On an individual basis following risk assessment
CDI-RJ45 service interface → 10	-	On an individual basis following risk assessment

#### *Protecting access via hardware write protection*

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

Hardware write protection is disabled when the device is delivered.

#### *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*

Write access to the device parameters via the local display, Web browser or operating tool (e.g. FieldCare, DeviceCare) can be protected by the modifiable, user-specific access code.

#### *WLAN passphrase: Operation as WLAN access point*

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

When the device is delivered, the network key is pre-defined depending on the device. It can be changed via the **WLAN settings** submenu in the **WLAN passphrase** parameter.

#### *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.

#### *Access via Web server*

The device can be operated and configured via a Web browser with the integrated Web server. The connection is via the service interface (CDI-RJ45) or the WLAN interface. For device versions with the EtherNet/IP and PROFINET communication protocols, the connection can also be established via the terminal connection for signal transmission with EtherNet/IP, PROFINET (RJ45 plug) or PROFINET with Ethernet-APL (two-wire).

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 → 137

### Access via OPC-UA

 The "OPC UA Server" application package is available in the device version with the HART communication protocol →  133.

The device can communicate with OPC UA clients using the "OPC UA Server" application package.

The OPC UA server integrated in the device can be accessed via the WLAN access point using the WLAN interface - which can be ordered as an optional extra - or the service interface (CDI- RJ45) via Ethernet network. Access rights and authorization as per separate configuration.


The following Security Modes are supported as per the OPC UA Specification (IEC 62541):


- None
- Basic128Rsa15 – signed
- Basic128Rsa15 – signed and encrypted

### Access via service interface (CDI-RJ45)

The device can be connected to a network via the service interface (CDI-RJ45). Device-specific functions guarantee the secure operation of the device in a network.

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

 Transmitters with an Ex de approval may not be connected via the service interface (CDI-RJ45)!  
Order code for "Approval transmitter + sensor", options (Ex de): BA, BB, C1, C2, GA, GB, MA, MB, NA, NB

 The device can be incorporated into a ring topology. The device is integrated via the terminal connection for signal transmission (output 1) and the connection to the service interface (CDI-RJ45) .

## Input

### Measured variable

#### Direct measured variables

- Volume flow (proportional to induced voltage)
- Temperature <sup>1)</sup>
- Electrical conductivity

#### Calculated measured variables

- Mass flow
- Corrected volume flow
- Corrected electrical conductivity <sup>1)</sup>

### Measuring range

Typically  $v = 0.01$  to  $10$  m/s ( $0.03$  to  $33$  ft/s) with the specified accuracy

*Flow characteristic values in SI units: DN 2 to 125 ( $1/12$  to 5")*

Nominal diameter		Recommended flow min./max. full scale value ( $v \sim 0.3/10$ m/s) [dm <sup>3</sup> /min]	Factory settings		
[mm]	[in]		Full scale value current output ( $v \sim 2.5$ m/s) [dm <sup>3</sup> /min]	Pulse value ( $\sim 2$ pulse/s) [dm <sup>3</sup> ]	Low flow cut off ( $v \sim 0.04$ m/s) [dm <sup>3</sup> /min]
2	$1/12$	0.06 to 1.8	0.5	0.005	0.01
4	$5/32$	0.25 to 7	2	0.025	0.05
8	$5/16$	1 to 30	8	0.1	0.1

1) Available only for nominal diameters DN 15 to 150 ( $1/2$  to 6") and with the order code for "Sensor option", option CI "Medium temperature measurement".

Nominal diameter		Recommended flow min./max. full scale value (v ~ 0.3/10 m/s) [dm <sup>3</sup> /min]	Factory settings		
[mm]	[in]		Full scale value current output (v ~ 2.5 m/s) [dm <sup>3</sup> /min]	Pulse value (~ 2 pulse/s) [dm <sup>3</sup> ]	Low flow cut off (v ~ 0.04 m/s) [dm <sup>3</sup> /min]
15	½	4 to 100	25	0.2	0.5
25 <sup>1)</sup>	1	9 to 300	75	0.5	1
40	1 ½	25 to 700	200	1.5	3
50	2	35 to 1 100	300	2.5	5
65	–	60 to 2 000	500	5	8
80	3	90 to 3 000	750	5	12
100	4	145 to 4 700	1200	10	20
125	5	220 to 7 500	1850	15	30

1) The values apply for the product version: 5HxB26

*Flow characteristic values in SI units: DN 150 (6")*



Nominal diameter		Recommended flow min./max. full scale value (v ~ 0.3/10 m/s) [m <sup>3</sup> /h]	Factory settings		
[mm]	[in]		Full scale value current output (v ~ 2.5 m/s) [m <sup>3</sup> /h]	Pulse value (~ 2 pulse/s) [m <sup>3</sup> ]	Low flow cut off (v ~ 0.04 m/s) [m <sup>3</sup> /h]
150	6	20 to 600	150	0.03	2.5

*Flow characteristic values in US units: ½" - 6" (DN 2 - 150)*

Nominal diameter		Recommended flow min./max. full scale value (v ~ 0.3/10 m/s) [gal/min]	Full scale value current output (v ~ 2.5 m/s) [gal/min]	Pulse value (~ 2 pulse/s) [gal]	Low flow cut off (v ~ 0.04 m/s) [gal/min]
[in]	[mm]				
½ <sub>12</sub>	2	0.015 to 0.5	0.1	0.001	0.002
½ <sub>32</sub>	4	0.07 to 2	0.5	0.005	0.008
¾ <sub>16</sub>	8	0.25 to 8	2	0.02	0.025
½	15	1 to 27	6	0.05	0.1
1 <sup>1)</sup>	25	2.5 to 80	18	0.2	0.25
1 ½	40	7 to 190	50	0.5	0.75
2	50	10 to 300	75	0.5	1.25
3	80	24 to 800	200	2	2.5
4	100	40 to 1 250	300	2	4
5	125	60 to 1 950	450	5	7
6	150	90 to 2 650	600	5	12

1) The values apply for the product version: 5HxB26


**Recommended measuring range**

 Flow limit →  73

 For custody transfer, the applicable approval determines the permitted measuring range, the pulse value and the low flow cut off.

**Operable flow range**

Over 1000 : 1

 For custody transfer, the operable flow range is 100 : 1 to 630 : 1, depending on the nominal diameter. Further details are specified by the applicable approval.

**Input signal****Output and input variants**

→  14

**External measured values**

To increase the accuracy of certain measured variables or to calculate the mass flow, the automation system can continuously write different measured values to the measuring device:

- Medium temperature enables temperature-compensated conductivity measurement (e.g. iTEMP)
- Reference density for calculating the mass flow

 Various pressure and temperature measuring devices can be ordered from Endress+Hauser: see "Accessories" section →  137


It is recommended to read in external measured values to calculate the corrected volume flow.

*HART protocol*

The measured values are written from the automation system to the measuring device via the HART protocol. The pressure transmitter must support the following protocol-specific functions:

- HART protocol
- Burst mode

*Current input*

The measured values are written from the automation system to the measuring device via the current input →  12.

*Digital communication*

The measured values can be written by the automation system via:

- FOUNDATION Fieldbus
- PROFIBUS DP
- PROFIBUS PA
- Modbus RS485
- EtherNet/IP
- PROFINET
- PROFINET with Ethernet-APL

**Current input 0/4 to 20 mA**

<b>Current input</b>	0/4 to 20 mA (active/passive)
<b>Current span</b>	<ul style="list-style-type: none"> <li>▪ 4 to 20 mA (active)</li> <li>▪ 0/4 to 20 mA (passive)</li> </ul>
<b>Resolution</b>	1 $\mu$ A
<b>Voltage drop</b>	Typically: 0.6 to 2 V for 3.6 to 22 mA (passive)
<b>Maximum input voltage</b>	$\leq$ 30 V (passive)
<b>Open-circuit voltage</b>	$\leq$ 28.8 V (active)
<b>Possible input variables</b>	<ul style="list-style-type: none"> <li>▪ Temperature</li> <li>▪ Density</li> </ul>



**Status input**

<b>Maximum input values</b>	<ul style="list-style-type: none"> <li>▪ DC -3 to 30 V</li> <li>▪ If status input is active (ON): <math>R_i &gt; 3 \text{ k}\Omega</math></li> </ul>
<b>Response time</b>	Configurable: 5 to 200 ms
<b>Input signal level</b>	<ul style="list-style-type: none"> <li>▪ Low signal: DC -3 to +5 V</li> <li>▪ High signal: DC 12 to 30 V</li> </ul>
<b>Assignable functions</b>	<ul style="list-style-type: none"> <li>▪ Off</li> <li>▪ Reset the individual totalizers separately</li> <li>▪ Reset all totalizers</li> <li>▪ Flow override</li> </ul>

## Output

### Output and input variants

Depending on the option selected for output/input 1, different options are available for the other outputs and inputs. Only one option can be selected for each output/input 1 to 4. The following tables must be read vertically (↓).

Example: If the option BA "4–20 mA HART" was selected for output/input 1, one of the options A, B, D, E, F, H, I or J is available for output 2 and one of the options A, B, D, E, F, H, I or J is available for output 3 and 4.

### Output/input 1 and options for output/input 2





Options for output/input 3 and 4 → 15

Order code for "Output; input 1" (020) →	Possible options												
Current output 4 to 20 mA HART	BA												
Current output 4 to 20 mA HART Ex i passive	↓	CA											
Current output 4 to 20 mA HART Ex i active		↓	CC										
FOUNDATION Fieldbus			↓	SA									
FOUNDATION Fieldbus Ex i				↓	TA								
PROFIBUS DP					↓	LA							
PROFIBUS PA						↓	GA						
PROFIBUS PA Ex i							↓	HA					
Modbus RS485								↓	MA				
EtherNet/IP 2-port switch integrated									↓	NA			
PROFINET 2-port switch integrated										↓	RA		
PROFINET with Ethernet-APL											↓	RB	
PROFINET with Ethernet-APL Ex i												↓	RC
<b>Order code for "Output; input 2" (021) →</b>	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Not assigned	A	A	A	A	A	A	A	A	A	A	A	A	A
Current output 4 to 20 mA	B			B		B	B		B	B	B	B	
Current output 4 to 20 mA Ex i passive		C	C		C			C					C
User-configurable input/output <sup>1)</sup>	D			D		D	D		D	D	D	D	
Pulse/frequency/switch output	E			E		E	E		E	E	E	E	
Double pulse output <sup>2)</sup>	F								F				
Pulse/frequency/switch output Ex i passive		G	G		G			G					G
Relay output	H			H		H	H		H	H	H	H	
Current input 0/4 to 20 mA	I			I		I	I		I	I	I	I	
Status input	J			J		J	J		J	J	J	J	

1) A specific input or output can be assigned to a user-configurable input/output → 21.

2) If double pulse output (F) is selected for output/input 2 (021), only the double pulse output (F) option is available for selection for output/input 3 (022).

Output/input 1 and options for output/input 3 and 4

 Options for output/input 2 →  14

Order code for "Output; input 1" (020) →	Possible options												
Current output 4 to 20 mA HART	BA												
Current output 4 to 20 mA HART Ex i passive	↓	CA											
Current output 4 to 20 mA HART Ex i active		↓	CC										
FOUNDATION Fieldbus			↓	SA									
FOUNDATION Fieldbus Ex i				↓	TA								
PROFIBUS DP					↓	LA							
PROFIBUS PA						↓	GA						
PROFIBUS PA Ex i							↓	HA					
Modbus RS485								↓	MA				
EtherNet/IP 2-port switch integrated									↓	NA			
PROFINET 2-port switch integrated										↓	RA		
PROFINET with Ethernet-APL											↓	RB	
PROFINET with Ethernet-APL Ex i												↓	RC
<b>Order code for "Output; input 3" (022), "Output; input 4" (023) <sup>1)</sup> →</b>	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	
Not assigned	A	A	A	A	A	A	A	A	A	A	A	A	
Current output 4 to 20 mA	B						B			B	B	B	
Current output 4 to 20 mA Ex i passive <sup>2)</sup>		C	C										
User-configurable input/output	D					D			D	D	D	D	
Pulse/frequency/switch output	E					E			E	E	E	E	
Double pulse output (slave) <sup>3)</sup>	F								F				
Pulse/frequency/switch output Ex i passive <sup>4)</sup>		G	G										
Relay output	H					H			H	H	H	H	
Current input 0/4 to 20 mA	I					I			I	I	I	I	
Status input	J					J			J	J	J	J	

- 1) The order code for "Output; input 4" (023) is only available for the Proline 500-digital transmitter, order code for "Integrated ISEM electronics", option A.
- 2) The current output 4 to 20 mA Ex i passive (C) option is not available for input/output 4.
- 3) The double pulse output (F) option is not available for input/output 4.
- 4) The pulse/frequency/switch output Ex i passive (G) option is not available for input/output 4.

## Output signal

## Current output 4 to 20 mA HART

<b>Order code</b>	"Output; input 1" (20): Option BA: current output 4 to 20 mA HART
<b>Signal mode</b>	Can be set to: <ul style="list-style-type: none"> <li>■ Active</li> <li>■ Passive</li> </ul>
<b>Current range</b>	Can be set to: <ul style="list-style-type: none"> <li>■ 4 to 20 mA NAMUR</li> <li>■ 4 to 20 mA US</li> <li>■ 4 to 20 mA</li> <li>■ 0 to 20 mA (only if the signal mode is active)</li> <li>■ Fixed current</li> </ul>
<b>Open-circuit voltage</b>	DC 28.8 V (active)
<b>Maximum input voltage</b>	DC 30 V (passive)
<b>Load</b>	250 to 700 $\Omega$
<b>Resolution</b>	0.38 $\mu$ A
<b>Damping</b>	Configurable: 0 to 999.9 s
<b>Assignable measured variables</b>	<ul style="list-style-type: none"> <li>■ Volume flow</li> <li>■ Mass flow</li> <li>■ Corrected volume flow</li> <li>■ Flow velocity</li> <li>■ Conductivity</li> <li>■ Corrected conductivity</li> <li>■ Temperature</li> <li>■ Electronics temperature</li> </ul>

## Current output 4 to 20 mA HART Ex i

<b>Order code</b>	"Output; input 1" (20) choose from: <ul style="list-style-type: none"> <li>■ Option CA: current output 4 to 20 mA HART Ex i passive</li> <li>■ Option CC: current output 4 to 20 mA HART Ex i active</li> </ul>
<b>Signal mode</b>	Depends on the selected order version.
<b>Current range</b>	Can be set to: <ul style="list-style-type: none"> <li>■ 4 to 20 mA NAMUR</li> <li>■ 4 to 20 mA US</li> <li>■ 4 to 20 mA</li> <li>■ 0 to 20 mA (only if the signal mode is active)</li> <li>■ Fixed current</li> </ul>
<b>Open-circuit voltage</b>	DC 21.8 V (active)
<b>Maximum input voltage</b>	DC 30 V (passive)
<b>Load</b>	<ul style="list-style-type: none"> <li>■ 250 to 400 <math>\Omega</math> (active)</li> <li>■ 250 to 700 <math>\Omega</math> (passive)</li> </ul>
<b>Resolution</b>	0.38 $\mu$ A
<b>Damping</b>	Configurable: 0 to 999.9 s
<b>Assignable measured variables</b>	<ul style="list-style-type: none"> <li>■ Volume flow</li> <li>■ Mass flow</li> <li>■ Corrected volume flow</li> <li>■ Flow velocity</li> <li>■ Conductivity</li> <li>■ Corrected conductivity</li> <li>■ Temperature</li> <li>■ Electronics temperature</li> </ul>

**FOUNDATION Fieldbus**

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

**PROFIBUS DP**

<b>Signal encoding</b>	NRZ code
<b>Data transfer</b>	9.6 kBaud...12 MBaud
<b>Terminating resistor</b>	Integrated, can be activated via DIP switches

**PROFIBUS PA**

<b>PROFIBUS PA</b>	In accordance with EN 50170 Volume 2, IEC 61158-2 (MBP), galvanically isolated
<b>Data transmission</b>	31.25 kbit/s
<b>Current consumption</b>	10 mA
<b>Permitted supply voltage</b>	9 to 32 V
<b>Bus connection</b>	With integrated reverse polarity protection

**Modbus RS485**

<b>Physical interface</b>	RS485 in accordance with EIA/TIA-485 standard
<b>Terminating resistor</b>	Integrated, can be activated via DIP switches

**EtherNet/IP**

<b>Standards</b>	In accordance with IEEE 802.3
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**PROFINET**

<b>Standards</b>	In accordance with IEEE 802.3
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## PROFINET with Ethernet-APL

<b>Device use</b>	<p><b>Device connection to an APL field switch</b> The device may only be operated according to the following APL port classifications:</p> <ul style="list-style-type: none"> <li>▪ If used in hazardous areas: SLAA or SLAC <sup>1)</sup></li> <li>▪ If used in non-hazardous areas: SLAX</li> </ul> <p>Connection values of APL field switch (corresponds to APL port classification SPCC or SPAA, for instance):</p> <ul style="list-style-type: none"> <li>▪ Maximum input voltage: 15 V<sub>DC</sub></li> <li>▪ Minimum output values: 0.54 W</li> </ul> <p><b>Device connection to an SPE switch</b> The device may only be operated according to the following PoDL power class: If used in the non-hazardous area: PoDL power class 10</p> <p>Connection values of SPE switch (corresponds to PoDL power class 10, 11 or 12):</p> <ul style="list-style-type: none"> <li>▪ Maximum input voltage: 30 V<sub>DC</sub></li> <li>▪ Minimum output values: 1.85 W</li> </ul>
<b>PROFINET</b>	According to IEC 61158 and IEC 61784
<b>Ethernet-APL</b>	According to IEEE 802.3cg, APL port profile specification v1.0, galvanically isolated
<b>Data transfer</b>	10 Mbit/s
<b>Current consumption</b>	<p><b>Transmitter</b></p> <ul style="list-style-type: none"> <li>▪ Max. 400 mA (24 V)</li> <li>▪ Max. 200 mA (110 V, 50/60 Hz; 230 V, 50/60 Hz)</li> </ul>
<b>Permitted supply voltage</b>	9 to 30 V
<b>Network connection</b>	With integrated reverse polarity protection

1) For more information on using the device in the hazardous area, see the Ex-specific Safety Instructions


## Current output 4 to 20 mA

<b>Order code</b>	"Output; input 2" (21), "Output; input 3" (022) or "Output; input 4" (023): Option B: current output 4 to 20 mA
<b>Signal mode</b>	Can be set to: <ul style="list-style-type: none"> <li>▪ Active</li> <li>▪ Passive</li> </ul>
<b>Current span</b>	Can be set to: <ul style="list-style-type: none"> <li>▪ 4 to 20 mA NAMUR</li> <li>▪ 4 to 20 mA US</li> <li>▪ 4 to 20 mA</li> <li>▪ 0 to 20 mA (only if the signal mode is active)</li> <li>▪ Fixed current</li> </ul>
<b>Maximum output values</b>	22.5 mA
<b>Open-circuit voltage</b>	DC 28.8 V (active)
<b>Maximum input voltage</b>	DC 30 V (passive)
<b>Load</b>	0 to 700 Ω
<b>Resolution</b>	0.38 μA
<b>Damping</b>	Configurable: 0 to 999.9 s
<b>Assignable measured variables</b>	<ul style="list-style-type: none"> <li>▪ Volume flow</li> <li>▪ Mass flow</li> <li>▪ Corrected volume flow</li> <li>▪ Flow velocity</li> <li>▪ Conductivity</li> <li>▪ Corrected conductivity</li> <li>▪ Temperature</li> <li>▪ Electronics temperature</li> </ul>

**Current output 4 to 20 mA Ex i passive**

<b>Order code</b>	"Output; input 2" (21), "Output; input 3" (022): Option C: current output 4 to 20 mA Ex i passive
<b>Signal mode</b>	Passive
<b>Current span</b>	Can be set to: <ul style="list-style-type: none"> <li>■ 4 to 20 mA NAMUR</li> <li>■ 4 to 20 mA US</li> <li>■ 4 to 20 mA</li> <li>■ Fixed current</li> </ul>
<b>Maximum output values</b>	22.5 mA
<b>Maximum input voltage</b>	DC 30 V
<b>Load</b>	0 to 700 Ω
<b>Resolution</b>	0.38 µA
<b>Damping</b>	Configurable: 0 to 999 s
<b>Assignable measured variables</b>	<ul style="list-style-type: none"> <li>■ Volume flow</li> <li>■ Mass flow</li> <li>■ Corrected volume flow</li> <li>■ Flow velocity</li> <li>■ Conductivity</li> <li>■ Corrected conductivity</li> <li>■ Temperature</li> <li>■ Electronics temperature</li> </ul>

**Pulse/frequency/switch output**

<b>Function</b>	Can be configured as pulse, frequency or switch output
<b>Version</b>	Open collector Can be set to: <ul style="list-style-type: none"> <li>■ Active</li> <li>■ Passive</li> <li>■ Passive NAMUR</li> </ul>  Ex-i, passive
<b>Maximum input values</b>	DC 30 V, 250 mA (passive)
<b>Open-circuit voltage</b>	DC 28.8 V (active)
<b>Voltage drop</b>	For 22.5 mA: ≤ DC 2 V
<b>Pulse output</b>	
<b>Maximum input values</b>	DC 30 V, 250 mA (passive)
<b>Maximum output current</b>	22.5 mA (active)
<b>Open-circuit voltage</b>	DC 28.8 V (active)
<b>Pulse width</b>	Configurable: 0.05 to 2 000 ms
<b>Maximum pulse rate</b>	10 000 Impulse/s
<b>Pulse value</b>	Configurable
<b>Assignable measured variables</b>	<ul style="list-style-type: none"> <li>■ Volume flow</li> <li>■ Mass flow</li> <li>■ Corrected volume flow</li> </ul>
<b>Frequency output</b>	
<b>Maximum input values</b>	DC 30 V, 250 mA (passive)
<b>Maximum output current</b>	22.5 mA (active)
<b>Open-circuit voltage</b>	DC 28.8 V (active)
<b>Output frequency</b>	Configurable: end value frequency 2 to 10 000 Hz (f <sub>max</sub> = 12 500 Hz)

<b>Damping</b>	Configurable: 0 to 999.9 s
<b>Pulse/pause ratio</b>	1:1
<b>Assignable measured variables</b>	<ul style="list-style-type: none"> <li>■ Volume flow</li> <li>■ Mass flow</li> <li>■ Corrected volume flow</li> <li>■ Flow velocity</li> <li>■ Conductivity</li> <li>■ Corrected conductivity</li> <li>■ Temperature</li> <li>■ Electronics temperature</li> </ul>
<b>Switch output</b>	
<b>Maximum input values</b>	DC 30 V, 250 mA (passive)
<b>Open-circuit voltage</b>	DC 28.8 V (active)
<b>Switching behavior</b>	Binary, conductive or non-conductive
<b>Switching delay</b>	Configurable: 0 to 100 s
<b>Number of switching cycles</b>	Unlimited
<b>Assignable functions</b>	<ul style="list-style-type: none"> <li>■ Off</li> <li>■ On</li> <li>■ Diagnostic behavior</li> <li>■ Limit value: <ul style="list-style-type: none"> <li>■ Off</li> <li>■ Volume flow</li> <li>■ Mass flow</li> <li>■ Corrected volume flow</li> <li>■ Flow velocity</li> <li>■ Conductivity</li> <li>■ Corrected conductivity</li> <li>■ Totalizer 1-3</li> <li>■ Temperature</li> <li>■ Electronics temperature</li> </ul> </li> <li>■ Flow direction monitoring</li> <li>■ Status <ul style="list-style-type: none"> <li>■ Empty pipe detection</li> <li>■ Buildup index</li> <li>■ HBSI limit value exceeded</li> <li>■ Low flow cut off</li> </ul> </li> </ul>

#### Double pulse output

<b>Function</b>	Double pulse
<b>Version</b>	Open collector Can be set to: <ul style="list-style-type: none"> <li>■ Active</li> <li>■ Passive</li> <li>■ Passive NAMUR</li> </ul>
<b>Maximum input values</b>	DC 30 V, 250 mA (passive)
<b>Open-circuit voltage</b>	DC 28.8 V (active)
<b>Voltage drop</b>	For 22.5 mA: ≤ DC 2 V
<b>Output frequency</b>	Configurable: 0 to 1000 Hz
<b>Damping</b>	Configurable: 0 to 999 s



<b>Pulse/pause ratio</b>	1:1
<b>Assignable measured variables</b>	<ul style="list-style-type: none"> <li>▪ Volume flow</li> <li>▪ Mass flow</li> <li>▪ Corrected volume flow</li> <li>▪ Flow velocity</li> <li>▪ Conductivity</li> <li>▪ Corrected conductivity</li> <li>▪ Temperature</li> <li>▪ Electronics temperature</li> </ul>

**Relay output**

<b>Function</b>	Switch output
<b>Version</b>	Relay output, galvanically isolated
<b>Switching behavior</b>	Can be set to: <ul style="list-style-type: none"> <li>▪ NO (normally open), factory setting</li> <li>▪ NC (normally closed)</li> </ul>
<b>Maximum switching capacity (passive)</b>	<ul style="list-style-type: none"> <li>▪ DC 30 V, 0.1 A</li> <li>▪ AC 30 V, 0.5 A</li> </ul>
<b>Assignable functions</b>	<ul style="list-style-type: none"> <li>▪ Off</li> <li>▪ On</li> <li>▪ Diagnostic behavior</li> <li>▪ Limit value:               <ul style="list-style-type: none"> <li>▪ Off</li> <li>▪ Volume flow</li> <li>▪ Mass flow</li> <li>▪ Corrected volume flow</li> <li>▪ Flow velocity</li> <li>▪ Conductivity</li> <li>▪ Corrected conductivity</li> <li>▪ Totalizer 1-3</li> <li>▪ Temperature</li> <li>▪ Electronics temperature</li> </ul> </li> <li>▪ Flow direction monitoring</li> <li>▪ Status               <ul style="list-style-type: none"> <li>▪ Empty pipe detection</li> <li>▪ Buildup index</li> <li>▪ HBSI limit value exceeded</li> <li>▪ Low flow cut off</li> </ul> </li> </ul>

**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

The technical values correspond to those of the inputs and outputs described in this section.

**Signal on alarm**

Depending on the interface, failure information is displayed as follows:

**HART current output**

<b>Device diagnostics</b>	Device condition can be read out via HART Command 48
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**PROFIBUS PA**

Status and alarm messages	Diagnostics in accordance with PROFIBUS PA Profile 3.02
Failure current FDE (Fault Disconnection Electronic)	0 mA

**PROFIBUS DP**

Status and alarm messages	Diagnostics in accordance with PROFIBUS PA Profile 3.02
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**EtherNet/IP**

Device diagnostics	Device condition can be read out in Input Assembly
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**PROFINET**

Device diagnostics	According to "Application Layer protocol for decentralized periphery", Version 2.3
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**PROFINET with Ethernet-APL**

Device diagnostics	Diagnostics according to PROFINET PA Profile 4
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**FOUNDATION Fieldbus**

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

**Modbus RS485**

Failure mode	Choose from: <ul style="list-style-type: none"> <li>▪ NaN value instead of current value</li> <li>▪ Last valid value</li> </ul>
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**Current output 0/4 to 20 mA***4 to 20 mA*

Failure mode	Choose from: <ul style="list-style-type: none"> <li>▪ 4 to 20 mA in accordance with NAMUR recommendation NE 43</li> <li>▪ 4 to 20 mA in accordance with US</li> <li>▪ Min. value: 3.59 mA</li> <li>▪ Max. value: 22.5 mA</li> <li>▪ Freely definable value between: 3.59 to 22.5 mA</li> <li>▪ Actual value</li> <li>▪ Last valid value</li> </ul>
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*0 to 20 mA*

Failure mode	Choose from: <ul style="list-style-type: none"> <li>▪ Maximum alarm: 22 mA</li> <li>▪ Freely definable value between: 0 to 20.5 mA</li> </ul>
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**Pulse/frequency/switch output**

Pulse output	
Failure mode	Choose from: <ul style="list-style-type: none"> <li>▪ Actual value</li> <li>▪ No pulses</li> </ul>
Frequency output	
Failure mode	Choose from: <ul style="list-style-type: none"> <li>▪ Actual value</li> <li>▪ 0 Hz</li> <li>▪ Defined value (<math>f_{max} 2</math> to 12 500 Hz)</li> </ul>
Switch output	
Failure mode	Choose from: <ul style="list-style-type: none"> <li>▪ Current status</li> <li>▪ Open</li> <li>▪ Closed</li> </ul>

**Relay output**

Failure mode	Choose from: <ul style="list-style-type: none"> <li>▪ Current status</li> <li>▪ Open</li> <li>▪ Closed</li> </ul>
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**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:
  - HART protocol
  - FOUNDATION Fieldbus
  - PROFIBUS PA
  - PROFIBUS DP
  - Modbus RS485
  - EtherNet/IP
  - PROFINET
  - PROFINET with Ethernet-APL
- Via service interface
  - CDI-RJ45 service interface
  - WLAN interface

Plain text display	With information on cause and remedial measures
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Additional information on remote operation → 115

**Web browser**

Plain text display	With information on cause and remedial measures
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## Light emitting diodes (LED)

<b>Status information</b>	<p>Status indicated by various light emitting diodes</p> <p>The following information is displayed depending on the device version:</p> <ul style="list-style-type: none"> <li>▪ Supply voltage active</li> <li>▪ Data transmission active</li> <li>▪ Device alarm/error has occurred</li> <li>▪ EtherNet/IP network available</li> <li>▪ EtherNet/IP connection established</li> <li>▪ PROFINET network available</li> <li>▪ PROFINET connection established</li> <li>▪ PROFINET blinking feature</li> </ul>
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## Load

Output signal → 16

## Ex connection data

## Safety-related values

Order code for "Output; input 1"	Output type	Safety-related values "Output; input 1"	
		26 (+)	27 (-)
Option <b>BA</b>	Current output 4 to 20 mA HART	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$	
Option <b>GA</b>	PROFIBUS PA	$U_N = 32 V_{DC}$ $U_M = 250 V_{AC}$	
Option <b>LA</b>	PROFIBUS DP	$U_N = 32 V_{DC}$ $U_M = 250 V_{AC}$	
Option <b>MA</b>	Modbus RS485	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$	
Option <b>SA</b>	FOUNDATION Fieldbus	$U_N = 32 V_{DC}$ $U_M = 250 V_{AC}$	
Option <b>NA</b>	EtherNet/IP	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$	
Option <b>RA</b>	PROFINET	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$	
Option <b>RB</b>	PROFINET with Ethernet- APL	APL port profile SLAX SPE PoDL classes 10, 11, 12 $U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$	

Order code for "Output; input 2"; "Output; input 3"; "Output; input 4"	Output type	Safety-related values					
		Output; input 2		Output; input 3		Output; input 4 <sup>1)</sup>	
		24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)
Option <b>B</b>	Current output 4 to 20 mA	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$					
Option <b>D</b>	User-configurable input/ output	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$					
Option <b>E</b>	Pulse/frequency/switch output	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$					
Option <b>F</b>	Double pulse output	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$					
Option <b>H</b>	Relay output	$U_N = 30 V_{DC}$ $I_N = 100 mA_{DC} / 500 mA_{AC}$ $U_M = 250 V_{AC}$					

Order code for "Output; input 2"; "Output; input 3" "Output; input 4"	Output type	Safety-related values					
		Output; input 2		Output; input 3		Output; input 4 <sup>1)</sup>	
		24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)
Option I	Current input 4 to 20 mA	U <sub>N</sub> = 30 V <sub>DC</sub> U <sub>M</sub> = 250 V <sub>AC</sub>					
Option J	Status input	U <sub>N</sub> = 30 V <sub>DC</sub> U <sub>M</sub> = 250 V <sub>AC</sub>					

1) The order code "Output; input 4" is only available for the Proline 500 – digital transmitter.

### Intrinsically safe values

Order code "Output; input 1"	Output type	Intrinsically safe values "Output; input 1"	
		26 (+)	27 (-)
Option CA	Current output 4 to 20 mA HART Ex i passive	U <sub>i</sub> = 30 V I <sub>i</sub> = 100 mA P <sub>i</sub> = 1.25 W L <sub>i</sub> = 0 μH C <sub>i</sub> = 6 nF	
Option CC	Current output 4 to 20 mA HART Ex i active	<b>Ex ia</b> <sup>1)</sup> U <sub>0</sub> = 21.8 V I <sub>0</sub> = 90 mA P <sub>0</sub> = 491 mW L <sub>0</sub> = 4.1 mH (IIC)/15 mH (IIB) C <sub>0</sub> = 160 nF (IIC)/ 1 160 nF (IIB)  U <sub>i</sub> = 30 V I <sub>i</sub> = 10 mA P <sub>i</sub> = 0.3 W L <sub>i</sub> = 5 μH C <sub>i</sub> = 6 nF	<b>Ex ic</b> <sup>2)</sup> U <sub>0</sub> = 21.8 V I <sub>0</sub> = 90 mA P <sub>0</sub> = 491 mW L <sub>0</sub> = 9 mH (IIC)/39 mH (IIB) C <sub>0</sub> = 600 nF (IIC)/ 4 000 nF (IIB)
Option HA	PROFIBUS PA Ex i (FISCO Field Device)	<b>Ex ia</b> <sup>1)</sup> U <sub>i</sub> = 30 V I <sub>i</sub> = 570 mA P <sub>i</sub> = 8.5 W L <sub>i</sub> = 10 μH C <sub>i</sub> = 5 nF	<b>Ex ic</b> <sup>2)</sup> U <sub>i</sub> = 32 V I <sub>i</sub> = 570 mA P <sub>i</sub> = 8.5 W L <sub>i</sub> = 10 μH C <sub>i</sub> = 5 nF
Option TA	FOUNDATION Fieldbus Ex i	<b>Ex ia</b> <sup>1)</sup> U <sub>i</sub> = 30 V I <sub>i</sub> = 570 mA P <sub>i</sub> = 8.5 W L <sub>i</sub> = 10 μH C <sub>i</sub> = 5 nF	<b>Ex ic</b> <sup>2)</sup> U <sub>i</sub> = 32 V I <sub>i</sub> = 570 mA P <sub>i</sub> = 8.5 W L <sub>i</sub> = 10 μH C <sub>i</sub> = 5 nF
Option RC	PROFINET with Ethernet- APL Ex i	<b>Ex ia</b> <sup>1)</sup> 2-WISE power load APL port profile SLAA	<b>Ex ic</b> <sup>2)</sup> 2-WISE power load APL port profile SLAC

1) Only available for Proline 500 transmitter Zone 1; Class I, Division 1.

2) Only available for transmitter Zone 2; Class I, Division 2 and only for Proline 500 – digital transmitter

Order code for "Output; input 2"; "Output; input 3"; "Output; input 4"	Output type	Intrinsically safe values or NIFW values					
		Output; input 2		Output; input 3		Output; input 4 <sub>1)</sub>	
		24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)
Option C	Current output 4 to 20 mA Ex i passive	$U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 1.25 \text{ W}$ $L_i = 0$ $C_i = 0$					
Option G	Pulse/frequency/switch output Ex i passive	$U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 1.25 \text{ W}$ $L_i = 0$ $C_i = 0$					

1) The order code "Output; input 4" is only available for the Proline 500 – digital transmitter.

#### Low flow cut off

The switch points for low flow cut off are user-selectable.


#### Galvanic isolation

The outputs are galvanically isolated:

- from the power supply
- from one another
- from the potential equalization (PE) terminal

#### Protocol-specific data

##### HART

Manufacturer ID	0x11
Device type ID	0x3C
HART protocol revision	7
Device description files (DTM, DD)	Information and files under: <a href="http://www.endress.com">www.endress.com</a>
HART load	Min. 250 $\Omega$
System integration	Information on system integration: Operating Instructions →  137. <ul style="list-style-type: none"> <li>▪ Measured variables via HART protocol</li> <li>▪ Burst Mode functionality</li> </ul>




##### FOUNDATION Fieldbus

Manufacturer ID	0x452B48 (hex)
Ident number	0x103C (hex)
Device revision	1
DD revision	Information and files under:
CFF revision	<ul style="list-style-type: none"> <li>▪ <a href="http://www.endress.com">www.endress.com</a></li> <li>▪ <a href="http://www.fieldcommgroup.org">www.fieldcommgroup.org</a></li> </ul>
Interoperability Test Kit (ITK)	Version 6.2.0
ITK Test Campaign Number	Information: <ul style="list-style-type: none"> <li>▪ <a href="http://www.endress.com">www.endress.com</a></li> <li>▪ <a href="http://www.fieldcommgroup.org">www.fieldcommgroup.org</a></li> </ul>
Link Master capability (LAS)	Yes
Choice of "Link Master" and "Basic Device"	Yes Factory setting: Basic Device
Node address	Factory setting: 247 (0xF7)




<b>Supported functions</b>	The following methods are supported: <ul style="list-style-type: none"> <li>Restart</li> <li>ENP Restart</li> <li>Diagnostic</li> <li>Set to OOS</li> <li>Set to AUTO</li> <li>Read trend data</li> <li>Read event logbook</li> </ul>
<b>Virtual Communication Relationships (VCRs)</b>	
<b>Number of VCRs</b>	44
<b>Number of link objects in VFD</b>	50
<b>Permanent entries</b>	1
<b>Client VCRs</b>	0
<b>Server VCRs</b>	10
<b>Source VCRs</b>	43
<b>Sink VCRs</b>	0
<b>Subscriber VCRs</b>	43
<b>Publisher VCRs</b>	43
<b>Device Link Capabilities</b>	
<b>Slot time</b>	4
<b>Min. delay between PDU</b>	8
<b>Max. response delay</b>	16
<b>System integration</b>	Information regarding system integration: Operating Instructions → 137. <ul style="list-style-type: none"> <li>Cyclic data transmission</li> <li>Description of the modules</li> <li>Execution times</li> <li>Methods</li> </ul>

**PROFIBUS DP**

<b>Manufacturer ID</b>	0x11
<b>Ident number</b>	0x1570
<b>Profile version</b>	3.02
<b>Device description files (GSD, DTM, DD)</b>	Information and files under: <ul style="list-style-type: none"> <li><a href="https://www.endress.com/download">https://www.endress.com/download</a> On the device product page: PRODUCTS → Product Finder → Links</li> <li><a href="https://www.profibus.com">https://www.profibus.com</a></li> </ul>
<b>Supported functions</b>	<ul style="list-style-type: none"> <li>Identification &amp; Maintenance Simplest device identification on the part of the control system and nameplate</li> <li>PROFIBUS upload/download Reading and writing parameters is up to ten times faster with PROFIBUS upload/download</li> <li>Condensed status Simplest and self-explanatory diagnostic information by categorizing diagnostic messages that occur</li> </ul>
<b>Configuration of the device address</b>	<ul style="list-style-type: none"> <li>DIP switches on the I/O electronics module</li> <li>Via operating tools (e.g. FieldCare)</li> </ul>





<b>Compatibility with earlier model</b>	<p>If the device is replaced, the measuring device Promag 500 supports the compatibility of the cyclic data with previous models. It is not necessary to adjust the engineering parameters of the PROFIBUS network with the Promag 500 GSD file.</p> <p>Earlier models:</p> <ul style="list-style-type: none"> <li>▪ Promag 50 PROFIBUS DP <ul style="list-style-type: none"> <li>▪ ID No.: 1546 (hex)</li> <li>▪ Extended GSD file: EH3x1546.gsd</li> <li>▪ Standard GSD file: EH3_1546.gsd</li> </ul> </li> <li>▪ Promag 53 PROFIBUS DP <ul style="list-style-type: none"> <li>▪ ID No.: 1526 (hex)</li> <li>▪ Extended GSD file: EH3x1526.gsd</li> <li>▪ Standard GSD file: EH3_1526.gsd</li> </ul> </li> </ul> <p> Description of the function scope of compatibility: Operating Instructions →  137.</p>
<b>System integration</b>	<p>Information regarding system integration: Operating Instructions →  137.</p> <ul style="list-style-type: none"> <li>▪ Cyclic data transmission</li> <li>▪ Block model</li> <li>▪ Description of the modules</li> </ul>

### PROFIBUS PA

<b>Manufacturer ID</b>	0x11
<b>Ident number</b>	0x156C
<b>Profile version</b>	3.02
<b>Device description files (GSD, DTM, DD)</b>	<p>Information and files under:</p> <ul style="list-style-type: none"> <li>▪ <a href="https://www.endress.com/download">https://www.endress.com/download</a> On the device product page: PRODUCTS → Product Finder → Links</li> <li>▪ <a href="https://www.profibus.com">https://www.profibus.com</a></li> </ul>
<b>Supported functions</b>	<ul style="list-style-type: none"> <li>▪ Identification &amp; Maintenance Simplest device identification on the part of the control system and nameplate</li> <li>▪ PROFIBUS upload/download Reading and writing parameters is up to ten times faster with PROFIBUS upload/download</li> <li>▪ Condensed status Simplest and self-explanatory diagnostic information by categorizing diagnostic messages that occur</li> </ul>
<b>Configuration of the device address</b>	<ul style="list-style-type: none"> <li>▪ DIP switches on the I/O electronics module</li> <li>▪ Local display</li> <li>▪ Via operating tools (e.g. FieldCare)</li> </ul>
<b>Compatibility with earlier model</b>	<p>If the device is replaced, the measuring device Promag 500 supports the compatibility of the cyclic data with previous models. It is not necessary to adjust the engineering parameters of the PROFIBUS network with the Promag 500 GSD file.</p> <p>Earlier models:</p> <ul style="list-style-type: none"> <li>▪ Promag 50 PROFIBUS PA <ul style="list-style-type: none"> <li>▪ ID No.: 1525 (hex)</li> <li>▪ Extended GSD file: EH3x1525.gsd</li> <li>▪ Standard GSD file: EH3_1525.gsd</li> </ul> </li> <li>▪ Promag 53 PROFIBUS PA <ul style="list-style-type: none"> <li>▪ ID No.: 1527 (hex)</li> <li>▪ Extended GSD file: EH3x1527.gsd</li> <li>▪ Standard GSD file: EH3_1527.gsd</li> </ul> </li> </ul> <p> Description of the function scope of compatibility: Operating Instructions →  137.</p>
<b>System integration</b>	<p>Information regarding system integration: Operating Instructions →  137.</p> <ul style="list-style-type: none"> <li>▪ Cyclic data transmission</li> <li>▪ Block model</li> <li>▪ Description of the modules</li> </ul>




### Modbus RS485

<b>Protocol</b>	Modbus Applications Protocol Specification V1.1
<b>Response times</b>	<ul style="list-style-type: none"> <li>▪ Direct data access: typically 25 to 50 ms</li> <li>▪ Auto-scan buffer (data range): typically 3 to 5 ms</li> </ul>
<b>Device type</b>	Slave
<b>Slave address range</b>	1 to 247
<b>Broadcast address range</b>	0
<b>Function codes</b>	<ul style="list-style-type: none"> <li>▪ 03: Read holding register</li> <li>▪ 04: Read input register</li> <li>▪ 06: Write single registers</li> <li>▪ 08: Diagnostics</li> <li>▪ 16: Write multiple registers</li> <li>▪ 23: Read/write multiple registers</li> </ul>
<b>Broadcast messages</b>	Supported by the following function codes: <ul style="list-style-type: none"> <li>▪ 06: Write single registers</li> <li>▪ 16: Write multiple registers</li> <li>▪ 23: Read/write multiple registers</li> </ul>
<b>Supported baud rate</b>	<ul style="list-style-type: none"> <li>▪ 1 200 BAUD</li> <li>▪ 2 400 BAUD</li> <li>▪ 4 800 BAUD</li> <li>▪ 9 600 BAUD</li> <li>▪ 19 200 BAUD</li> <li>▪ 38 400 BAUD</li> <li>▪ 57 600 BAUD</li> <li>▪ 115 200 BAUD</li> </ul>
<b>Data transfer mode</b>	<ul style="list-style-type: none"> <li>▪ ASCII</li> <li>▪ RTU</li> </ul>
<b>Data access</b>	Each device parameter can be accessed via Modbus RS485.  For Modbus register information
<b>Compatibility with earlier model</b>	If the device is replaced, the measuring device Promag 500 supports the compatibility of the Modbus registers for the process variables and the diagnostic information with the previous model Promag 53. It is not necessary to change the engineering parameters in the automation system.  Description of the function scope of compatibility: Operating Instructions →  137.
<b>System integration</b>	Information on system integration: Operating Instructions →  137. <ul style="list-style-type: none"> <li>▪ Modbus RS485 information</li> <li>▪ Function codes</li> <li>▪ Register information</li> <li>▪ Response time</li> <li>▪ Modbus data map</li> </ul>


### EtherNet/IP

<b>Protocol</b>	<ul style="list-style-type: none"> <li>▪ The CIP Networks Library Volume 1: Common Industrial Protocol</li> <li>▪ The CIP Networks Library Volume 2: EtherNet/IP Adaptation of CIP</li> </ul>
<b>Communication type</b>	<ul style="list-style-type: none"> <li>▪ 10Base-T</li> <li>▪ 100Base-TX</li> </ul>
<b>Device profile</b>	Generic device (product type: 0x2B)
<b>Manufacturer ID</b>	0x000049E
<b>Device type ID</b>	0x103C
<b>Baud rates</b>	Automatic <sup>10</sup> / <sub>100</sub> Mbit with half-duplex and full-duplex detection
<b>Polarity</b>	Auto-polarity for automatic correction of crossed TxD and RxD pairs
<b>Supported CIP connections</b>	Max. 3 connections

<b>Explicit connections</b>	Max. 6 connections
<b>I/O connections</b>	Max. 6 connections (scanner)
<b>Configuration options for measuring device</b>	<ul style="list-style-type: none"> <li>▪ DIP switches on the electronics module for IP addressing</li> <li>▪ Manufacturer-specific software (FieldCare)</li> <li>▪ Add-on Profile Level 3 for Rockwell Automation control systems</li> <li>▪ Web browser</li> <li>▪ Electronic Data Sheet (EDS) integrated in the measuring device</li> </ul>
<b>Configuration of the EtherNet interface</b>	<ul style="list-style-type: none"> <li>▪ Speed: 10 MBit, 100 MBit, auto (factory setting)</li> <li>▪ Duplex: half-duplex, full-duplex, auto (factory setting)</li> </ul>
<b>Configuration of the device address</b>	<ul style="list-style-type: none"> <li>▪ DIP switches on the electronics module for IP addressing (last octet)</li> <li>▪ DHCP</li> <li>▪ Manufacturer-specific software (FieldCare)</li> <li>▪ Add-on Profile Level 3 for Rockwell Automation control systems</li> <li>▪ Web browser</li> <li>▪ EtherNet/IP tools, e.g. RSLinx (Rockwell Automation)</li> </ul>
<b>Device Level Ring (DLR)</b>	Yes
<b>System integration</b>	<p>Information regarding system integration: Operating Instructions →  137.</p> <ul style="list-style-type: none"> <li>▪ Cyclic data transmission</li> <li>▪ Block model</li> <li>▪ Input and output groups</li> </ul>


## PROFINET

<b>Protocol</b>	Application layer protocol for decentral device periphery and distributed automation, Version 2.3
<b>Communication type</b>	100 MBit/s
<b>Conformance Class</b>	Conformance Class B
<b>Netload Class</b>	Netload Class 2 0 Mbps
<b>Baud rates</b>	Automatic 100 Mbit/s with full-duplex detection
<b>Cycle times</b>	From 8 ms
<b>Polarity</b>	Auto-polarity for automatic correction of crossed TxD and RxD pairs
<b>Media Redundancy Protocol (MRP)</b>	Yes
<b>System redundancy support</b>	System redundancy S2 (2 AR with 1 NAP)
<b>Device profile</b>	Application interface identifier 0xF600 Generic device
<b>Manufacturer ID</b>	0x11
<b>Device type ID</b>	0x843C
<b>Device description files (GSD, DTM, DD)</b>	<p>Information and files under:</p> <ul style="list-style-type: none"> <li>▪ <a href="http://www.endress.com">www.endress.com</a> On the product page for the device: Documents/Software → Device drivers</li> <li>▪ <a href="http://www.profibus.com">www.profibus.com</a></li> </ul>
<b>Supported connections</b>	<ul style="list-style-type: none"> <li>▪ 2 x AR (IO Controller AR)</li> <li>▪ 1 x AR (IO-Supervisor Device AR connection allowed)</li> <li>▪ 1 x Input CR (Communication Relation)</li> <li>▪ 1 x Output CR (Communication Relation)</li> <li>▪ 1 x Alarm CR (Communication Relation)</li> </ul>
<b>Configuration options for measuring device</b>	<ul style="list-style-type: none"> <li>▪ DIP switches on the electronics module, for device name assignment (last part)</li> <li>▪ Asset management software (FieldCare, DeviceCare, Field Xpert)</li> <li>▪ Integrated Web server via Web browser and IP address</li> <li>▪ Device master file (GSD), can be read out via the integrated Web server of the measuring device.</li> <li>▪ Onsite operation</li> </ul>

<b>Configuration of the device name</b>	<ul style="list-style-type: none"> <li>▪ DIP switches on the electronics module, for device name assignment (last part)</li> <li>▪ DCP protocol</li> <li>▪ Asset management software (FieldCare, DeviceCare, Field Xpert)</li> <li>▪ Integrated Web server</li> </ul>
<b>Supported functions</b>	<ul style="list-style-type: none"> <li>▪ Identification &amp; Maintenance, simple device identifier via: <ul style="list-style-type: none"> <li>▪ Control system</li> <li>▪ Nameplate</li> </ul> </li> <li>▪ Measured value status The process variables are communicated with a measured value status</li> <li>▪ Blinking feature via the local display for simple device identification and assignment</li> <li>▪ Device operation via asset management software (e.g. FieldCare, DeviceCare, SIMATIC PDM)</li> </ul>
<b>System integration</b>	<p>Information regarding system integration: Operating Instructions →  137.</p> <ul style="list-style-type: none"> <li>▪ Cyclic data transmission</li> <li>▪ Overview and description of the modules</li> <li>▪ Status coding</li> <li>▪ Startup configuration</li> <li>▪ Factory setting</li> </ul>

**PROFINET with Ethernet-APL**

<b>Protocol</b>	Application layer protocol for decentral device periphery and distributed automation, Version 2.4
<b>Communication type</b>	Ethernet Advanced Physical Layer 10BASE-T1L
<b>Conformance Class</b>	Conformance Class B (PA)
<b>Netload Class</b>	Netload Class 2 0 Mbps
<b>Baud rates</b>	10 Mbit/s Full-duplex
<b>Cycle times</b>	64 ms
<b>Polarity</b>	Automatic correction of crossed "APL signal +" and "APL signal -" signal lines
<b>Media Redundancy Protocol (MRP)</b>	Not possible (point-to-point connection to APL field switch)
<b>System redundancy support</b>	System redundancy S2 (2 AR with 1 NAP)
<b>Device profile</b>	PROFINET PA profile 4 (Application interface identifier API: 0x9700)
<b>Manufacturer ID</b>	0x11
<b>Device type ID</b>	0xA43C
<b>Device description files (GSD, DTM, FDI)</b>	<p>Information and files under:</p> <ul style="list-style-type: none"> <li>▪ <a href="http://www.endress.com/download">www.endress.com/download</a> On the device product page: PRODUCTS → Product Finder → Links</li> <li>▪ <a href="http://www.profibus.com">www.profibus.com</a></li> </ul>
<b>Supported connections</b>	<ul style="list-style-type: none"> <li>▪ 2x AR (IO Controller AR)</li> <li>▪ 2x AR (IO Supervisor Device AR connection allowed)</li> </ul>
<b>Configuration options for measuring device</b>	<ul style="list-style-type: none"> <li>▪ DIP switches on the electronics module, for device name assignment (last part)</li> <li>▪ Asset management software (FieldCare, DeviceCare, Field Xpert)</li> <li>▪ Integrated Web server via Web browser and IP address</li> <li>▪ Device master file (GSD), can be read out via the integrated Web server of the measuring device.</li> <li>▪ Onsite operation</li> </ul>
<b>Configuration of the device name</b>	<ul style="list-style-type: none"> <li>▪ DIP switches on the electronics module, for device name assignment (last part)</li> <li>▪ DCP protocol</li> <li>▪ Asset management software (FieldCare, DeviceCare, Field Xpert)</li> <li>▪ Integrated Web server</li> </ul>


<b>Supported functions</b>	<ul style="list-style-type: none"> <li>▪ Identification &amp; Maintenance, simple device identifier via: <ul style="list-style-type: none"> <li>▪ Control system</li> <li>▪ Nameplate</li> </ul> </li> <li>▪ Measured value status The process variables are communicated with a measured value status</li> <li>▪ Blinking feature via the local display for simple device identification and assignment</li> <li>▪ Device operation via asset management software (e.g. FieldCare, DeviceCare, SIMATIC PDM with FDI package)</li> </ul>
<b>System integration</b>	<p>Information regarding system integration: Operating Instructions →  137.</p> <ul style="list-style-type: none"> <li>▪ Cyclic data transmission</li> <li>▪ Overview and description of the modules</li> <li>▪ Status coding</li> <li>▪ Startup configuration</li> <li>▪ Factory setting</li> </ul>

## Power supply


### Terminal assignment

#### Transmitter: supply voltage, input/outputs


##### HART

Supply voltage		Input/output 1		Input/output 2		Input/output 3		Input/output 4	
1 (+)	2 (-)	26 (+)	27 (-)	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)
The terminal assignment depends on the specific device version ordered →  14.									


##### FOUNDATION Fieldbus

Supply voltage		Input/output 1		Input/output 2		Input/output 3		Input/output 4	
1 (+)	2 (-)	26 (A)	27 (B)	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)
The terminal assignment depends on the specific device version ordered →  14.									


##### PROFIBUS DP

Supply voltage		Input/output 1		Input/output 2		Input/output 3		Input/output 4	
1 (+)	2 (-)	26 (B)	27 (A)	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)
The terminal assignment depends on the specific device version ordered →  14.									


##### PROFIBUS PA

Supply voltage		Input/output 1		Input/output 2		Input/output 3		Input/output 4	
1 (+)	2 (-)	26 (B)	27 (A)	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)
The terminal assignment depends on the specific device version ordered →  14.									


##### Modbus RS485

Supply voltage		Input/output 1		Input/output 2		Input/output 3		Input/output 4	
1 (+)	2 (-)	26 (B)	27 (A)	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)
The terminal assignment depends on the specific device version ordered →  14.									


*EtherNet/IP*

Supply voltage		Input/output 1	Input/output 2	Input/output 3	Input/output 4
1 (+)	2 (-)	EtherNet/IP (RJ45 connector)	24 (+)   25 (-)	22 (+)   23 (-)	20 (+)   21 (-)
The terminal assignment depends on the specific device version ordered →  14.					

*PROFINET*

Supply voltage		Input/output 1	Input/output 2	Input/output 3	Input/output 4
1 (+)	2 (-)	PROFINET (RJ45 connector)	24 (+)   25 (-)	22 (+)   23 (-)	20 (+)   21 (-)
The terminal assignment depends on the specific device version ordered →  14.					



*PROFINET with Ethernet-APL*

Supply voltage		Input/output 1	Input/output 2	Input/output 3	Input/output 4
1 (+)	2 (-)	EtherNet/IP (RJ45 connector)	24 (+)   25 (-)	22 (+)   23 (-)	20 (+)   21 (-)
The terminal assignment depends on the specific device version ordered →  14.					


**Transmitter and sensor connection housing: connecting cable**

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

Terminal assignment and connection of the connecting cable:






- Proline 500 – digital →  37
- Proline 500 →  38

**Available device plugs**

 Device plugs may not be used in hazardous areas!


**Device plugs for fieldbus systems:**

Order code for "Input; output 1"


- Option **SA** "FOUNDATION Fieldbus" →  33
- Option **GA** "PROFIBUS PA" →  34
- Option **NA** "EtherNet/IP" →  34
- Option **RA** "PROFINET" →  34
- Option **RB** "PROFINET with Ethernet-APL" →  34

**Device plug for connecting to the service interface:**

Order code for "Accessory mounted"

Option **NB**, adapter RJ45 M12 (service interface) →  36

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

Order code for "Electrical connection"	Cable entry/connection →  38	
	2	3
M, 3, 4, 5	7/8" connector	-

**Order code for "Input; output 1", option GA "PROFIBUS PA"**

Order code for "Electrical connection"	Cable entry/connection → 38	
	2	3
L, N, P, U	Connector M12 × 1	-

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

Order code for "Electrical connection"	Cable entry/connection → 38	
	2	3
L, N, P, U	Connector M12 × 1	-
R <sup>1) 2)</sup> , S <sup>1) 2)</sup> , T <sup>1) 2)</sup> , V <sup>1) 2)</sup>	Connector M12 × 1	Connector M12 × 1

- 1) Cannot be combined with an external WLAN antenna (order code for "Enclosed accessories", option P8) of an RJ45 M12 adapter for the service interface (order code for "Accessories mounted", option NB) or of the remote display and operating module DKX001
- 2) Suitable for integrating the device in a ring topology.

**Order code for "Input; output 1", option RA "PROFINET"**

Order code for "Electrical connection"	Cable entry/connection → 38	
	2	3
L, N, P, U	Connector M12 × 1	-
R <sup>1) 2)</sup> , S <sup>1) 2)</sup> , T <sup>1) 2)</sup> , V <sup>1) 2)</sup>	Connector M12 × 1	Connector M12 × 1

- 1) Cannot be combined with an external WLAN antenna (order code for "Enclosed accessories", option P8) of an RJ45 M12 adapter for the service interface (order code for "Accessories mounted", option NB) or of the remote display and operating module DKX001.
- 2) Suitable for integrating the device in a ring topology.

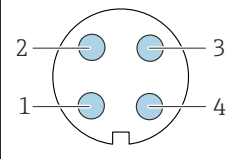
**Order code for "Input; output 1", option RB "PROFINET with Ethernet-APL"**

Order code "Electrical connection"	Cable entry/connection → 38	
	2	3
L, N, P, U	M12 plug × 1	-

**Order code for "Accessory mounted", option NB "Adapter RJ45 M12 (service interface)"**

Order code "Accessory mounted"	Cable entry/coupling → 38	
	Cable entry 2	Cable entry 3
NB	Plug M12 × 1	-

**Pin assignment, device plug****FOUNDATION Fieldbus**

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

**PROFIBUS PA**

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

- i** Recommended plug:
- Binder, series 713, part no. 99 1430 814 04
  - Phoenix, part no. 1413934 SACC-FS-4QO SH PBPA SCO

**PROFINET**

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

- i** Recommended plug:
- Binder, series 825, part no. 99 3729 810 04
  - Phoenix, part no. 1543223 SACC-M12MSD-4Q

**PROFINET with Ethernet-APL**

	Pin	Assignment		Coding	Plug/socket
	1	-	APL signal -		
	2	+	APL signal +		
	3		Cable shield <sup>1</sup>		
	4		Not assigned		
	Metal plug housing		Cable shield		
<sup>1</sup> If a cable shield is used					

- i** Recommended plug:
- Binder, series 713, part no. 99 1430 814 04
  - Phoenix, part no. 1413934 SACC-FS-4QO SH PBPA SCO

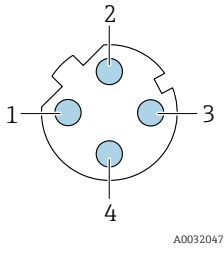
**EtherNet/IP**

	Pin	Assignment		Coding	Plug/socket
	1	+	Tx		
	2	+	Rx		
	3	-	Tx		
	4	-	Rx		
	Coding		Plug/socket		
D		Socket			

- i** Recommended plug:
- Binder, series 763, part no. 99 3729 810 04
  - Phoenix, part no. 1543223 SACC-M12MSD-4Q

**Service interface**

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

	Pin		Assignment	
	1	+	Tx	
	2	+	Rx	
	3	-	Tx	
	4	-	Rx	
	Coding		Plug/socket	
D		Socket		

- i** Recommended plug:
- Binder, series 763, part no. 99 3729 810 04
  - Phoenix, part no. 1543223 SACC-M12MSD-4Q

Supply voltage	Order code for "Power supply"		Terminal voltage		Frequency range
	Option D		DC 24 V	±20%	–
Option E		AC 100 to 240 V	–15 to +10%	50/60 Hz, ±4 Hz	
Option I		DC 24 V	±20%	–	
		AC 100 to 240 V	–15 to +10%	50/60 Hz, ±4 Hz	

Power consumption	Transmitter		
	Max. 10 W (active power)		
	<table border="1"> <tr> <td>switch-on current</td> <td>Max. 36 A (&lt;5 ms) as per NAMUR Recommendation NE 21</td> </tr> </table>	switch-on current	Max. 36 A (<5 ms) as per NAMUR Recommendation NE 21
switch-on current	Max. 36 A (<5 ms) as per NAMUR Recommendation NE 21		

Current consumption	Transmitter
	<ul style="list-style-type: none"> <li>▪ Max. 400 mA (24 V)</li> <li>▪ Max. 200 mA (110 V, 50/60 Hz; 230 V, 50/60 Hz)</li> </ul>

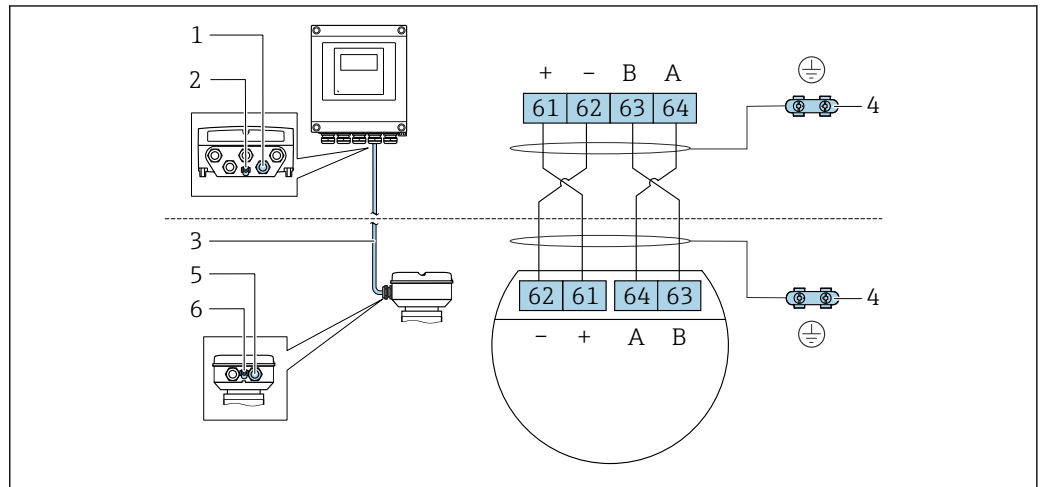
Power supply failure	
	<ul style="list-style-type: none"> <li>▪ Totalizers stop at the last value measured.</li> <li>▪ Depending on the device version, the configuration is retained in the device memory or in the pluggable data memory (HistoROM DAT).</li> <li>▪ Error messages (incl. total operated hours) are stored.</li> </ul>

Overcurrent protection element	
	<p>The device must be operated with a dedicated circuit breaker, as it does not have an ON/OFF switch of its own.</p> <ul style="list-style-type: none"> <li>▪ The circuit breaker must be easy to reach and labeled accordingly.</li> <li>▪ Permitted nominal current of the circuit breaker: 2 A up to maximum 10 A.</li> </ul>



Electrical connection

Connection of connecting cable: Proline 500 – digital



A0028198

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

Depending on the device version of the sensor connection housing, the connecting cable is connected via terminals or device plugs.

Sensor connection housing Order code for "Housing"	Connection on connection housing via	Connection on transmitter housing via
Option B: stainless	Terminals	Terminals
Option C: ultra-compact, hygienic, stainless	Device plug	Terminals

Pin assignment, device plug

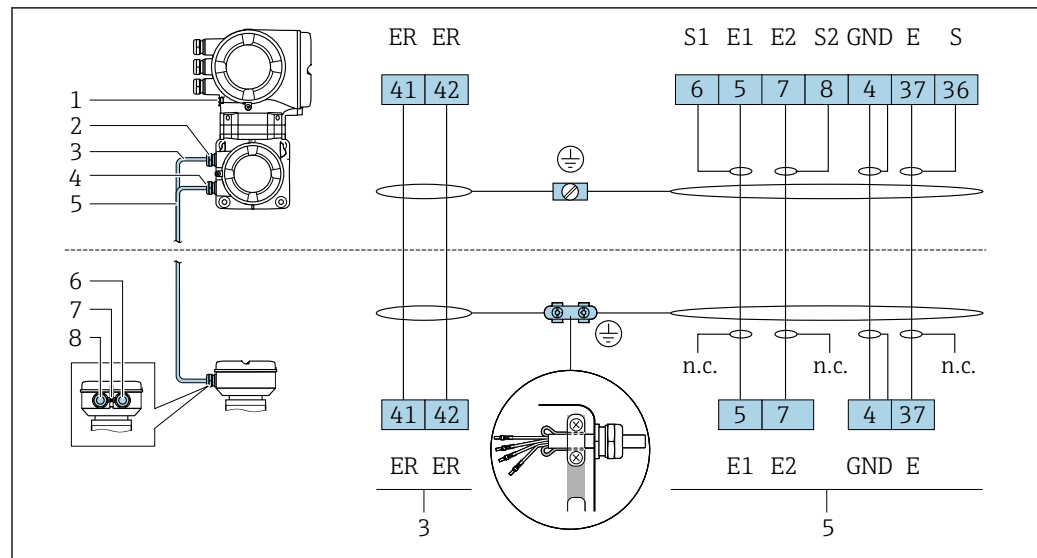
Device plugs are only available for device version, order code for "Housing":  
Option C: ultra-compact, hygienic, stainless  
For connection to sensor connection housing.

	Pin	Color <sup>1)</sup>	Assignment		Connection to terminal
	1	Brown	+	Supply voltage	
2	White	A	ISEM communication		64
3	Blue	B			63
4	Black	-	Supply voltage		62
5	-		-		-
<b>Coding</b>			<b>Plug/socket</b>		
A			Plug		

1) Cable colors of connecting cable

A connecting cable with a device plug is optionally available.

Connection of the connecting cable: Proline 500



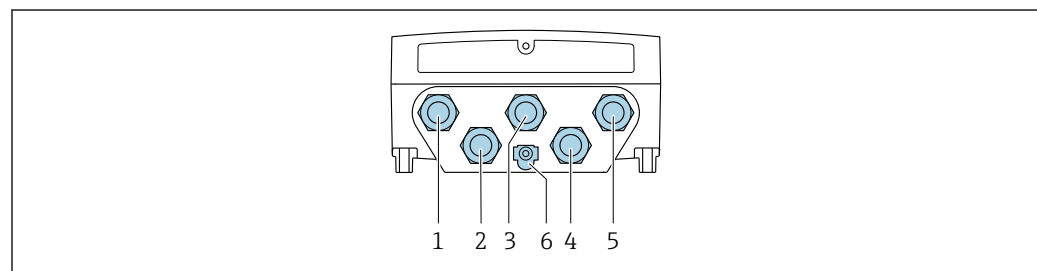
A0029444

- 1 Terminal connection for potential equalization (PE)
- 2 Cable entry for coil current cable on transmitter connection housing
- 3 Coil current cable
- 4 Cable entry for signal cable on transmitter connection housing
- 5 Signal cable
- 6 Cable entry for signal cable on sensor connection housing
- 7 Terminal connection for potential equalization (PE)
- 8 Cable entry for coil current cable on sensor connection housing

Transmitter connection

- i** Terminal assignment → 32
- i** Device plug pin assignment → 34

Transmitter connection: Proline 500 – digital



A0028200

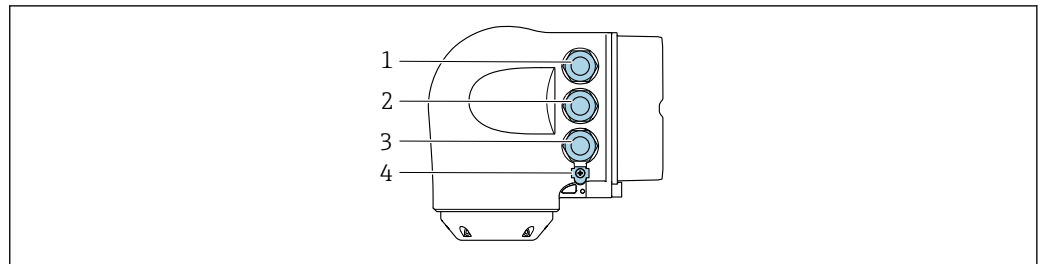
- 1 Terminal connection for supply voltage
- 2 Terminal connection for signal transmission, input/output
- 3 Terminal connection for signal transmission, input/output
- 4 Terminal connection for connecting cable between sensor and transmitter
- 5 Terminal connection for signal transmission, input/output or terminal for network connection (DHCP client) via service interface (CDI-RJ45); optional: terminal connection for external WLAN antenna
- 6 Terminal connection for potential equalization (PE)

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

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

**i** Network connection (DHCP client) via service interface (CDI-RJ45) → 121

Connecting the transmitter: Proline 500



A0026781

- 1 Terminal connection for supply voltage
- 2 Terminal connection for signal transmission, input/output
- 3 Terminal connection for signal transmission, input/output or terminal for network connection (DHCP client) via service interface (CDI-RJ45); optional: terminal connection for external WLAN antenna
- 4 Terminal connection for potential equalization (PE)

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

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

**i** Network connection (DHCP client) via service interface (CDI-RJ45) → 📄 121

Connecting in a ring topology

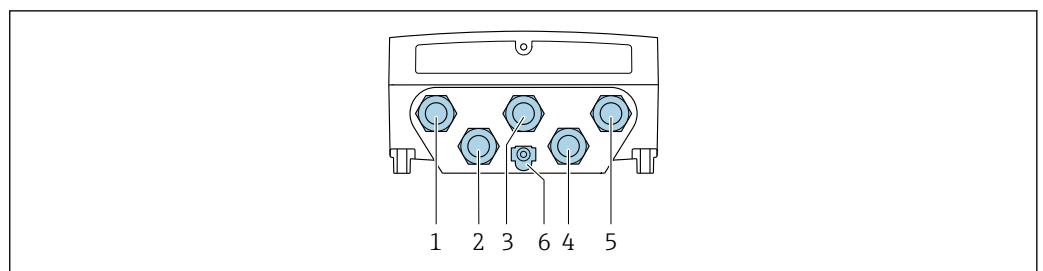
Device versions with EtherNet/IP and PROFINET communication protocols can be integrated into a ring topology. The device is integrated via the terminal connection for signal transmission (output 1) and the connection to the service interface (CDI-RJ45).

**i** Transmitters with an Ex de approval may **not** be connected via the service interface (CDI-RJ45)!  
Order code for "Approval transmitter + sensor", options (Ex de):  
BB, C2, GB, MB, NB

**i** Integrate the transmitter in a ring topology:

- EtherNet/IP
- PROFINET

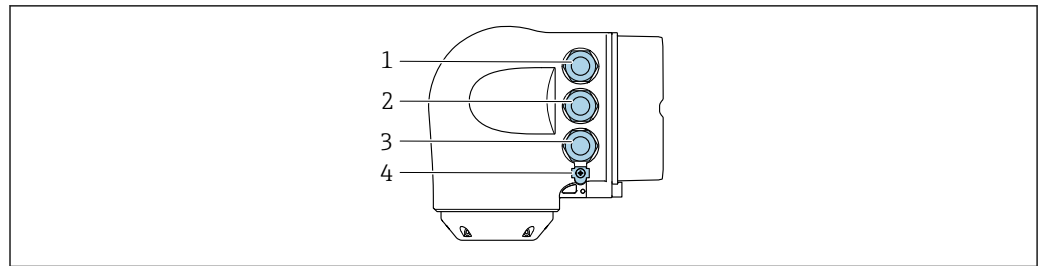
Transmitter: Proline 500 – digital



A0028200

- 1 Terminal connection for supply voltage
- 2 Terminal connection for signal transmission, input/output
- 3 Terminal connection for signal transmission: PROFINET or EtherNet/IP (RJ45 plug)
- 4 Terminal connection for connecting cable between sensor and transmitter
- 5 Terminal connection to service interface (CDI-RJ45)
- 6 Terminal connection for potential equalization (PE)

## Transmitter: Proline 500



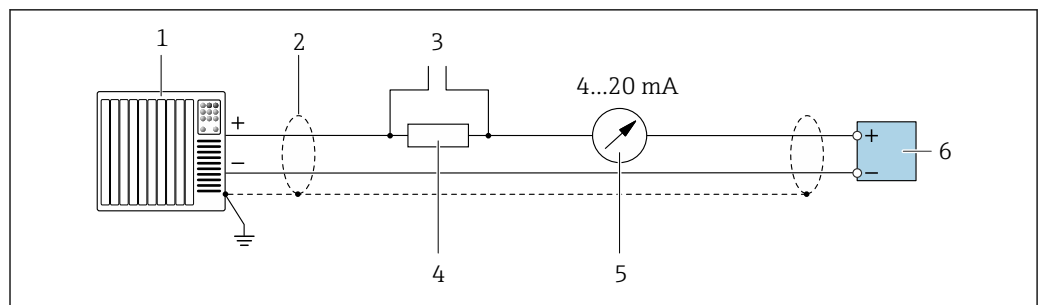
A0026781

- 1 Terminal connection for supply voltage
- 2 Terminal connection for signal transmission: PROFINET or EtherNet/IP (RJ45 plug)
- 3 Terminal connection to service interface (CDI-RJ45)
- 4 Terminal connection for potential equalization (PE)

**i** If the device has additional inputs/outputs, these are routed in parallel via the cable entry for connection to the service interface.

## Connection examples

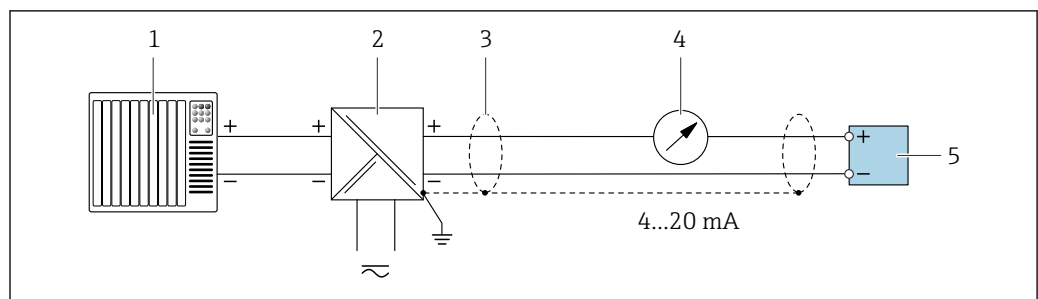
## Current output 4 to 20 mA HART



A0029055

**2** Connection example for 4 to 20 mA HART current output (active)

- 1 Automation system with current input (e.g. PLC)
- 2 Cable shield provided at one end. The cable shield must be grounded at both ends to comply with EMC requirements; observe cable specifications → 49
- 3 Connection for HART operating devices → 115
- 4 Resistor for HART communication ( $\geq 250 \Omega$ ): observe maximum load → 16
- 5 Analog display unit: observe maximum load → 16
- 6 Transmitter

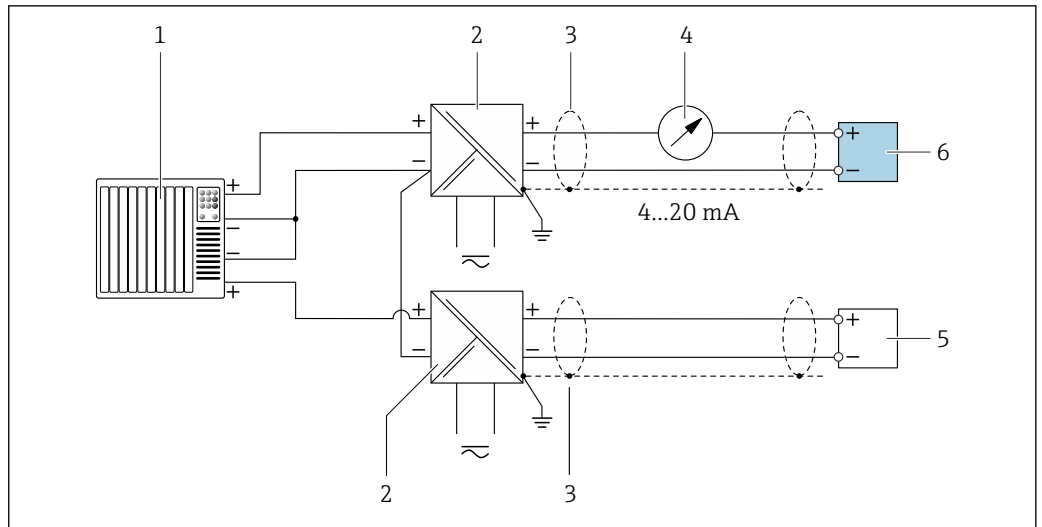


A0028762

**3** Connection example for 4 to 20 mA HART current output (passive)

- 1 Automation system with current input (e.g. PLC)
- 2 Power supply
- 3 Cable shield provided at one end. The cable shield must be grounded at both ends to comply with EMC requirements; observe cable specifications → 49
- 4 Analog display unit: observe maximum load → 16
- 5 Transmitter

HART input

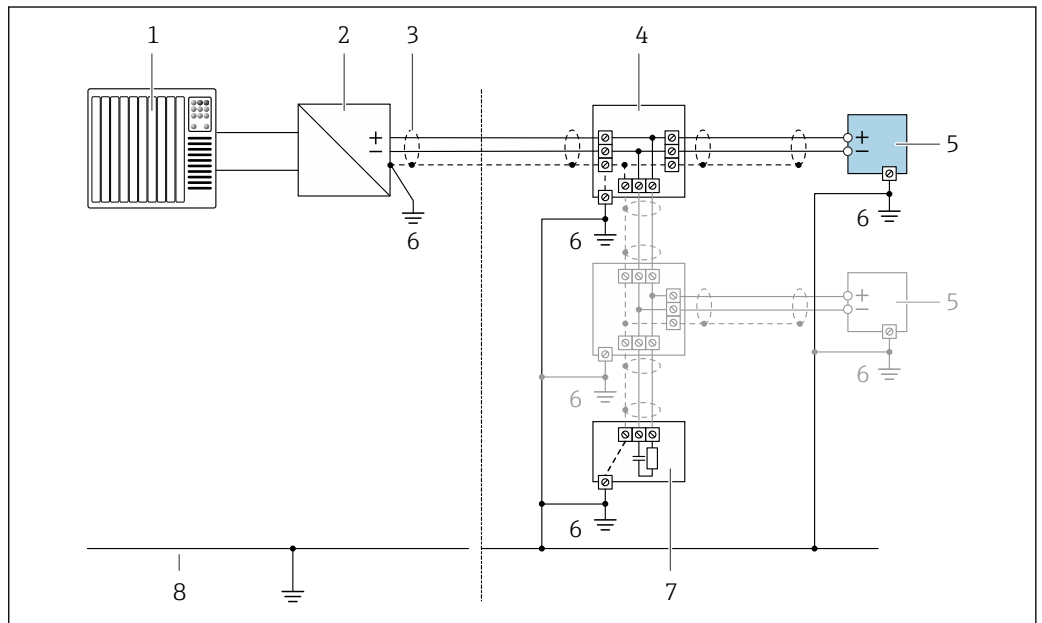


A0028763

4 Connection example for HART input with a common negative (passive)

- 1 Automation system with HART output (e.g. PLC)
- 2 Active barrier for power supply (e.g. RN221N)
- 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 Analog display unit: observe maximum load → 16
- 5 Pressure transmitter (e.g. Cerabar M, Cerabar S): see requirements
- 6 Transmitter

PROFIBUS PA

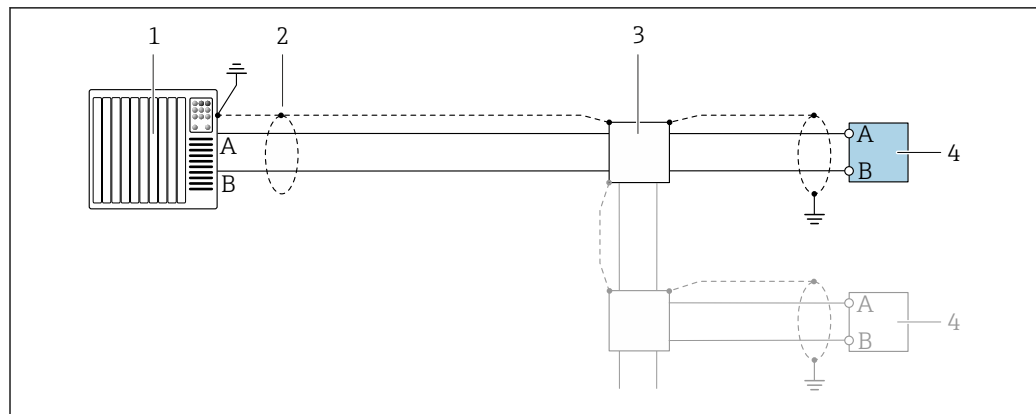


A0028768

5 Connection example for PROFIBUS PA

- 1 Control system (e.g. PLC)
- 2 PROFIBUS PA segment coupler
- 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

## PROFIBUS DP



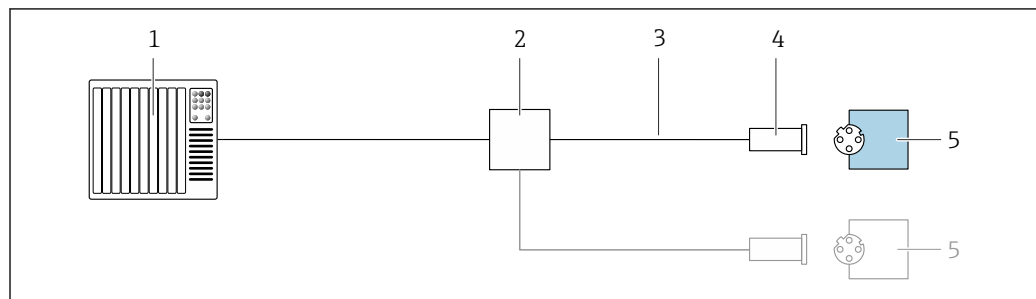
A0028765

**6** Connection example for PROFIBUS DP, non-hazardous area and Zone 2/Div. 2

- 1 Control system (e.g. PLC)
- 2 Cable shield provided at one end. The cable shield must be grounded at both ends to comply with EMC requirements; observe cable specifications
- 3 Distribution box
- 4 Transmitter

**i** If baud rates > 1.5 Mbaud an EMC cable entry must be used and the cable shield must continue as far as the terminal wherever possible.

## EtherNet/IP

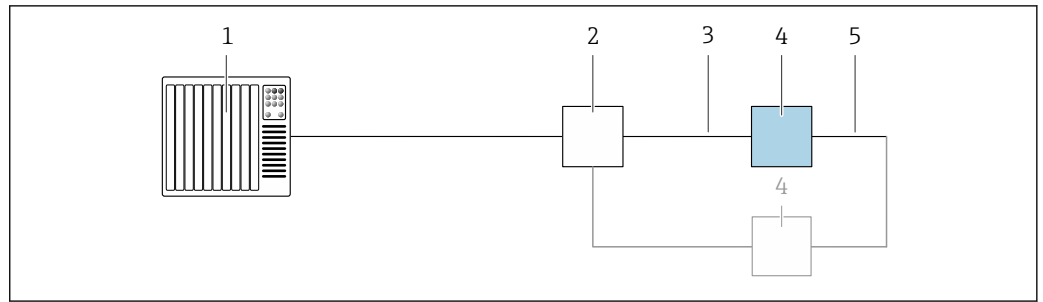


A0028767

**7** Connection example for EtherNet/IP

- 1 Control system (e.g. PLC)
- 2 Ethernet switch
- 3 Observe cable specifications
- 4 Device plug
- 5 Transmitter

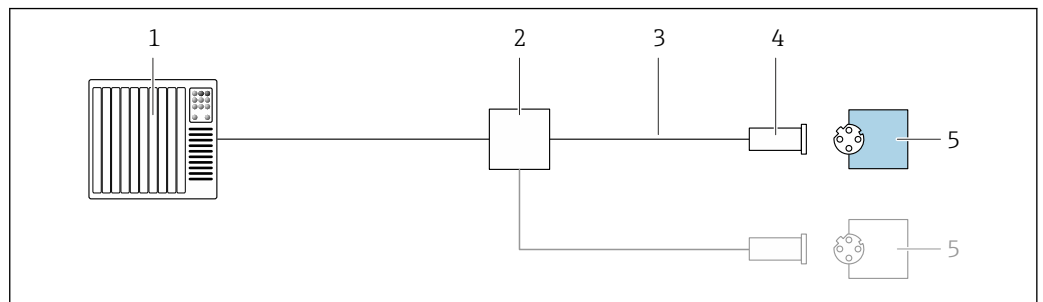
*EtherNet/IP: DLR (Device Level Ring)*



A0027544

- 1 Control system (e.g. PLC)
- 2 Ethernet switch
- 3 Observe cable specifications → 49
- 4 Transmitter
- 5 Connecting cable between the two transmitters

*PROFINET*

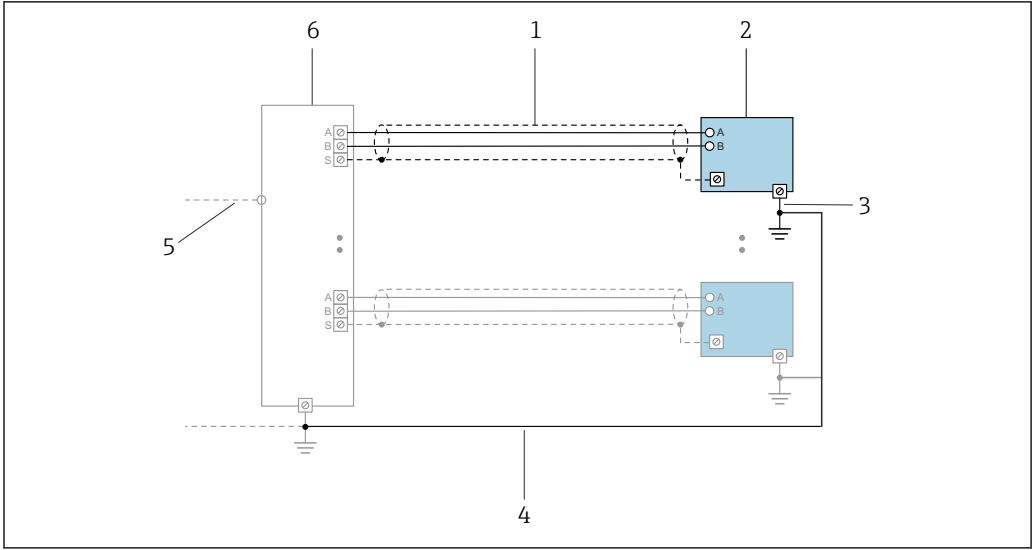


A0028767

**8** Connection example for PROFINET

- 1 Control system (e.g. PLC)
- 2 Ethernet switch
- 3 Observe cable specifications
- 4 Device plug
- 5 Transmitter

PROFINET with Ethernet-APL

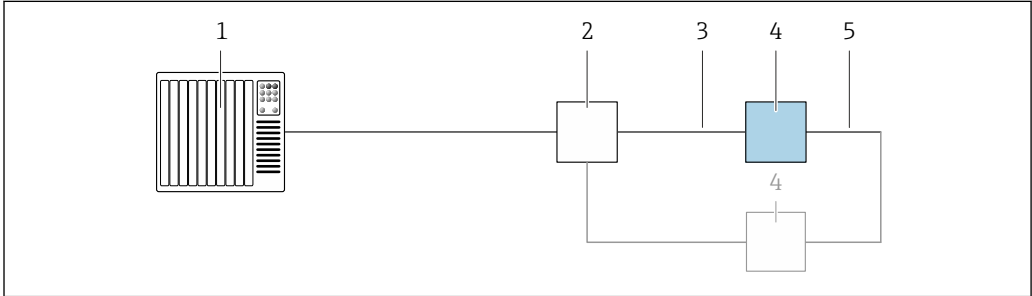


A0047536

9 Connection example for PROFNET with Ethernet-APL

- 1 Cable shield
- 2 Measuring device
- 3 Local grounding
- 4 Potential equalization
- 5 Trunk or TCP
- 6 Field switch

PROFINET: MRP (Media Redundancy Protocol)

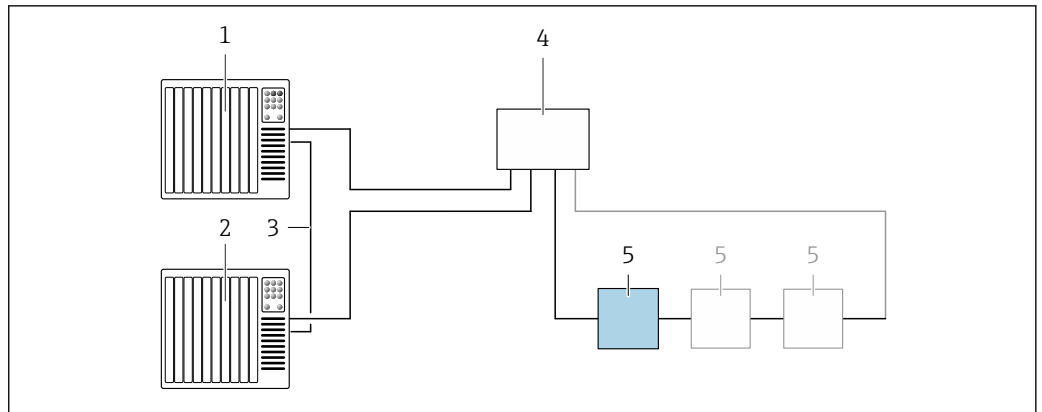


A0027544

- 1 Control system (e.g. PLC)
- 2 Ethernet switch
- 3 Observe cable specifications → 49
- 4 Transmitter
- 5 Connecting cable between the two transmitters



PROFINET: system redundancy S2

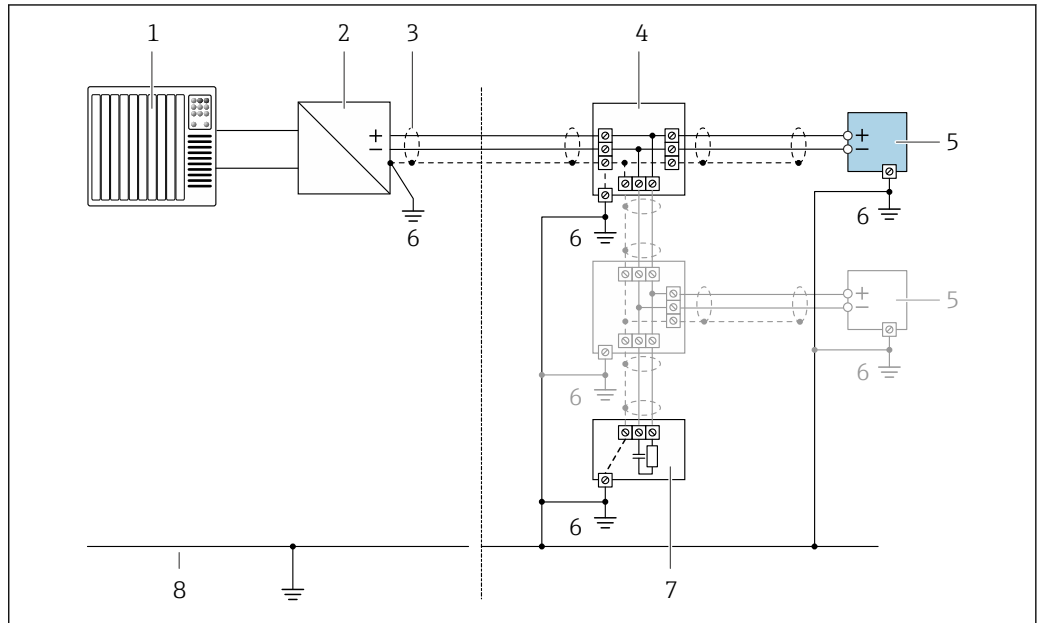


A0039553

10 Connection example for system redundancy S2

- 1 Control system 1 (e.g. PLC)
- 2 Synchronization of control systems
- 3 Control system 2 (e.g. PLC)
- 4 Industrial Ethernet Managed Switch
- 5 Transmitter

FOUNDATION Fieldbus

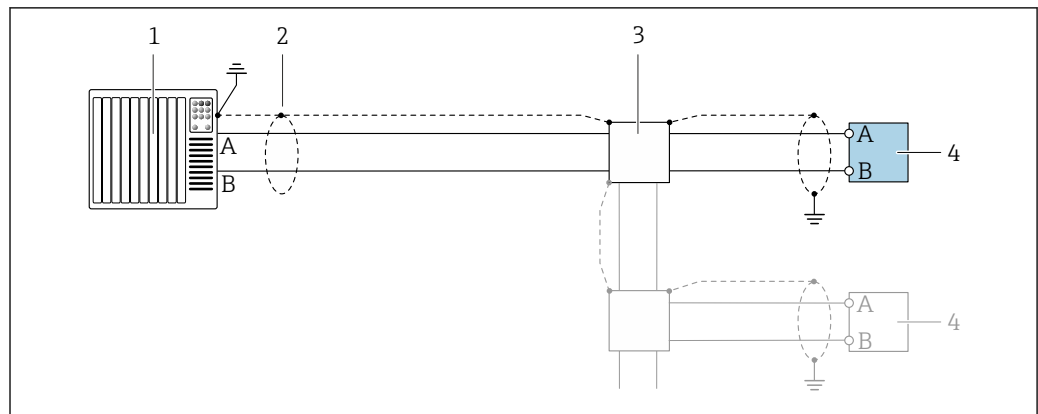


A0028768

11 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

## Modbus RS485

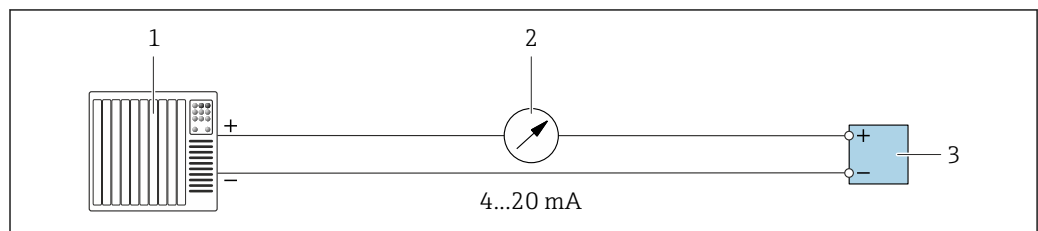


A0028765

12 Connection example for Modbus RS485, non-hazardous area and Zone 2/Div. 2

- 1 Control system (e.g. PLC)
- 2 Cable shield provided at one end. The cable shield must be grounded at both ends to comply with EMC requirements; observe cable specifications
- 3 Distribution box
- 4 Transmitter

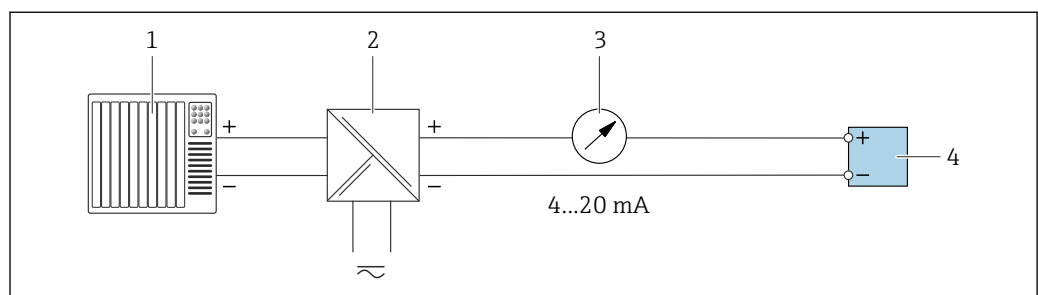
## Current output 4-20 mA



A0028758

13 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 → 16
- 3 Transmitter

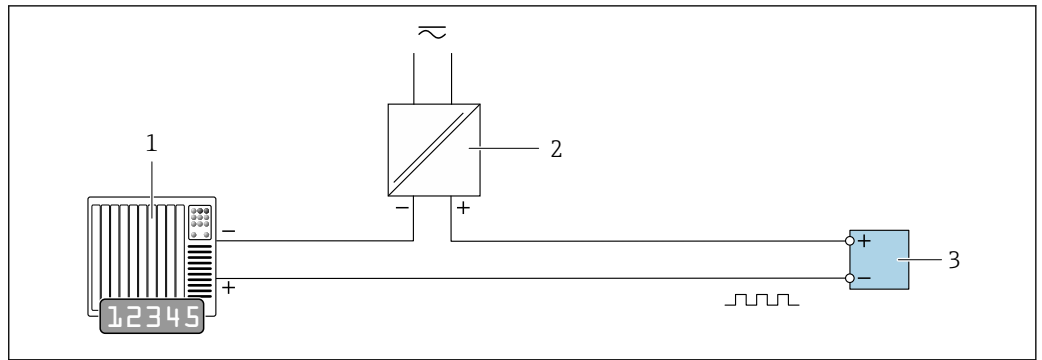


A0028759

14 Connection example for 4-20 mA current output (passive)

- 1 Automation system with current input (e.g. PLC)
- 2 Active barrier for power supply (e.g. RN221N)
- 3 Analog display unit: observe maximum load → 16
- 4 Transmitter

Pulse/frequency output

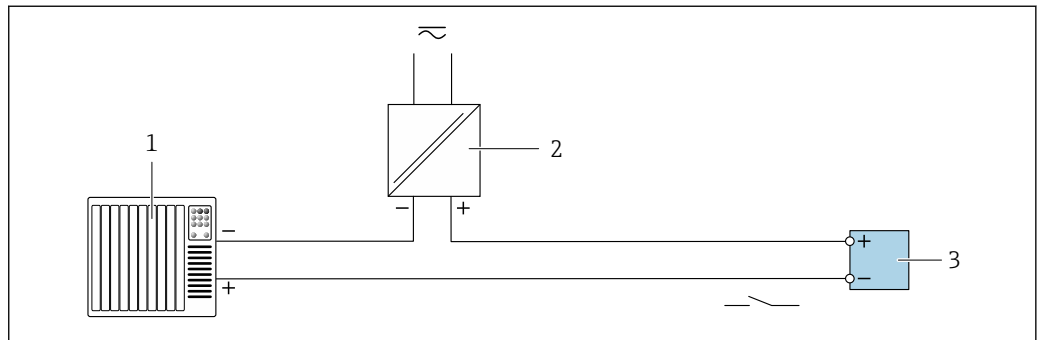


A0028761

15 Connection example for pulse/frequency output (passive)

- 1 Automation system with pulse/frequency input (e.g. PLC with 10 kΩ pull-up or pull-down resistor)
- 2 Power supply
- 3 Transmitter: observe input values → 19

Switch output

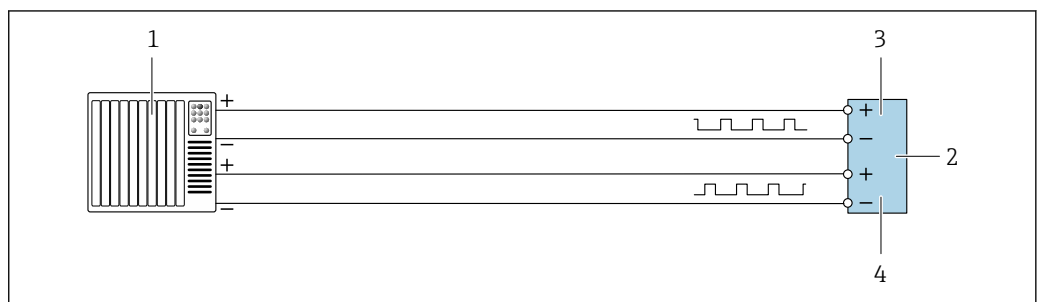


A0028760

16 Connection example for switch output (passive)

- 1 Automation system with switch input (e.g. PLC with a 10 kΩ pull-up or pull-down resistor)
- 2 Power supply
- 3 Transmitter: observe input values → 19

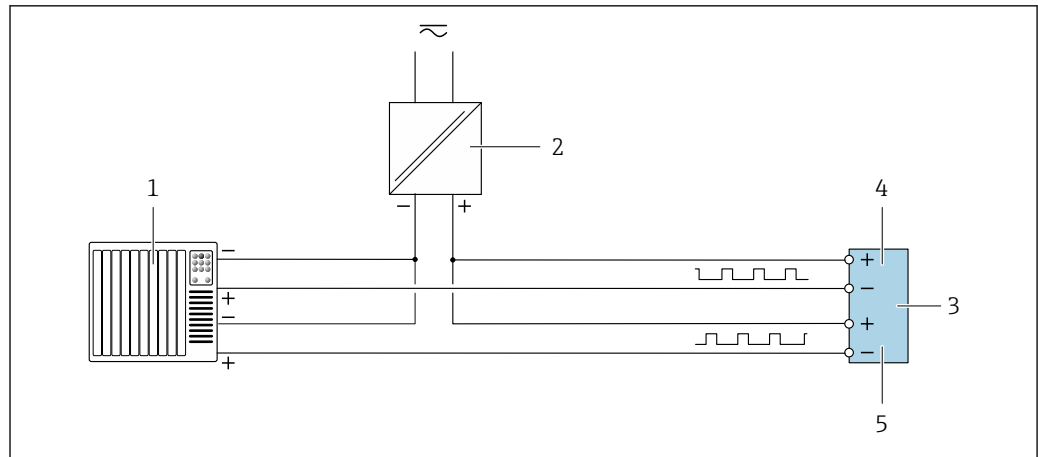
Double pulse output



A0029280

17 Connection example for double pulse output (active)

- 1 Automation system with double pulse input (e.g. PLC)
- 2 Transmitter: observe input values → 20
- 3 Double pulse output
- 4 Double pulse output (slave), phase-shifted

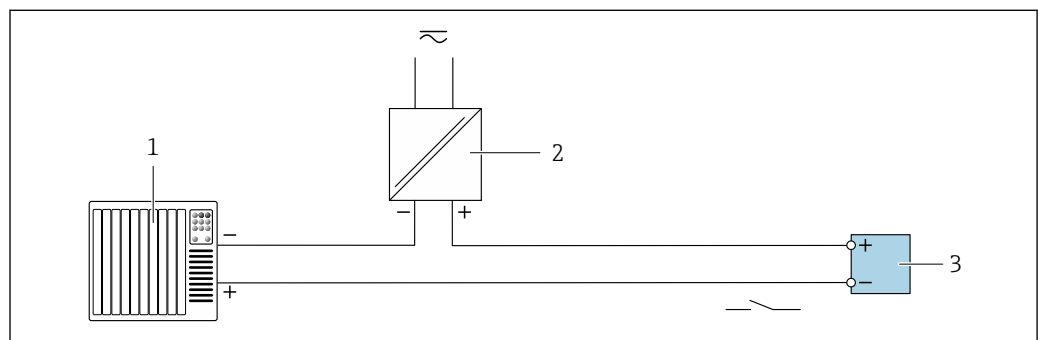


A0029279

18 Connection example for double pulse output (passive)

- 1 Automation system with double pulse input (e.g. PLC with a 10 k $\Omega$  pull-up or pull-down resistor)
- 2 Power supply
- 3 Transmitter: observe input values  $\rightarrow$  20
- 4 Double pulse output
- 5 Double pulse output (slave), phase-shifted

#### Relay output

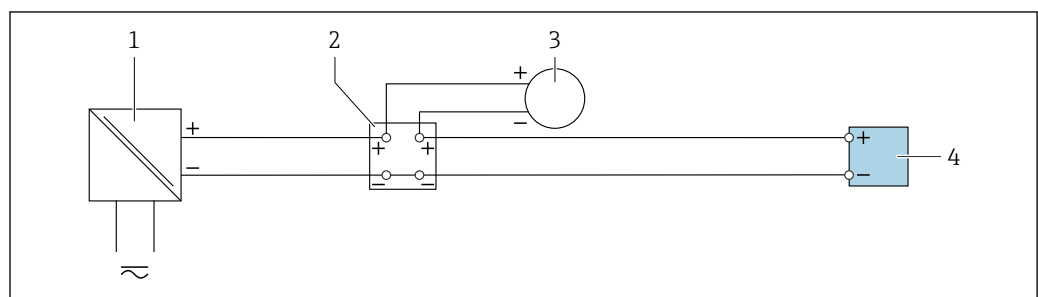


A0028760

19 Connection example for relay output (passive)

- 1 Automation system with relay input (e.g. PLC)
- 2 Power supply
- 3 Transmitter: observe input values  $\rightarrow$  21

#### Current input

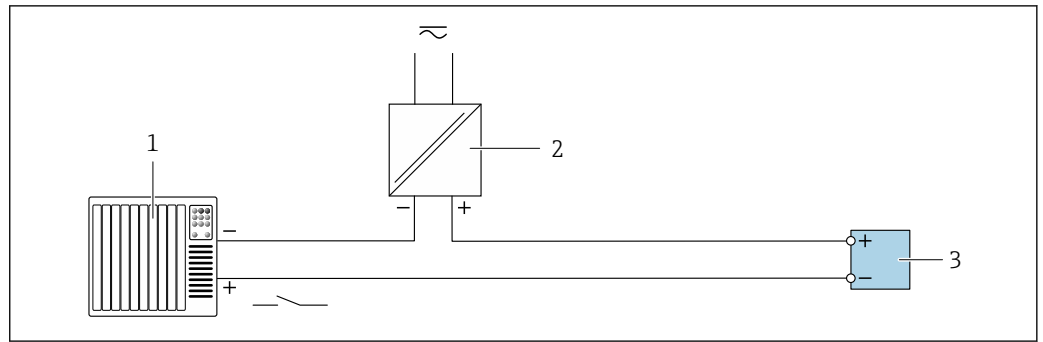


A0028915

20 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



21 Connection example for status input

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

Terminals

Spring-loaded terminals: Suitable for strands and strands with ferrules.  
 Conductor cross-section 0.2 to 2.5 mm<sup>2</sup> (24 to 12 AWG).

Cable entries

- Cable gland: M20 × 1.5 with cable  $\varnothing$  6 to 12 mm (0.24 to 0.47 in)
- Thread for cable entry:
  - NPT 1/2"
  - G 1/2"
  - M20
- Device plug for digital communication: M12  
 Only available for certain device versions → 33.
- Device plug for connecting cable: M12  
 A device plug is always used for the device version with the order code for "Sensor connection housing", option C "Ultra-compact, hygienic, stainless".

Cable specification

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 (incl. conductor for the inner ground terminal)

Standard installation cable is sufficient.

Protective grounding cable for the outer ground terminal

Conductor cross-section < 2.1 mm<sup>2</sup> (14 AWG)

The use of a cable lug enables the connection of larger cross-sections.

The grounding impedance must be less than 2  $\Omega$ .

Signal cable

Current output 4 to 20 mA HART

A shielded cable is recommended. Observe grounding concept of the plant.

PROFIBUS PA

Twisted, shielded two-wire cable. Cable type A is recommended .



For further information on planning and installing PROFIBUS networks see:

- Operating Instructions "PROFIBUS DP/PA: Guidelines for planning and commissioning" (BA00034S)
- PNO Directive 2.092 "PROFIBUS PA User and Installation Guideline"
- IEC 61158-2 (MBP)

*PROFIBUS DP*

The IEC 61158 standard specifies two types of cable (A and B) for the bus line which can be used for every transmission rate. Cable type A is recommended.

<b>Cable type</b>	A
<b>Characteristic impedance</b>	135 to 165 $\Omega$ at a measuring frequency of 3 to 20 MHz
<b>Cable capacitance</b>	< 30 pF/m
<b>Wire cross-section</b>	> 0.34 mm <sup>2</sup> (22 AWG)
<b>Cable type</b>	Twisted pairs
<b>Loop resistance</b>	$\leq$ 110 $\Omega$ /km
<b>Signal damping</b>	Max. 9 dB over the entire length of the cable cross-section
<b>Shield</b>	Copper braided shielding or braided shielding with foil shield. When grounding the cable shield, observe the grounding concept of the plant.



For further information on planning and installing PROFIBUS networks see:

- Operating Instructions "PROFIBUS DP/PA: Guidelines for planning and commissioning" (BA00034S)
- PNO Directive 2.092 "PROFIBUS PA User and Installation Guideline"
- IEC 61158-2 (MBP)

*EtherNet/IP*

The standard ANSI/TIA/EIA-568-B.2 Annex specifies CAT 5 as the minimum category for a cable used for EtherNet/IP. CAT 5e and CAT 6 are recommended.



For more information on planning and installing EtherNet/IP networks, please refer to the "Media Planning and Installation Manual. EtherNet/IP" of ODVA Organization

*PROFINET*

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



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

*PROFINET with Ethernet-APL*

The reference cable type for APL segments is fieldbus cable type A, MAU type 1 and 3 (specified in IEC 61158-2). This cable meets the requirements for intrinsically safe applications according to IEC TS 60079-47 and can also be used in non-intrinsically safe applications.

<b>Cable type</b>	A
<b>Cable capacitance</b>	45 to 200 nF/km
<b>Loop resistance</b>	15 to 150 $\Omega$ /km
<b>Cable inductance</b>	0.4 to 1 mH/km

Further details are provided in the Ethernet-APL Engineering Guideline (<https://www.ethernet-apl.org>).

*FOUNDATION Fieldbus*

Twisted, shielded two-wire cable.



For further information on planning and installing FOUNDATION Fieldbus networks see:

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

*Modbus RS485*

The EIA/TIA-485 standard specifies two types of cable (A and B) for the bus line which can be used for every transmission rate. Cable type A is recommended.

<b>Cable type</b>	A
<b>Characteristic impedance</b>	135 to 165 $\Omega$ at a measuring frequency of 3 to 20 MHz
<b>Cable capacitance</b>	< 30 pF/m
<b>Wire cross-section</b>	> 0.34 mm <sup>2</sup> (22 AWG)
<b>Cable type</b>	Twisted pairs
<b>Loop resistance</b>	$\leq$ 110 $\Omega$ /km
<b>Signal damping</b>	Max. 9 dB over the entire length of the cable cross-section
<b>Shield</b>	Copper braided shielding or braided shielding with foil shield. When grounding the cable shield, observe the grounding concept of the plant.

*Current output 0/4 to 20 mA*

Standard installation cable is sufficient

*Pulse /frequency /switch output*

Standard installation cable is sufficient

*Double pulse output*

Standard installation cable is sufficient

*Relay output*

Standard installation cable is sufficient.

*Current input 0/4 to 20 mA*

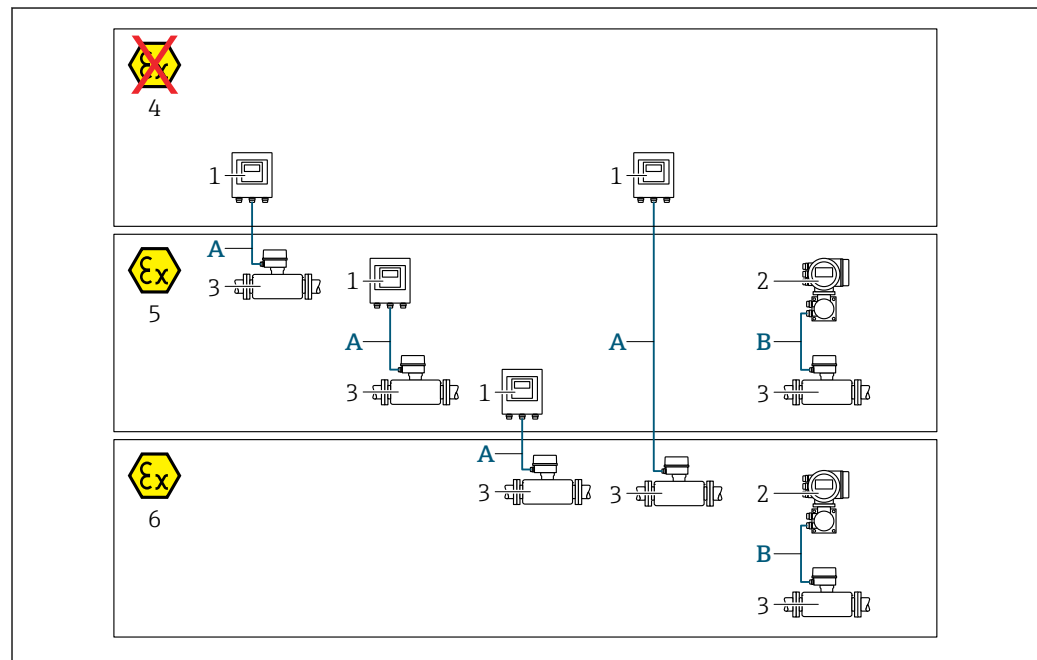
Standard installation cable is sufficient

*Status input*

Standard installation cable is sufficient

### Choice of connecting cable between the transmitter and sensor

Depends on the type of transmitter and the installation zones



A0032477

- 1 Proline 500 digital transmitter
- 2 Proline 500 transmitter
- 3 Promag sensor
- 4 Non-hazardous area
- 5 Hazardous area: Zone 2; Class I, Division 2
- 6 Hazardous area: Zone 1; Class I, Division 1
- A Standard cable to 500 digital transmitter → 52  
Transmitter installed in the non-hazardous area or hazardous area: Zone 2; Class I, Division 2 / sensor installed in the hazardous area: Zone 2; Class I, Division 2 or Zone 1; Class I, Division 1
- B Signal cable to 500 transmitter → 53  
Transmitter and sensor installed in the hazardous area: Zone 2; Class I, Division 2 or Zone 1; Class I, Division 1

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

#### Standard cable

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

<b>Design</b>	4 cores (2 pairs); uninsulated stranded CU wires; pair-stranded with common shield
<b>Shielding</b>	Tin-plated copper braid, optical cover ≥ 85 %
<b>Cable length</b>	Maximum 300 m (900 ft), see the following table.

Cross-section	Cable lengths for use in	
	Non-hazardous area, Hazardous area: Zone 2; Class I, Division 2	Hazardous area: Zone 1; Class I, Division 1
0.34 mm <sup>2</sup> (AWG 22)	80 m (240 ft)	50 m (150 ft)
0.50 mm <sup>2</sup> (AWG 20)	120 m (360 ft)	60 m (180 ft)
0.75 mm <sup>2</sup> (AWG 18)	180 m (540 ft)	90 m (270 ft)
1.00 mm <sup>2</sup> (AWG 17)	240 m (720 ft)	120 m (360 ft)



Cross-section	Cable lengths for use in	
	Non-hazardous area, Hazardous area: Zone 2; Class I, Division 2	Hazardous area: Zone 1; Class I, Division 1
1.50 mm <sup>2</sup> (AWG 15)	300 m (900 ft)	180 m (540 ft)
2.50 mm <sup>2</sup> (AWG 13)	300 m (900 ft)	300 m (900 ft)

*Optionally available connecting cable*

<b>Design</b>	2 × 2 × 0.34 mm <sup>2</sup> (AWG 22) PVC cable <sup>1)</sup> with common shield (2 pairs, uninsulated stranded CU wires; pair-stranded)
<b>Flame resistance</b>	According to DIN EN 60332-1-2
<b>Oil-resistance</b>	According to DIN EN 60811-2-1
<b>Shielding</b>	Tin-plated copper braid, optical cover ≥ 85 %
<b>Operating temperature</b>	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)
<b>Available cable length</b>	Fixed: 20 m (60 ft); variable: up to maximum 50 m (150 ft)

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

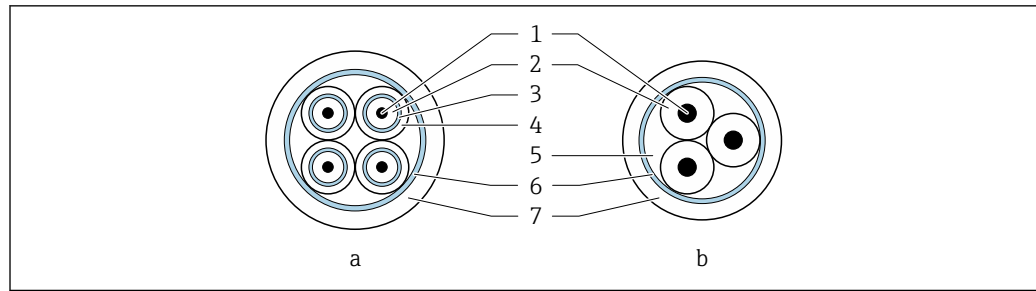
*B: Connecting cable between sensor and transmitter: Proline 500*

*Signal cable*

<b>Design</b>	3 × 0.38 mm <sup>2</sup> (20 AWG) with common, braided copper shield (∅ ~ 9.5 mm (0.37 in)) and individual shielded cores
<b>Conductor resistance</b>	≤ 50 Ω/km (0.015 Ω/ft)
<b>Capacitance: core/shield</b>	≤ 420 pF/m (128 pF/ft)
<b>Cable length (max.)</b>	Depends on the medium conductivity, max. 200 m (656 ft)
<b>Cable lengths (available for order)</b>	5 m (15 ft), 10 m (30 ft), 20 m (60 ft) or variable length up to max. 200 m (600 ft)
<b>Cable diameter</b>	9.4 mm (0.37 in) ± 0.5 mm (0.02 in)
<b>Operating temperature</b>	-20 to +80 °C (-4 to +176 °F)

*Coil current cable*

<b>Design</b>	3 × 0.75 mm <sup>2</sup> (18 AWG) with common, braided copper shield (∅ ~ 9 mm (0.35 in)) and individual shielded cores
<b>Conductor resistance</b>	≤ 37 Ω/km (0.011 Ω/ft)
<b>Capacitance: core/core, shield grounded</b>	≤ 120 pF/m (37 pF/ft)
<b>Cable length (max.)</b>	Depends on the medium conductivity, max. 200 m (656 ft)
<b>Cable lengths (available for order)</b>	5 m (15 ft), 10 m (30 ft), 20 m (60 ft) or variable length up to max. 200 m (600 ft)
<b>Cable diameter</b>	8.8 mm (0.35 in) ± 0.5 mm (0.02 in)
<b>Continuous operating temperature</b>	-20 to +80 °C (-4 to +176 °F)
<b>Test voltage for cable insulation</b>	≤ AC 1433 V rms 50/60 Hz or ≥ DC 2026 V



A0029151

22 Cable cross-section

- a Electrode cable
- b Coil current cable
- 1 Core
- 2 Core insulation
- 3 Core shield
- 4 Core jacket
- 5 Core reinforcement
- 6 Cable shield
- 7 Outer jacket

*Operation in zones of severe electrical interference*

The measuring system meets the general safety requirements → 132 and EMC specifications → 66.

Grounding is by means of the ground terminal provided for the purpose inside the connection housing. The stripped and twisted lengths of cable shield to the ground terminal must be as short as possible.

**Overvoltage protection**

<b>Mains voltage fluctuations</b>	→ 36
<b>Overvoltage category</b>	Overvoltage category II
<b>Short-term, temporary overvoltage</b>	Up to 1200 V between cable and ground, for max. 5 s
<b>Long-term, temporary overvoltage</b>	Up to 500 V between cable and ground

## Performance characteristics

**Reference operating conditions**

- Error limits following DIN EN 29104, in future ISO 20456
- Water, typically: +15 to +45 °C (+59 to +113 °F); 0.5 to 7 bar (73 to 101 psi)
- Data as indicated in the calibration protocol
- Accuracy based on accredited calibration rigs according to ISO 17025
- Reference temperature for conductivity measurement: 25 °C (77 °F)

**Maximum measured error**

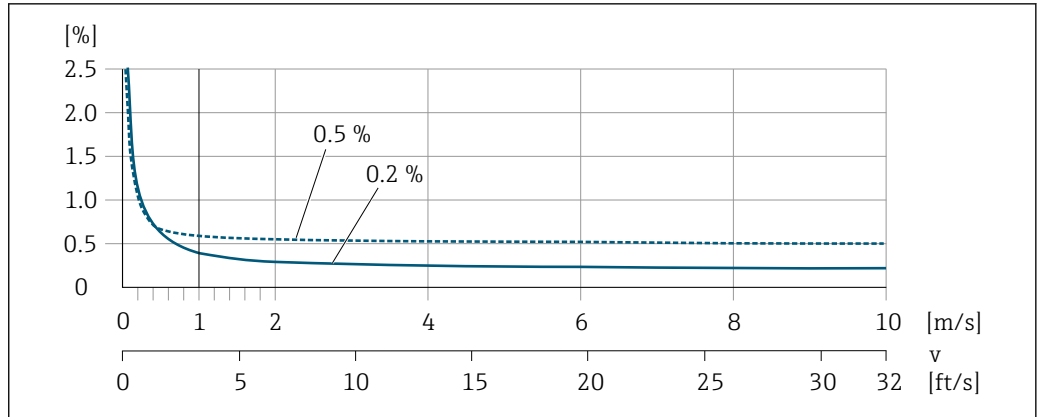
o.r. = of reading

**Error limits under reference operating conditions**

*Volume flow*

- ±0.5 % o.r. ± 1 mm/s (0.04 in/s)
- Optional: ±0.2 % o.r. ± 2 mm/s (0.08 in/s)

**i** Fluctuations in the supply voltage do not have any effect within the specified range.



A0028974

23 Maximum measured error in % o.r.

Temperature

±3 °C (±5.4 °F)

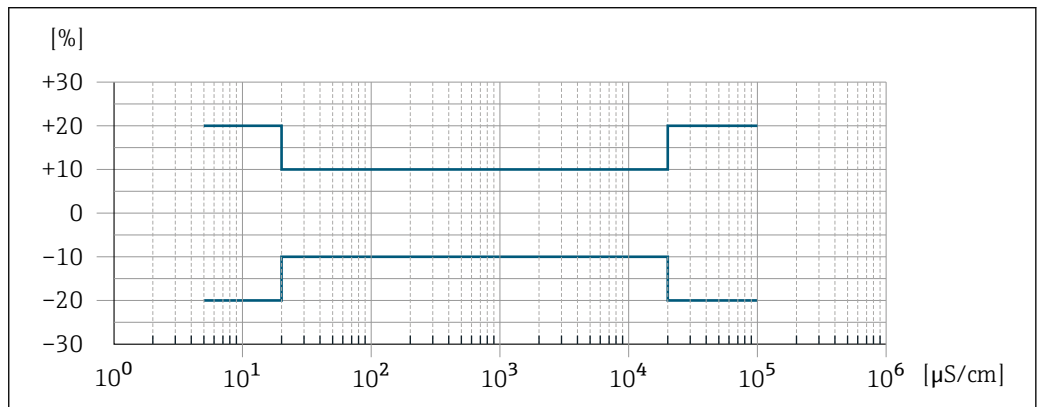
Electrical conductivity

The values apply for:

- Devices with stainless steel process connections
- Proline 500 – digital device version
- Measurements at a reference temperature of 25 °C (77 °F). At different temperatures, attention must be paid to the temperature coefficient of the medium (typically 2.1 %/K)

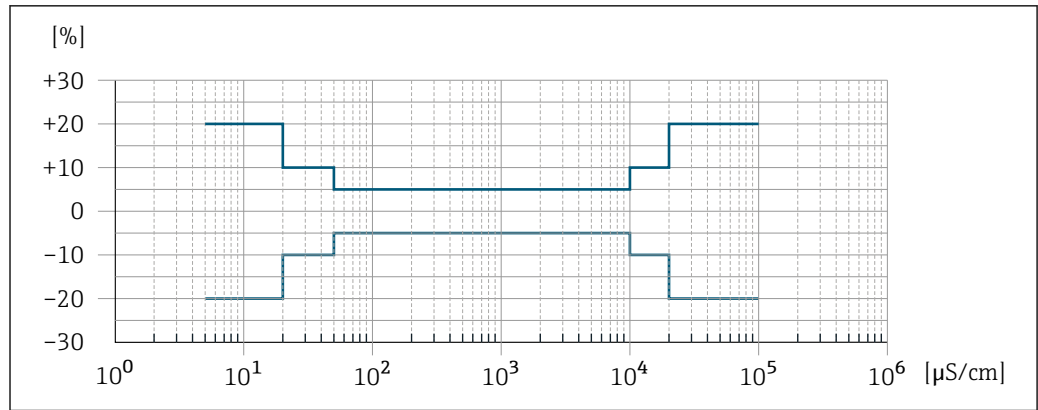
Conductivity [μS/cm]	Nominal diameter		Measured error [%] of reading
	[mm]	[in]	
5 to 20	15 to 150	½ to 6	± 20%
> 20 to 50	15 to 150	½ to 6	± 10%
> 50 to 10000	2 to 8	¼ to 5/16	± 10%
	15 to 150	½ to 6	<ul style="list-style-type: none"> <li>■ Standard: ± 10%</li> <li>■ Optional <sup>1)</sup>: ± 5%</li> </ul>
> 10000 to 20000	2 to 150	¼ to 6	± 10%
> 20000 to 100000	2 to 150	¼ to 6	± 20%

1) Order code for "Calibrated conductivity measurement", option CW



A0042279

24 Measured error (standard)



25 Measured error (optional: order code for "Calibrated conductivity measurement", option CW)

**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

**Volume flow**

Max. ±0.1 % o.r. ± 0.5 mm/s (0.02 in/s)

**Temperature**

±0.5 °C (±0.9 °F)

**Electrical conductivity**

- Max. ±5 % o.r.
- Max. ±1 % o.r. for DN 15 to 150 in conjunction with process connections made of stainless steel 1.4404 (F316L)

**Temperature measurement response time**

T<sub>90</sub> < 15 s

**Influence of ambient temperature**

**Current output**

Temperature coefficient	Max. 1 μA/°C
-------------------------	--------------

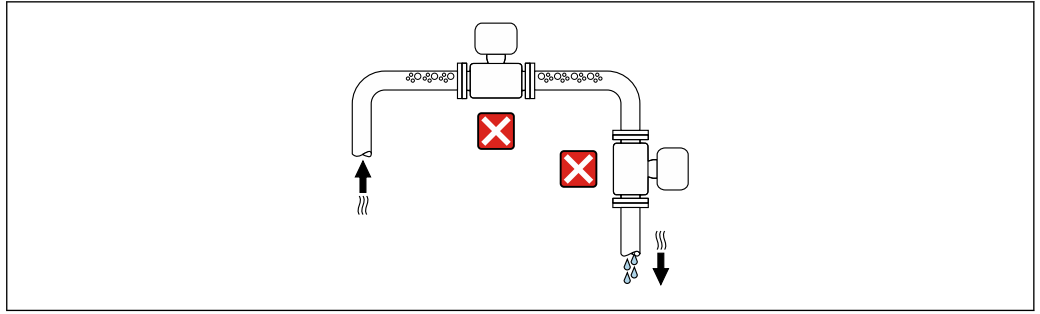
**Pulse/frequency output**

Temperature coefficient	No additional effect. Included in accuracy.
-------------------------	---

**Installation**

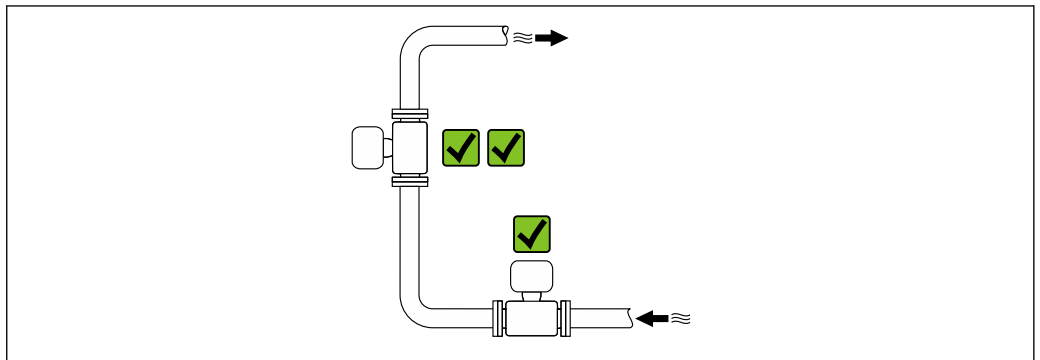
**Mounting location**

- Do not install the device at the highest point of the pipe.
- Do not install the device upstream from a free pipe outlet in a down pipe.



A0042131

The device should ideally be installed in an ascending pipe.



A0042317

**Installation upstream from a down pipe**

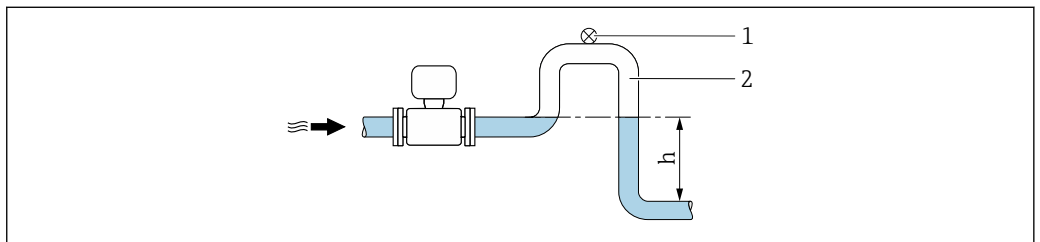
**NOTICE**

**Negative pressure in the measuring pipe can damage the liner!**

- ▶ If installing upstream of down pipes whose length  $h \geq 5 \text{ m}$  (16.4 ft): install a siphon with a vent valve downstream of the device.



This arrangement prevents the flow of liquid stopping in the pipe and air entrainment.

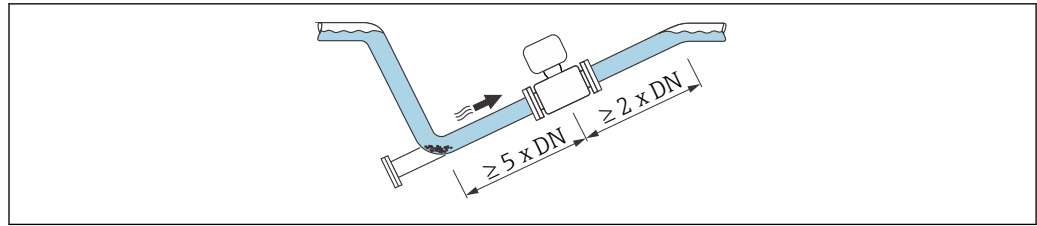


A0028981

- 1 Vent valve
- 2 Pipe siphon
- h Length of down pipe

**Installation with partially filled pipes**

- Partially filled pipes with a gradient require a drain-type configuration.
- The installation of a cleaning valve is recommended.



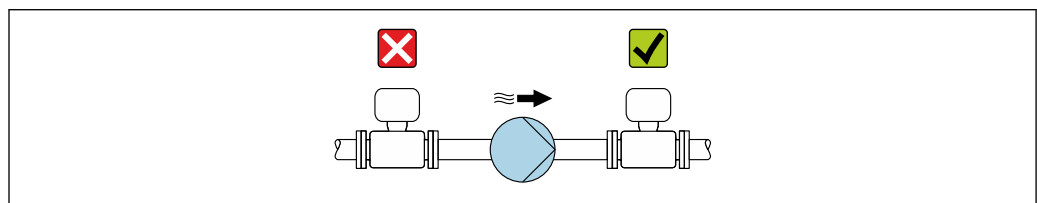
A0041086

### Installation near pumps

#### NOTICE

#### Negative pressure in the measuring pipe can damage the liner!

- ▶ In order to maintain the system pressure, install the device in the flow direction downstream from the pump.
- ▶ Install pulsation dampers if reciprocating, diaphragm or peristaltic pumps are used.



A0041083

- i** Information on the liner's resistance to partial vacuum
- Information on the measuring system's resistance to vibration and shock → 65

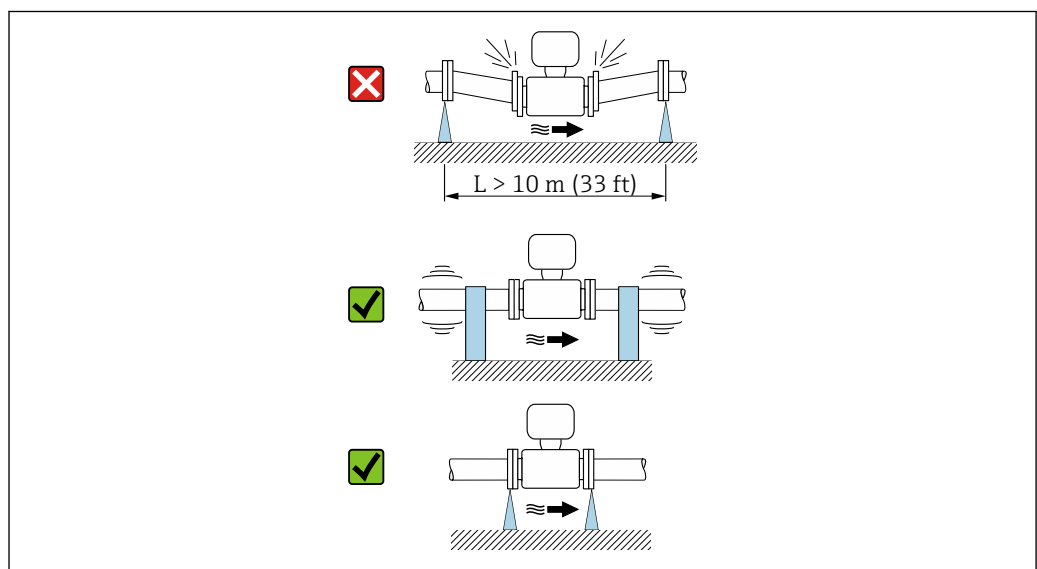
### Installation in event of pipe vibrations

A remote version is recommended in the event of strong pipe vibrations.

#### NOTICE

#### Pipe vibrations can damage the device!

- ▶ Do not expose the device to strong vibrations.
- ▶ Support the pipe and fix it in place.
- ▶ Support the device and fix it in place.
- ▶ Mount the sensor and transmitter separately.

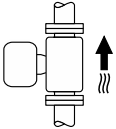
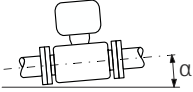
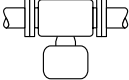



A0041092

- i** Information on the measuring system's resistance to vibration and shock → 65

**Orientation**

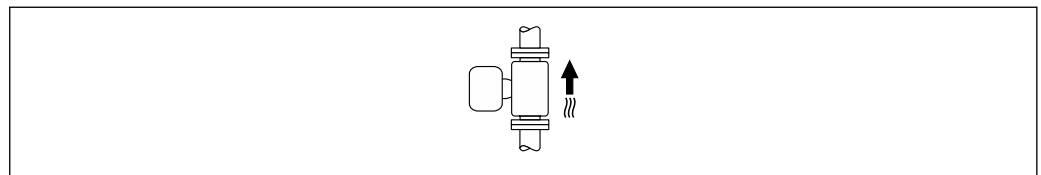
The direction of the arrow on the sensor nameplate helps you to install the sensor according to the flow direction (direction of medium flow through the piping).

Orientation	Orientation	Recommendation
Vertical orientation	 <p style="text-align: right; font-size: small;">A0015591</p>	<p style="text-align: center;">☑☑</p>
Horizontal orientation	 <p style="text-align: right; font-size: small;">A0041328</p>	<p style="text-align: center;">☑<sup>1)</sup></p>
Horizontal orientation, transmitter at bottom	 <p style="text-align: right; font-size: small;">A0015590</p>	<p style="text-align: center;">☑☑<sup>2) 3)</sup> ☒<sup>4)</sup></p>
Horizontal orientation, transmitter at side	 <p style="text-align: right; font-size: small;">A0015592</p>	<p style="text-align: center;">☒</p>

- 1) The measuring device should be self-draining for hygiene applications. A vertical orientation is recommended for this. If only a horizontal orientation is possible, an angle of inclination  $\alpha \geq 10^\circ$  is recommended.
- 2) Applications with high process temperatures may increase the ambient temperature. To maintain the maximum ambient temperature for the transmitter, this orientation is recommended.
- 3) To prevent the electronics from overheating in the event of strong heat formation (e.g. CIP or SIP cleaning process), install the device with the transmitter part pointing downwards.
- 4) When the empty pipe detection function is switched on, empty pipe detection only works if the transmitter housing is pointing upwards.

**Vertical**

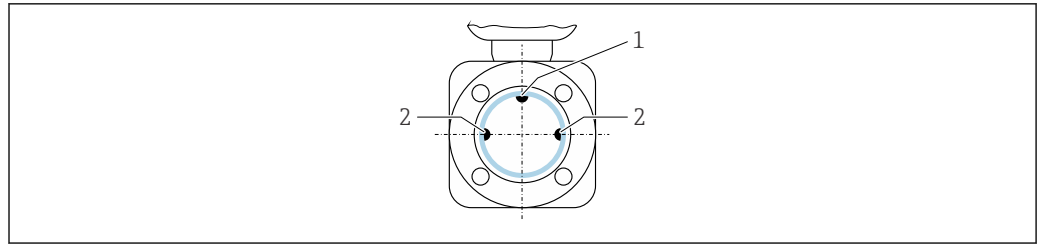
Optimum for self-emptying pipe systems and for use in conjunction with empty pipe detection.



A0015591

**Horizontal**

- Ideally, the measuring electrode plane should be horizontal. This prevents brief insulation of the measuring electrodes by entrained air bubbles.
- Empty pipe detection only works if the transmitter housing is pointing upwards as otherwise there is no guarantee that the empty pipe detection function will actually respond to a partially filled or empty measuring tube.



A0028998

- 1 EPD electrode for empty pipe detection (available from DN > 15 mm (½ in))  
 2 Measuring electrodes for signal detection

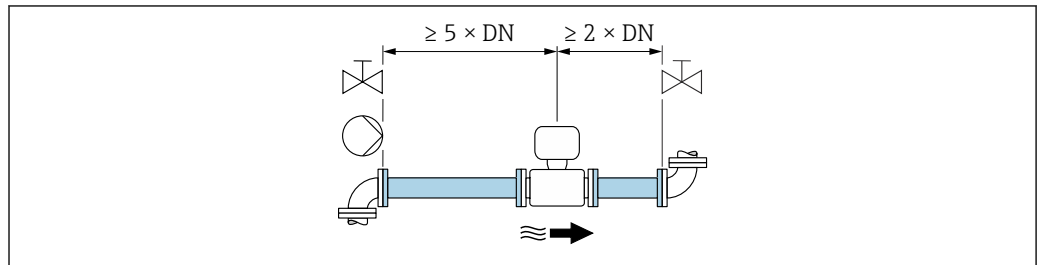
**i** Measuring devices with a nominal diameter < DN 15 mm (½ in) do not have an EPD electrode. In this case, empty pipe detection is performed via the measuring electrodes.

## Inlet and outlet runs

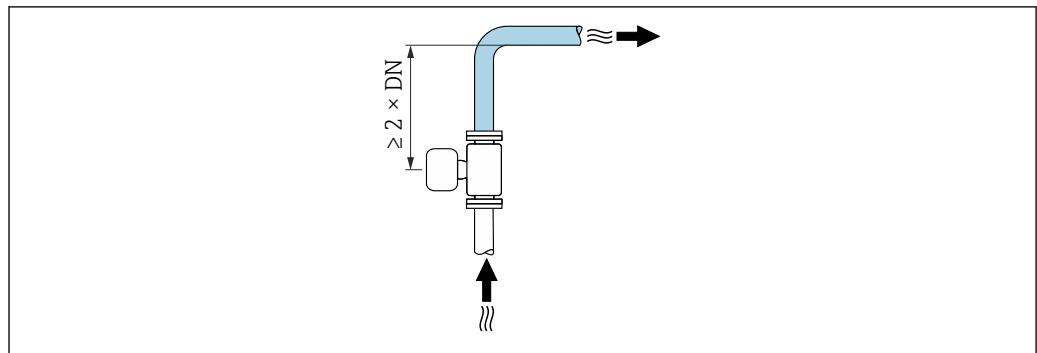
### Installation with inlet and outlet runs

To avoid a vacuum and to maintain the specified level of accuracy, install the device upstream from assemblies that produce turbulence (e.g. valves, T-sections) and downstream from pumps.

Maintain straight, unimpeded inlet and outlet runs.



A0028997



A0042132

## Adapters

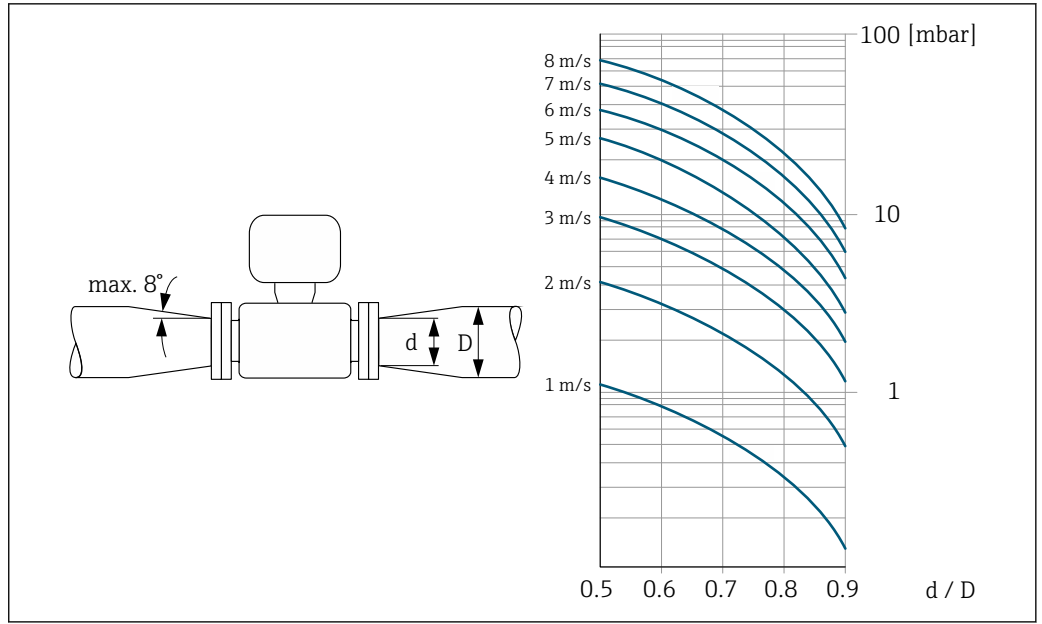
Suitable adapters to DIN EN 545 (double-flange reducers) can be used to install the sensor in larger-diameter pipes. The resultant increase in the rate of flow improves measuring accuracy with very slow-moving fluids.

The nomogram shown here can be used to calculate the pressure loss caused by reducers and expanders:

- Calculate the ratio of the diameters  $d/D$ .
- From the nomogram read off the pressure loss as a function of flow velocity (downstream from the reduction) and the  $d/D$  ratio.

- i**
- The nomogram only applies to liquids with a viscosity similar to that of water.
  - If the medium has a high viscosity, a larger measuring tube diameter can be considered in order to reduce pressure loss.





A0029002

**Length of connecting cable**

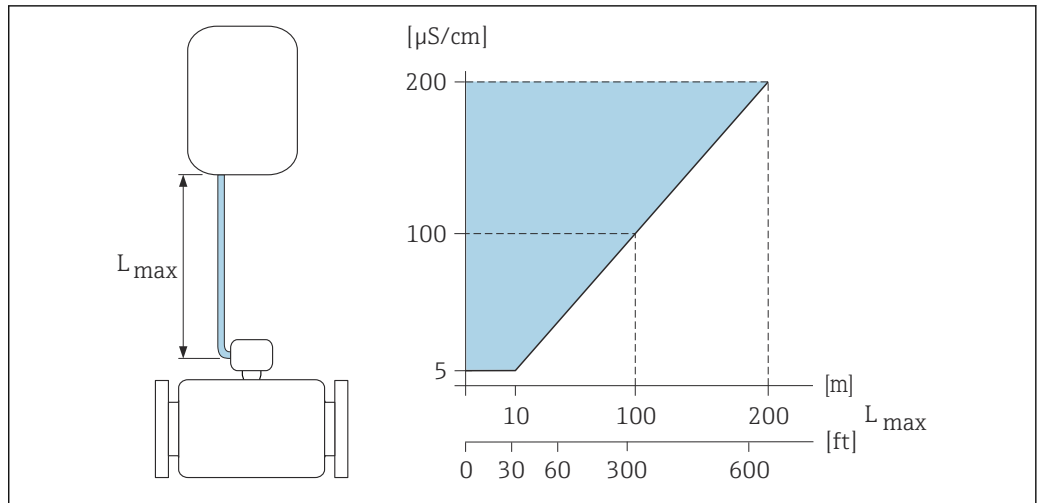
**Proline 500 – digital transmitter**

Lengths of connecting cable → 52

**Proline 500 transmitter**

Max. 200 m (650 ft)

To obtain correct measurement results, observe the permitted connecting cable length of  $L_{max}$ . This length is determined by the conductivity of the medium. If measuring liquids in general: 5  $\mu S/cm$



A0016539

26 Permitted length of connecting cable

Colored area = permitted range

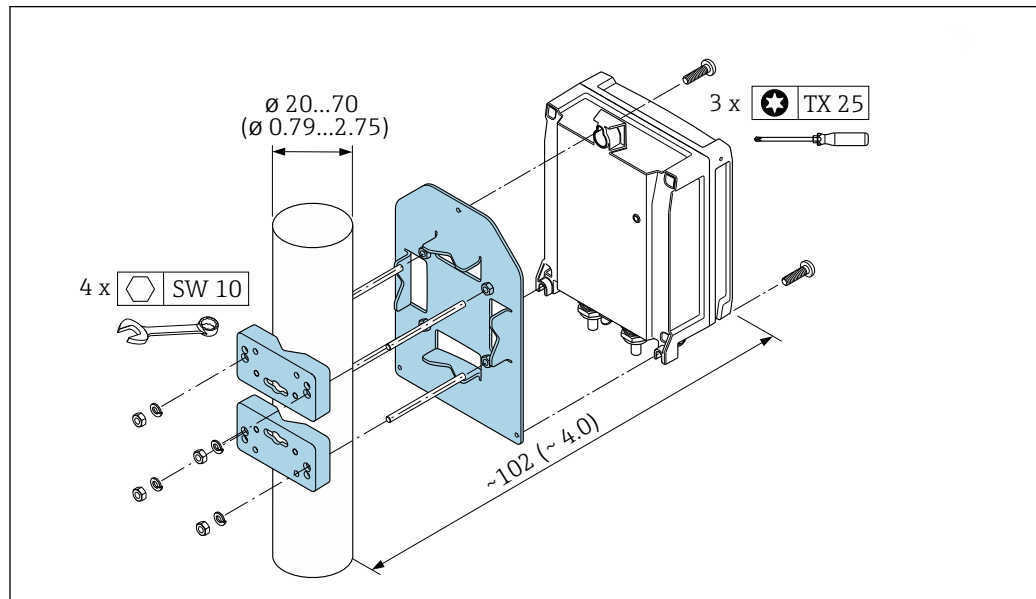
$L_{max}$  = length of connecting cable in [m] ([ft])

[ $\mu S/cm$ ] = medium conductivity

## Mounting the transmitter housing

### Proline 500 – digital transmitter

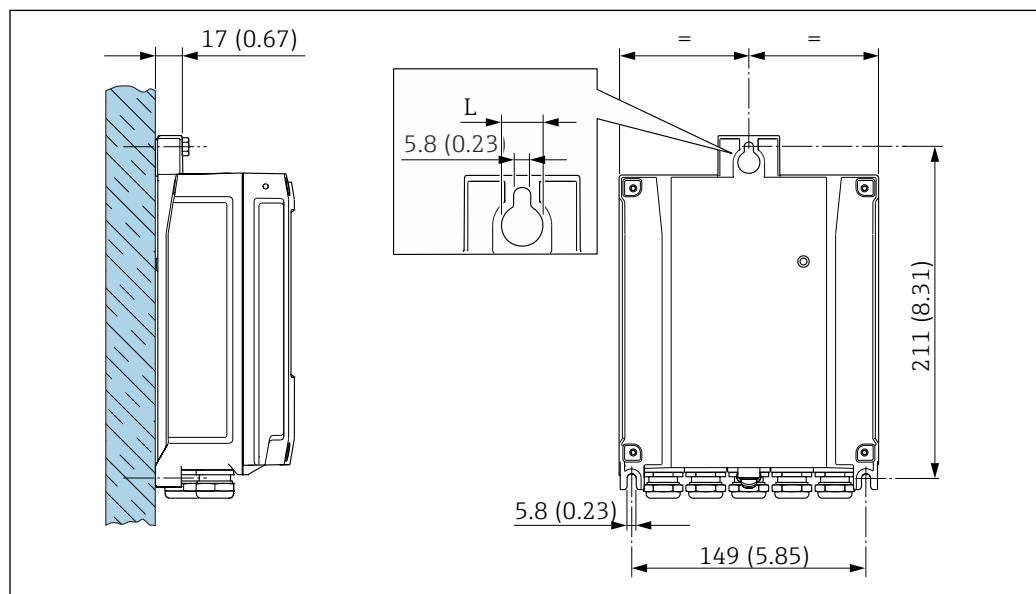
#### Post mounting



A0029051

27 Engineering unit mm (in)

#### Wall mounting



A0029054

28 Engineering unit mm (in)

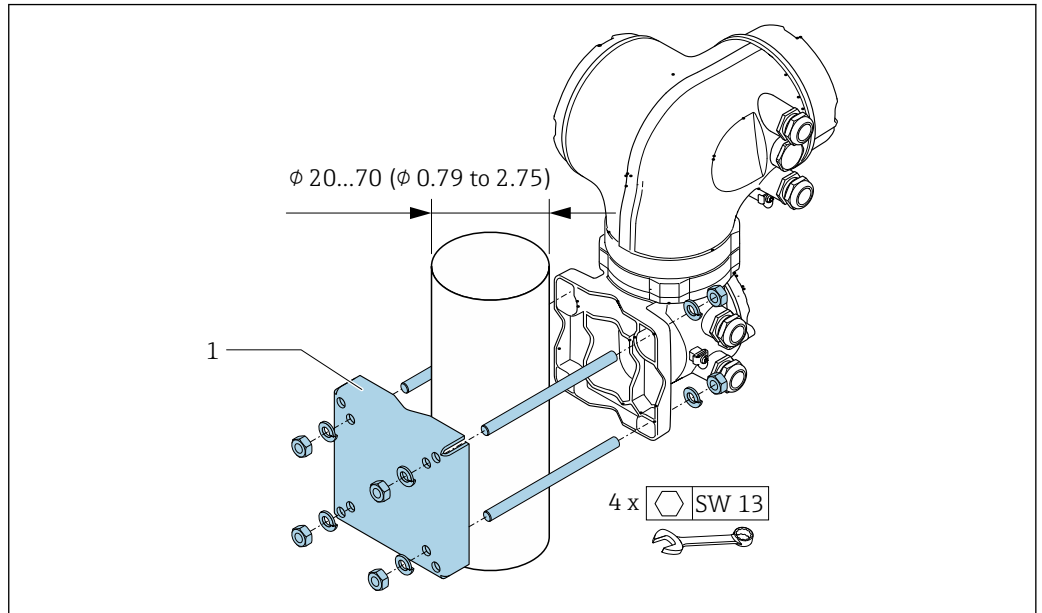
L Depends on order code for "Transmitter housing"

Order code for "Transmitter housing"

- Option A, aluminum, coated: L = 14 mm (0.55 in)
- Option D, polycarbonate: L = 13 mm (0.51 in)

**Proline 500 transmitter**

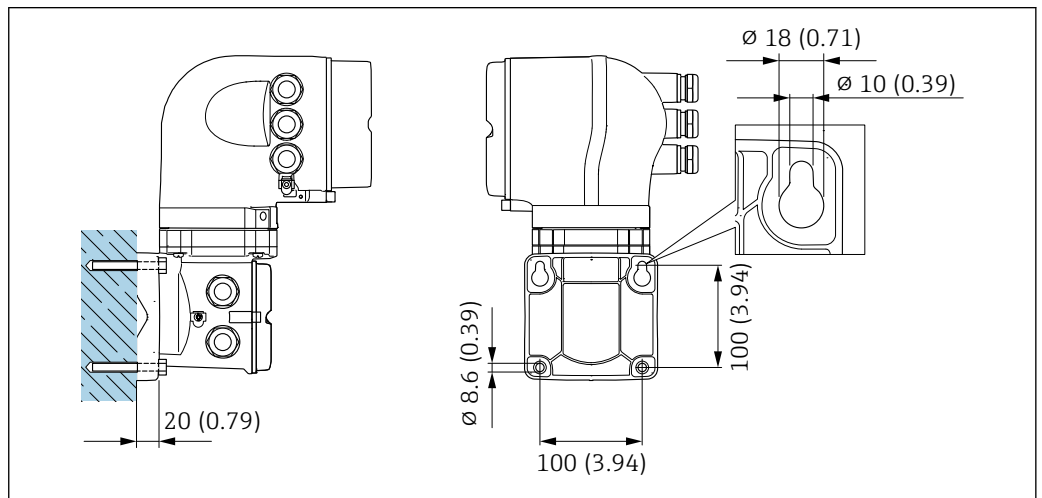
*Post mounting*



A0029057

29 Engineering unit mm (in)

*Wall mounting*

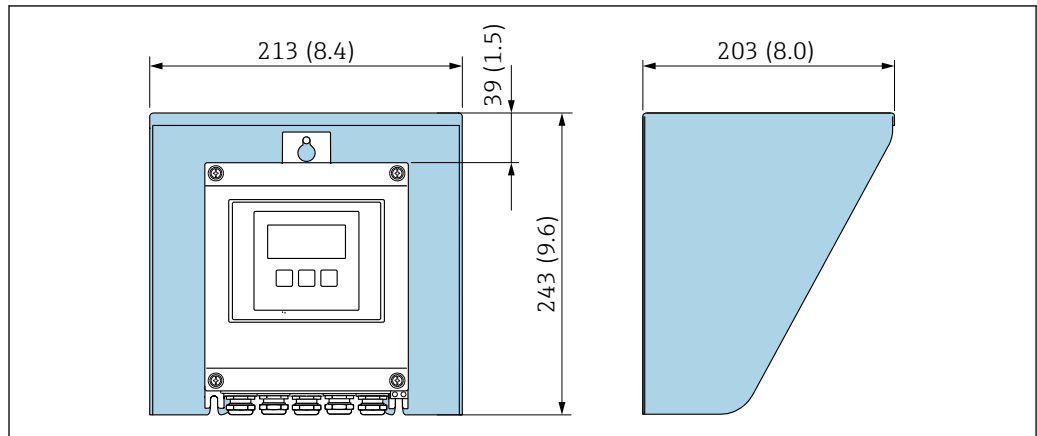


A0029068

30 Engineering unit mm (in)

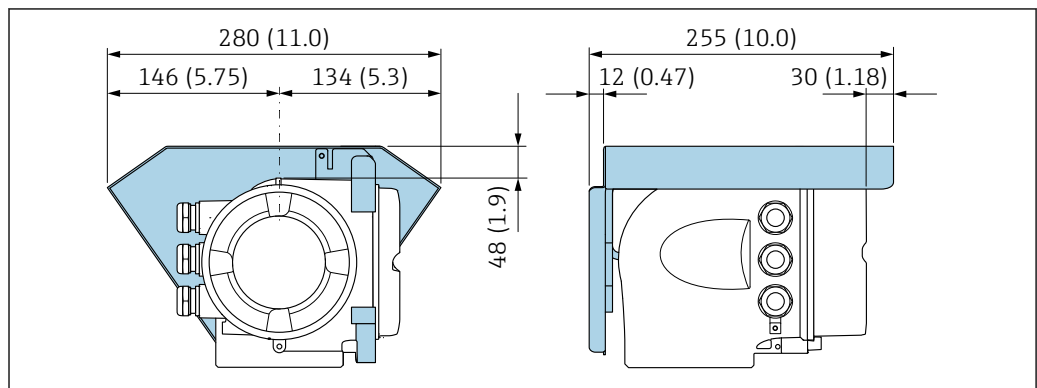
Special mounting instructions

Weather protection cover



A0029552

31 Weather protection cover for Proline 500 – digital; engineering unit mm (in)



A0029553

32 Weather protection cover for Proline 500; engineering unit mm (in)

Hygienic compatibility

**i** When installing in hygienic applications, please refer to the information in the "Certificates and approvals/hygienic compatibility" section → 130


Environment

Ambient temperature range

Transmitter	<ul style="list-style-type: none"> <li>Standard: -40 to +60 °C (-40 to +140 °F)</li> <li>Optional: -50 to +60 °C (-58 to +140 °F) (Order code for "Test, certificate", option JN "Ambient temperature of transmitter -50 °C (-58 °F)")</li> </ul>
Local display	-20 to +60 °C (-4 to +140 °F), the readability of the display may be impaired at temperatures outside the temperature range.
Sensor	-40 to +60 °C (-40 to +140 °F) If both the ambient and the medium temperatures are high, mount the sensor separately from the transmitter.
Liner	Do not exceed or fall below the permitted temperature range of the liner .

If operating outdoors:

- Install the measuring device in a shady location.
- Avoid direct sunlight, particularly in warm climatic regions.
- Avoid direct exposure to weather conditions.

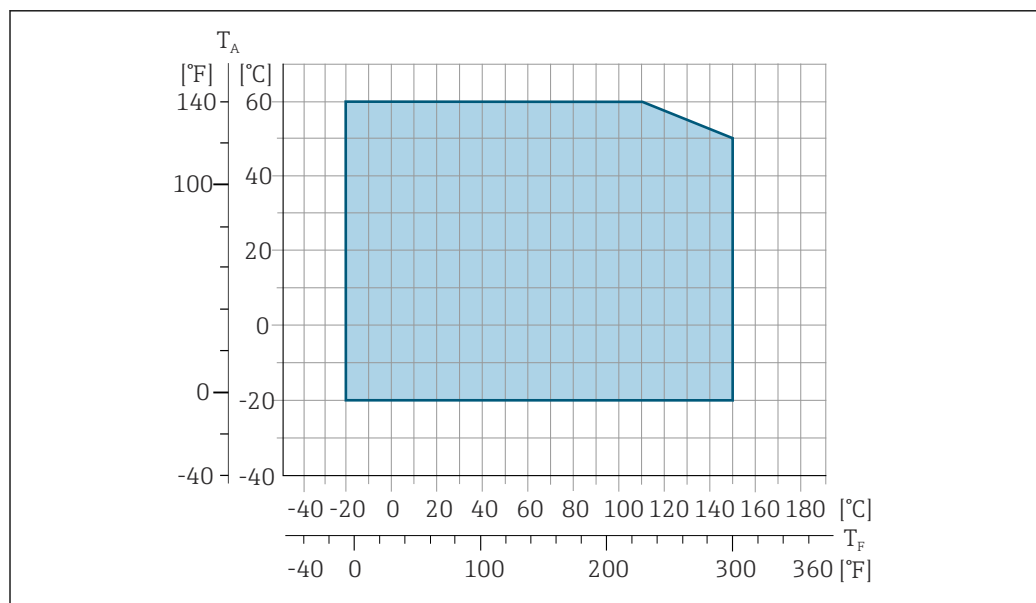
<b>Storage temperature</b>	<p>The storage temperature corresponds to the operating temperature range of the transmitter and the sensor →  64.</p> <ul style="list-style-type: none"> <li>■ Protect the measuring device against direct sunlight during storage in order to avoid unacceptably high surface temperatures.</li> <li>■ Select a storage location where moisture cannot collect in the measuring device as fungus or bacteria infestation can damage the liner.</li> <li>■ If protection caps or protective covers are mounted these should never be removed before installing the measuring device.</li> </ul>
<b>Atmosphere</b>	<p>Additional protection against condensation and moisture: the sensor housing is potted with a gel. Order code for "Sensor option", option CF "Harsh environment".</p>
<b>Relative humidity</b>	<p>The device is suitable for use in outdoor and indoor areas with a relative humidity of 4 to 95%.</p>
<b>Operating height</b>	<p>According to EN 61010-1</p> <ul style="list-style-type: none"> <li>■ ≤ 2 000 m (6 562 ft)</li> <li>■ &gt; 2 000 m (6 562 ft) with additional overvoltage protection (e.g. Endress+Hauser HAW Series)</li> </ul>
<b>Degree of protection</b>	<p><b>Transmitter</b></p> <ul style="list-style-type: none"> <li>■ IP66/67, Type 4X enclosure, suitable for pollution degree 4</li> <li>■ When the housing is open: IP20, Type 1 enclosure, suitable for pollution degree 2</li> <li>■ Display module: IP20, Type 1 enclosure, suitable for pollution degree 2</li> </ul> <p><b>Sensor</b></p> <ul style="list-style-type: none"> <li>■ IP66/67, Type 4X enclosure, suitable for pollution degree 4</li> <li>■ When the housing is open: IP20, Type 1 enclosure, suitable for pollution degree 2</li> </ul> <p><i>Optional</i></p> <p><b>External WLAN antenna</b></p> <p>IP67</p>
<b>Vibration- and shock-resistance</b>	<p><b>Sinusoidal vibration according to IEC 60068-2-6</b></p> <ul style="list-style-type: none"> <li>■ 2 to 8.4 Hz, 7.5 mm peak</li> <li>■ 8.4 to 2 000 Hz, 2 g peak</li> </ul> <p><b>Vibration broad-band random, according to IEC 60068-2-64</b></p> <ul style="list-style-type: none"> <li>■ 10 to 200 Hz, 0.01 g<sup>2</sup>/Hz</li> <li>■ 200 to 2 000 Hz, 0.003 g<sup>2</sup>/Hz</li> <li>■ Total: 2.70 g rms</li> </ul> <p><b>Shock half-sine, according to IEC 60068-2-27</b></p> <p>6 ms 50 g</p> <p><b>Rough handling shocks according to IEC 60068-2-31</b></p>
<b>Interior cleaning</b>	<ul style="list-style-type: none"> <li>■ Cleaning in place (CIP)</li> <li>■ Sterilization in place (SIP)</li> </ul>
<b>Mechanical load</b>	<p>Transmitter housing and sensor connection housing:</p> <ul style="list-style-type: none"> <li>■ Protect against mechanical effects, such as shock or impact</li> <li>■ Do not use as a ladder or climbing aid</li> </ul>

**Electromagnetic compatibility (EMC)**

- As per IEC/EN 61326 and NAMUR Recommendation 21 (NE 21)
  - Device version with PROFIBUS DP: Complies with emission limits for industry as per EN 50170 Volume 2, IEC 61784
- i** The following applies for PROFIBUS DP: If baud rates > 1.5 MBaud, an EMC cable entry must be used and the cable shield must continue as far as the terminal wherever possible.
- i** Details are provided in the Declaration of Conformity.
- i** This unit is not intended for use in residential environments and cannot guarantee adequate protection of the radio reception in such environments.

**Process**

**Medium temperature range**    -20 to +150 °C (-4 to +302 °F)

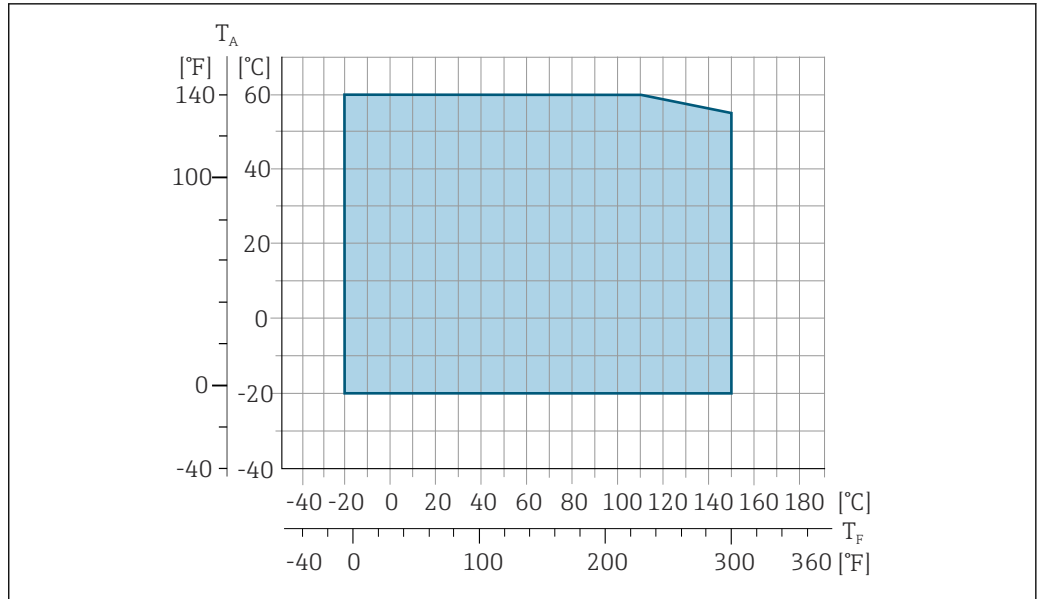


A0027806

**33** Promag 500 – digital

$T_A$  Ambient temperature range

$T_F$  Fluid temperature



34 Promag 500

T<sub>A</sub> Ambient temperature range  
 T<sub>F</sub> Fluid temperature

**i** The permitted fluid temperature in custody transfer is 0 to +50 °C (+32 to +122 °F).

**Conductivity**

≥5 μS/cm for liquids in general.

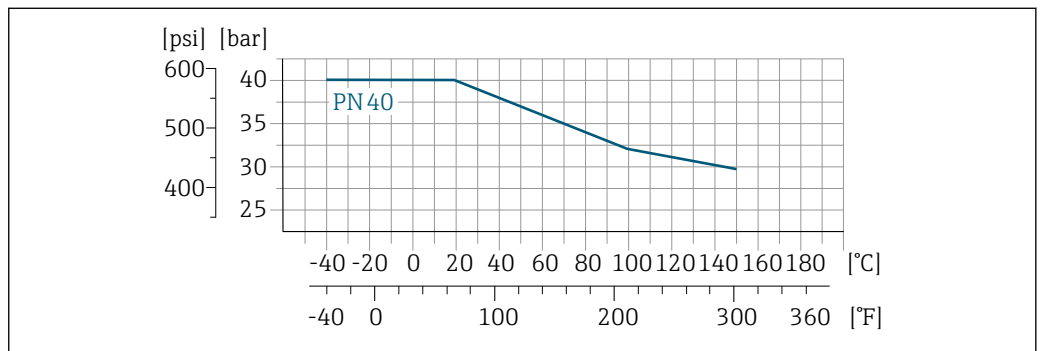
**i** Proline 500  
 The necessary minimum conductivity also depends on the length of the connecting cable  
 → 61.

**Pressure-temperature ratings**

The following graphics contain material load diagrams (reference curves) for different process connections in relation to the medium temperature.

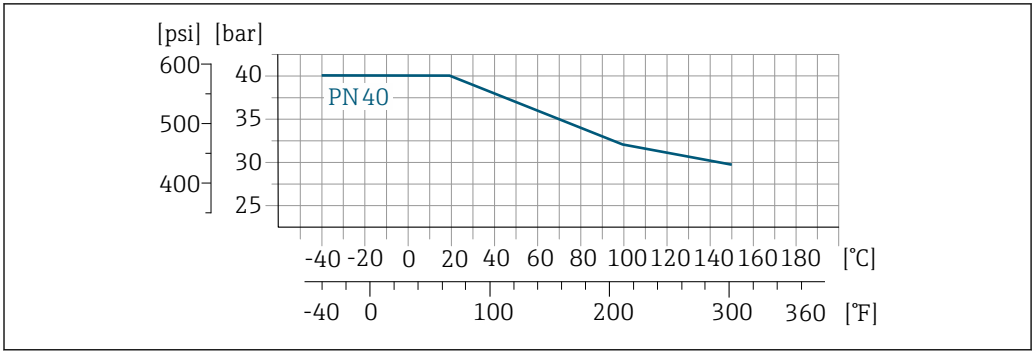
**Process connections with O-ring seal, DN 2 to 25 (1/12 to 1")**

Process connection: welding nipple according to DIN EN ISO 1127, ISO 2037; coupling according to ISO 228 / DIN 2999, NPT

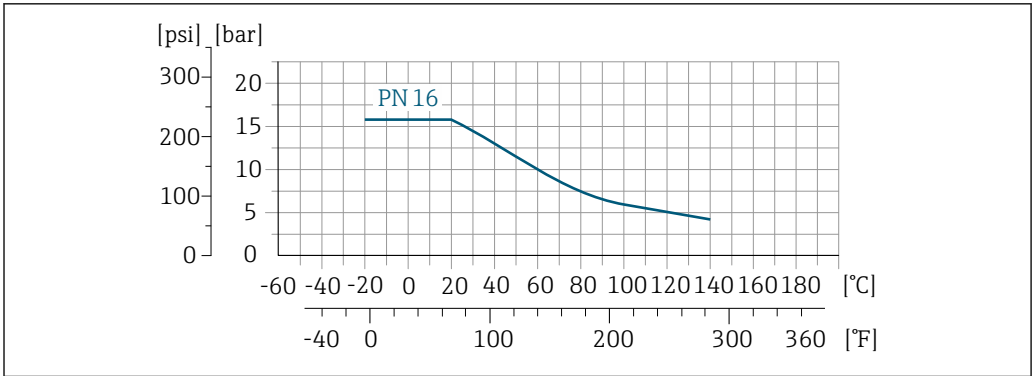


35 Process connection material: stainless steel, 1.4404 (F316L)

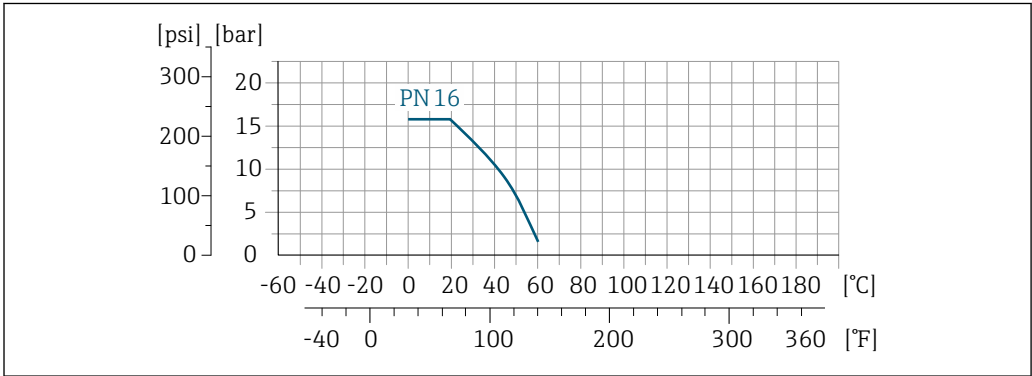
Process connection: flange according to EN 1092-1 (DIN 2501), adhesive sleeve



36 Process connection material: stainless steel, 1.4404 (F316L)



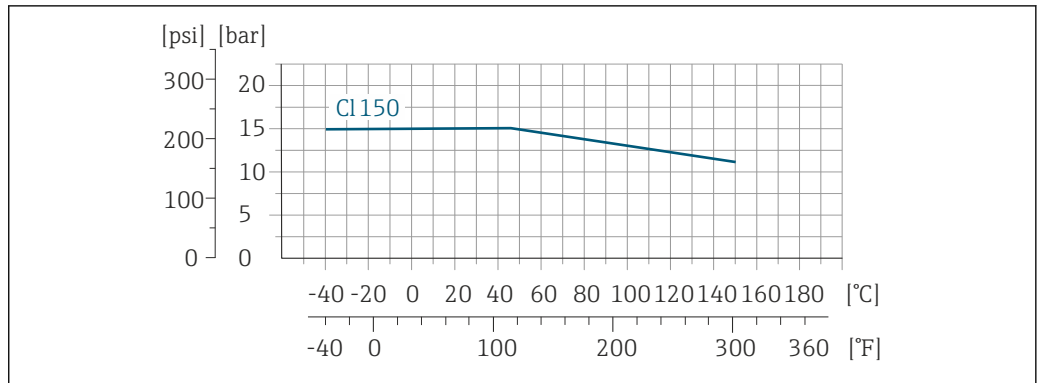
37 Process connection material: PVDF



38 Process connection material: PVC-U

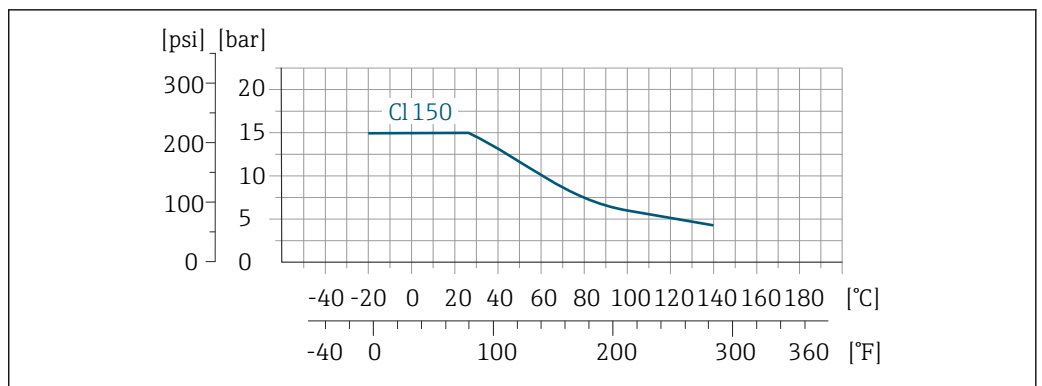


Process connection: flange according to ASME B16.5



A0028936-EN

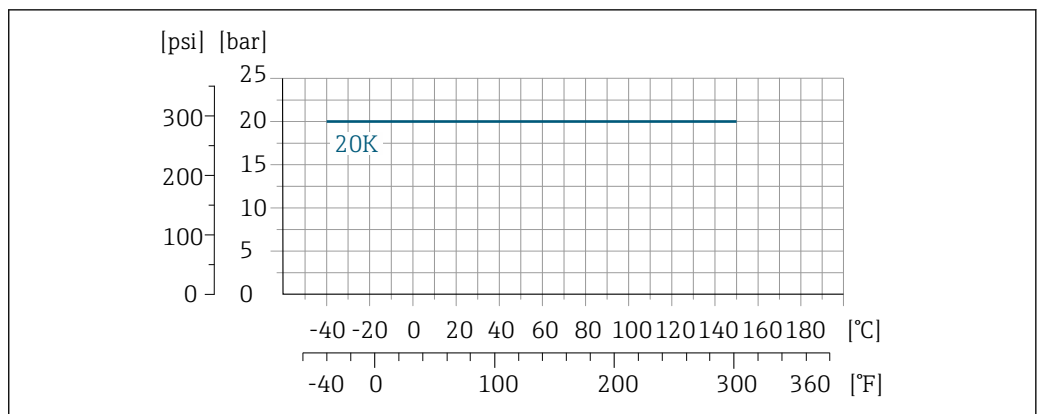
39 Process connection material: stainless steel, 1.4404 (F316L)



A0028937-EN

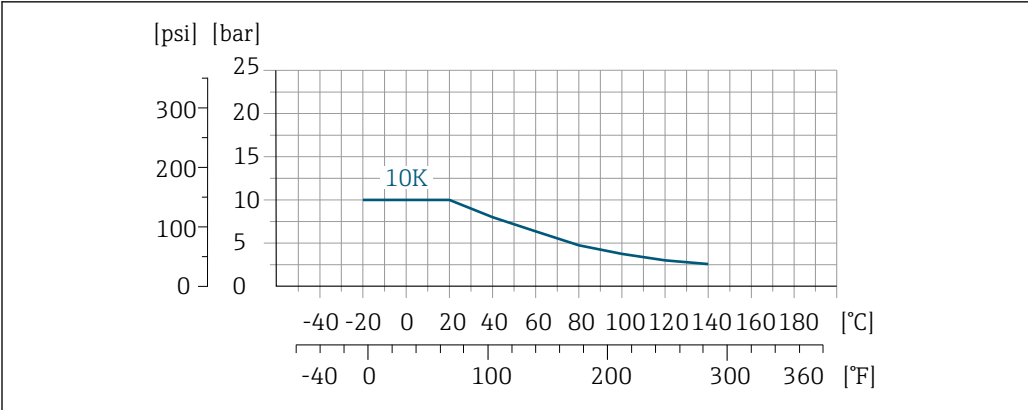
40 Process connection material: PVDF

Process connection: flange according to JIS B2220



A0028938-EN

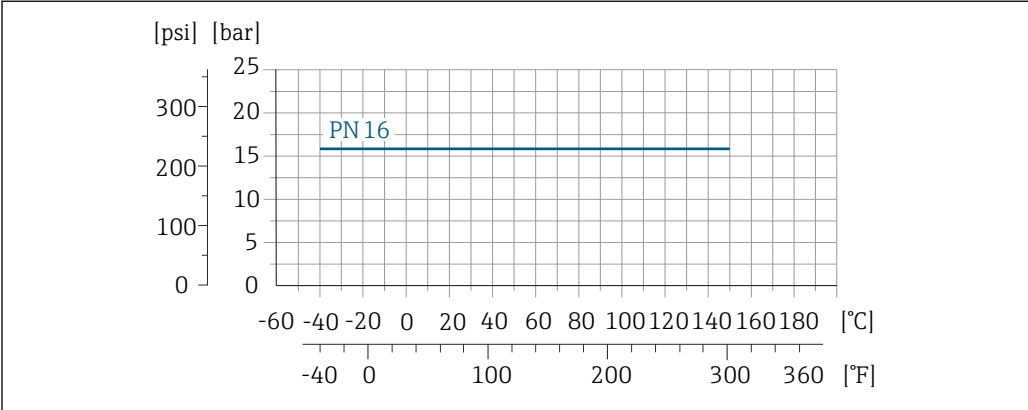
41 Process connection material: stainless steel, 1.4404 (F316L)



42 Process connection material: PVDF

**Process connections with aseptic gasket seal, DN 2 to 25 (1/12 to 1")**

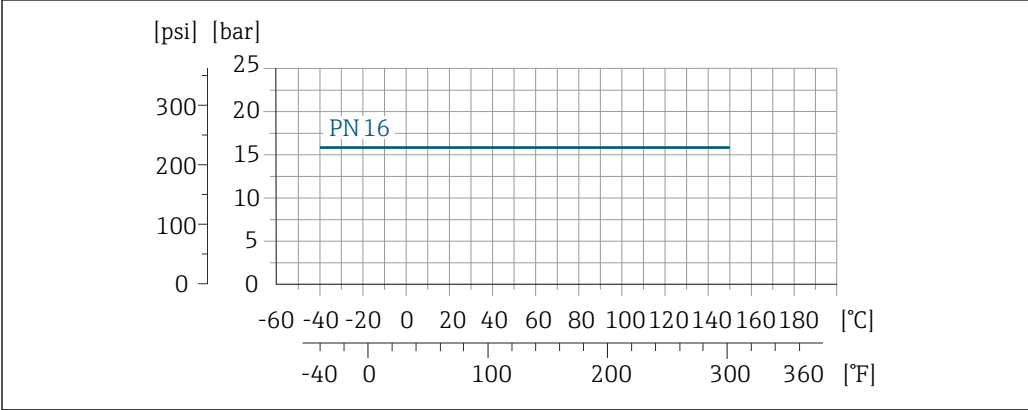
Process connection: welding nipple according to EN 10357, ASME BPE, ISO 2037; Clamp according to ISO 2852, DIN 32676; coupling according to DIN 11851, DIN 11864-1, SMS 1145; flange according to DIN 11864-2



43 Process connection material: stainless steel, 1.4404 (F316L)

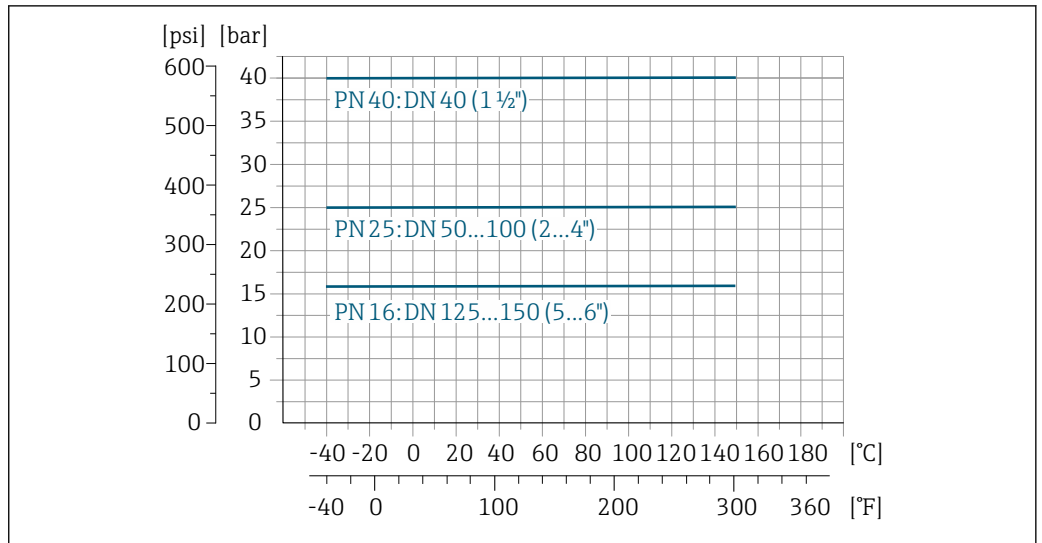
**Process connections with aseptic gasket seal, DN 40 to 150 (1 1/2 to 6")**

Process connection: coupling according to SMS 1145



44 Process connection material: stainless steel, 1.4404 (F316L)

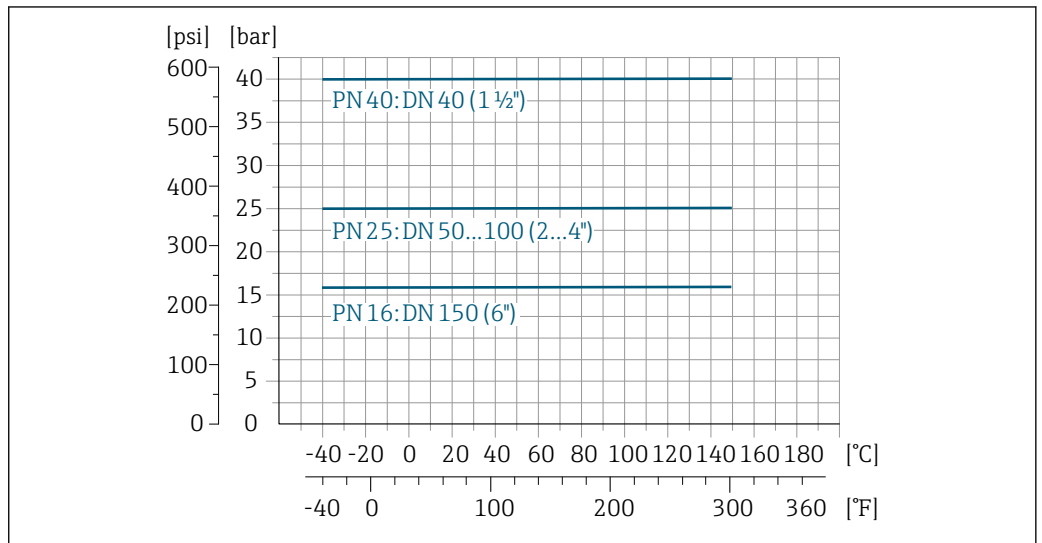
Process connection: welding nipple according to EN 10357; coupling according to DIN 11851



A0028941-EN

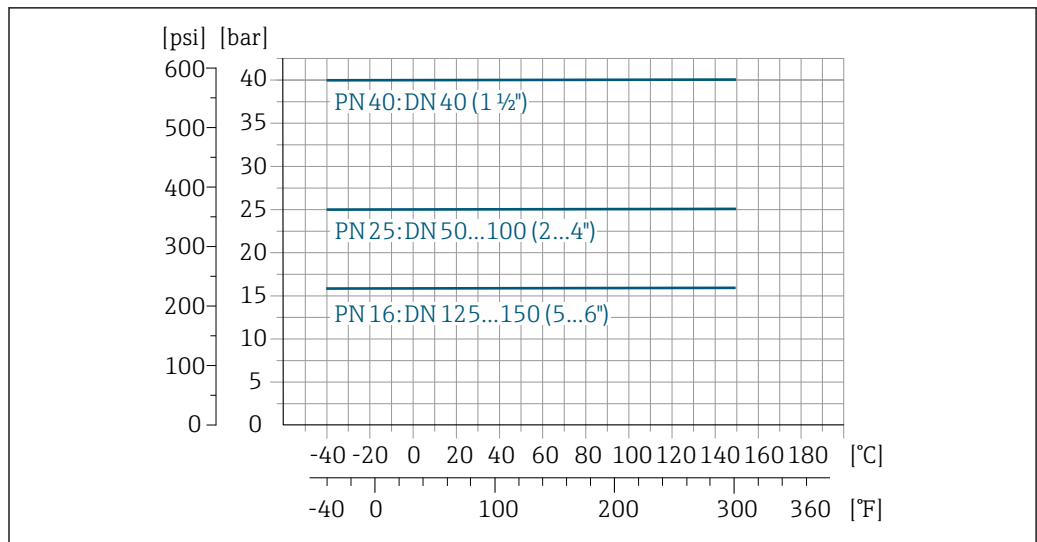
45 Process connection material: stainless steel, 1.4404 (F316L)

Process connection: welding nipple according to ASME BPE



A0028942-EN

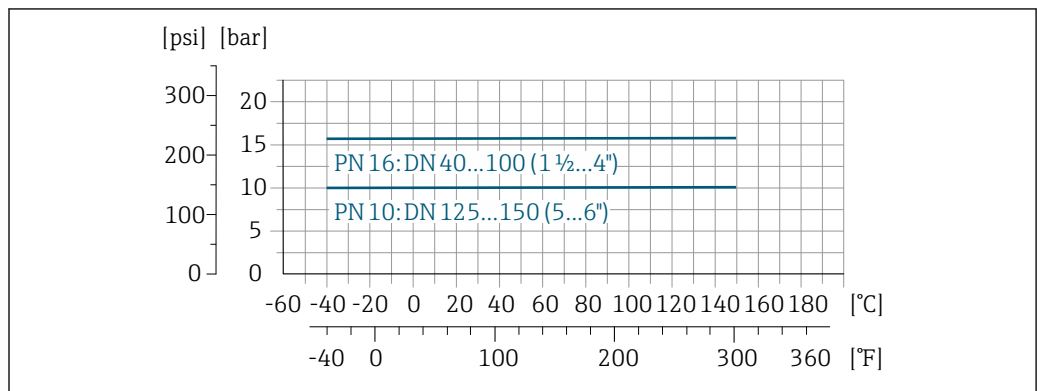
Process connection: welding nipple according to ISO 2037



A0028941-EN

46 Process connection material: stainless steel, 1.4404 (F316L)

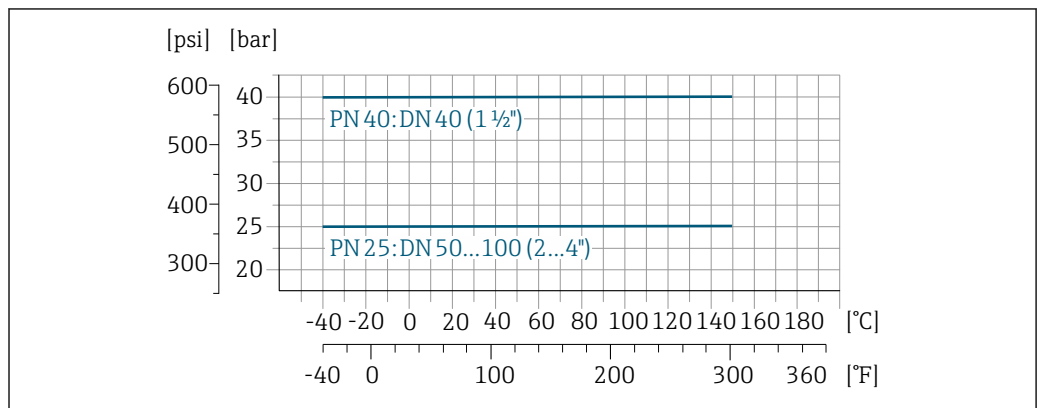
Process connection: clamp according to ISO 2852, DIN 32676



A0028943-EN

47 Process connection material: stainless steel, 1.4404 (F316L)

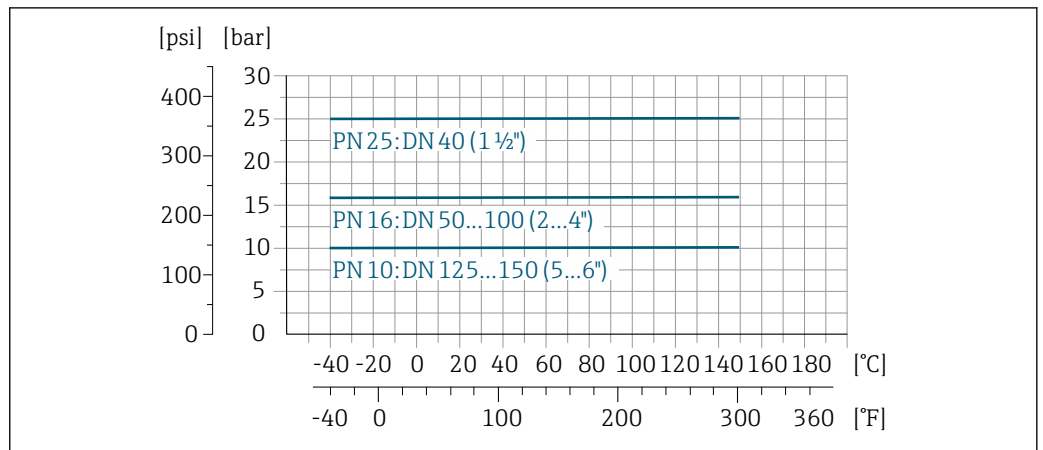
Process connection: coupling according to DIN 11864-1, ISO 2853



A0028944-EN

48 Process connection material: stainless steel, 1.4404 (F316L)

Process connection: flange according to DIN 11864-2



A0028945-EN

49 Process connection material: stainless steel, 1.4404 (F316L)

**Pressure tightness**

Liner: PFA

Nominal diameter		Limit values for absolute pressure in [mbar] ([psi]) for medium temperatures:				
[mm]	[in]	+25 °C (+77 °F)	+80 °C (+176 °F)	+100 °C (+212 °F)	+130 °C (+266 °F)	+150 °C (+302 °F)
2 to 150	1/12 to 6	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

**Flow limit**

The diameter of the pipe and the flow rate determine the nominal diameter of the sensor. The optimum velocity of flow is between 2 to 3 m/s (6.56 to 9.84 ft/s). Also match the velocity of flow (v) to the physical properties of the medium:

- $v < 2$  m/s (6.56 ft/s): for low conductivity values
- $v > 2$  m/s (6.56 ft/s): for media producing buildup (e.g. milk with a high fat content)



A necessary increase in the flow velocity can be achieved by reducing the sensor nominal diameter.



For an overview of the full scale values for the measuring range, see the "Measuring range" section

**Pressure loss**

- No pressure loss occurs as of nominal diameter DN 8 (5/16") if the sensor is installed in a pipe with the same nominal diameter.
- Pressure losses for configurations incorporating adapters according to DIN EN 545 → 60

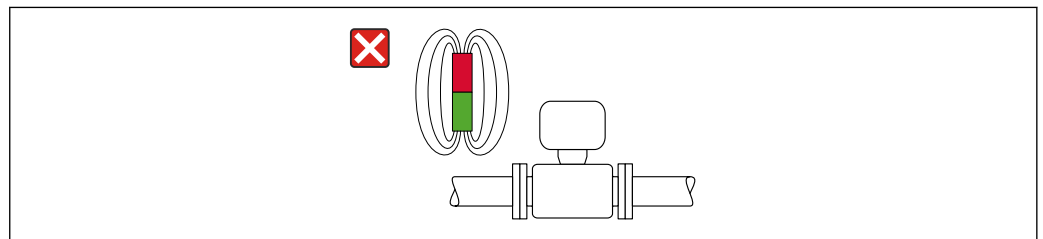
**System pressure**

Installation near pumps → 58

**Vibrations**

Installation in event of pipe vibrations → 58

**Magnetism and static electricity**



A0042152

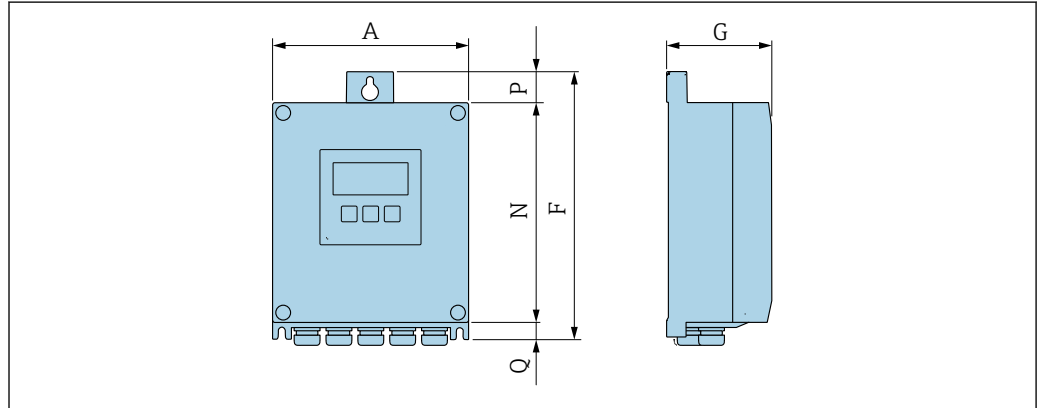
50 Avoid magnetic fields

## Mechanical construction

Dimensions in SI units

Housing of Proline 500 – digital transmitter

Non-hazardous area or hazardous area: Zone 2; Class I, Division 2



A0033789

Order code for "Transmitter housing", option A "Aluminum, coated" and order code for "Integrated ISEM electronics", option A "Sensor"

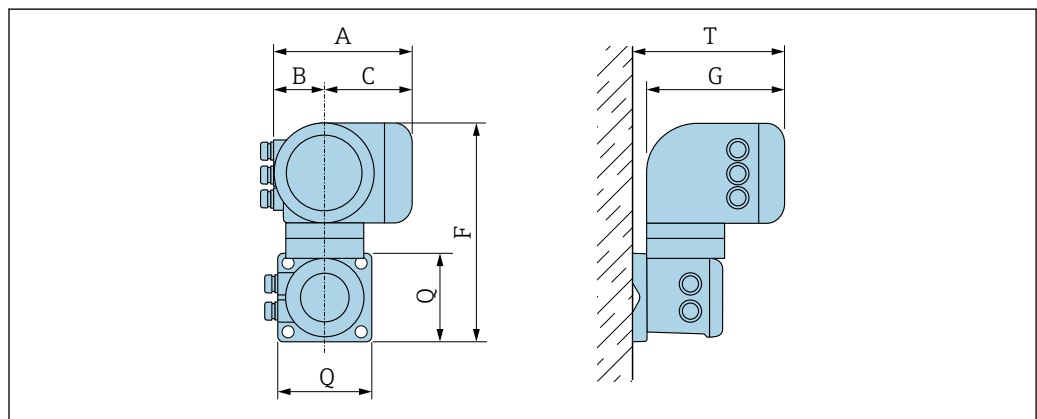
A [mm]	F [mm]	G [mm]	N [mm]	P [mm]	Q [mm]
167	232	89	187	24	21

Order code for "Transmitter housing", option D "Polycarbonate" and order code for "Integrated ISEM electronics", option A "Sensor"

A [mm]	F [mm]	G [mm]	N [mm]	P [mm]	Q [mm]
177	234	89	197	17	22

Housing of Proline 500 transmitter

Hazardous area: Zone 2; Class I, Division 2 or Zone 1; Class I, Division 1

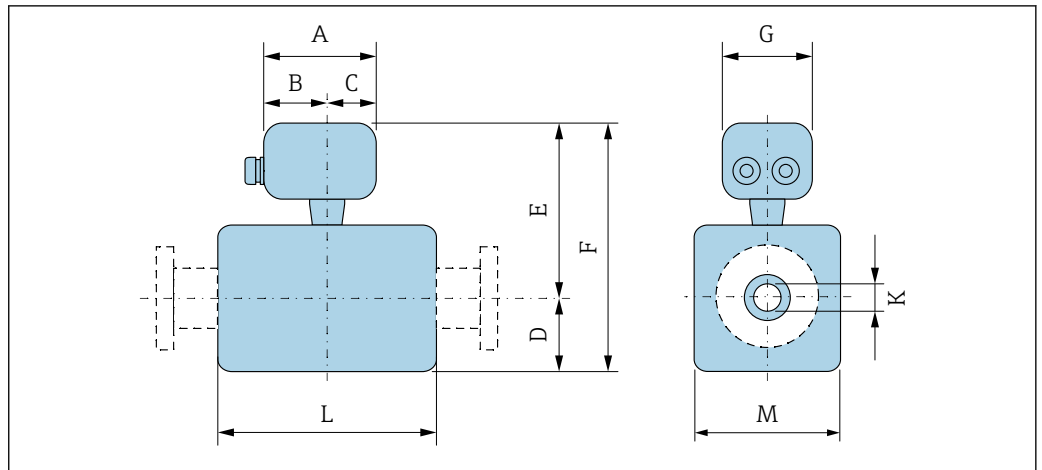


A0033788

Order code for "Transmitter housing", option A "Aluminum, coated" and order code for "Integrated ISEM electronics", option B "Transmitter"

A [mm]	B [mm]	C [mm]	F [mm]	G [mm]	Q [mm]	T [mm]
188	85	103	318	217	130	239

Sensor connection housing



A0035761

Order code for "Sensor connection housing", option A "Aluminum, coated"

DN [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	K [mm]	L <sup>1)</sup> [mm]	M [mm]
2	148	94	54	55	178	233	136	2.25	86	43
4	148	94	54	55	178	233	136	4.50	86	43
8	148	94	54	55	178	233	136	9.00	86	43
15	148	94	54	55	178	233	136	16.0	86	43
25	148	94	54	55	178	233	136	22.6	86	56
40	148	94	54	54	178	232	136	34.8	140	107
50	148	94	54	60	184	244	136	47.5	140	120
65	148	94	54	68	195	263	136	60.2	140	135
80	148	94	54	74	198	272	136	72.9	140	148
100	148	94	54	87	212	299	136	97.4	140	174
125	148	94	54	103	227	330	136	120.0	200	206
150	148	94	54	117	241	358	136	146.9	200	234

1) Total installed length depends on process connections. → 78

Order code for "Sensor connection housing", option B "Stainless, hygienic"

DN [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	K [mm]	L <sup>1)</sup> [mm]	M [mm]
2	137	78	59	55	174	229	134	2.25	86	43
4	137	78	59	55	174	229	134	4.50	86	43
8	137	78	59	55	174	229	134	9.00	86	43
15	137	78	59	55	174	229	134	16.0	86	43
25	137	78	59	55	174	229	134	22.6	86	56
40	137	78	59	54	173	226	134	34.8	140	107
50	137	78	59	60	180	240	134	47.5	140	120
65	137	78	59	68	190	258	134	60.2	140	135
80	137	78	59	74	194	267	134	72.9	140	148
100	137	78	59	87	207	294	134	97.4	140	174

DN [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	K [mm]	L <sup>1)</sup> [mm]	M [mm]
125	137	78	59	103	223	325	134	120.0	200	206
150	137	78	59	117	237	353	134	146.9	200	234

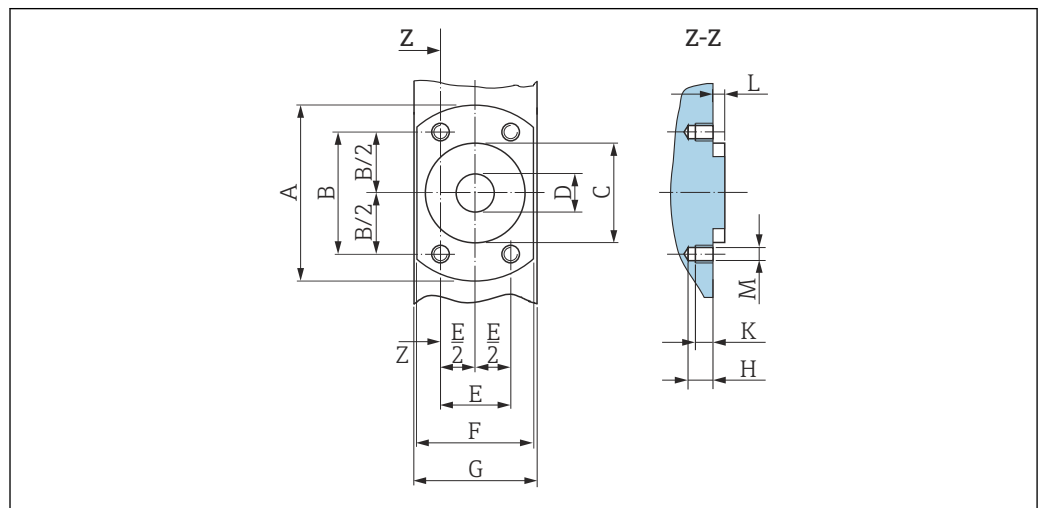
1) Total installed length depends on process connections. → 78

Order code for "Sensor connection housing", option C "Ultra-compact hygienic, stainless"

DN [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	K [mm]	L <sup>1)</sup> [mm]	M [mm]
2	124	68	56	55	173	228	112	2.25	86	43
4	124	68	56	55	173	228	112	4.50	86	43
8	124	68	56	55	173	228	112	9.00	86	43
15	124	68	56	55	173	228	112	16.0	86	43
25	124	68	56	55	174	229	112	22.6	86	56
40	124	68	56	54	173	227	112	34.8	140	107
50	124	68	56	60	179	239	112	47.5	140	120
65	124	68	56	68	190	258	112	60.2	140	135
80	124	68	56	74	193	267	112	72.9	140	148
100	124	68	56	87	207	294	112	97.4	140	174
125	124	68	56	103	222	325	112	120.0	200	206
150	124	68	56	117	236	353	112	146.9	200	234

1) Total installed length depends on process connections. → 78

**Sensor flange connection**



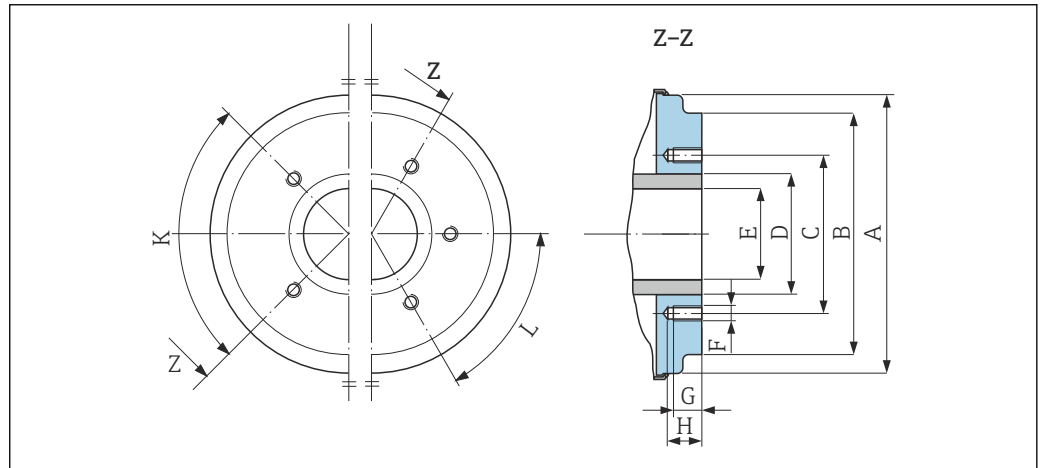
A0017657

51 Front view without process connections

DN [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	K [mm]	L [mm]	M [mm]
2	62	41.6	34	9	24	42	43	8.5	6	4	M6
4	62	41.6	34	9	24	42	43	8.5	6	4	M6



DN	A	B	C	D	E	F	G	H	K	L	M
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
8	62	41.6	34	9	24	42	43	8.5	6	4	M6
15	62	41.6	34	16	24	42	43	8.5	6	4	M6
25	72	50.2	44	26	29	55	56	8.5	6	4	M6



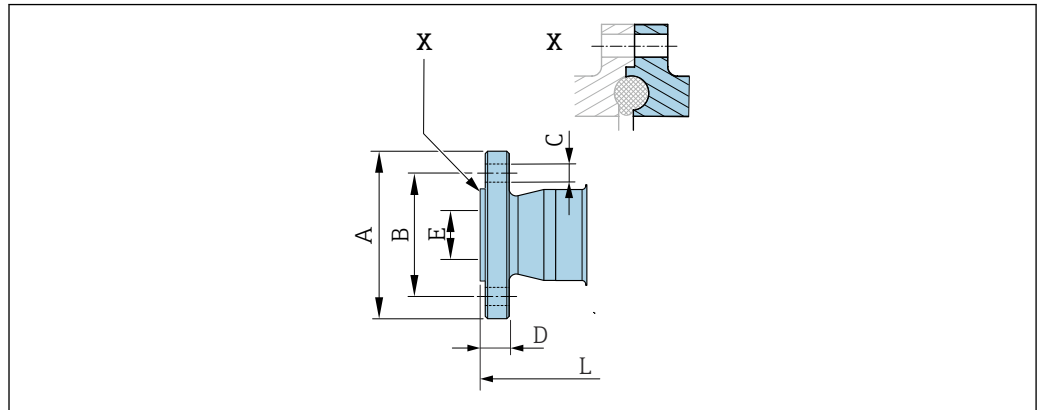
A0005528

52 Front view without process connections

DN	A	B	C	D	E	F	G	H	K	L
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	90° ±0.5°	60° ±0.5°
									Tapped holes	
40	99.7	85.8	71.0	48.3	34.8	M8	12	17	4	-
50	112.7	98.8	83.5	60.3	47.5	M8	12	17	4	-
65	127.7	114.8	100.0	76.1	60.2	M8	12	17	-	6
80	140.7	133.5	114.0	88.9	72.9	M8	12	17	-	6
100	166.7	159.5	141.0	114.3	97.4	M8	12	17	-	6
125	198.7	191.5	171.0	139.7	120.0	M10	15	20	-	6
150	226.7	219.5	200.0	168.3	146.9	M10	15	20	-	6

## Flange connections

### Female with aseptic gasket seal



A0043232

53 Detail X: Asymmetrical process connection; the part shown in blue is provided by the supplier.

**Flange DIN 11864-2, aseptic female, Form A**  
**1.4404 (316L), suitable for pipe according to EN 10357 series A, female**  
 Order code for "Process connection", option DES/DQS

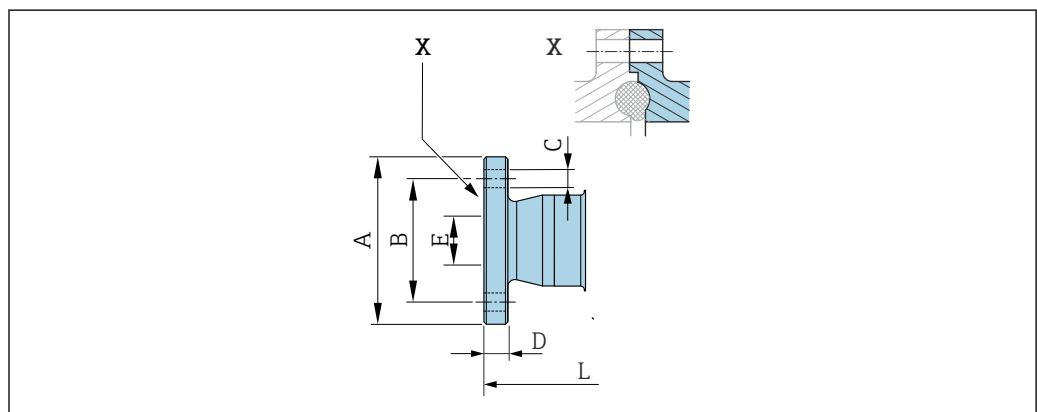
DN [mm]	Suitable for pipe according to EN 10357 series A [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	L [mm]
2 to 8 <sup>1)</sup>	13 × 1.5 (DN 10)	54	37	4 × Ø9	10	10	183
15	19 × 1.5 (DN 15)	59	42	4 × Ø9	10	16	183
25	29 × 1.5 (DN 25)	70	53	4 × Ø9	10	26	183

Surface roughness:  $Ra_{max} = 0.76 \mu\text{m}$ , optional order code for "Service", option HJ:  $Ra_{max} = 0.38 \mu\text{m}$  electropolished

Please note the internal diameters of the measuring pipe and process connection (E) when cleaning with pigs.

- 1) With DN 10 flanges as standard

### Flange with notch with aseptic gasket seal



A0042819

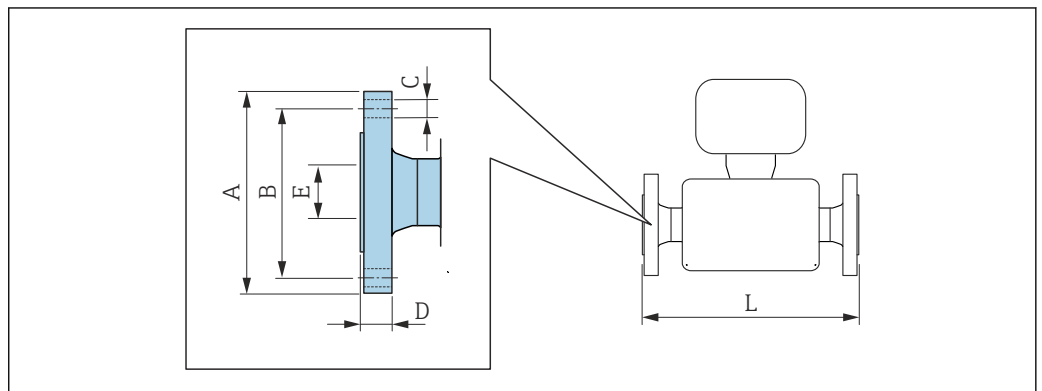
54 Detail X: Asymmetrical process connection; the part shown in blue is provided by the supplier.

**Flange DIN 11864-2, aseptic flange with notch, Form A**  
**1.4404 (316L), suitable for pipe according to EN 10357 series A, flange with notch**  
*Order code for "Process connection", option DES/DRS*

DN [mm]	Suitable for pipe according to EN 10357 series A [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	L [mm]
40	41 × 1.5	82	65	4 × Ø9	10	38	246
50	53 × 1.5	94	77	4 × Ø9	10	50	246
65	70 × 2	113	95	8 × Ø9	10	66	246
80	85 × 2	133	112	8 × Ø11	10	81	270
100	104 × 2	159	137	8 × Ø11	10	100	278
125	129 × 2	183	161	8 × Ø11	10	125	362
150	154 × 2	213	188	8 × Ø14	10	150	362

Surface roughness:  $Ra_{max} = 0.76 \mu\text{m}$ , optional order code for "Service", option HJ:  $Ra_{max} = 0.38 \mu\text{m}$  electropolished  
 Please note the internal diameters of the measuring pipe and process connection (E) when cleaning with pigs.

*Flanges with O-ring seal*



A0015621

**Flange according to EN 1092-1 (DIN 2501), Form B: PN 40**  
**1.4404 (316L)**  
*Order code for "Process connection", option D5S*

DN [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	L [mm]
2 to 8 <sup>1)</sup>	95	65	4 × Ø14	16	17.3	198.4
15	95	65	4 × Ø14	16	17.3	198.4
25	115	85	4 × Ø14	18	28.5	198.4

Surface roughness:  $Ra_{max} = 1.6 \mu\text{m}$

1) DN 2 to 8 with DN 15 flanges as standard

**Flange according to ASME B16.5: Class 150**  
**1.4404 (316L)**  
*Order code for "Process connection", option A1S*

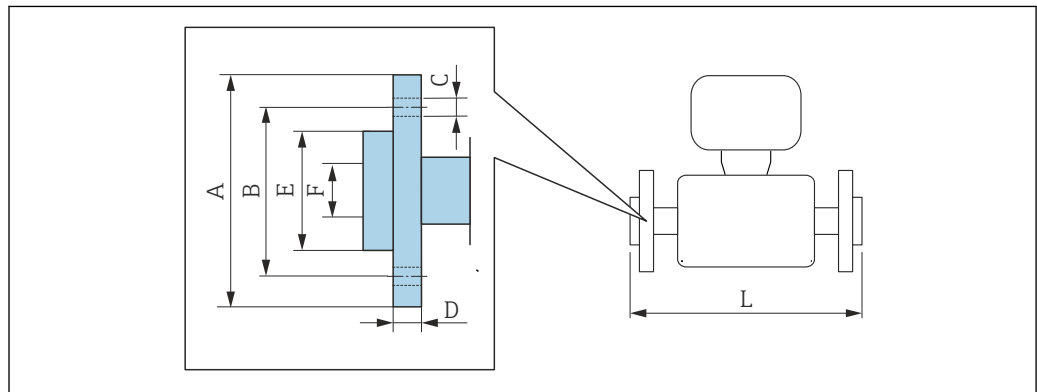
DN [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	L [mm]
2 to 8 <sup>1)</sup>	90	60.3	4 × Ø15.7	11.2	15.7	218
15	90	60.3	4 × Ø15.7	11.2	15.7	218

<b>Flange according to ASME B16.5: Class 150 1.4404 (316L)</b>						
Order code for "Process connection", option A1S						
DN [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	L [mm]
25	110	79.4	4 × Ø15.7	14.2	26.7	230
Surface roughness: Ra <sub>max</sub> = 1.6 µm						

- 1) DN 2 to 8 with DN 15 flanges as standard

<b>Flange according to JIS B2220: 20K 1.4404 (316L)</b>						
Order code for "Process connection", option N4S						
DN [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	L [mm]
2 to 8 <sup>1)</sup>	95	70	4 × Ø15	14	15	220
15	95	70	4 × Ø15	14	15	220
25	125	90	4 × Ø19	16	25	220
Surface roughness: Ra <sub>max</sub> = 1.6 µm						

- 1) DN 2 to 8 with DN 15 flanges as standard



A002221

<b>Lap joint flange according to EN 1092-1 (DIN 2501): PN 16 PVDF</b>							
Order code for "Process connection", option D3P							
DN [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	L [mm]
2 to 8 <sup>1)</sup>	95	65	4 x Ø14	14.5	45	17.3	200
15	95	65	4 x Ø14	14.5	45	17.3	200
25	115	85	4 x Ø14	16.5	68	28.5	200
Surface roughness: Ra <sub>max</sub> = 1.6 µm							
The required grounding rings can be ordered as accessories (order code: DK5HR-****).							

- 1) DN 2 to 8 with DN 15 flanges as standard

<b>Lap joint flange with grounding electrode according to EN 1092-1 (DIN 2501): PN 16</b>							
<b>PVDF</b>							
<i>Order code for "Process connection", option D4P</i>							
<b>DN [mm]</b>	<b>A [mm]</b>	<b>B [mm]</b>	<b>C [mm]</b>	<b>D [mm]</b>	<b>E [mm]</b>	<b>F [mm]</b>	<b>L [mm]</b>
2 to 8 <sup>1)</sup>	95	65	4 x Ø14	14.5	45	17.3	200
15	95	65	4 x Ø14	14.5	45	17.3	200
25	115	85	4 x Ø14	16.5	68	28.5	200
Surface roughness: Ra <sub>max</sub> = 1.6 µm Grounding rings are not necessary.							

1) DN 2 to 8 with DN 15 flanges as standard

<b>Lap joint flange according to ASME B16.5: Class 150</b>							
<b>PVDF</b>							
<i>Order code for "Process connection", option A1P</i>							
<b>DN [mm]</b>	<b>A [mm]</b>	<b>B [mm]</b>	<b>C [mm]</b>	<b>D [mm]</b>	<b>E [mm]</b>	<b>F [mm]</b>	<b>L [mm]</b>
2 to 8 <sup>1)</sup>	90	60.3	4 × Ø 15.7	15	35.1	15.7	200
15	90	60.3	4 × Ø 15.7	15	35.1	15.7	200
25	110	79.4	4 × Ø 15.7	16	50.8	26.7	200
Surface roughness: Ra <sub>max</sub> = 1.6 µm The required grounding rings can be ordered as accessories (order code: DK5HR-****).							

1) DN 2 to 8 with DN 15 flanges as standard

<b>Lap joint flange with grounding electrode according to ASME B16.5: Class 150</b>							
<b>PVDF</b>							
<i>Order code for "Process connection", option A4P</i>							
<b>DN [mm]</b>	<b>A [mm]</b>	<b>B [mm]</b>	<b>C [mm]</b>	<b>D [mm]</b>	<b>E [mm]</b>	<b>F [mm]</b>	<b>L [mm]</b>
2 to 8 <sup>1)</sup>	90	60.3	4 × Ø 15.7	15	35.1	15.7	200
15	90	60.3	4 × Ø 15.7	15	35.1	15.7	200
25	110	79.4	4 × Ø 15.7	16	50.8	26.7	200
Surface roughness: Ra <sub>max</sub> = 1.6 µm Grounding rings are not necessary.							

1) DN 2 to 8 with DN 15 flanges as standard

<b>Lap joint flange according to JIS B2220: 10K</b>							
<b>PVDF</b>							
<i>Order code for "Process connection", option N3P</i>							
<b>DN [mm]</b>	<b>A [mm]</b>	<b>B [mm]</b>	<b>C [mm]</b>	<b>D [mm]</b>	<b>E [mm]</b>	<b>F [mm]</b>	<b>L [mm]</b>
2 to 8 <sup>1)</sup>	95	70	4 × Ø 15.7	15	35.1	15	200
15	95	70	4 × Ø 15.7	15	35.1	15	200
25	125	90	4 × Ø 15.7	16	50.8	19	200
Surface roughness: Ra <sub>max</sub> = 1.6 µm The required grounding rings can be ordered as accessories (order code: DK5HR-****).							

1) DN 2 to 8 with DN 15 flanges as standard

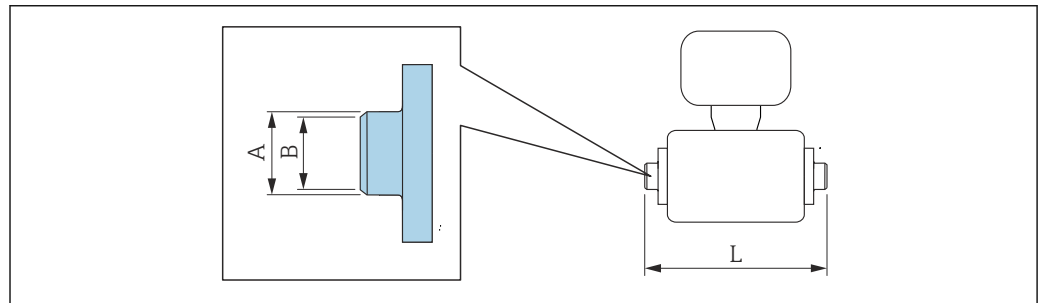
Lap joint flange with grounding electrode according to JIS B2220: 10K PVDF							
Order code for "Process connection", option N4P							
DN [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	L [mm]
2 to 8 <sup>1)</sup>	95	70	4 × Ø 15.7	15	35.1	15	200
15	95	70	4 × Ø 15.7	15	35.1	15	200
25	125	90	4 × Ø 15.7	16	50.8	19	200

Surface roughness: Ra<sub>max</sub> = 1.6 µm  
Grounding rings are not necessary.

1) DN 2 to 8 with DN 15 flanges as standard

### Welding nipple

Welding nipple with aseptic gasket seal



A0027510

Welding nipple according to EN 10357 1.4404 (316L), suitable for pipe EN 10357 series A				
Order code for "Process connection", option DAS				
DN [mm]	Suitable for pipe EN 10357 series A [mm]	A [mm]	B [mm]	L [mm]
2 to 8	13 × 1.5	13	10	132.6
15	19 × 1.5	19	16	132.6
25	29 × 1.5	29	26	132.6
40	41 × 1.5	41	38	220
50	53 × 1.5	53	50	220
65	70 × 2	70	66	220
80	85 × 2	85	81	220
100	104 × 2	104	100	220
125	129 × 2	129	125	300
150	154 × 2	154	150	300

Surface roughness: Ra<sub>max</sub> = 0.76 µm, optional order code for "Service", option HJ: Ra<sub>max</sub> = 0.38 µm  
electropolished  
Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

**Welding nipple according to ISO 2037**  
**1.4404 (316L), suitable for pipe ISO 2037**  
*Order code for "Process connection", option IAS*

DN [mm]	Suitable for pipe ISO 2037 [mm]	A [mm]	B [mm]	L [mm]
2 to 8	12.7 × 1.65	12	10	118.2
15	19.05 × 1.65	18	16	118.2
25	25.4 × 1.60	25	22.6	118.2
40	38 × 1.2	38	35.6	220
50	51 × 1.2	51	48.6	220
65	63.5 × 1.6	63.5	60.3	220
80	76.1 × 1.6	76.1	72.9	220
100	101.6 × 2	101.6	97.6	220
125	139.7 × 2	139.7	135.7	380
150	168.3 × 2.6	168.3	163.1	380

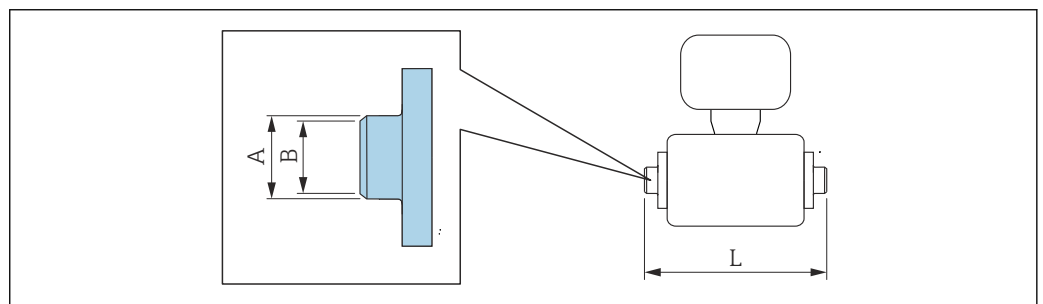
Surface roughness:  $Ra_{max} = 0.76 \mu\text{m}$ , optional order code for "Service", option HJ:  $Ra_{max} = 0.38 \mu\text{m}$  electropolished  
 Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

**Welding nipple according to ASME BPE**  
**1.4404 (316L), suitable for pipe according to ASME BPE and DIN 11866 series C**  
*Order code for "Process connection", option AAS*

DN [mm]	Suitable for pipe according to ASME BPE [mm]	A [mm]	B [mm]	L [mm]
2 to 8	12.7 × 1.65	12.7	9	118.2
15	19.1 × 1.65	19.1	16	118.2
25	25.4 × 1.65	25.4	22.6	118.2
40	38.1 × 1.65	38.1	34.8	220
50	50.8 × 1.65	50.8	47.5	220
65	63.5 × 1.65	63.5	60.2	220
80	76.2 × 1.65	76.2	72.9	220
100	101.6 × 1.65	101.6	97.4	220
150	152.4 × 2.77	152.4	146.9	300

Surface roughness:  $Ra_{max} = 0.76 \mu\text{m}$ , optional order code for "Service", option HJ:  $Ra_{max} = 0.38 \mu\text{m}$  electropolished  
 Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

*Welding nipple with O-ring seal*



A0027510

Welding nipple according to ISO 1127 1.4404 (316L), suitable for pipe according to ISO 1127 series 1 Order code for "Process connection", option A2S				
DN [mm]	Suitable for pipe according to ISO 1127 series 1 [mm]	A [mm]	B [mm]	L [mm]
2 to 8	13.5 × 2.30	13.5	9	126.6
15	21.3 × 2.65	21.3	16	126.6
25	33.7 × 3.25	33.7	27.2	126.6

Surface roughness: Ra<sub>max</sub> = 1.6 µm

Welding nipple according to ISO 1127 1.4404 (316L), suitable for pipe according to ISO 1127 series 1 and DIN 11866 series B Order code for "Process connection", option D1S				
DN [mm]	Suitable for pipe according to ISO 1127 series 1 and DIN 11866 series B [mm]	A [mm]	B [mm]	L [mm]
2 to 8	13.5 × 1.6	13.5	10.3	126.6
15	21.3 × 1.6	21.3	18.1	126.6
25	33.7 × 2.0	33.7	29.7	126.6

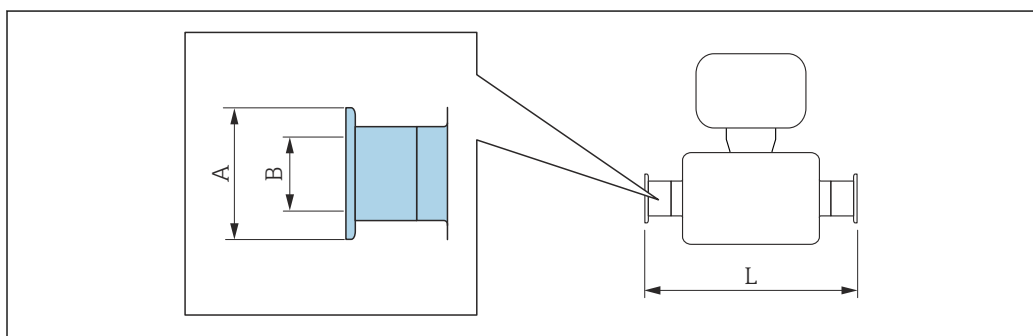
Surface roughness: Ra<sub>max</sub> = 1.6 µm

Welding nipple according to ISO 2037 1.4404 (316L), suitable for pipe ISO 203 Order code for "Process connection", option I1S				
DN [mm]	Suitable for pipe ISO 2037 [mm]	A [mm]	B [mm]	L [mm]
2 to 8	13.5 × 2.3	13.5	9	126.6
15	21.3 × 2.65	21.3	16	126.6
25	33.7 × 3.25	33.7	27.2	126.6

Surface roughness: Ra<sub>max</sub> = 1.6 µm

## Clamp connections

Clamp connections with aseptic gasket seal



A0015625



<b>Clamp according to DIN 32676 1.4404 (316L)</b> <i>Order code for "Process connection", option DBS</i>				
DN [mm]	Suitable for pipe [mm]	A [mm]	B [mm]	L [mm]
2 to 8	14 × 2 (DN 10)	34	10	168
15	20 × 2 (DN 15)	34	16	168
25	30 × 2 (DN 25)	50.5	26	175
40	41 × 1.5	50.5	38	220
50	53 × 1.5	64	50	220
65	70 × 2	91	66	220
80	85 × 2	106	81	220
100	104 × 2	119	100	220
125	129 × 2	155	125	300
150	154 × 2	183	150	300

Surface roughness:  $Ra_{max} = 0.76 \mu\text{m}$ , optional order code for "Service", option HJ:  $Ra_{max} = 0.38 \mu\text{m}$  electropolished  
Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

<b>Tri-Clamp 1.4404 (316L), suitable for pipe according to ASME BPE and DIN 11866 series C</b> <i>Order code for "Process connection", option FAS</i>				
DN [mm]	Suitable for pipe according to ASME BPE [mm]	A [mm]	B [mm]	L [mm]
2 to 8	12.7 × 1.65	25	9.4	143
15	19.1 × 1.65	25	15.8	143
25	25.4 × 1.65	50.4	22.1	143
40	38.1 × 1.65	50.4	34.8	220
50	50.8 × 1.65	63.9	47.5	220
65	63.5 × 1.65	77.4	60.2	220
80	76.2 × 1.65	90.9	72.9	220
100	101.6 × 2.11	118.9	97.4	220
150	152.4 × 2.77	166.9	146.9	300

Surface roughness:  $Ra_{max} = 0.76 \mu\text{m}$ , optional order code for "Service", option HJ:  $Ra_{max} = 0.38 \mu\text{m}$  electropolished  
Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

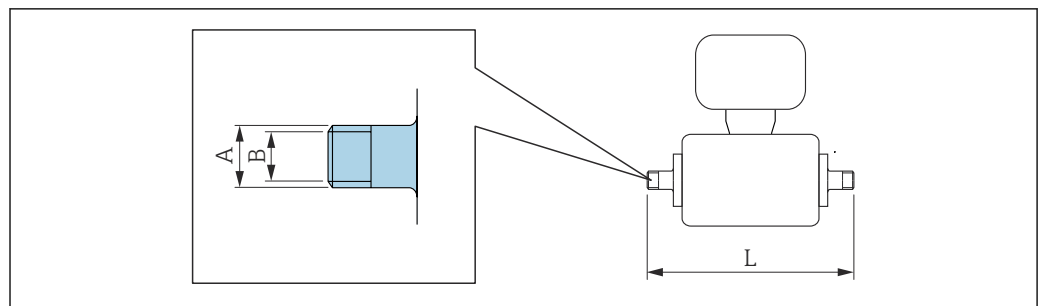
<b>Clamp according to ISO 2852, Fig. 2 1.4404 (316L)</b> <i>Order code for "Process connection", option IBS</i>				
DN [mm]	Suitable for pipe ISO 2037 [mm]	A [mm]	B [mm]	L [mm]
25	24.5 × 1.65	50.5	22.6	174.6
40	38 × 1.6	50.5	35.6	220
50	51 × 1.6	64	48.6	220
65	63.5 × 1.6	77.5	60.3	220
80	76.1 × 1.6	91	72.9	220
100	101.6 × 2	119	97.6	220

<b>Clamp according to ISO 2852, Fig. 2</b> 1.4404 (316L) Order code for "Process connection", option IBS				
DN [mm]	Suitable for pipe ISO 2037 [mm]	A [mm]	B [mm]	L [mm]
125	139.7 × 2	155	135.7	300
150	168.3 × 2.6	183	163.1	300

Surface roughness:  $Ra_{max} = 0.76 \mu\text{m}$ , optional order code for "Service", option HJ:  $Ra_{max} = 0.38 \mu\text{m}$  electropolished  
Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

## Couplings

Thread with aseptic gasket seal



A0027509

<b>Coupling DIN 11851, thread</b> 1.4404 (316L), suitable for pipe EN 10357 series B Order code for "Process connection", option DCS				
DN [mm]	Suitable for pipe EN 10357 series B [mm]	A [mm]	B [mm]	L [mm]
2 to 8	12 × 1 (DN 10)	Rd 28 × 1/8	10	174
15	18 × 1.5	Rd 34 × 1/8	16	174
25	28 × 1 or 28 × 1.5	Rd 52 × 1/6	26	190

Surface roughness:  $Ra_{max} = 0.76 \mu\text{m}$ , optional order code for "Service", option HJ:  $Ra_{max} = 0.38 \mu\text{m}$  electropolished  
Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

<b>Coupling DIN 11851, thread</b> 1.4404 (316L), suitable for pipe EN 10357 series A Order code for "Process connection", option DCS				
DN [mm]	Suitable for pipe EN 10357 series A [mm]	A [mm]	B [mm]	L [mm]
40	41 × 1.5	Rd 65 × 1/6	38	260
50	53 × 1.5	Rd 78 × 1/6	50	260
65	70 × 2	Rd 95 × 1/6	66	270
80	85 × 2	Rd 110 × 1/4	81	280
100	104 × 2	Rd 130 × 1/4	100	290
125	129 × 2	Rd 160 × 1/4	125	380
150	154 × 2	Rd 160 × 1/4	150	390

Surface roughness:  $Ra_{max} = 0.76 \mu\text{m}$ , optional order code for "Service", option HJ:  $Ra_{max} = 0.38 \mu\text{m}$  electropolished  
Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

<b>Coupling DIN 11864-1, aseptic thread, Form A 1.4404 (316L), suitable for pipe EN 10357 series A Order code for "Process connection", option DDS</b>					
DN [mm]	Suitable for pipe EN 10357 series A [mm]	A [mm/in]	B [mm]	L [mm]	
2 to 8	13 × 1.5 (DN 10)	Rd 28 × 1/8	10	170	
15	19 × 1.5	Rd 34 × 1/8	16	170	
25	29 × 1.5	Rd 52 × 1/6	26	184	
40	41 × 1.5	Rd 65 × 1/6	38	256	
50	53 × 1.5	Rd 78 × 1/6	50	256	
65	70 × 2	Rd 95 × 1/6	66	266	
80	85 × 2	Rd 110 × 1/4	81	276	
100	104 × 2	Rd 130 × 1/4	100	286	

Surface roughness: Ra<sub>max</sub> = 0.76 µm, optional order code for "Service", option HJ: Ra<sub>max</sub> = 0.38 µm electropolished  
Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

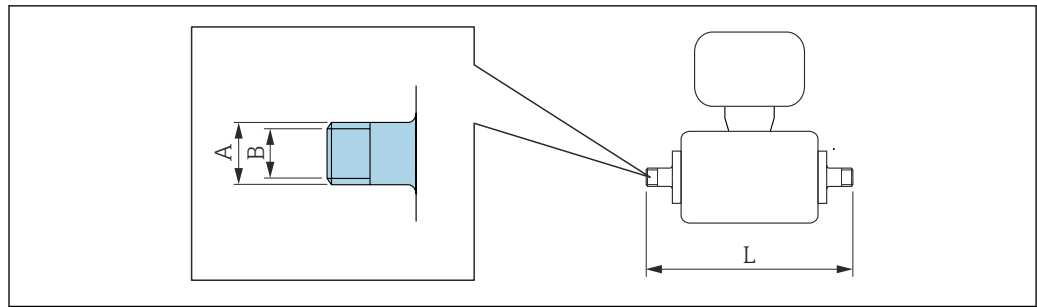
<b>Coupling ISO 2853, thread 1.4404 (316L) Order code for "Process connection", option ICS</b>					
DN [mm]	Suitable for pipe ISO 2037 [mm]	DN Clamp ISO 2853 [mm]	A [mm/in]	B [mm]	L [mm]
40	38 × 1.6	38	Tr 50.5 × 3.175	35.6	256
50	51 × 1.6	51	Tr 64 × 3.175	48.6	256
65	63.5 × 1.6	63.5	Tr 77.5 × 3.175	60.3	266
80	76.1 × 1.6	76.1	Tr 91 × 3.175	72.9	276
100	101.6 × 2	101.6	Tr 118 × 3.175	97.6	286

Surface roughness: Ra<sub>max</sub> = 0.76 µm, optional order code for "Service", option HJ: Ra<sub>max</sub> = 0.38 µm electropolished  
Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

<b>Coupling SMS 1145, thread 1.4404 (316L) Order code for "Process connection", option SAS</b>					
DN [mm]	Suitable for pipe [mm]	DN SMS 1145 [mm]	A [mm/in]	B [mm]	L [mm]
25	1	25	Rd 40 × 1/6	22.6	147.6
40	38.1 × 1.65	38	Rd 60 × 1/6	34.8	256
50	50.8 × 1.65	51	Rd 70 × 1/6	47.5	256
65	63.5 × 1.65	63.5	Rd 85 × 1/6	60.2	266
80	76.2 × 1.65	76	Rd 98 × 1/6	72.6	276
100	101.6 × 1.65	101.6	Rd 132 × 1/6	97.4	286

Surface roughness: Ra<sub>max</sub> = 0.76 µm, optional order code for "Service", option HJ: Ra<sub>max</sub> = 0.38 µm electropolished  
Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

Thread with O-ring seal



A0027509

**External thread according to ISO 228/DIN 2999  
1.4404 (316L)**

Order code for "Process connection", option I2S

DN [mm]	Suitable for internal thread ISO 228/DIN 2999 [in]	A [mm/in]	B [mm]	L [mm]
2 to 8	R 3/8	R 10.1 × 3/8	10	166
15	R 1/2	R 13.2 × 1/2	16	166
25	R 1	R 16.5 × 1	25	170

Surface roughness: Ra<sub>max</sub> = 1.6 µm

**Internal thread according to ISO 228/DIN 2999  
1.4404 (316L)**

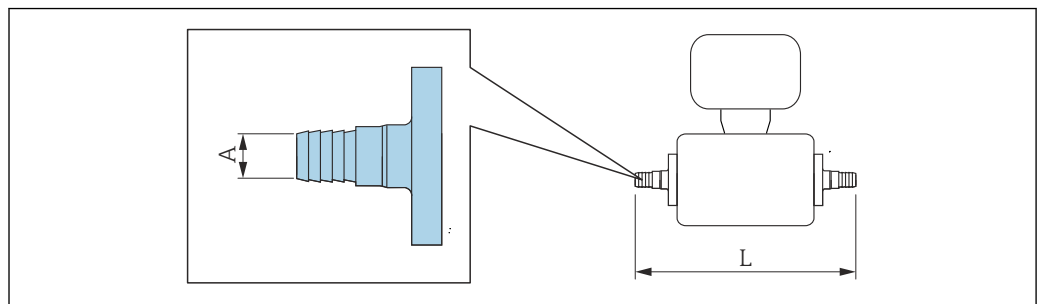
Order code for "Process connection", option I3S

DN [mm]	Suitable for external thread ISO 228/DIN 2999 [in]	A [mm/in]	B [mm]	L [mm]
2 to 8	Rp 3/8	Rp 13 × 3/8	9	176
15	Rp 1/2	Rp 14 × 1/2	16	176
25	Rp 1	Rp 17 × 1	27.2	188

Surface roughness: Ra<sub>max</sub> = 1.6 µm

**Hose adapter**

Hose adapter with O-ring seal



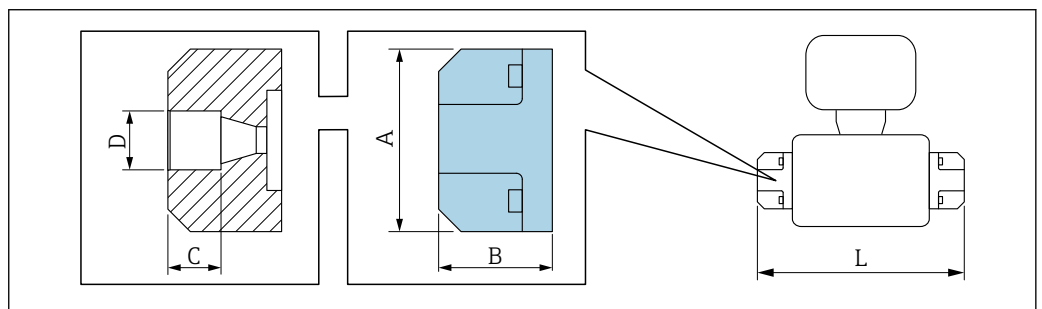
A0027511

<b>Hose adapter</b> <b>1.4404 (316L)</b> <i>Order code for "Process connection", options O1S, O2S, O3S</i>			
DN [mm]	Suitable for internal diameter [mm]	A [mm]	L [mm]
2 to 8	13	10	184
15	16	12.6	184
25	19	16	184

Surface roughness:  $Ra_{max} = 1.6 \mu m$

**Adhesive sleeves**

*Adhesive sleeves with O-ring seal*



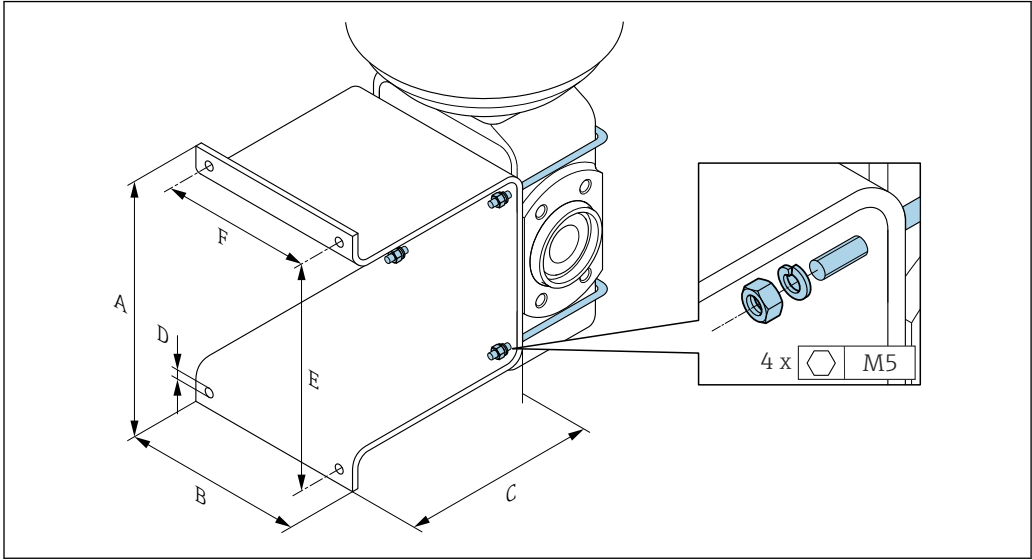
A0036663

<b>Adhesive sleeve</b> <b>PVC</b> <i>Order code for "Process connection", option O2V</i>						
DN [mm]	Suitable for pipe [mm] / [in]	A [mm]	B [mm]	C [mm]	D [mm]	L [mm]
2 to 8	20 × 2 (DIN 8062)	62	38.5	18	20.2	163
15			28.0			142

Surface roughness:  $Ra_{max} = 1.6 \mu m$   
 The required grounding rings can be ordered as accessories (order code: DK5HR-\*\*\*\*).

**Mounting kits**

*Wall mounting kit*

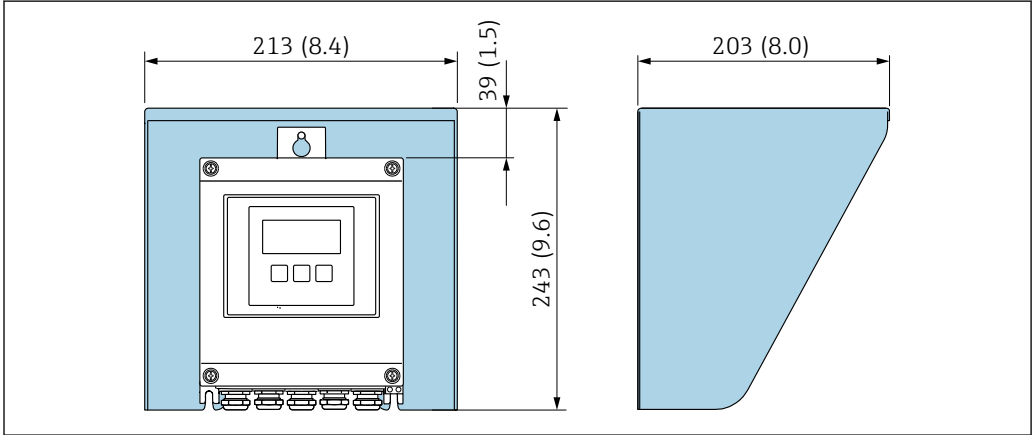


A0005537

A [mm]	B [mm]	C [mm]	Ø D [mm]	E [mm]	F [mm]
137	110	120	7	125	88

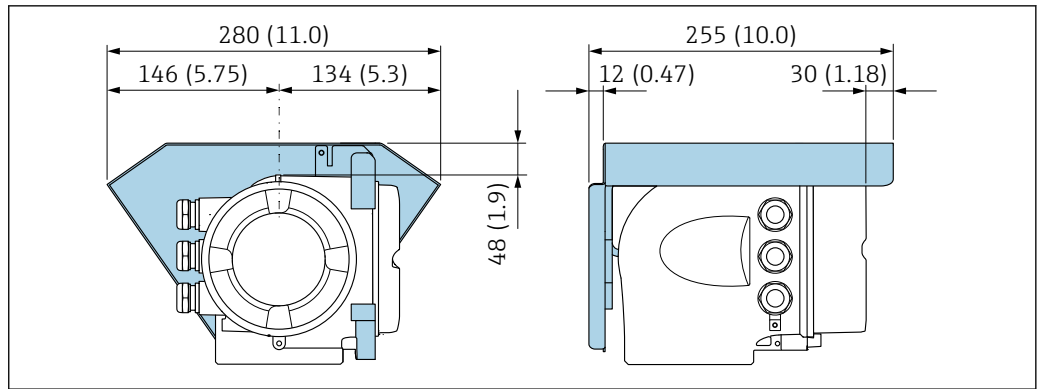
**Accessories**

*Weather protection cover*



A0029552

55 Weather protection cover for Proline 500 – digital; engineering unit mm (in)



A0029553

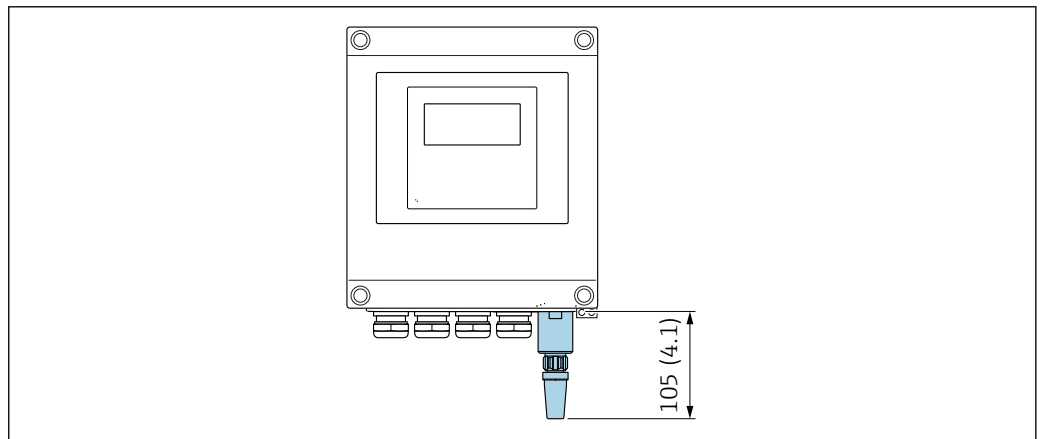
56 Weather protection cover for Proline 500; engineering unit mm (in)

*External WLAN antenna*

**i** The external WLAN antenna is not suitable for use in hygienic applications.

*Proline 500 – digital*

*External WLAN antenna mounted on device*

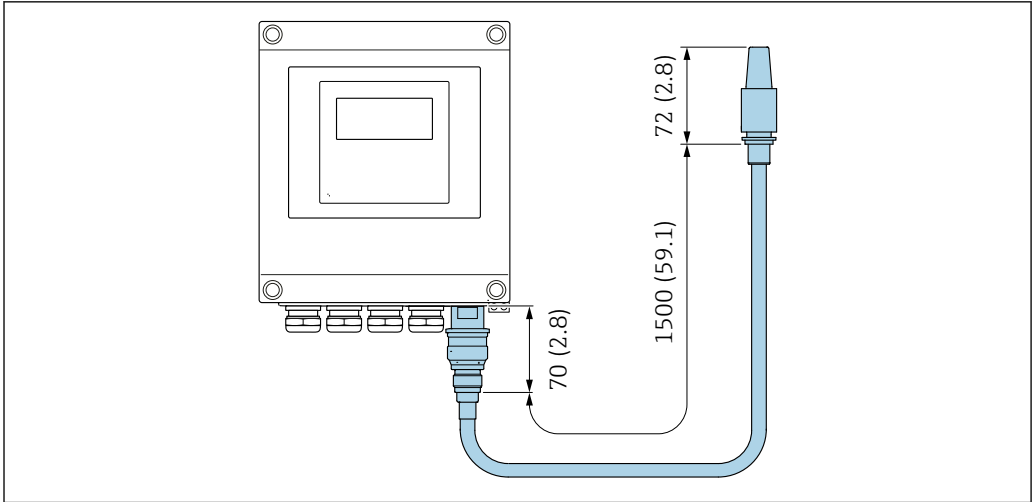


A0033607

57 Engineering unit mm (in)

*External WLAN antenna mounted with cable*

The external WLAN antenna can be mounted separately from the transmitter if the transmission/reception conditions at the transmitter mounting location are poor.

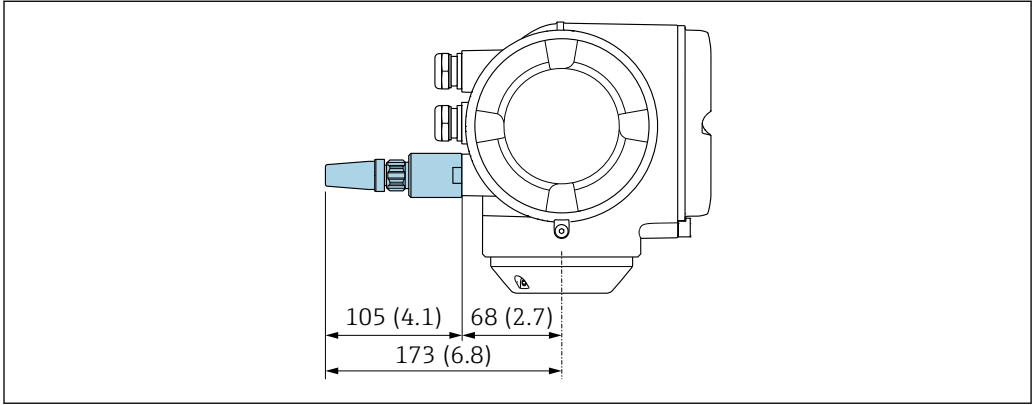


A0033606

58 Engineering unit mm (in)

Proline 500

External WLAN antenna mounted on device

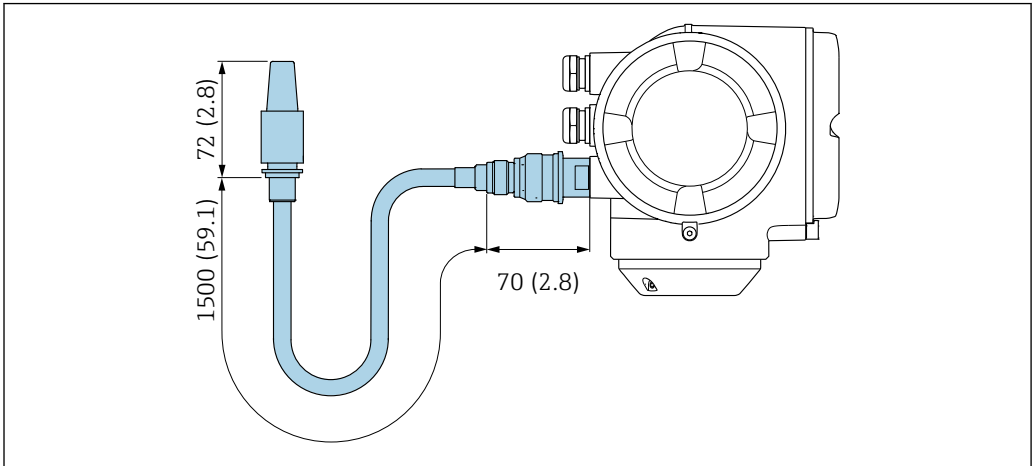


A0028923

59 Engineering unit mm (in)

External WLAN antenna mounted with cable

The external WLAN antenna can be mounted separately from the transmitter if the transmission/reception conditions at the transmitter mounting location are poor.

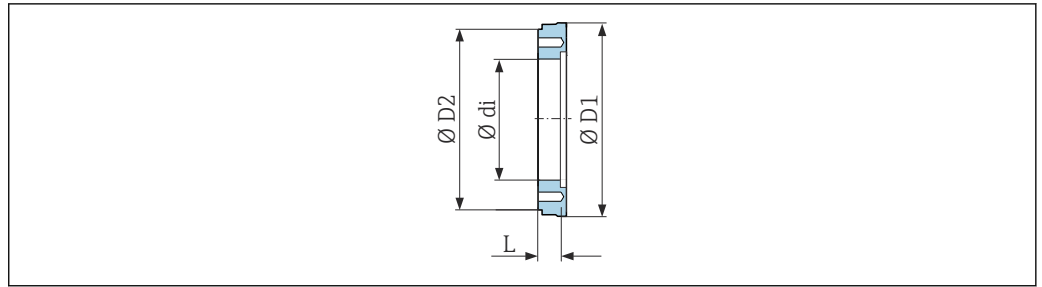


A0033597

60 Engineering unit mm (in)



Spacer

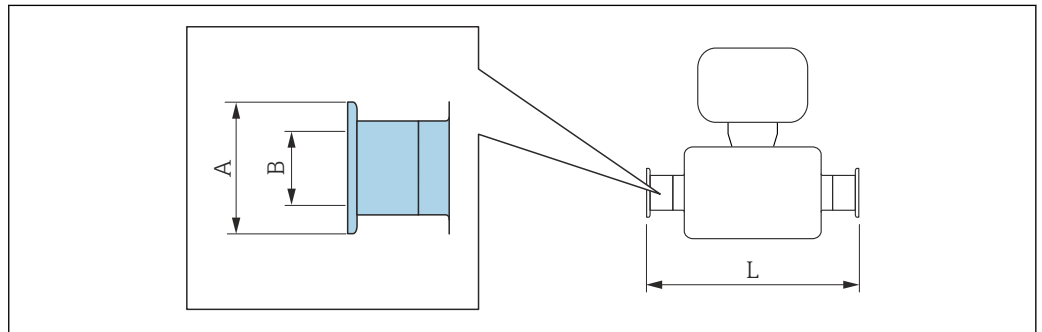


A0017294

Order code: DK5HB-\*\*\*\*

DN [mm]	di [mm]	D1 [mm]	D2 [mm]	L [mm]
80	72.9	140.7	141	30
100	97.4	166.7	162	30

Clamp connections with aseptic gasket seal available for order



A0015625

Tri-Clamp

1.4404 (316L), suitable for pipe according to ASME BPE and BS 4825, reduction from pipe OD 1" (Tri-Clamp connection) to device DN 15

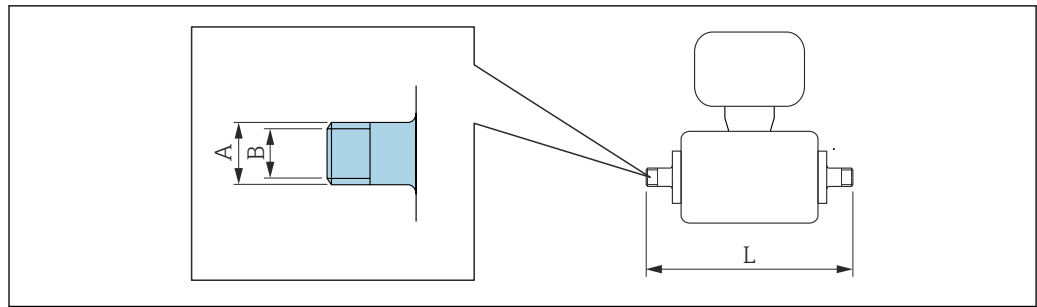
Order code: DKH\*\*-HF\*\*

DN [mm]	Suitable for pipe according to ASME BPE and BS 4825 (reduction) [mm]	A [mm]	B [mm]	L [mm]
15	Pipe OD 1"	50.4	22.1	143

Surface roughness: Ra<sub>max</sub> = 0.76 µm, optional order code for "Design", option CB: Ra<sub>max</sub> = 0.38 µm electropolished

Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

Couplings with O-ring seal available for order



A0027509

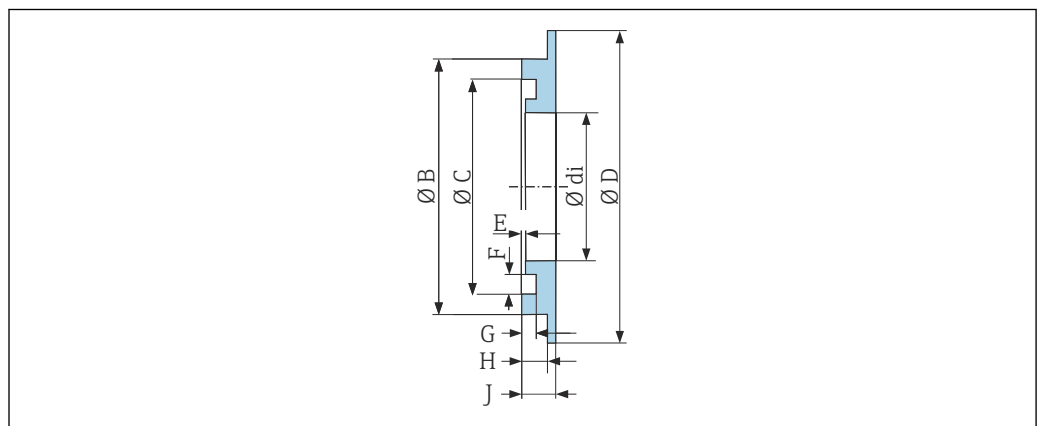
External thread 1.4404 (316L) Order code: DKH**-GD**				
DN [mm]	Suitable for internal thread NPT [in]	A [mm/in]	B [mm]	L [mm]
2 to 8	NPT 3/8	R 15.5 × 3/8	10	186
15	NPT 1/2	R 20 × 1/2	16	186
25	NPT 1	R 25 × 1	25	196

Surface roughness: Ra<sub>max</sub> = 1.6 µm

Internal thread 1.4404 (316L) Order code: DKH**-GC**				
DN [mm]	Suitable for external thread NPT [in]	A [mm/in]	B [mm]	L [mm]
2 to 8	NPT 3/8	R 13 × 3/8	8.9	176
15	NPT 1/2	R 14 × 1/2	16	176
25	NPT 1	R 17 × 1	27.2	188

Surface roughness: Ra<sub>max</sub> = 1.6 µm

Grounding rings



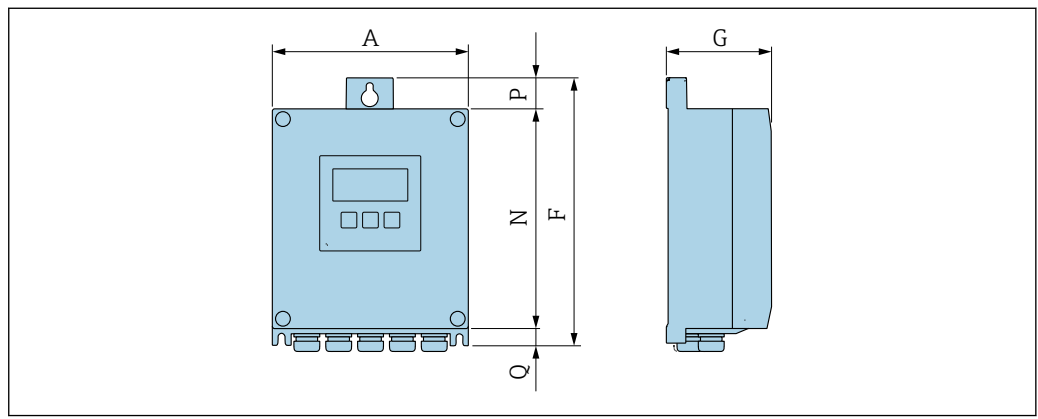
A0017673

For lap joint flange made of PVDF and PVC adhesive sleeve 1.4435 (316L), Alloy C22, tantalum Order code: DK5HR-****									
DN [mm]	di [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	J [mm]
2 to 8	9	22	17.6	33.9	0.5	3.5	1.9	3.4	4.5
15	16	29	24.6	33.9	0.5	3.5	1.9	3.4	4.5
25	26	39	34.6	43.9	0.5	3.5	1.9	3.4	4.5

Dimensions in US units

Housing of Proline 500 – digital transmitter

Non-hazardous area or hazardous area: Zone 2; Class I, Division 2



A0033789

Order code for "Transmitter housing", option A "Aluminum, coated" and order code for "Integrated ISEM electronics", option A "Sensor"

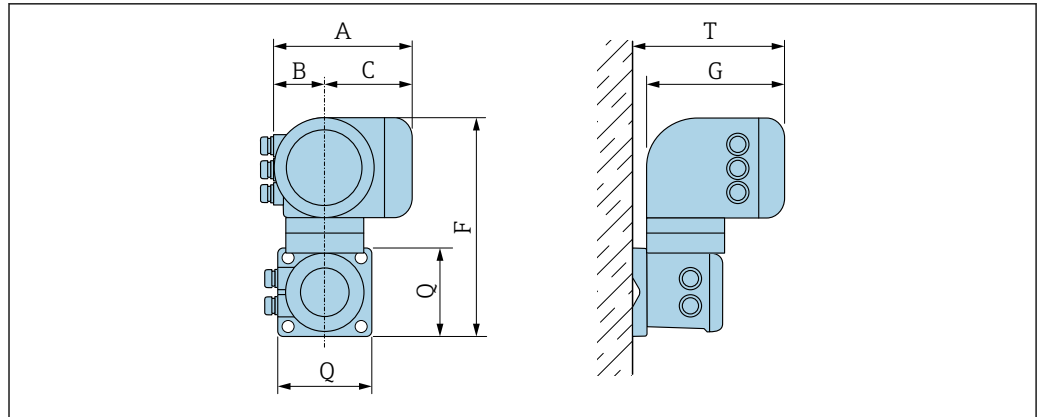
A [in]	F [in]	G [in]	N [in]	P [in]	Q [in]
6.57	9.13	3.50	7.36	0.94	0.83

Order code for "Transmitter housing", option D "Polycarbonate" and order code for "Integrated ISEM electronics", option A "Sensor"

A [in]	F [in]	G [in]	N [in]	P [in]	Q [in]
6.97	9.21	3.50	7.76	0.67	0.87

Housing of Proline 500 transmitter

Hazardous area: Zone 2; Class I, Division 2 or Zone 1; Class I, Division 1

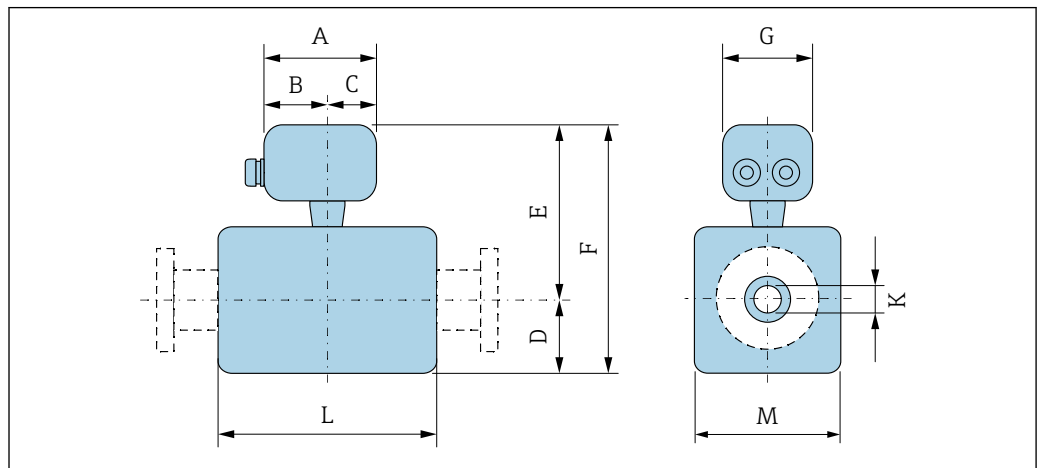


A0033788

Order code for "Transmitter housing", option A "Aluminum, coated" and order code for "Integrated ISEM electronics", option B "Transmitter"

A [in]	B [in]	C [in]	F [in]	G [in]	Q [in]	T [in]
7.40	3.35	4.06	12.5	8.54	5.12	9.41

**Sensor connection housing**



A0035761

Order code for "Sensor connection housing", option A "Aluminum, coated"

DN [in]	A [in]	B [in]	C [in]	D [in]	E [in]	F [in]	G [in]	K [in]	L <sup>1)</sup> [in]	M [in]
1/12	5.83	3.70	2.13	2.17	7.01	9.17	5.35	0.09	3.39	1.69
1/8	5.83	3.70	2.13	2.17	7.01	9.17	5.35	0.18	3.39	1.69
3/8	5.83	3.70	2.13	2.17	7.01	9.17	5.35	0.35	3.39	1.69
1/2	5.83	3.70	2.13	2.17	7.01	9.17	5.35	0.63	3.39	1.69
1	5.83	3.70	2.13	2.17	7.01	9.17	5.35	0.89	3.39	2.20
1 1/2	5.83	3.70	2.13	2.13	7.01	9.13	5.35	1.37	5.51	4.21
2	5.83	3.70	2.13	2.36	7.24	9.61	5.35	1.87	5.51	4.72
3	5.83	3.70	2.13	2.91	7.80	10.7	5.35	2.87	5.51	5.83

DN [in]	A [in]	B [in]	C [in]	D [in]	E [in]	F [in]	G [in]	K [in]	L <sup>1)</sup> [in]	M [in]
4	5.83	3.70	2.13	3.43	8.35	11.8	5.35	3.83	5.51	6.85
6	5.83	3.70	2.13	4.61	9.49	14.1	5.35	5.78	7.87	9.21

1) Total installed length depends on process connections. → ☰ 99

*Order code for "Sensor connection housing", option B "Stainless, hygienic"*

DN [in]	A [in]	B [in]	C [in]	D [in]	E [in]	F [in]	G [in]	K [in]	L <sup>1)</sup> [in]	M [in]
1/12	5.39	3.07	2.32	2.17	6.85	9.02	5.28	0.09	3.39	1.69
1/8	5.39	3.07	2.32	2.17	6.85	9.02	5.28	0.18	3.39	1.69
3/8	5.39	3.07	2.32	2.17	6.85	9.02	5.28	0.35	3.39	1.69
1/2	5.39	3.07	2.32	2.17	6.85	9.02	5.28	0.63	3.39	1.69
1	5.39	3.07	2.32	2.17	6.85	9.02	5.28	0.89	3.39	2.20
1 1/2	5.39	3.07	2.32	2.13	6.81	8.90	5.28	1.37	5.51	4.21
2	5.39	3.07	2.32	2.36	7.09	9.45	5.28	1.87	5.51	4.72
3	5.39	3.07	2.32	2.91	7.64	10.5	5.28	2.87	5.51	5.83
4	5.39	3.07	2.32	3.43	8.15	11.6	5.28	3.83	5.51	6.85
6	5.39	3.07	2.32	4.61	9.33	13.9	5.28	5.78	7.87	9.21

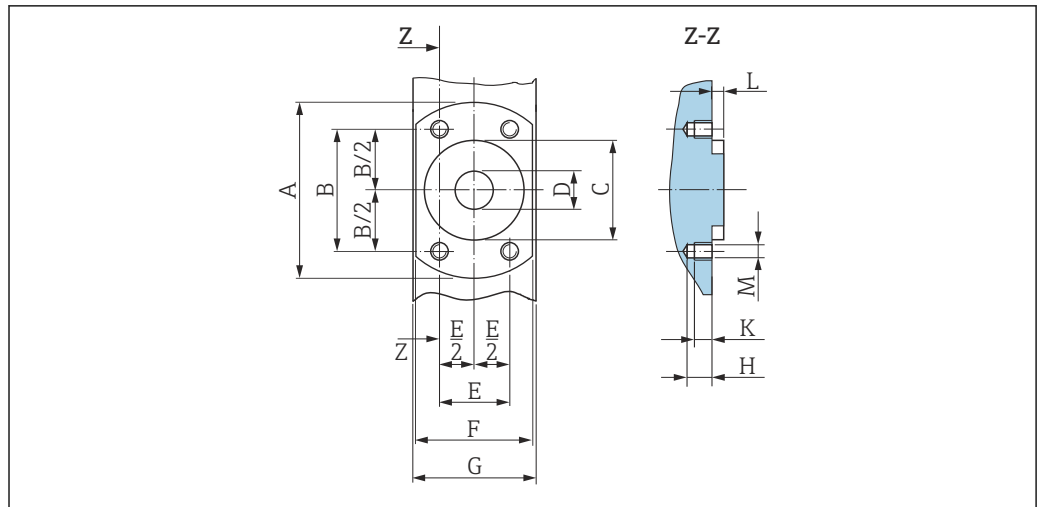
1) Total installed length depends on process connections. → ☰ 99

*Order code for "Sensor connection housing", option C "Ultra-compact hygienic, stainless"*

DN [in]	A [in]	B [in]	C [in]	D [in]	E [in]	F [in]	G [in]	K [in]	L <sup>1)</sup> [in]	M [in]
1/12	4.88	2.68	2.20	2.17	6.81	8.98	4.41	0.09	3.39	1.69
1/8	4.88	2.68	2.20	2.17	6.81	8.98	4.41	0.18	3.39	1.69
3/8	4.88	2.68	2.20	2.17	6.81	8.98	4.41	0.35	3.39	1.69
1/2	4.88	2.68	2.20	2.17	6.81	8.98	4.41	0.63	3.39	1.69
1	4.88	2.68	2.20	2.17	6.85	9.02	4.41	0.89	3.39	2.20
1 1/2	4.88	2.68	2.20	2.13	6.81	8.94	4.41	1.37	5.51	4.21
2	4.88	2.68	2.20	2.36	7.05	9.41	4.41	1.87	5.51	4.72
3	4.88	2.68	2.20	2.91	7.60	10.5	4.41	2.87	5.51	5.83
4	4.88	2.68	2.20	3.43	8.15	11.6	4.41	3.83	5.51	6.85
6	4.88	2.68	2.20	4.61	9.29	13.9	4.41	5.78	7.87	9.21

1) Total installed length depends on process connections. → ☰ 99

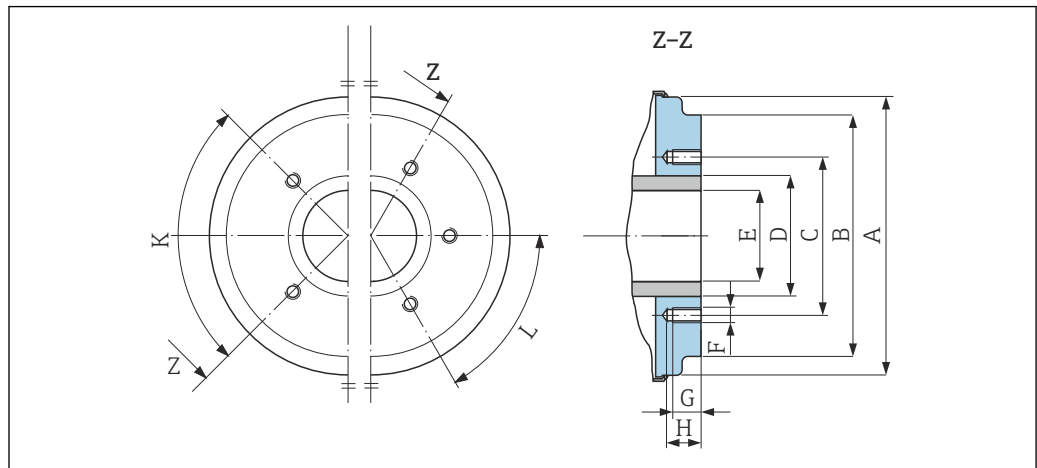
Sensor flange connection



A0017657

61 Front view without process connections

DN	A	B	C	D	E	F	G	H	K	L	M
[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[mm]
1/12	2.44	1.64	1.34	0.35	0.94	1.65	1.69	0.33	0.24	0.16	M6
5/32	2.44	1.64	1.34	0.35	0.94	1.65	1.69	0.33	0.24	0.16	M6
5/16	2.44	1.64	1.34	0.35	0.94	1.65	1.69	0.33	0.24	0.16	M6
½	2.44	1.64	1.34	0.63	0.94	1.65	1.69	0.33	0.24	0.16	M6
1	2.83	1.98	1.73	0.89	1.14	2.17	2.20	0.33	0.24	0.16	M6



A0005528

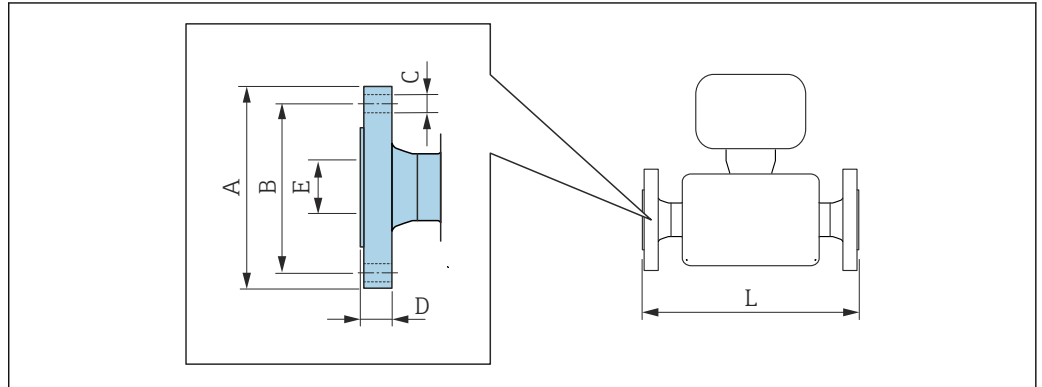
62 Front view without process connections

DN	A	B	C	D	E	F	G	H	K	L
[in]	[in]	[in]	[in]	[in]	[in]	[mm]	[in]	[in]	90° ±0.5°	60° ±0.5°
									Tapped holes	
1 ½	3.93	3.38	2.80	1.90	1.37	M8	0.47	0.67	4	-
2	4.44	3.89	3.29	2.37	1.87	M8	0.47	0.67	4	-
3	5.54	5.26	4.49	3.50	2.87	M8	0.47	0.67	-	6
4	6.56	6.28	5.55	4.50	3.83	M8	0.47	0.67	-	6

DN	A	B	C	D	E	F	G	H	K	L
[in]	[in]	[in]	[in]	[in]	[in]	[mm]	[in]	[in]	90° ±0.5°	60° ±0.5°
									Tapped holes	
5	7.82	7.54	6.73	5.50	4.72	M10	0.59	0.79	-	6
6	8.93	8.64	7.87	6.63	5.78	M10	0.59	0.79	-	6

**Flange connections**

*Flanges with O-ring seal*

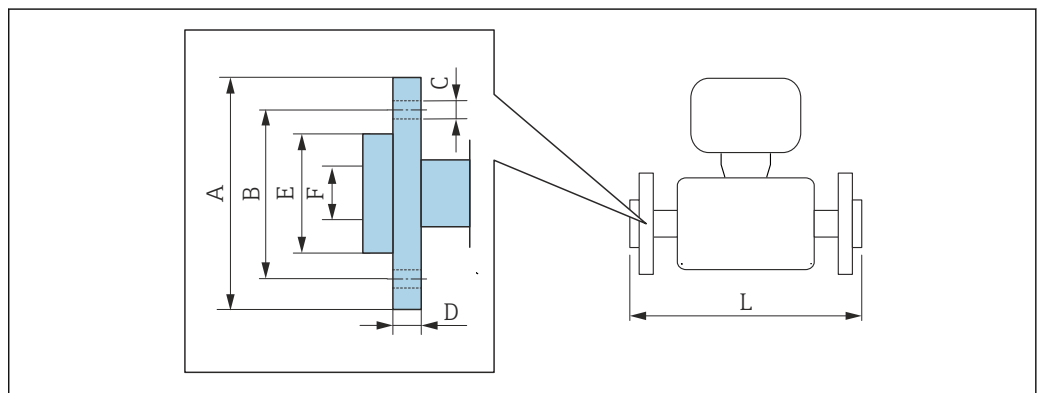


A0015621

Flange according to ASME B16.5: Class 150 1.4404 (316L) Order code for "Process connection", option A1S						
DN [in]	A [in]	B [in]	C [in]	D [in]	E [in]	L [in]
1/12 to 3/8 <sup>1)</sup>	3.50	2.38	4 × Ø0.62	0.44	0.62	8.59
1/2	3.50	2.38	4 × Ø0.62	0.44	0.63	8.59
1	4.25	3.12	4 × Ø0.62	0.56	1.05	9.05

Surface roughness: Ra<sub>max</sub> = 63 µin

1) DN 1/12 to 3/8 with DN 1/2" flanges as standard



A0022221

Lap joint flange according to ASME B16.5: Class 150 PVDF Order code for "Process connection", option A1P							
DN [in]	A [in]	B [in]	C [in]	D [in]	E [in]	F [in]	L [in]
$\frac{1}{12}$ to $\frac{3}{8}$ <sup>1)</sup>	3.74	2.36	4 × Ø 0.62	0.59	1.38	0.63	7.87
$\frac{1}{2}$	3.74	2.36	4 × Ø 0.62	0.59	1.38	0.63	7.87

Surface roughness:  $Ra_{max} = 63 \mu\text{in}$   
The required grounding rings can be ordered as accessories (order code: DK5HR-\*\*\*\*).

- 1) DN  $\frac{1}{12}$  to  $\frac{3}{8}$  with DN  $\frac{1}{2}$ " flanges as standard

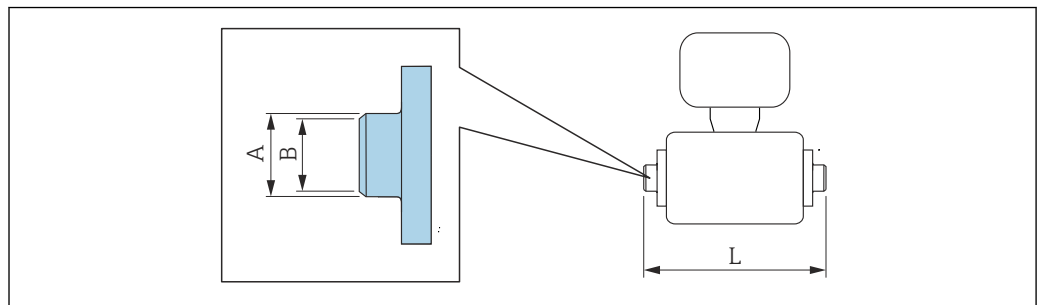
Lap joint flange according to ASME B16.5: Class 150 PVDF Order code for "Process connection", option A4P							
DN [in]	A [in]	B [in]	C [in]	D [in]	E [in]	F [in]	L [in]
$\frac{1}{12}$ to $\frac{3}{8}$ <sup>1)</sup>	3.74	2.36	4 × Ø 0.62	0.59	1.38	0.63	7.87
$\frac{1}{2}$	3.74	2.36	4 × Ø 0.62	0.59	1.38	0.63	7.87

Surface roughness:  $Ra_{max} = 63 \mu\text{in}$   
Grounding rings are not necessary.

- 1) DN  $\frac{1}{12}$  to  $\frac{3}{8}$  with DN  $\frac{1}{2}$ " flanges as standard

### Welding nipple

Welding nipple with aseptic gasket seal



A0027510

Welding nipple according to ISO 2037 1.4404 (316L), suitable for pipe ISO 2037 Order code for "Process connection", option IAS				
DN [in]	Suitable for pipe ISO 2037 [in]	A [in]	B [in]	L [in]
$\frac{1}{12}$ to $\frac{3}{8}$	0.50 × 0.06	0.47	0.39	4.65
$\frac{1}{2}$	0.75 × 0.06	0.71	0.63	4.65
1	1.00 × 0.06	0.98	0.89	4.65
1 $\frac{1}{2}$	1.50 × 0.05	1.50	1.40	8.66
2	2.00 × 0.05	2.01	1.91	8.66
3	3.00 × 0.06	3.00	2.87	8.66
4	2.50 × 0.08	4.00	3.84	8.66
5	4.00 × 0.08	5.50	5.34	15.00



**Welding nipple according to ISO 2037**  
**1.4404 (316L), suitable for pipe ISO 2037**  
*Order code for "Process connection", option IAS*

DN [in]	Suitable for pipe ISO 2037 [in]	A [in]	B [in]	L [in]
6	6.63 × 0.10	6.63	6.42	15.00

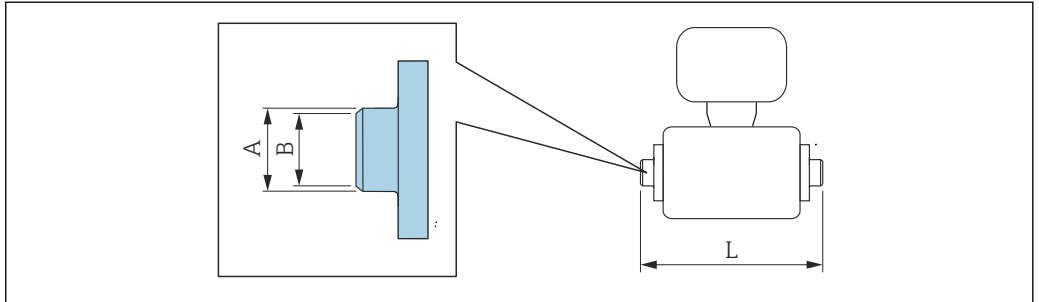
Surface roughness:  $Ra_{max} = 31.5 \mu\text{in}$ , optional order code for "Service", option HJ:  $Ra_{max} = 15 \mu\text{in}$  electropolished  
 Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

**Welding nipple according to ASME BPE**  
**1.4404 (316L), suitable for pipe according to ASME BPE and DIN 11866 series C**  
*Order code for "Process connection", option AAS*

DN [in]	Suitable for pipe according to ASME BPE [in]	A [in]	B [in]	L [in]
$\frac{1}{12}$ to $\frac{3}{8}$	0.50 × 0.06	0.50	0.35	4.65
$\frac{1}{2}$	0.75 × 0.06	0.75	0.63	4.65
1	1.00 × 0.06	1.00	0.89	4.65
1 ½	1.50 × 0.06	1.50	1.37	8.66
2	2.00 × 0.06	2.00	1.87	8.66
3	3.00 × 0.06	3.00	2.87	8.66
4	4.00 × 0.08	4.00	3.83	8.66
6	6.00 × 0.11	6.00	5.78	11.80

Surface roughness:  $Ra_{max} = 31.5 \mu\text{in}$ , optional order code for "Service", option HJ:  $Ra_{max} = 15 \mu\text{in}$  electropolished  
 Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

Welding nipple with O-ring seal



A0027510

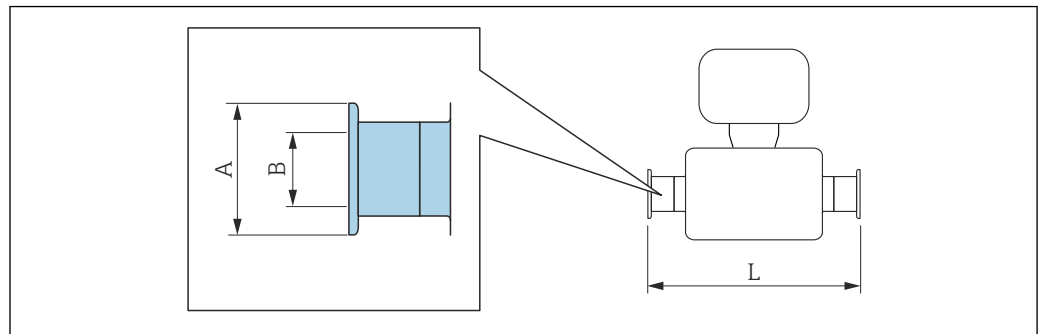
**Welding nipple according to ISO 1127**  
**1.4404 (316L), suitable for pipe according to ISO 1127 series 1**  
*Order code for "Process connection", option A2S*

DN [in]	Suitable for pipe according to ISO 1127 series 1 [in]	A [in]	B [in]	L [in]
$\frac{1}{12}$ to $\frac{3}{8}$	0.53 × 0.09	0.53	0.35	4.99
$\frac{1}{2}$	0.84 × 0.10	0.84	0.63	4.99

Surface roughness:  $Ra_{max} = 63 \mu\text{in}$

## Clamp connections

Clamp connections with aseptic gasket seal



A0015625

### Tri-Clamp

1.4404 (316L), suitable for pipe according to ASME BPE and DIN 11866 series C

Order code for "Process connection", option FAS

DN [in]	Suitable for pipe according to ASME BPE [in]	A [in]	B [in]	L [in]
$\frac{1}{12}$ to $\frac{3}{8}$	$\frac{1}{2}$	1	0.37	5.63
$\frac{1}{2}$	$\frac{3}{4}$	1	0.62	5.63
1	1	2	0.87	5.63
1 $\frac{1}{2}$	$1.50 \times 0.06$	1.98	1.37	8.66
2	$2.00 \times 0.06$	2.52	1.87	8.66
3	$3.00 \times 0.06$	3.58	2.87	8.66
4	$4.00 \times 0.08$	4.68	3.83	8.66
6	$6.00 \times 0.11$	6.57	5.90	11.80

Surface roughness:  $Ra_{max} = 31.5 \mu\text{m}$ , optional order code for "Service", option HJ:  $Ra_{max} = 15 \mu\text{m}$  electropolished  
Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

### Clamp according to ISO 2852, Fig. 2

1.4404 (316L)

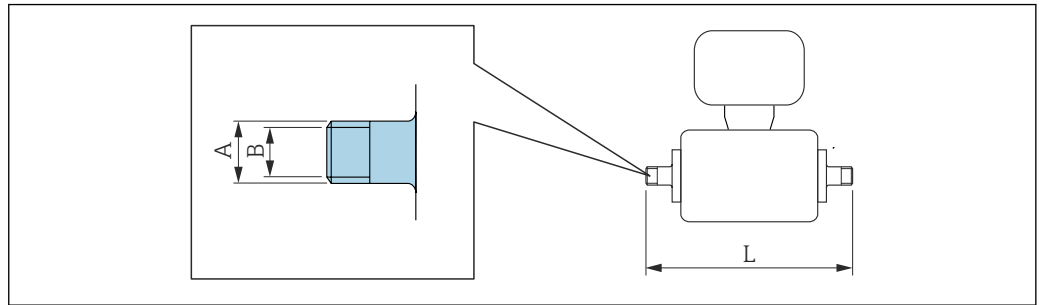
Order code for "Process connection", option IBS

DN [in]	Suitable for pipe ISO 2037 [in]	DN Clamp ISO 2852 [in]	A [in]	B [in]	L [in]
1	$0.96 \times 0.06$	1	2.00	0.89	6.87
1 $\frac{1}{2}$	$1.50 \times 0.06$	1.50	1.99	1.40	8.66
2	$2.00 \times 0.06$	2.01	2.52	1.91	8.66
3	$3.00 \times 0.06$	3.00	3.58	2.87	8.66
4	$2.50 \times 0.08$	4.00	4.69	3.84	8.66
5	$4.00 \times 0.08$	5.50	6.10	5.34	11.80
6	$6.63 \times 0.10$	6.63	7.20	6.42	11.80

Surface roughness:  $Ra_{max} = 31.5 \mu\text{m}$ , optional order code for "Service", option HJ:  $Ra_{max} = 15 \mu\text{m}$  electropolished  
Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

**Couplings**

*Thread with aseptic gasket seal*



A0027509

**Coupling DIN 11851, thread**  
**1.4404 (316L), suitable for pipe EN 10357 series B**  
*Order code for "Process connection", option DCS*

DN [in]	Suitable for pipe EN 10357 series B [in]	A [in]	B [in]	L [in]
1/12 to 5/16	0.47 × 0.04 (DN 1/8 )	Rd 1.10 × 1/8	0.39	6.85
1/2	0.71 × 0.06	Rd 1.34 × 1/8	0.63	6.85
1	1.10 × 0.04 or 1.10 × 0.06	Rd 2.05 × 1/6	1.02	7.48

Surface roughness: Ra<sub>max</sub> = 31.5 μin, optional order code for "Service", option HJ: Ra<sub>max</sub> = 15 μin electropolished  
 Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

**Coupling DIN 11851, thread**  
**1.4404 (316L), suitable for pipe EN 10357 series A**  
*Order code for "Process connection", option DCS*

DN [in]	Suitable for pipe EN 10357 series A [in]	A [in]	B [in]	L [in]
1 1/2	1.65 × 0.06	Rd 2.56 × 1/6	1.50	10.20
2	2.13 × 0.06	Rd 3.07 × 1/6	1.97	10.20
3	3.35 × 0.08	Rd 4.33 × 1/4	3.19	11.00
4	4.09 × 0.08	Rd 5.12 × 1/4	3.94	11.40
5	5.08 × 0.08	Rd 6.30 × 1/4	4.92	15.00
6	6.06 × 0.08	Rd 6.30 × 1/4	5.91	15.40

Surface roughness: Ra<sub>max</sub> = 31.5 μin, optional order code for "Service", option HJ: Ra<sub>max</sub> = 15 μin electropolished  
 Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

**Coupling ISO 2853, thread**  
**1.4404 (316L)**  
*Order code for "Process connection", option ICS*

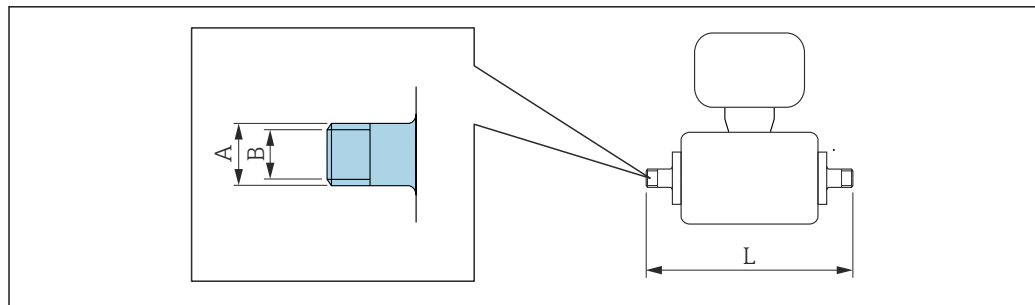
DN [in]	Suitable for pipe EN 10357 (DIN 11850) [in]	DN Clamp ISO 2853 [in]	A [in]	B [in]	L [in]
1 1/2	1.50 × 0.06	1.50	Tr 2.00 × 0.13	1.40	10.80
2	2.00 × 0.06	2.01	Tr 2.52 × 0.13	1.91	10.80
3	3.00 × 0.06	3.00	Tr 3.58 × 0.13	2.87	10.90
4	2.50 × 0.08	4.00	Tr 4.65 × 0.13	3.84	11.30

Surface roughness: Ra<sub>max</sub> = 31.5 μin, optional order code for "Service", option HJ: Ra<sub>max</sub> = 15 μin electropolished  
 Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

<b>Coupling SMS 1145, thread 1.4404 (316L)</b> <i>Order code for "Process connection", option SAS</i>					
DN [in]	Suitable for pipe [in]	DN SMS 1145 [in]	A [in]	B [in]	L [in]
1	1	1	Rd1.57 × 0.17	0.89	5.81
1 ½	1.50 × 0.06	1.50	Rd 2.36 × ¼	1.37	10.10
2	2.00 × 0.06	2.00	Rd 2.76 × ¼	1.87	10.10
3	3.00 × 0.06	3.00	Rd 3.86 × ¼	2.86	10.90
4	4.00 × 0.08	4.00	Rd 5.20 × ¼	3.83	11.30

Surface roughness:  $Ra_{max} = 31.5 \mu\text{in}$ , optional order code for "Service", option HJ:  $Ra_{max} = 15 \mu\text{in}$  electropolished  
Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

#### Thread with O-ring seal



A0027509

<b>External thread according to ISO 228/DIN 2999 1.4404 (316L)</b> <i>Order code for "Process connection", option I2S</i>				
DN [in]	Suitable for internal thread ISO 228/DIN 2999 [in]	A [in]	B [in]	L [in]
¼ <sub>12</sub> to ¾ <sub>8</sub>	R ¾ <sub>8</sub>	R 0.40 × ¾ <sub>8</sub>	0.39	6.53
½	R ½	R 0.52 × ½	0.63	6.53
1	R 1	R 0.66 × 1	0.98	6.69

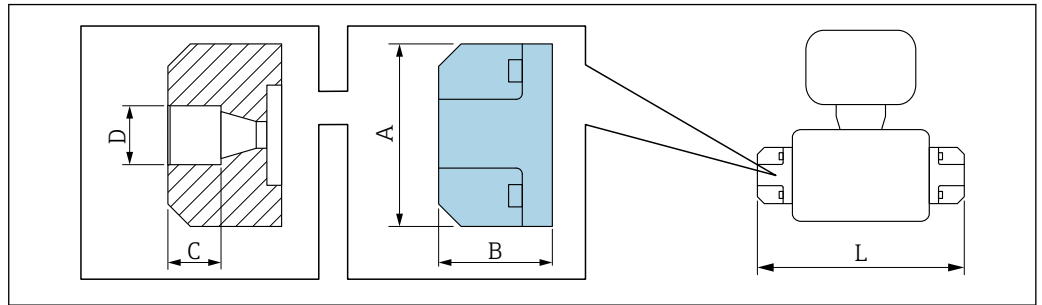
Surface roughness:  $Ra_{max} = 63 \mu\text{in}$

<b>Internal thread according to ISO 228/DIN 2999 1.4404 (316L)</b> <i>Order code for "Process connection", option I3S</i>				
DN [in]	Suitable for external thread ISO 228/DIN 2999 [in]	A [in]	B [in]	L [in]
¼ <sub>12</sub> to ¾ <sub>8</sub>	Rp ¾ <sub>8</sub>	Rp 0.51 × ¾ <sub>8</sub>	0.35	6.93
½	Rp ½	Rp 0.55 × ½	0.63	6.93
1	Rp 1	Rp 0.67 × 1	1.07	7.41

Surface roughness:  $Ra_{max} = 63 \mu\text{in}$

**Adhesive sleeves**

*Adhesive sleeves with O-ring seal*



A0036663

**Adhesive sleeve  
PVC**

*Order code for "Process connection", option O1V*

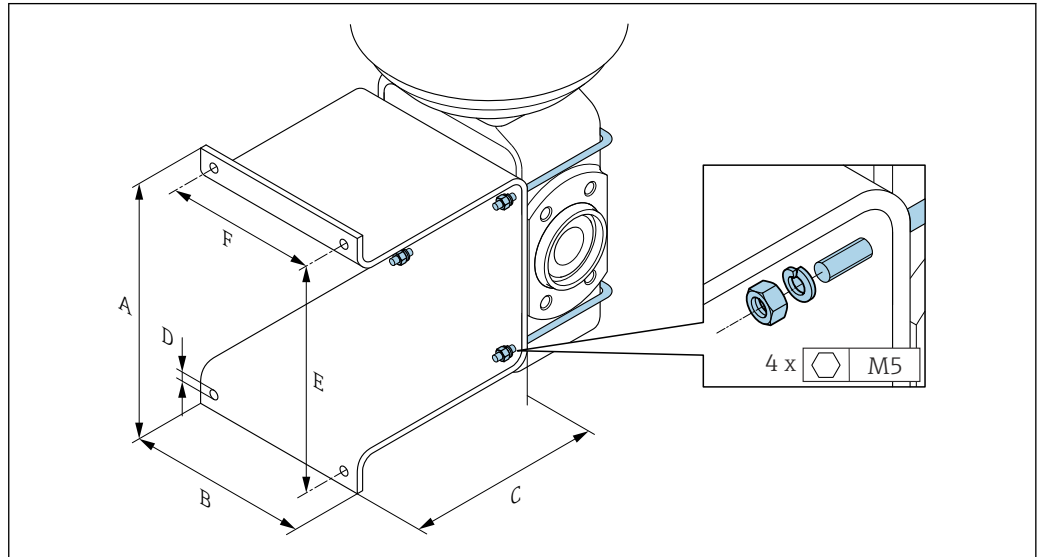
DN [in]	Suitable for pipe [in]	A [in]	B [in]	C [in]	D [in]	L [in]
1/12 to 3/8	1/2	2.44	1.52	0.71	0.85	6.42

Surface roughness: Ra<sub>max</sub> = 63 µin

The required grounding rings can be ordered as accessories (order code: DK5HR-\*\*\*\*).

**Mounting kits**

*Wall mounting kit*

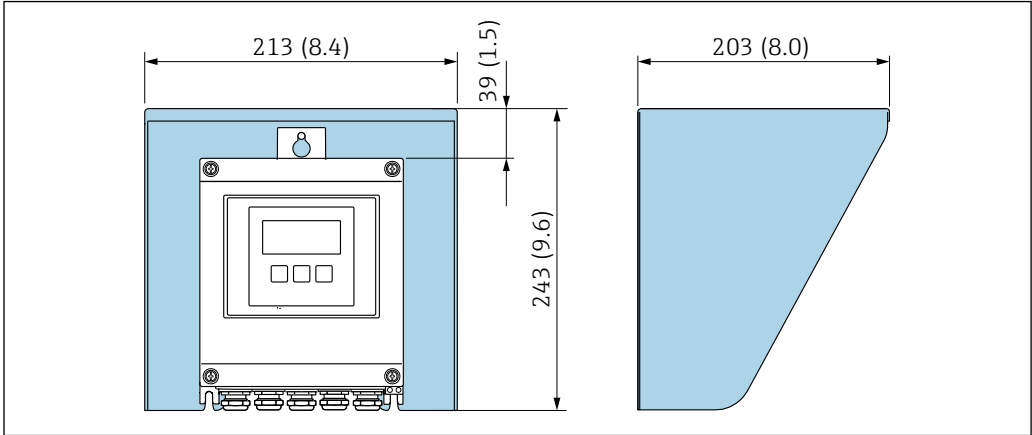


A0005537

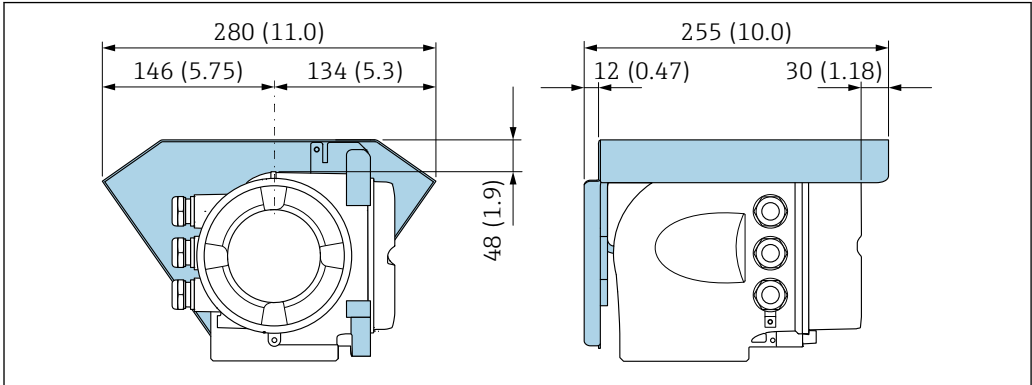
A [in]	B [in]	C [in]	Ø D [in]	E [in]	F [in]
5.39	4.33	4.72	0.28	4.92	3.46

Accessories

Weather protection cover



63 Weather protection cover for Proline 500 – digital; engineering unit mm (in)



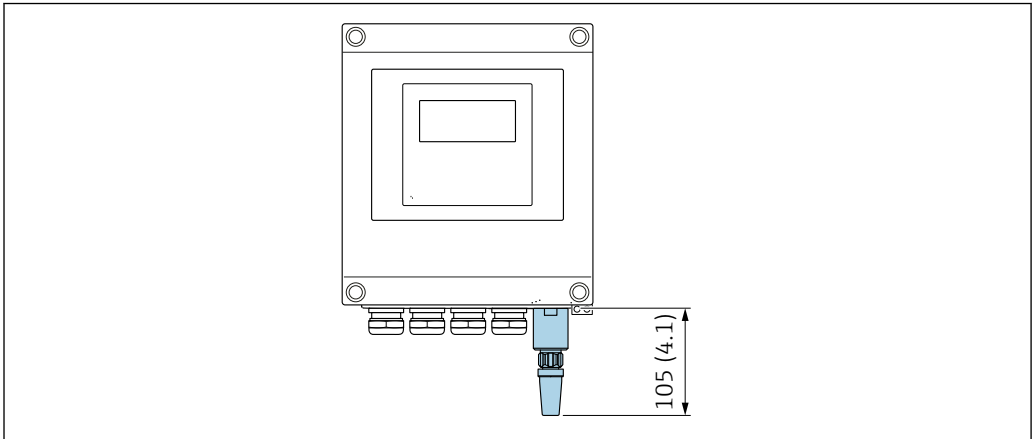
64 Weather protection cover for Proline 500; engineering unit mm (in)

External WLAN antenna

**i** The external WLAN antenna is not suitable for use in hygienic applications.

Proline 500 – digital

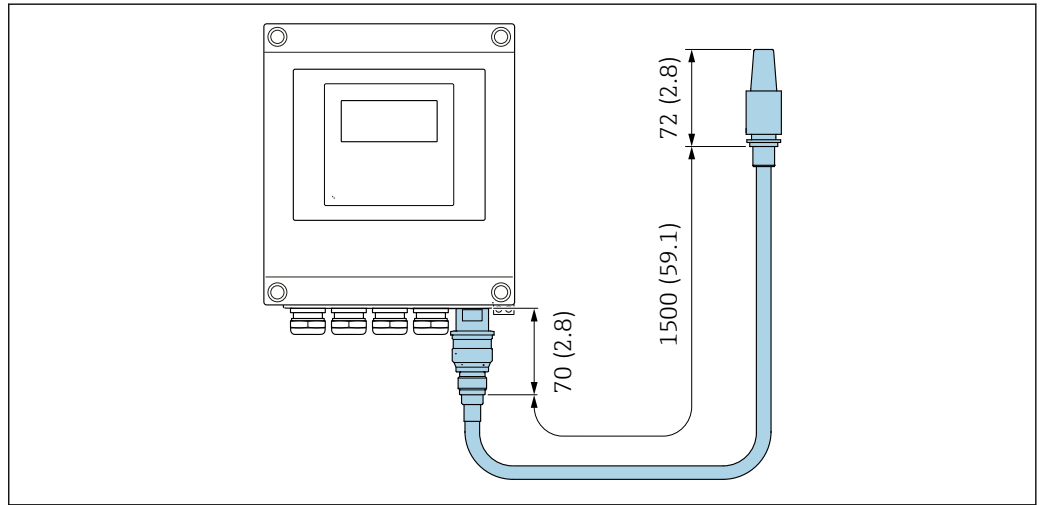
External WLAN antenna mounted on device



65 Engineering unit mm (in)

*External WLAN antenna mounted with cable*

The external WLAN antenna can be mounted separately from the transmitter if the transmission/reception conditions at the transmitter mounting location are poor.

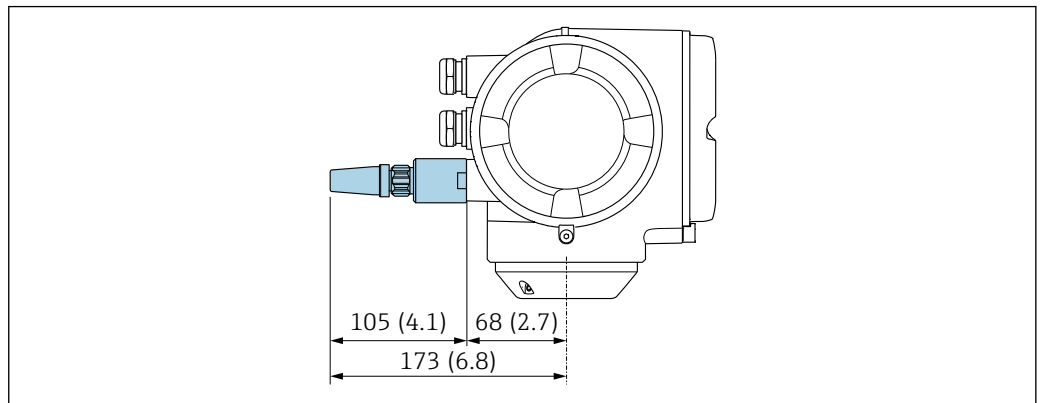


A0033606

66 Engineering unit mm (in)

*Proline 500*

*External WLAN antenna mounted on device*

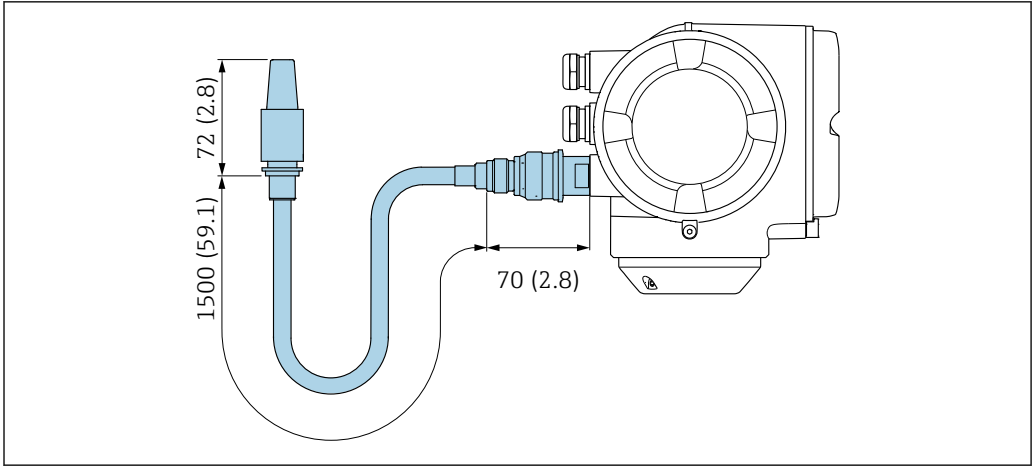


A0028923

67 Engineering unit mm (in)

*External WLAN antenna mounted with cable*

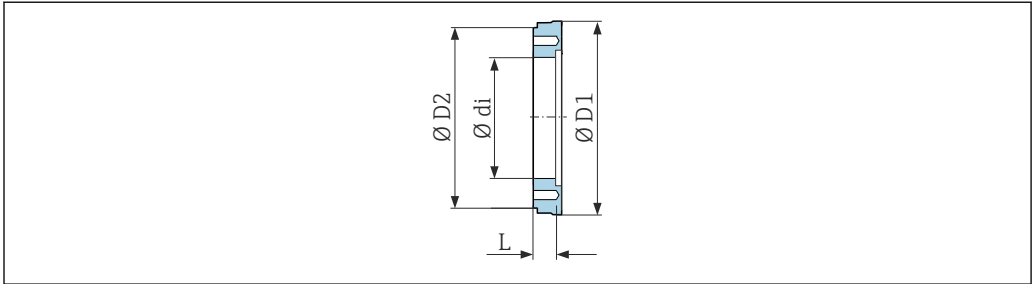
The external WLAN antenna can be mounted separately from the transmitter if the transmission/reception conditions at the transmitter mounting location are poor.



A0033597

68 Engineering unit mm (in)

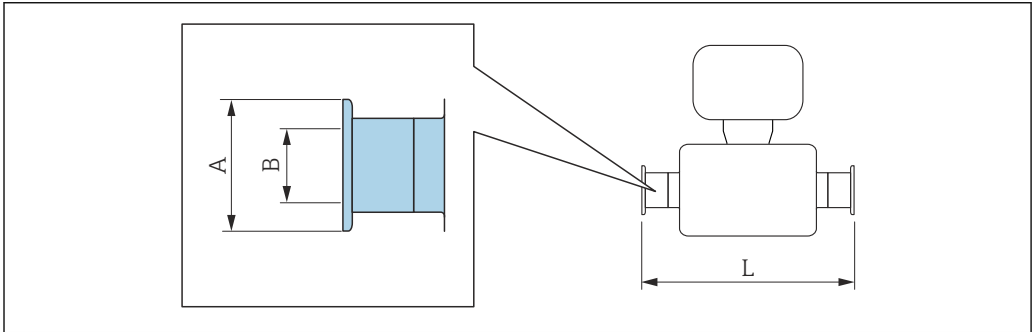
Spacer



A0017294

Order code: DK5HB-****				
DN [in]	di [in]	D1 [in]	D2 [in]	L [in]
3	2.87	5.54	5.55	1.30
4	3.83	6.56	6.38	1.30

Clamp connections with aseptic gasket seal available for order



A0015625

69 Hygienic clamp adapter connection suitable for pipes with connection according to ASME BPE (reduction)

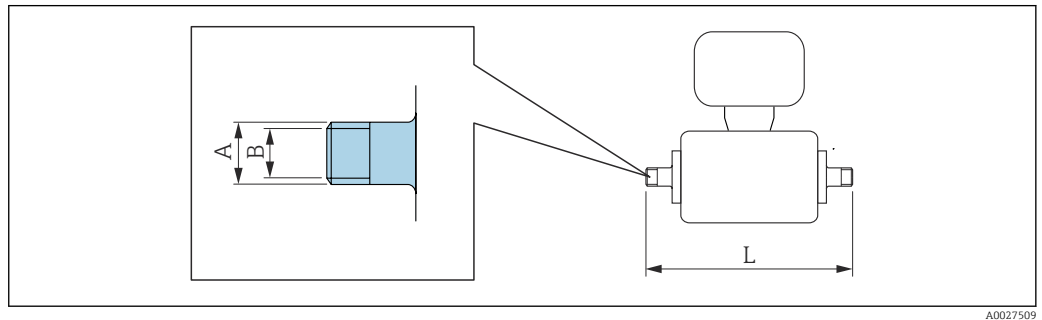


**Tri-Clamp**  
 1.4404 (316L), suitable for pipe according to ASME BPE and BS 4825, reduction from pipe OD 1" (Tri-Clamp connection) to device DN 15  
 Order code: DKH\*\*-HF\*\*

DN [in]	Suitable for pipe according to ASME BPE and BS 4825 (reduction) [in]	A [in]	B [in]	L [in]
½	Pipe OD 1"	2	0.87	5.63

Surface roughness:  $Ra_{max} = 31.5 \mu\text{in}$ , optional order code for "Design", option CB:  $Ra_{max} = 15 \mu\text{in}$  electropolished  
 Please note the internal diameters of the measuring pipe and process connection (B) when cleaning with pigs.

Couplings with O-ring seal available for order



A0027509

**External thread**  
 1.4404 (316L)  
 Order code: DKH\*\*-GD\*\*

DN [in]	Suitable for internal thread NPT [in]	A [in]	B [in]	L [in]
½ <sub>12</sub> to ¾ <sub>8</sub>	NPT 3/8	R 0.61 × 3/8	0.39	7.39
½	NPT ½	R 0.79 × ½	0.63	7.39
1	NPT 1	R 1 × 1	1.00	7.73

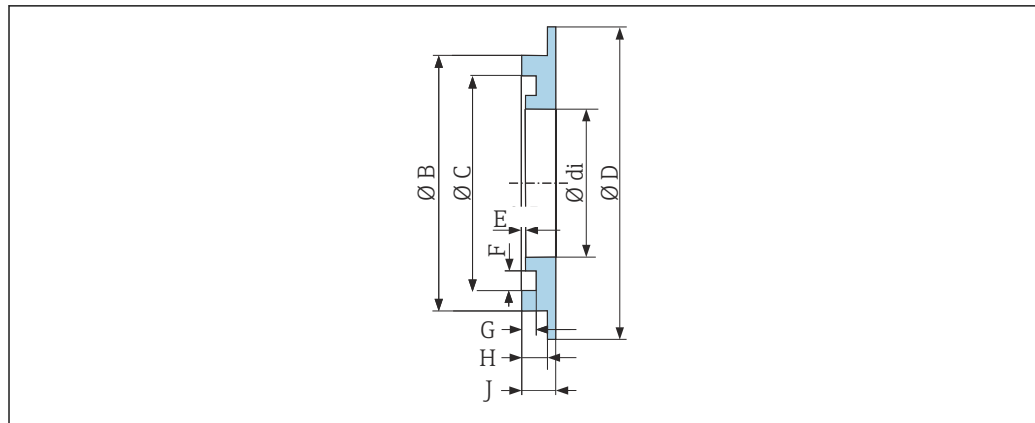
Surface roughness:  $Ra_{max} = 63 \mu\text{in}$

**Internal thread**  
 1.4404 (316L)  
 Order code: DKH\*\*-GC\*\*

DN [in]	Suitable for external thread NPT [in]	A [in]	B [in]	L [in]
½ <sub>12</sub> to ¾ <sub>8</sub>	NPT 3/8	R 0.51 × 3/8	0.35	6.93
½	NPT ½	R 0.55 × ½	0.63	6.93
1	NPT 1	R 0.67 × 1	1.07	7.41

Surface roughness:  $Ra_{max} = 63 \mu\text{in}$

## Grounding rings



A0017673

For lap joint flange made of PVDF and PVC adhesive sleeve  
1.4435 (316L), Alloy C22, tantalum  
Order code: DK5HR-\*\*\*\*

DN [in]	di [in]	B [in]	C [in]	D [in]	E [in]	F [in]	G [in]	H [in]	J [in]
$\frac{1}{12}$ to $\frac{3}{8}$	0.35	0.87	0.69	1.33	0.02	0.14	0.07	0.13	0.18
$\frac{1}{2}$	0.63	1.14	0.97	1.33	0.02	0.14	0.07	0.13	0.18
1	0.89	1.44	1.23	1.73	0.02	0.14	0.07	0.13	0.18

## Weight

All values (weight exclusive of packaging material) refer to devices with flanges of the standard pressure rating.

The weight may be lower than indicated depending on the pressure rating and design.

## Transmitter

- Proline 500 – digital polycarbonate: 1.4 kg (3.1 lbs)
- Proline 500 – digital aluminum: 2.4 kg (5.3 lbs)
- Proline 500 aluminum: 6.5 kg (14.3 lbs)

## Sensor

Sensor with aluminum connection housing version:

Nominal diameter		Weight	
[mm]	[in]	[kg]	[lbs]
2	$\frac{1}{12}$	2.00	4.41
4	$\frac{5}{32}$	2.00	4.41
8	$\frac{5}{16}$	2.00	4.41
15	$\frac{1}{2}$	1.90	4.19
25	1	2.80	6.17
40	$1 \frac{1}{2}$	4.10	9.04
50	2	4.60	10.1
65	–	5.40	11.9
80	3	6.00	13.2
100	4	7.30	16.1
125	5	12.7	28.0
150	6	15.1	33.3

## Measuring tube specification

Nominal diameter		Pressure rating <sup>1)</sup>	Process connection internal diameter	
[mm]	[in]	EN (DIN) [bar]	PFA [mm]	[in]
2	1/12	PN 16/40	2.25	0.09
4	5/32	PN 16/40	4.5	0.18
8	5/16	PN 16/40	9.0	0.35
15	½	PN 16/40	16.0	0.63
-	1	PN 16/40	22.6 <sup>2)</sup>	0.89 <sup>2)</sup>
25	-	PN 16/40	26.0 <sup>3)</sup>	1.02 <sup>3)</sup>

1) Depending on process connection and seals used

2) Order code 5H\*\*22

3) Order code 5H\*\*26

## Materials

## Transmitter housing

*Housing of Proline 500 – digital transmitter*

Order code for "Transmitter housing":

- Option **A** "Aluminum coated": aluminum, AlSi10Mg, coated
- Option **D** "Polycarbonate": polycarbonate

*Housing of Proline 500 transmitter*

Order code for "Transmitter housing":

Option **A** "Aluminum coated": aluminum, AlSi10Mg, coated

*Window material*

Order code for "Transmitter housing":

- Option **A** "Aluminum, coated": glass
- Option **D** "Polycarbonate": plastic

*Fastening components for mounting on a post*

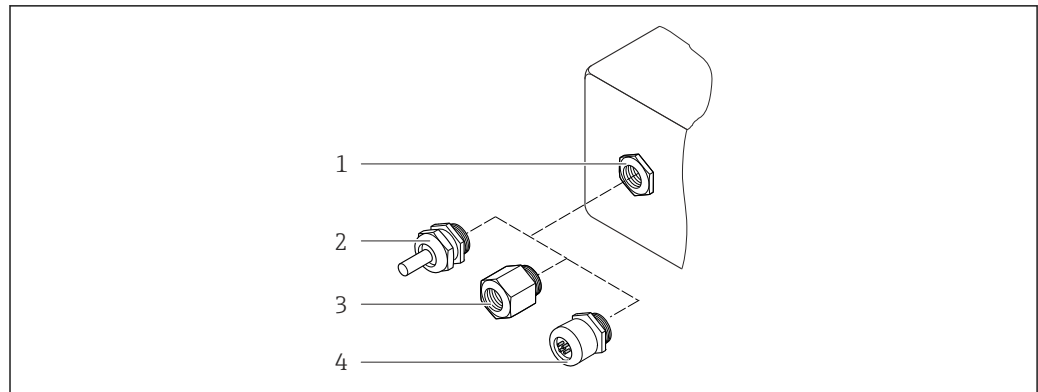
- Screws, threaded bolts, washers, nuts: stainless A2 (chrome-nickel steel)
- Metal plates: stainless steel, 1.4301 (304)

## Sensor connection housing

Order code for "Sensor connection housing":

- Option **A** "Aluminum coated": aluminum, AlSi10Mg, coated
- Option **B** "Stainless, hygienic":  
Stainless steel 1.4301 (304)
- Option **C** "Ultra-compact hygienic, stainless":  
Stainless steel 1.4301 (304)

### Cable entries/cable glands



A0028352

70 Possible cable entries/cable glands

- 1 Female thread M20 × 1.5
- 2 Cable gland M20 × 1.5
- 3 Adapter for cable entry with female thread G ½" or NPT ½"
- 4 Device plug

Cable entries and adapters	Material
Cable gland M20 × 1.5	Plastic
<ul style="list-style-type: none"> <li>■ Adapter for cable entry with female thread G ½"</li> <li>■ Adapter for cable entry with female thread NPT ½"</li> </ul> <p><b>i</b> Only available for certain device versions:</p> <ul style="list-style-type: none"> <li>■ Order code for "Transmitter housing":                             <ul style="list-style-type: none"> <li>■ Option A "Aluminum, coated"</li> <li>■ Option D "Polycarbonate"</li> </ul> </li> <li>■ Order code for "Sensor connection housing":                             <ul style="list-style-type: none"> <li>■ Proline 500 – digital:                                     <ul style="list-style-type: none"> <li>Option A "Aluminum coated"</li> <li>Option B "Stainless"</li> </ul> </li> <li>■ Proline 500:                                     <ul style="list-style-type: none"> <li>Option A "Aluminum coated"</li> <li>Option C "Stainless, hygienic"</li> </ul> </li> </ul> </li> </ul>	Nickel-plated brass
<p>Adapter for device plug</p> <p><b>i</b> <ul style="list-style-type: none"> <li>■ Device plug for digital communication: Only available for certain device versions → 33.</li> <li>■ Device plug for connecting cable: A device plug is always used for the device version, order code for "Sensor connection housing", option C (ultra-compact, hygienic, stainless).</li> </ul> </p>	Stainless steel, 1.4404 (316L)

### Device plug

Electrical connection	Material
Plug M12x1	<ul style="list-style-type: none"> <li>■ Socket: Stainless steel, 1.4404 (316L)</li> <li>■ Contact housing: Polyamide</li> <li>■ Contacts: Gold-plated brass</li> </ul>

### Connecting cable

**i** UV rays can impair the cable outer sheath. Protect the cable from exposure to sun as much as possible.

Connecting cable for sensor - Proline 500 – digital transmitter

PVC cable with copper shield

*Connecting cable for sensor - Proline 500 transmitter*

PVC cable with copper shield

**Sensor housing**

Stainless steel 1.4301 (304)

**Measuring tubes**

Stainless steel 1.4301 (304)

*Liner*

PFA (USP Class VI, FDA 21 CFR 177.2600)

**Process connections**

- Stainless steel, 1.4404 (F316L)
- PVDF
- PVC adhesive sleeve

**Electrodes**

Standard: 1.4435 (316L)

**Seals**

- O-ring seal, DN 2 to 25 (1/12 to 1"): EPDM, FKM<sup>2)</sup>, Kalrez
- Aseptic<sup>3)</sup> gasket seal, DN 2 to 150 (1/12 to 6"): EPDM, FKM<sup>2)</sup>, VMQ (silicone)

**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

*Grounding rings*

- Standard: 1.4435 (316L)
- Optional: Alloy C22, tantalum

*Wall mounting kit*

Stainless steel, 1.4301 (304)<sup>4)</sup>

*Spacer*

1.4435 (F316L)

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**Fitted electrodes**

- 2 measuring electrodes for signal detection
- 1 empty pipe detection electrode for empty pipe detection/temperature measurement (only DN 15 to 150 (½ to 6"))

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**Process connections**

With O-ring seal:

- Welding nipple (DIN EN ISO 1127, ODT/SMS, ISO 2037)
- Flange (EN (DIN), ASME, JIS)
- Flange from PVDF (EN (DIN), ASME, JIS)

---

2) USP Class VI, FDA 21 CFR 177.2600, 3A  
3) Aseptic means hygienic design in this context  
4) Does not meet the hygienic design installation guidelines.

- External thread
- Internal thread
- Hose connection
- PVC adhesive sleeve

With aseptic molded seal:

- Coupling (DIN 11851, DIN 11864-1, ISO 2853, SMS 1145)
- Flange DIN 11864-2



For information on the different materials used in the process connections → 113

## Surface roughness

Electrodes:

- Stainless steel, 1.4435 (316L) electropolished  $\leq 0.5 \mu\text{m}$  (19.7  $\mu\text{in}$ )
- Alloy C22, 2.4602 (UNSN06022); tantalum  $\leq 0.5 \mu\text{m}$  (19.7  $\mu\text{in}$ )

(All data refer to parts in contact with the medium)

Liner with PFA:

$\leq 0.4 \mu\text{m}$  (15.7  $\mu\text{in}$ )

(All data refer to parts in contact with the medium)

Stainless steel process connections:

- With O-ring seal:  $\leq 1.6 \mu\text{m}$  (63  $\mu\text{in}$ )
- With aseptic seal:  $R_{\text{max}} = 0.76 \mu\text{m}$  (31.5  $\mu\text{in}$ )  
Optional:  $R_{\text{max}} = 0.38 \mu\text{m}$  (15  $\mu\text{in}$ ) electropolished

(All data refer to parts in contact with the medium)

## Operability

### Operating concept

#### Operator-oriented menu structure for user-specific tasks

- Commissioning
- Operation
- Diagnostics
- Expert level

#### Fast and safe commissioning

- Guided menus ("Make-it-run" wizards) for applications
- Menu guidance with brief descriptions of the individual parameter functions
- Access to the device via Web server
- WLAN access to the device via mobile handheld terminal, tablet or smart phone

#### Reliable operation

- Operation in local language
- Uniform operating philosophy applied to device and operating tools
- If replacing electronic modules, transfer the device configuration via the integrated memory (HistoROM backup) which contains the process and measuring device data and the event logbook. No need to reconfigure.

#### Efficient diagnostic behavior increases measurement availability

- Troubleshooting measures can be called up via the device and in the operating tools
- Diverse simulation options, logbook for events that occur and optional line recorder functions

### Languages

Can be operated in the following languages:


- Via local operation  
English, German, French, Spanish, Italian, Dutch, Portuguese, Polish, Russian, Turkish, Chinese, Japanese, Korean, Vietnamese, Czech, Swedish
- Via Web browser  
English, German, French, Spanish, Italian, Dutch, Portuguese, Polish, Russian, Turkish, Chinese, Japanese, Vietnamese, Czech, Swedish
- Via "FieldCare", "DeviceCare" operating tool: English, German, French, Spanish, Italian, Chinese, Japanese

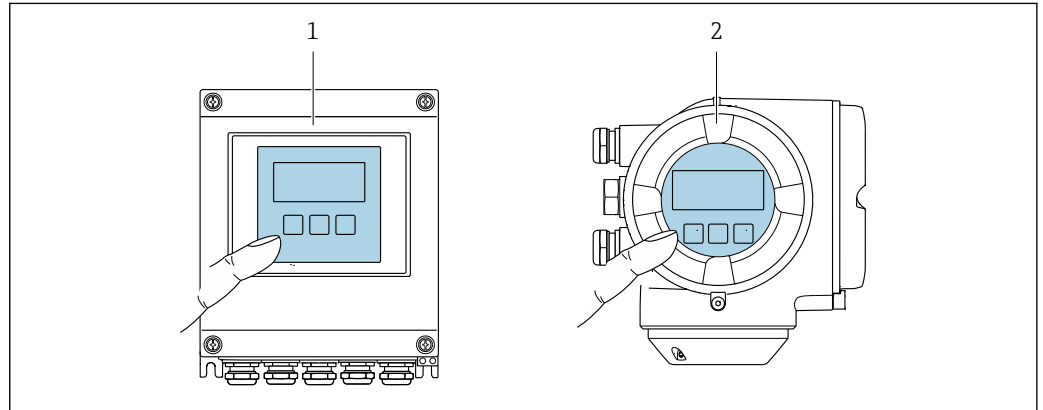
**Local operation**

**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 →  122



A0028232


 71 Operation with touch control

- 1 Proline 500 – digital
- 2 Proline 500

*Display elements*

- 4-line, illuminated, graphic display
- White background lighting; switches to red in event of device errors
- Format for displaying measured variables and status variables can be individually configured
- 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.

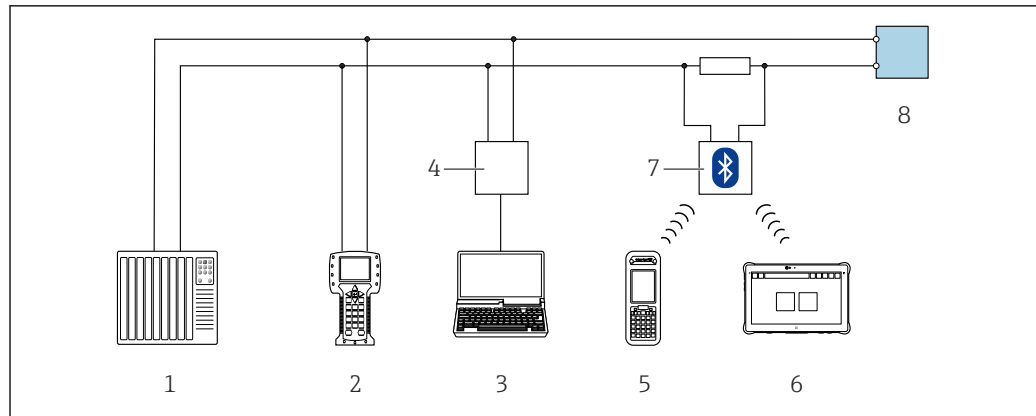
*Operating elements*

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

**Remote operation**

**Via HART protocol**

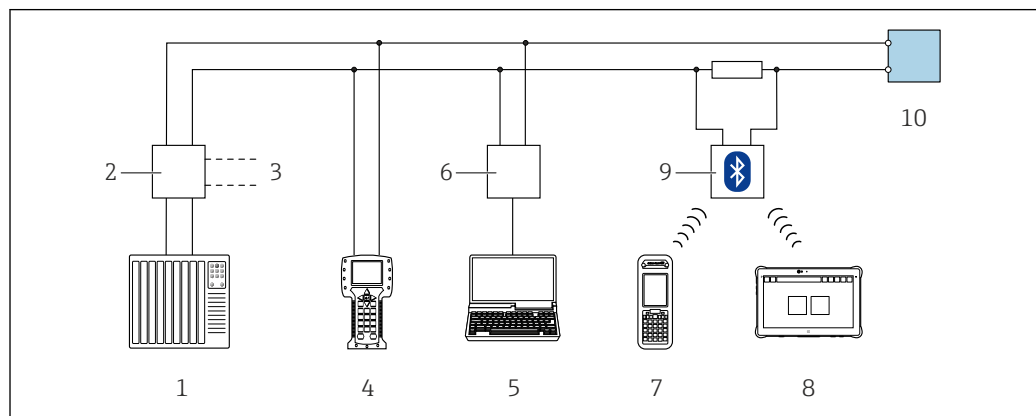
This communication interface is available in device versions with a HART output.



A0028747

72 Options for remote operation via HART protocol (active)

- 1 Control system (e.g. PLC)
- 2 Field Communicator 475
- 3 Computer with Web browser (e.g. Internet Explorer) for accessing the integrated device Web server or computer with operating tool (e.g. FieldCare, DeviceCare, AMS Device Manager, SIMATIC PDM) with COM DTM "CDI Communication TCP/IP"
- 4 Commubox FXA195 (USB)
- 5 Field Xpert SFX350 or SFX370
- 6 Field Xpert SMT70
- 7 VIATOR Bluetooth modem with connecting cable
- 8 Transmitter



A0028746

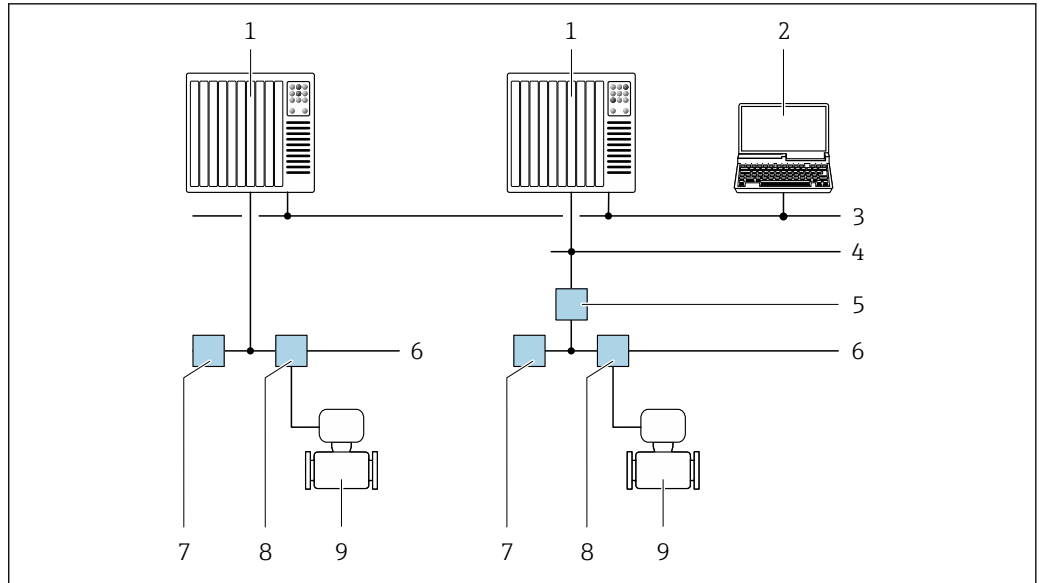
73 Options for remote operation via HART protocol (passive)

- 1 Control system (e.g. PLC)
- 2 Transmitter power supply unit, e.g. RN221N (with communication resistor)
- 3 Connection for Commubox FXA195 and Field Communicator 475
- 4 Field Communicator 475
- 5 Computer with Web browser (e.g. Internet Explorer) for accessing the integrated device Web server or computer with operating tool (e.g. FieldCare, DeviceCare, AMS Device Manager, SIMATIC PDM) with COM DTM "CDI Communication TCP/IP"
- 6 Commubox FXA195 (USB)
- 7 Field Xpert SFX350 or SFX370
- 8 Field Xpert SMT70
- 9 VIATOR Bluetooth modem with connecting cable
- 10 Transmitter

### Via FOUNDATION Fieldbus network

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





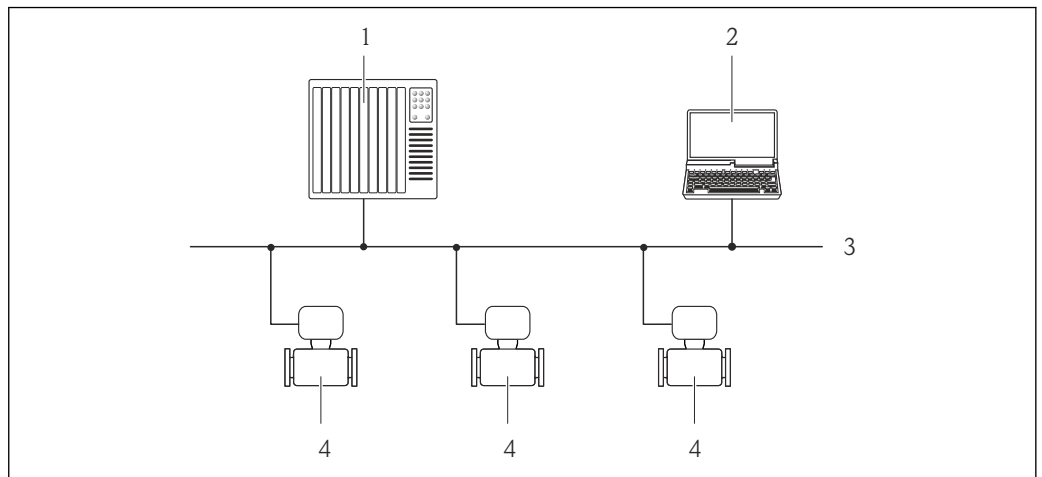
A0028837

74 Options for remote operation via FOUNDATION Fieldbus network

- 1 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

**Via PROFIBUS DP network**

This communication interface is available in device versions with PROFIBUS DP.



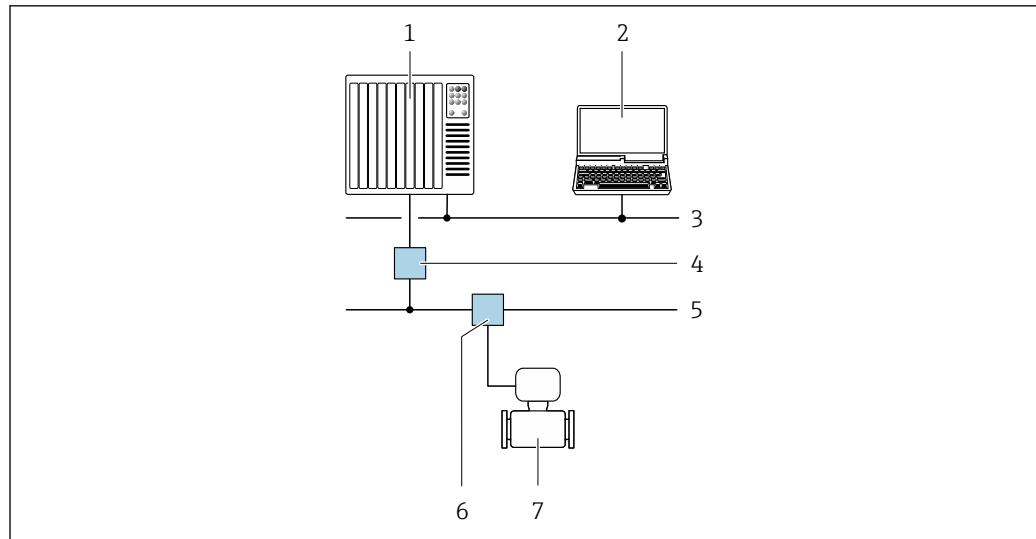
A0020903

75 Options for remote operation via PROFIBUS DP network

- 1 Automation system
- 2 Computer with PROFIBUS network card
- 3 PROFIBUS DP network
- 4 Measuring device

**Via PROFIBUS PA network**

This communication interface is available in device versions with PROFIBUS PA.



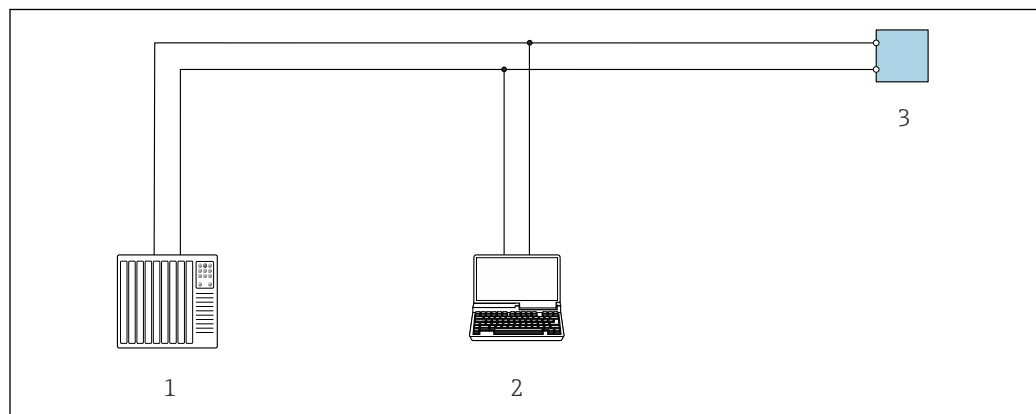
A0028838

76 Options for remote operation via PROFIBUS PA network

- 1 Automation system
- 2 Computer with PROFIBUS network card
- 3 PROFIBUS DP network
- 4 Segment coupler PROFIBUS DP/PA
- 5 PROFIBUS PA network
- 6 T-box
- 7 Measuring device

### Via Modbus RS485 protocol

This communication interface is available in device versions with a Modbus-RS485 output.



A0029437

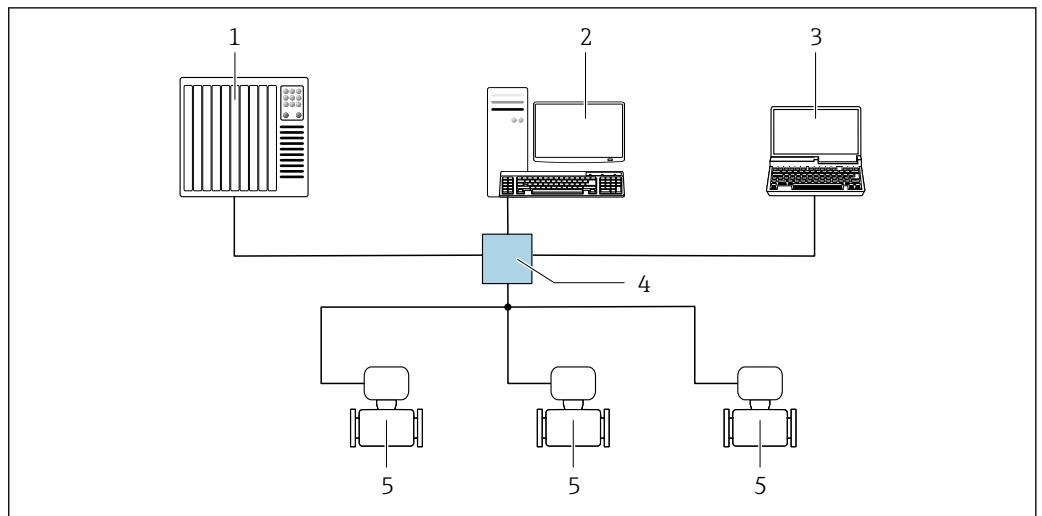
77 Options for remote operation via Modbus-RS485 protocol (active)

- 1 Control system (e.g. PLC)
- 2 Computer with Web browser (e.g. Internet Explorer) for accessing the integrated device Web server or with operating tool (e.g. FieldCare, DeviceCare) with COM DTM "CDI Communication TCP/IP" or Modbus DTM
- 3 Transmitter

### Via EtherNet/IP network

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

Star topology



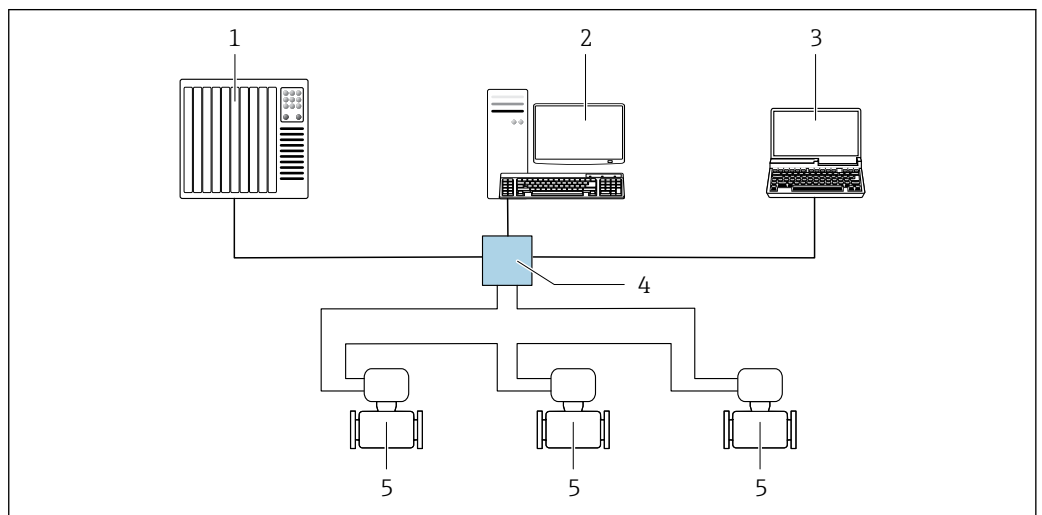
A0032078

78 Options for remote operation via EtherNet/IP network: star topology

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

Ring topology

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



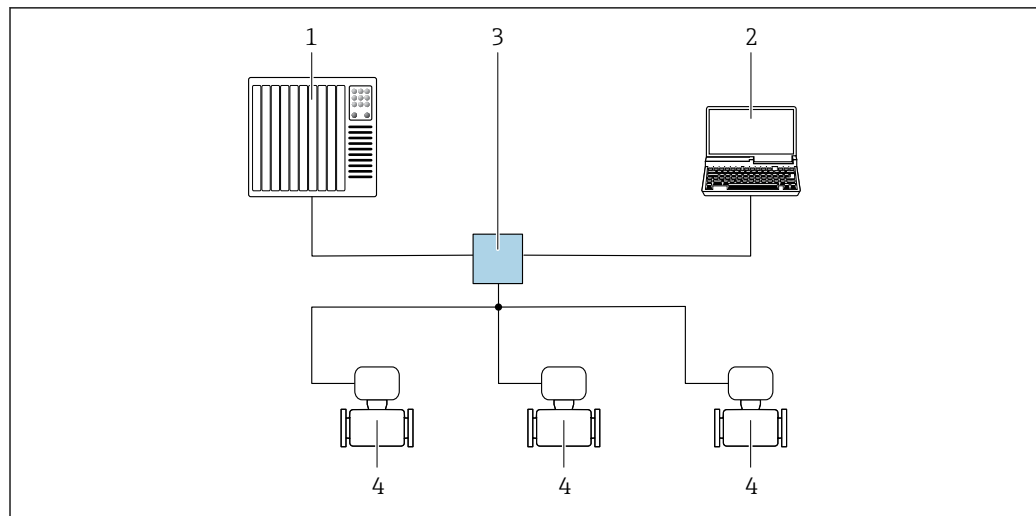
A0033725

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

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

**Via PROFINET network**

This communication interface is available in device versions with PROFINET.

*Star topology*

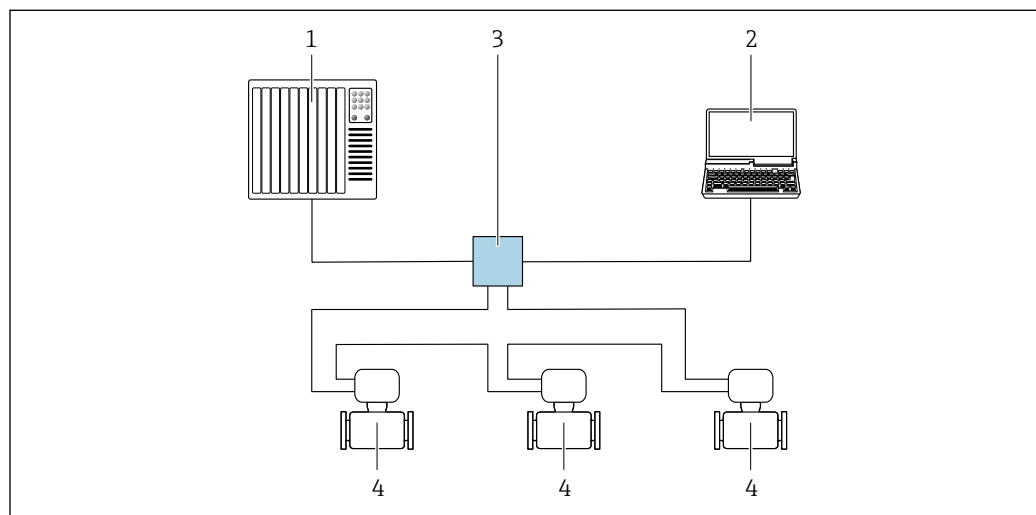
A0026545

80 Options for remote operation via PROFINET network: star topology

- 1 Automation system, e.g. Simatic S7 (Siemens)
- 2 Computer with Web browser (e.g. Internet Explorer) for accessing the integrated Web server or computer with operating tool (e.g. FieldCare, DeviceCare, SIMATIC PDM) with COM DTM "CDI Communication TCP/IP"
- 3 Standard Ethernet switch, e.g. Scalance X204 (Siemens)
- 4 Measuring device

*Ring topology*

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

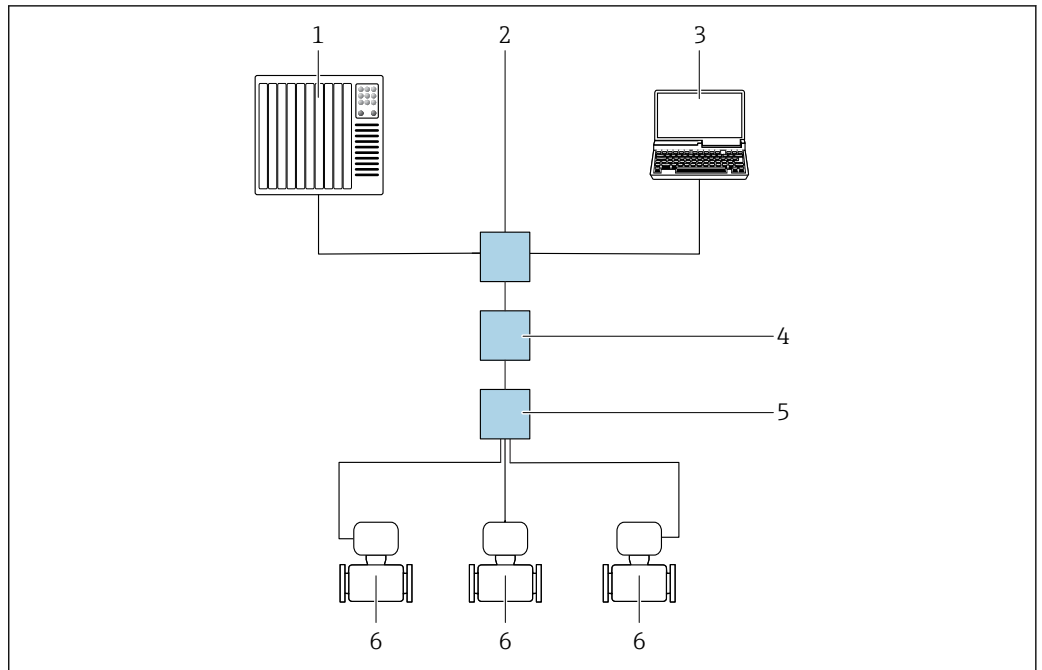


A0033719

81 Options for remote operation via PROFINET network: ring topology

- 1 Automation system, e.g. Simatic S7 (Siemens)
- 2 Computer with Web browser (e.g. Internet Explorer) for accessing the integrated Web server or computer with operating tool (e.g. FieldCare, DeviceCare, SIMATIC PDM) with COM DTM "CDI Communication TCP/IP"
- 3 Standard Ethernet switch, e.g. Scalance X204 (Siemens)
- 4 Measuring device

**Via APL network**



A0046117

82 Options for remote operation via APL network

- 1 Automation system, e.g. Simatic S7 (Siemens)
- 2 Ethernet switch, e.g. Scalance X204 (Siemens)
- 3 Computer with Web browser (e.g. Internet Explorer) for access to integrated Web server or computer with operating tool (e.g. FieldCare or DeviceCare with PROFINET COM DTM or SIMATIC PDM with FDI-Package)
- 4 APL power switch (optional)
- 5 APL field switch
- 6 Measuring device

**Service interface**

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

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

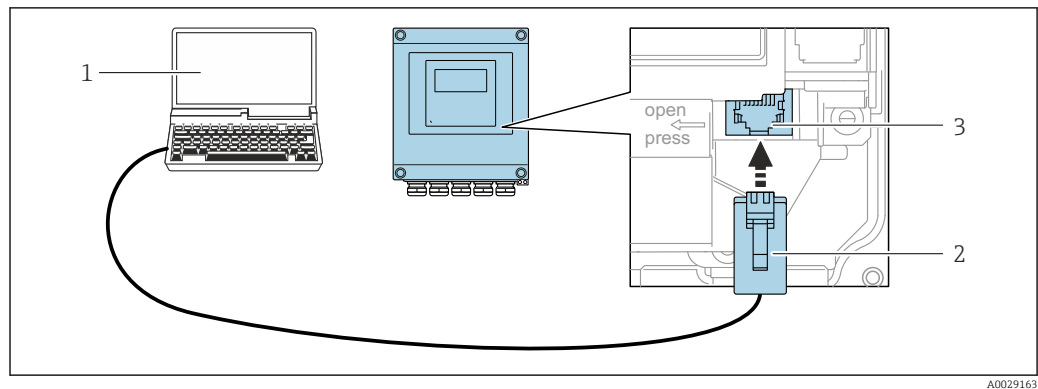


An adapter for RJ45 to the M12 plug is optionally available:

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

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

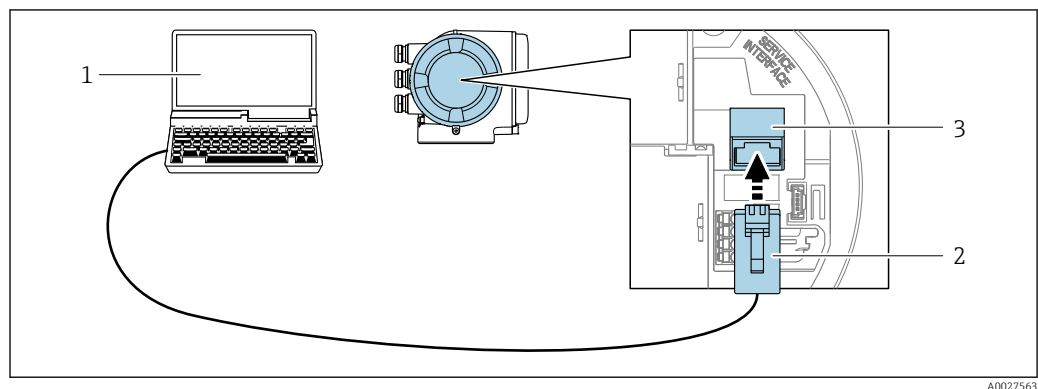
## Proline 500 – digital transmitter



83 Connection via service interface (CDI-RJ45)

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

## Proline 500 transmitter



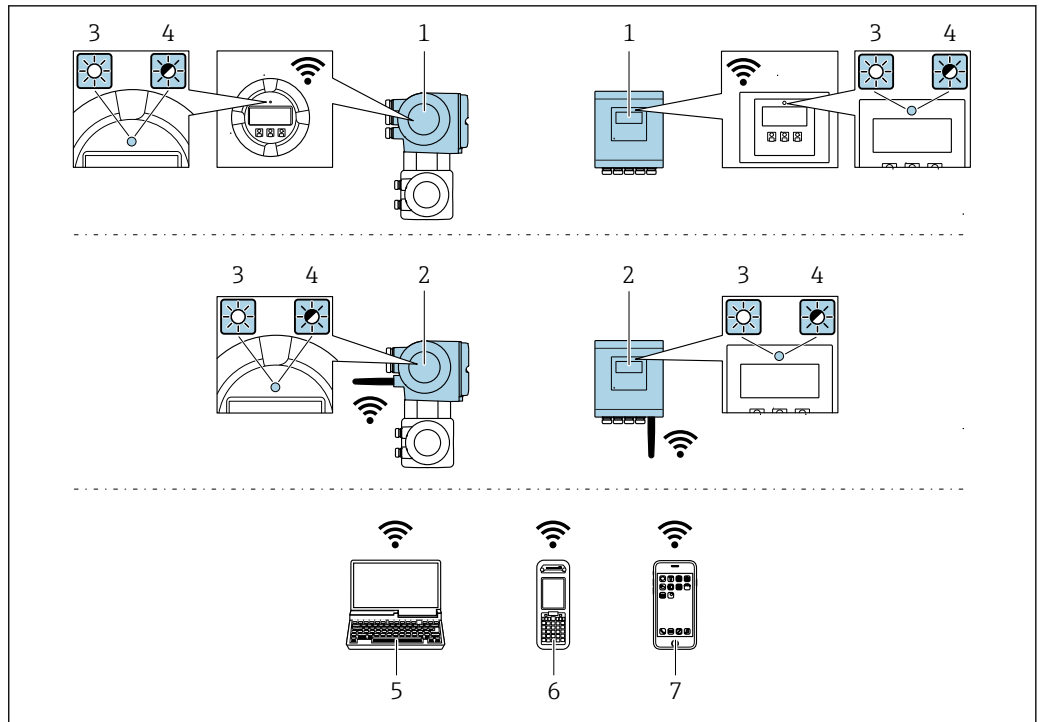
84 Connection via service interface (CDI-RJ45)

- 1 Computer with Web browser (e.g. Microsoft Internet Explorer, Microsoft Edge) for accessing the integrated Web server or with "FieldCare", "DeviceCare" operating tool with COM DTM "CDI Communication TCP/IP" or Modbus DTM
- 2 Standard Ethernet connecting cable with RJ45 plug
- 3 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"



A0034569

- 1 Transmitter with integrated WLAN antenna
- 2 Transmitter with external WLAN antenna
- 3 LED lit constantly: WLAN reception is enabled on measuring device
- 4 LED flashing: WLAN connection established between operating unit and measuring device
- 5 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)
- 6 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)
- 7 Smart phone or tablet (e.g. Field Xpert SMT70)

Function	WLAN: IEEE 802.11 b/g (2.4 GHz) <ul style="list-style-type: none"> <li>▪ Access Point with DHCP server (factory setting)</li> <li>▪ Network</li> </ul>
Encryption	WPA2-PSK AES-128 (in accordance with IEEE 802.11i)
Configurable WLAN channels	1 to 11
Degree of protection	IP67
Available antennas	<ul style="list-style-type: none"> <li>▪ Internal antenna</li> <li>▪ External antenna (optional)</li> </ul> In the event of poor transmission/reception conditions at the place of installation. Available as an accessory → 134. <b>i</b> Only 1 antenna is active at any one time!
Range	<ul style="list-style-type: none"> <li>▪ Internal antenna: typically 10 m (32 ft)</li> <li>▪ External antenna: typically 50 m (164 ft)</li> </ul>
Materials (external antenna)	<ul style="list-style-type: none"> <li>▪ Antenna: ASA plastic (acrylic ester-styrene-acrylonitrile) and nickel-plated brass</li> <li>▪ Adapter: Stainless steel and nickel-plated brass</li> <li>▪ Cable: Polyethylene</li> <li>▪ Plug: Nickel-plated brass</li> <li>▪ Angle bracket: Stainless steel</li> </ul>

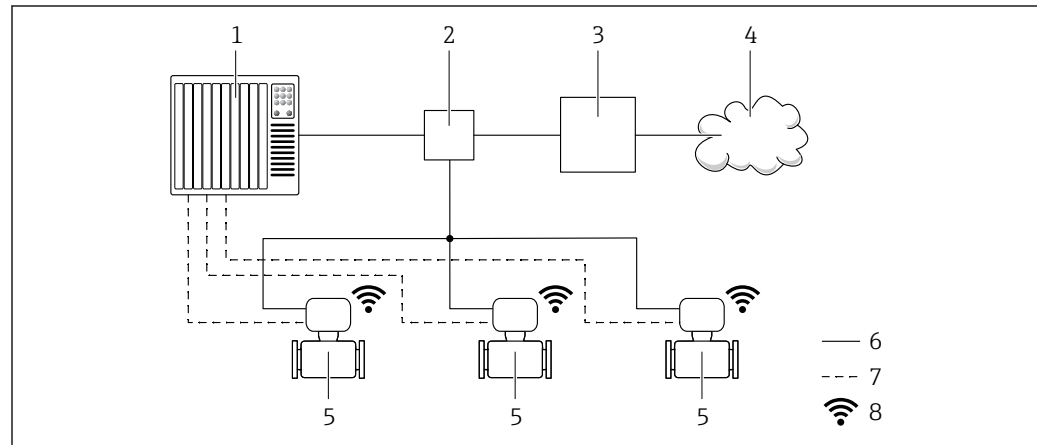
**Network integration**

**i** Network integration is only available for the HART communication protocol.

With the optional "OPC-UA Server" application package, the device can be integrated into an Ethernet network via the service interface (CDI-RJ45 and WLAN) and communicate with OPC-UA clients. If the device is used in this way, IT security must be considered.

**i** Transmitters with an Ex de approval may **not** be connected via the service interface (CDI-RJ45)!  
 Order code for "Approval transmitter + sensor", options (Ex de):  
 BB, C2, GB, MB, NB

For permanent access to device data and for device configuration via the Web server, the device is incorporated directly in a network via the service interface (CDI-RJ45). In this way, the device can be accessed any time from the control station. The measured values are processed separately via the inputs and outputs through the automation system.



- 1 Automation system, e.g. Simatic S7 (Siemens)
- 2 Ethernet switch
- 3 Edge Gateway
- 4 Cloud
- 5 Measuring device
- 6 Ethernet network
- 7 Measured values via inputs and outputs
- 8 Optional WLAN interface

**i** The optional WLAN interface is available on the following device version:  
 Order code for "Display; operation", option **G** "4-line, backlit, graphic display; touch control + WLAN"


**📖** Special Documentation for the OPC-UA Server application package → **📄** 138.

**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	<ul style="list-style-type: none"> <li>■ CDI-RJ45 service interface</li> <li>■ WLAN interface</li> <li>■ Ethernet-based fieldbus (EtherNet/IP, PROFINET)</li> </ul>	Special Documentation for the device
DeviceCare SFE100	Notebook, PC or tablet with Microsoft Windows system	<ul style="list-style-type: none"> <li>■ CDI-RJ45 service interface</li> <li>■ WLAN interface</li> <li>■ Fieldbus protocol</li> </ul>	→ <b>📄</b> 136
FieldCare SFE500	Notebook, PC or tablet with Microsoft Windows system	<ul style="list-style-type: none"> <li>■ CDI-RJ45 service interface</li> <li>■ WLAN interface</li> <li>■ Fieldbus protocol</li> </ul>	→ <b>📄</b> 136



Supported operating tools	Operating unit	Interface	Additional information
Field Xpert	SMT70/77/50	<ul style="list-style-type: none"> <li>■ All fieldbus protocols</li> <li>■ WLAN interface</li> <li>■ Bluetooth</li> <li>■ CDI-RJ45 service interface</li> </ul>	Operating Instructions BA01202S  Device description files: Use update function of handheld terminal
SmartBlue app	Smart phone or tablet with iOS or Android	WLAN	→  136



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) from Rockwell Automation → [www.rockwellautomation.com](http://www.rockwellautomation.com)
- Process Device Manager (PDM) from Siemens → [www.siemens.com](http://www.siemens.com)
- Asset Management Solutions (AMS) from Emerson → [www.emersonprocess.com](http://www.emersonprocess.com)
- FieldCommunicator 375/475 from Emerson → [www.emersonprocess.com](http://www.emersonprocess.com)
- Field Device Manager (FDM) from Honeywell → [www.process.honeywell.com](http://www.process.honeywell.com)
- FieldMate from Yokogawa → [www.yokogawa.com](http://www.yokogawa.com)
- PACTWare → [www.pactware.com](http://www.pactware.com)

The related device description files are available: [www.endress.com](http://www.endress.com) → Downloads


### Web server

Thanks to the integrated Web server the device can be operated and configured via a Web browser and via the service interface (CDI-RJ45) or via the WLAN interface. The structure of the operating menu is the same as for the local display. In addition to the measured values, device status information is also displayed and allows users 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
- Visualize up to 1000 saved measured values (only available with the **Extended HistoROM** application package →  133)



Web server special documentation →  138

### 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:

	HistoROM backup	T-DAT	S-DAT
<b>Available data</b>	<ul style="list-style-type: none"> <li>▪ Event logbook such as diagnostic events for example</li> <li>▪ Parameter data record backup</li> <li>▪ Device firmware package</li> <li>▪ Driver for system integration for exporting via Web server, e.g.:               <ul style="list-style-type: none"> <li>▪ GSD for PROFIBUS DP</li> <li>▪ GSD for PROFIBUS PA</li> <li>▪ GSDML for PROFINET</li> <li>▪ EDS for EtherNet/IP</li> <li>▪ DD for FOUNDATION Fieldbus</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Measured value logging ("Extended HistoROM" order option)</li> <li>▪ Current parameter data record (used by firmware at run time)</li> <li>▪ Maximum indicators (min/max values)</li> <li>▪ Totalizer values</li> </ul>	<ul style="list-style-type: none"> <li>▪ Sensor data: nominal diameter etc.</li> <li>▪ Serial number</li> <li>▪ Calibration data</li> <li>▪ Device configuration (e.g. SW options, fixed I/O or multi I/O)</li> </ul>
<b>Storage location</b>	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 transmission

#### Manual

- Transfer of a device configuration to another device using the export function of the specific operating tool, e.g. with FieldCare, DeviceCare or Web server: to duplicate the configuration or to store in an archive (e.g. for backup purposes)
- Transmission of the drivers for system integration via Web server, e.g.:
  - GSD for PROFIBUS DP
  - GSD for PROFIBUS PA
  - GSDML for PROFINET
  - EDS for EtherNet/IP
  - 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 1 000 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

## Certificates and approvals

Current certificates and approvals that are available for the product can be selected via the Product Configurator at [www.endress.com](http://www.endress.com):

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Configuration**.

**CE mark**

The device meets the legal requirements of the applicable EU Directives. These are listed in the corresponding EU Declaration of Conformity along with the standards applied.

Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.

**UKCA marking**

The device meets the legal requirements of the applicable UK regulations (Statutory Instruments). These are listed in the UKCA Declaration of Conformity along with the designated standards. By selecting the order option for UKCA marking, Endress+Hauser confirms a successful evaluation and testing of the device by affixing the UKCA mark.

Contact address Endress+Hauser UK:


Endress+Hauser Ltd.  
Floats Road  
Manchester M23 9NF  
United Kingdom  
[www.uk.endress.com](http://www.uk.endress.com)

**RCM mark**

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

**Ex approval**

The measuring device is 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.

-  The separate Ex documentation (XA) containing all the relevant explosion protection data is available from your Endress+Hauser sales center.

**Proline 500 – digital**

*ATEX, IECEx*

Currently, the following versions for use in hazardous areas are available:

*Ex ia, Ex db*

Transmitter		Sensor	
Category	Type of protection	Category	Type of protection
II(1)G	[Ex ia] IIC	II2G	Ex db ia IIC T6...T1 Gb
II3(1)G	Ex ec [ia Ga] IIC T5...T4 Gc	II2G	Ex db ia IIC T6...T1 Gb

*Ex tb*

Transmitter		Sensor	
Category	Type of protection	Category	Type of protection
II(1)D	[Ex ia] IIIC	II2D	Ex ia tb IIIC T** °C Db

*Non-Ex, Ex ec*

Transmitter		Sensor	
Category	Type of protection	Category	Type of protection
Non-Ex	Non-Ex	II3G	Ex ec ic IIC T5...T1 Gc
II3G	Ex ec IIC T5...T4 Gc	II3G	Ex ec ic IIC T5...T1 Gc

*cCSAus*

Currently, the following versions for use in hazardous areas are available:

*IS (Ex nA, Ex i)*

Transmitter	Sensor
Class I Division 2 Groups A - D	Class I, II, III Division 1 Groups A-G

*NI (Ex nA)*

Transmitter	Sensor
Class I Division 2 Groups A - D	

*Ex nA, Ex i*

Transmitter	Sensor
Class I, Zone 2 AEx/ Ex nA [ia Ga] IIC T5...T4 Gb	Class I, Zone 1 AEx/ Ex d ia IIC T6...T1 Gb

*Ex nA*

Transmitter	Sensor
Class I, Zone 2 AEx/ Ex nA IIC T5...T4 Gc	Class I, Zone 2 AEx/Ex nA ic IIC T5...T1 Gc

*Ex tb*

Transmitter	Sensor
[AEx / Ex ia ] IIIC	Zone 2 1 AEx/ Ex ia tb IIIC T** °C Db

**Proline 500***ATEX, IECEx*

Currently, the following versions for use in hazardous areas are available:

*Ex db eb*

Category	Type of protection	
	Transmitter	Sensor
II2G	Ex db eb ia IIC T6...T4 Gb	Ex eb ia IIC T6...T1 Gb

*Ex db*

Category	Type of protection	
	Transmitter	Sensor
II2G	Ex db ia IIC T6...T4 Gb	Ex eb ia IIC T6...T1 Gb

*Ex tb*

Category	Type of protection	
	Transmitter	Sensor
II2G	Ex tb IIIC T85°C Db	Ex ia tb IIIC T** °C Db

*Ex ec*

Category	Type of protection	
	Transmitter	Sensor
II3G	Ex ec IIC T5...T4 Gc	Ex ec ic IIC T5...T1 Gc

*cCSAus*

Currently, the following versions for use in hazardous areas are available:

*IS (Ex i), XP (Ex d)*

Transmitter	Sensor
Class I, II, III Division 1 Groups A-G	

*NI (Ex nA)*

Transmitter	Sensor
Class I Division 2 Groups A - D	

*Ex de*

Transmitter	Sensor
Class I, Zone 1 AEx/ Ex de ia IIC T6...T4 Gb	Class I, Zone 1 AEx/Ex e ia IIC T6...T1 Gb

*Ex d*

Transmitter	Sensor
Class I, Zone 1 AEx/ Ex d ia IIC T6...T4 Gb	Class I, Zone 1 AEx/Ex e ia IIC T6...T1 Gb

*Ex nA*

Transmitter	Sensor
Class I, Zone 2 AEx/ Ex nA IIC T5...T4 Gc	Class I, Zone 2 AEx/Ex nA ic IIC T5...T1 Gc

Ex tb

Transmitter	Sensor
Zone 21 AEx/ Ex tb IIIC T85 °C Db	Zone 21 AEx/ Ex ia tb IIIC T** °C Db

**Sanitary compatibility**

- 3-A SSI 28-06 or more recent
  - Confirmation by affixing the 3-A logo for measuring devices with the order code for "Additional approval", option LP "3-A".
  - 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. 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 Type EL Class I
  - Confirmation by affixing the EHEDG symbol for measuring devices with the order code for "Additional approval", option LT "EHEDG".
  - EPDM is not a suitable seal material for fluids with a fat content > 8 %.
  - 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](http://www.ehedg.org)).
- FDA 21 CFR 177
- Food Contact Materials Regulation (EC) 1935/2004
- Food Contact Materials Regulation China GB 4806
- Pasteurized Milk Ordinance (PMO)



**Pharmaceutical compatibility**

- FDA 21 CFR 177
- USP <87>
- USP <88> Class VI 121 °C
- TSE/BSE Certificate of Suitability
- cGMP  
Devices with the order code for "Test, certificate", option JG "Conformity with cGMP-derived requirements, declaration" comply with the requirements of cGMP with regard to the surfaces of parts in contact with the medium, design, FDA 21 CFR material conformity, USP Class VI tests and TSE/BSE conformity.  
A serial number-specific declaration is generated.

**Functional safety**

The measuring device can be used for flow monitoring systems (min., max., range) up to SIL 2 (single-channel architecture; order code for "Additional approval", option LA) and SIL 3 (multi-channel architecture with homogeneous redundancy) and is independently evaluated and certified in accordance with IEC 61508.

The following types of monitoring in safety equipment are possible:

 Functional Safety Manual with information on the SIL device →  138

**HART certification****HART interface**

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

- Certified according to HART 7
- The device can also be operated with certified devices of other manufacturers (interoperability)

**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)

**Certification PROFIBUS**

**PROFIBUS interface**

The measuring device is certified and registered by the PNO (PROFIBUS Nutzerorganisation e.V. / PROFIBUS User Organization). The measuring system meets all the requirements of the following specifications:

- Certified according to PA Profile 3.02
- The device can also be operated with certified devices of other manufacturers (interoperability)

**EtherNet/IP certification**

The measuring device is certified and registered by the ODVA (Open Device Vendor Association). The measuring system meets all the requirements of the following specifications:

- Certified in accordance with the ODVA Conformance Test
- EtherNet/IP Performance Test
- EtherNet/IP PlugFest compliance
- The device can also be operated with certified devices of other manufacturers (interoperability)

**Certification PROFINET**

**PROFINET interface**

The measuring device is certified and registered by the PNO (PROFIBUS Nutzerorganisation e.V. / PROFIBUS User Organization). The measuring system meets all the requirements of the following specifications:

- Certified according to:
  - Test specification for PROFINET devices
  - PROFINET Security Level 2 – Netload Class 2 0 Mbps
- The device can also be operated with certified devices of other manufacturers (interoperability)
- The device supports PROFINET S2 system redundancy.

**Certification PROFINET with Ethernet-APL**

**PROFINET interface**

The measuring device is certified and registered by the PNO (PROFIBUS Nutzerorganisation e.V. / PROFIBUS User Organization). The measuring system meets all the requirements of the following specifications:

- Certified according to:
  - Test specification for PROFINET devices
  - PROFINET PA Profile 4
  - PROFINET Security Level 2 – Netload Class 2 0 Mbps
  - APL conformance test
- The device can also be operated with certified devices of other manufacturers (interoperability)
- The device supports PROFINET S2 system redundancy.

**Radio approval**

The measuring device has radio approval.



For detailed information on the radio approval, see the Special Documentation

**Pressure Equipment Directive**

The devices can be ordered with or without a PED or UKCA approval. If a device with a PED or UKCA approval is required, this must be explicitly stated in the order. For devices with nominal diameters less than or equal to DN 25 (1"), this is neither possible nor necessary. A UK Ex approval must be selected for UKCA.

- With the marking:
  - a) PED/G1/x (x = category) or
  - b) UK/G1/x (x = category)
 on the sensor nameplate, Endress+Hauser confirms compliance with the "Essential Safety Requirements"
  - a) specified in Annex I of the Pressure Equipment Directive 2014/68/EU or
  - b) Schedule 2 of Statutory Instruments 2016 No. 1105.
- Devices bearing this marking (PED or UKCA) are suitable for the following types of medium: Media in Group 1 and 2 with a vapor pressure greater than, or smaller and equal to 0.5 bar (7.3 psi)
- Devices not bearing this marking (without PED or UKCA) are designed and manufactured according to sound engineering practice. They meet the requirements of
  - a) Art. 4 Para. 3 of the Pressure Equipment Directive 2014/68/EU or
  - b) Part 1, Para. 8 of Statutory Instruments 2016 No. 1105.
 The scope of application is indicated
  - a) in diagrams 6 to 9 in Annex II of the Pressure Equipment Directive 2014/68/EU or
  - b) Schedule 3, Para. 2 of Statutory Instruments 2016 No. 1105.

**Additional certification****PWIS-free**

PWIS = paint-wetting impairment substances

Order code for "Service":

- Option **HC**: PWIS-free (version A)
- Option **HD**: PWIS-free (version B)
- Option **HE**: PWIS-free (version C)



For more information on PWIS-free certification, see "Test specification" document TS01028D

**Other standards and guidelines**

- EN 60529  
Degrees of protection provided by enclosures (IP code)
- EN 61010-1  
Safety requirements for electrical equipment for measurement, control and laboratory use - general requirements
- IEC/EN 61326-2-3  
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 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

## Ordering information

Detailed ordering information is available from your nearest sales organization [www.addresses.endress.com](http://www.addresses.endress.com) or in the Product Configurator at [www.endress.com](http://www.endress.com):

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Configuration**.

**Product Configurator - the tool for individual product configuration**

- Up-to-the-minute configuration data
- Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability to order directly in the Endress+Hauser Online Shop

## 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](http://www.endress.com).



**Diagnostic functionality**

Order code for "Application package", option EA "Extended HistoROM"

Comprises extended functions concerning the event log and the activation of the measured value memory.

Event log:

Memory volume is extended from 20 message entries (standard version) to up to 100 entries.

Data logging (line recorder):

- Memory capacity for up to 1000 measured values is activated.
- 250 measured values can be output via each of the 4 memory channels. The recording interval can be defined and configured by the user.
- Measured value logs can be accessed via the local display or operating tool e.g. FieldCare, DeviceCare or Web server.

 For detailed information, see the Operating Instructions for the device.

**Heartbeat Technology**

Order code for "Application package", option EB "Heartbeat Verification + Monitoring"

**Heartbeat Verification**

Meets the requirement for traceable verification 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 the process influences (e.g. formation of buildup, magnetic field interference etc.) have on measuring performance over time.
- Schedule servicing in time.
- Monitor the process or product quality.

 For detailed information, see the Special Documentation for the device.

**Cleaning**

Order code for "Application package", option EC "ECC electrode cleaning "

The electrode cleaning circuit (ECC) function has been developed to have a solution for applications where magnetite ( $\text{Fe}_3\text{O}_4$ ) deposits frequently occur (e.g. hot water). Since magnetite is highly conductive this build up leads to measuring errors and ultimately to the loss of signal. The application package is designed to avoid build-up of very conductive matter and thin layers (typical of magnetite).

 For detailed information, see the Operating Instructions for the device.

**OPC-UA Server**

Order code for "Application package", option EL "OPC-UA Server"

The application package provides an integrated OPC-UA server for comprehensive device services for IoT and SCADA applications.

 For detailed information, see the Special Documentation for the device.















## 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](http://www.endress.com).



## Device-specific accessories

## For the transmitter



Accessories	Description
Transmitter <ul style="list-style-type: none"> <li>▪ Proline 500 – digital</li> <li>▪ Proline 500</li> </ul>	Transmitter for replacement or storage. Use the order code to define the following specifications: <ul style="list-style-type: none"> <li>▪ Approvals</li> <li>▪ Output</li> <li>▪ Input</li> <li>▪ Display/operation</li> <li>▪ Housing</li> <li>▪ Software</li> </ul> <p> <ul style="list-style-type: none"> <li>▪ Proline 500 – digital transmitter: Order number: 5X5BXX-*****A</li> <li>▪ Proline 500 transmitter: Order number: 5X5BXX-*****B</li> </ul> </p> <p> Proline 500 transmitter for replacement: It is essential to specify the serial number of the current transmitter when ordering. On the basis of the serial number, the device-specific data (e.g. calibration factors) of the replaced device can be used for the new transmitter.</p> <p> <ul style="list-style-type: none"> <li>▪ Proline 500 – digital transmitter: Installation Instructions EA01151D</li> <li>▪ Proline 500 transmitter: Installation Instructions EA01152D</li> </ul> </p>
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". <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>▪ The external WLAN antenna is not suitable for use in hygienic applications.</li> <li>▪ Additional information regarding the WLAN interface →  122.</li> </ul> </li> <li> Order number: 71351317</li> <li> Installation Instructions EA01238D</li> </ul>
Pipe mounting set	Pipe mounting set for transmitter. <ul style="list-style-type: none"> <li> Proline 500 – digital transmitter Order number: 71346427</li> <li> Installation Instructions EA01195D</li> <li> Proline 500 transmitter Order number: 71346428</li> </ul>
Weather protection cover Transmitter <ul style="list-style-type: none"> <li>▪ Proline 500 – digital</li> <li>▪ Proline 500</li> </ul>	Is used to protect the measuring device from the effects of the weather: e.g. rainwater, excess heating from direct sunlight. <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>▪ Proline 500 – digital transmitter Order number: 71343504</li> <li>▪ Proline 500 transmitter Order number: 71343505</li> </ul> </li> <li> Installation Instructions EA01191D</li> </ul>
Display guard Proline 500 – digital	Is used to protect the display against impact or scoring, for example from sand in desert areas. <ul style="list-style-type: none"> <li> Order number: 71228792</li> <li> Installation Instructions EA01093D</li> </ul>













Connecting cable Proline 500 – digital Sensor – Transmitter	<p>The connecting cable can be ordered directly with the measuring device (order code for "Cable, sensor connection) or as an accessory (order number DK5012).</p> <p>The following cable lengths are available: order code for "Cable, sensor connection"</p> <ul style="list-style-type: none"> <li>▪ Option B: 20 m (65 ft)</li> <li>▪ Option E: User-configurable up to max. 50 m</li> <li>▪ Option F: User-configurable up to max. 165 ft</li> </ul> <p> Maximum possible cable length for a Proline 500 – digital connecting cable: 300 m (1000 ft)</p>
Connecting cable Proline 500 Sensor – Transmitter	<p>The connecting cable can be ordered directly with the measuring device (order code for "Cable, sensor connection") or as an accessory (order number DK5012).</p> <p>The following cable lengths are available: order code for "Cable, sensor connection"</p> <ul style="list-style-type: none"> <li>▪ Option 1: 5 m (16 ft)</li> <li>▪ Option 2: 10 m (32 ft)</li> <li>▪ Option 3: 20 m (65 ft)</li> <li>▪ Option 4: User-configurable cable length (m)</li> <li>▪ Option 5: User-configurable cable length (ft)</li> </ul> <p> Possible cable length for a Proline 500 connecting cable: depending on the medium conductivity, max. 200 m (660 ft)</p>

**For the sensor**



Accessories	Description
Adapter set	<p>Adapter connections for installing a Promag H instead of a Promag 30/33 A or Promag 30/33 H (DN 25).</p> <p>Consists of:</p> <ul style="list-style-type: none"> <li>▪ 2 process connections</li> <li>▪ Screws</li> <li>▪ Seals</li> </ul>
Seal set	For the regular replacement of seals for the sensor.
Spacer	If replacing a DN 80/100 sensor in an existing installation, a spacer is needed if the new sensor is shorter.
Welding jig	Welding socket as process connection: welding jig for installation in pipe.
Grounding rings	<p>Are used to ground the medium in lined measuring tubes to ensure proper measurement.</p> <p> Grounding rings can be ordered via the device order structure or configured and ordered as an accessory via the DK5HR order structure.</p>
Ground disks	<p>Are used to ground the medium in lined measuring tubes to ensure proper measurement.</p> <p> For details, see Installation Instructions EA00070D</p>
Mounting kit	<p>Consists of:</p> <ul style="list-style-type: none"> <li>▪ 2 process connections</li> <li>▪ Screws</li> <li>▪ Seals</li> </ul>
Wall mounting kit	Wall mounting kit for measuring device (only DN 2 to 25 (1/12 to 1"))



**Communication-specific accessories**

Accessories	Description
Commubox FXA195 HART	<p>For intrinsically safe HART communication with FieldCare via the USB interface.</p> <p> Technical Information TI00404F</p>
HART Loop Converter HMX50	<p>Is used to evaluate and convert dynamic HART process variables to analog current signals or limit values.</p> <p> <ul style="list-style-type: none"> <li>▪ Technical Information TI00429F</li> <li>▪ Operating Instructions BA00371F</li> </ul> </p>


Fieldgate FXA42	<p>Is used to transmit the measured values of connected 4 to 20 mA analog measuring devices, as well as digital measuring devices</p> <ul style="list-style-type: none"> <li> Technical Information TI01297S</li> <li> Operating Instructions BA01778S</li> <li> Product page: <a href="http://www.endress.com/fxa42">www.endress.com/fxa42</a></li> </ul>
Field Xpert SMT50	<p>The Field Xpert SMT70 tablet PC for device configuration enables mobile plant asset management in non-hazardous areas. It is suitable for commissioning and maintenance staff to manage field instruments with a digital communication interface and to record progress.</p> <p>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.</p> <ul style="list-style-type: none"> <li> Technical Information TI01342S</li> <li> Operating Instructions BA01709S</li> <li> Product page: <a href="http://www.endress.com/smt50">www.endress.com/smt50</a></li> </ul>
Field Xpert SMT70	<p>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.</p> <p>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.</p> <ul style="list-style-type: none"> <li> Technical Information TI01342S</li> <li> Operating Instructions BA01709S</li> <li> Product page: <a href="http://www.endress.com/smt70">www.endress.com/smt70</a></li> </ul>
Field Xpert SMT77	<p>The Field Xpert SMT77 tablet PC for device configuration enables mobile plant asset management in areas categorized as Ex Zone 1.</p> <ul style="list-style-type: none"> <li> Technical Information TI01418S</li> <li> Operating Instructions BA01923S</li> <li> Product page: <a href="http://www.endress.com/smt77">www.endress.com/smt77</a></li> </ul>

## Service-specific accessories

Accessory	Description
Applicator	<p>Software for selecting and sizing Endress+Hauser measuring devices:</p> <ul style="list-style-type: none"> <li>▪ Choice of measuring devices with industrial requirements</li> <li>▪ Calculation of all the necessary data for identifying the optimum flowmeter: e.g. nominal diameter, pressure loss, flow velocity and accuracy.</li> <li>▪ Graphic illustration of the calculation results</li> <li>▪ 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.</li> </ul> <p>Applicator is available:</p> <ul style="list-style-type: none"> <li>▪ Via the Internet: <a href="https://portal.endress.com/webapp/applicator">https://portal.endress.com/webapp/applicator</a></li> <li>▪ As a downloadable DVD for local PC installation.</li> </ul>
W@M	<p>W@M Life Cycle Management</p> <p>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.</p> <p>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.</p> <p>Combined with the right services, W@M Life Cycle Management boosts productivity in every phase. For more information, see: <a href="http://www.endress.com/lifecyclemanagement">www.endress.com/lifecyclemanagement</a></p>
FieldCare	<p>FDT-based plant asset management tool from Endress+Hauser.</p> <p>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.</p> <ul style="list-style-type: none"> <li> Operating Instructions BA00027S and BA00059S</li> </ul>
DeviceCare	<p>Tool for connecting and configuring Endress+Hauser field devices.</p> <ul style="list-style-type: none"> <li> Innovation brochure IN01047S</li> </ul>

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.  <ul style="list-style-type: none"> <li>▪ Technical Information TI00133R</li> <li>▪ Operating Instructions BA00247R</li> </ul>
	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

## Supplementary documentation

-  For an overview of the scope of the associated Technical Documentation, refer to the following:
- *Device Viewer* ([www.endress.com/deviceviewer](http://www.endress.com/deviceviewer)): Enter serial number from nameplate.
  - *Endress+Hauser Operations app*: Enter serial number from nameplate or scan matrix code on nameplate.

### Standard documentation      Brief Operating Instructions

*Brief Operating Instructions for the sensor*

Measuring device	Documentation code
Proline Promag H	KA01289D

*Brief Operating Instructions for the transmitter*

Measuring device	Documentation code							PROFINET with Ethernet-APL
	HART	FOUNDATION Fieldbus	PROFIBUS PA	PROFIBUS DP	Modbus RS485	EtherNet/IP	PROFINET	
Proline 500 – digital	KA01313D	KA01292D	KA01407D	KA01388D	KA01317D	KA01343D	KA01349D	KA01519D
Proline 500	KA01312D	KA01293D	KA01406D	KA01387D	KA01316D	KA01342D	KA01348D	KA01518D

### Operating Instructions

Measuring device	Documentation code							PROFINET with Ethernet-APL
	HART	FOUNDATION Fieldbus	PROFIBUS PA	PROFIBUS DP	Modbus RS485	EtherNet/IP	PROFINET	
Promag H 500	BA01398D	BA01479D	BA01404D	BA01866D	BA01401D	BA01720D	BA01723D	BA02103D

### Description of Device Parameters

Measuring device	Documentation code							PROFINET with Ethernet-APL
	HART	FOUNDATION Fieldbus	PROFIBUS PA	PROFIBUS DP	Modbus RS485	EtherNet/IP	PROFINET	
Promag 500	GP01054D	GP01099D	GP01056D	GP01136D	GP01055D	GP01118D	GP01119D	GP01169D

**Supplementary device-dependent documentation****Safety instructions**

Safety instructions for electrical equipment for hazardous areas.

Contents	Documentation code
ATEX/IECEX Ex i	XA01522D
ATEX/IECEX Ex ec	XA01523D
cCSAus IS	XA01524D
cCSAus Ex e ia/Ex d ia	XA01525D
cCSAus Ex nA	XA01526D
INMETRO Ex i	XA01527D
INMETRO Ex ec	XA01528D
NEPSI Ex i	XA01529D
NEPSI Ex nA	XA01530D
EAC Ex i	XA01658D
EAC Ex nA	XA01659D
JPN	XA01776D

**Functional Safety Manual**

Contents	Documentation code
Promag 500	SD01741D

**Special Documentation**

Contents	Documentation code
Information on the Pressure Equipment Directive	SD01614D
Radio approvals for WLAN interface for A309/A310 display module	SD01793D
OPC-UA server <sup>1)</sup>	SD02044D

1) This Special Documentation is only available for device versions with a HART output.

Contents	Documentation code							
	HART	FOUNDATION Fieldbus	PROFIBUS PA	PROFIBUS DP	Modbus RS485	PROFINET	EtherNet/IP	PROFINET with Ethernet-APL
Heartbeat Technology	SD01641D	SD01745D	SD01747D	SD02207D	SD01746D	SD01987D	SD01981D	SD02730D
Web server	SD01658D	SD01661D	SD01660D	SD02236D	SD01659D	SD01979D	SD01978D	SD02760D

**Installation Instructions**

Contents	Comment
Installation instructions for spare part sets and accessories	Documentation code: specified for each individual accessory → 134.

## Registered trademarks

### **HART®**

Registered trademark of the FieldComm Group, Austin, Texas, USA

### **PROFIBUS®**

Registered trademark of the PROFIBUS Nutzerorganisation e.V. (PROFIBUS User Organization), Karlsruhe, Germany

### **FOUNDATION™ Fieldbus**

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

### **Modbus®**

Registered trademark of SCHNEIDER AUTOMATION, INC.

### **EtherNet/IP™**

Trademark of ODVA, Inc.

### **Ethernet-APL™**

Registered trademark of the PROFIBUS Nutzerorganisation e.V. (PROFIBUS User Organization), Karlsruhe, Germany

### **PROFINET®**

Registered trademark of the PROFIBUS Nutzerorganisation e.V. (PROFIBUS User Organization), Karlsruhe, Germany

### **TRI-CLAMP®**

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



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