

SITRANS P

Pressure transmitter SITRANS P320/P420

Compact Operating Instructions

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Product documentation
and support

A

Sealing plug / thread
adapter

B

7MF03.0 (SITRANS P320 with 4 ... 20 mA/HART)
7MF03.1 (SITRANS P320 with PROFIBUS PA)
7MF03.2 (SITRANS P320 with FOUNDATION Fieldbus)
7MF04.0 (SITRANS P420 with 4 ... 20 mA/HART)
7MF04.1 (SITRANS P420 with PROFIBUS PA)
7MF04.2 (SITRANS P420 with FOUNDATION Fieldbus)

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Getting started

Before you commission the device, observe the following safety notes:

- General safety notes (Page 17)
- Basic safety notes: Installing/mounting (Page 23)
- Basic safety notes: Connecting (Page 37)
- Basic safety notes: Commissioning (Page 45)

Read the entire device manual to achieve the optimum performance of the device.

Procedure

1. Install the device.
Installation (level) (Page 31)
Installation (except level) (Page 28)
2. Connect the device.
Connecting the device (Page 41)
3. Switch on the supply voltage.
Switching on the supply voltage (Page 43)
4. If you want to change the factory settings, configure the device using the local or the remote operation.
 - Read the operating instructions for information on this.
5. Lock the device.
 - Read the operating instructions for information on this.

Introduction

2.1 Purpose of this documentation

These instructions are a brief summary of important features, functions and safety information, and contain all information required for safe use of the device. Read the instructions carefully prior to installation and commissioning. In order to use the device correctly, first review its principle of operation.

The instructions are aimed at persons who install and commission the device.

To realize optimum performance from the device, read the complete operating instructions.

2.2 Scope of validity of this document

Variant	SITRANS P320	SITRANS P420
Gauge pressure	7MF030.	7MF040.
Gauge pressure from the differential pressure series	7MF031.	7MF041.
Absolute pressure from the gauge pressure series	7MF032.	7MF042.
Absolute pressure from the differential pressure series	7MF033.	7MF043.
Differential pressure and flow rate, MAWP 160 bar (2320 psi)	7MF034.	7MF044.
Differential pressure and flow rate, MAWP 420 bar (6092 psi)	7MF035.	7MF045.
Level	7MF036.	7MF046.

Article number of the variants

2.3 Intended use

Depending on the variant, the pressure transmitter measures corrosive, non-corrosive and hazardous gases, vapors and liquids.

You can use the pressure transmitter for the following measuring tasks:

- Gauge pressure
- Absolute pressure
- Differential pressure

With the appropriate configuration and the necessary add-on parts (e.g. limiters and remote seals), you can also use the pressure transmitter for the following measuring tasks:

- Level
- Volume flow
- Mass flow
- Volume
- Customized characteristic curve

The output signal for all measuring tasks is a direct current of 4 to 20 mA or a process-based, digital signal (e.g. with PROFIBUS PA).

You can install the "intrinsically-safe" or "flameproof enclosure" version of the pressure transmitter in hazardous areas. The devices have a test certification and comply with the corresponding directives.

Pressure transmitters with remote seals of various shapes can be provided for special applications. For example, measuring high-viscosity substances is a special application.

Operate the device in accordance with the specifications in section Technical specifications (Page 63).

2.4 Document history

Edition	Note
03/2024	• "Safety instructions" section • "Cleaning" section • "Structural design" section • "Technical support" section
11/2023	• "Product compatibility" section updated • "Cybersecurity notes" section updated • "Installing/mounting (except level)" section updated • "Installing/mounting (level)" section updated • "Technical specifications" section updated • "IECEX/ATEX" section - Special conditions for use added
11/2022	Update UKCA
09/2021	New variant of the device with FOUNDATION Fieldbus.
01/2021	• Technical specifications updated (e.g. introduction of the 160 bar measuring cell and the internal overvoltage protection up to 6 kV) • New variant of the device with PROFIBUS PA.
09/2018	• Section Sealing plug / thread adapter (Page 93) added. • Technical specifications updated
06/2018	First edition

2.5 Product compatibility

The following table describes the compatibility between the edition of this manual, the device revision, the engineering system and the associated EDD.

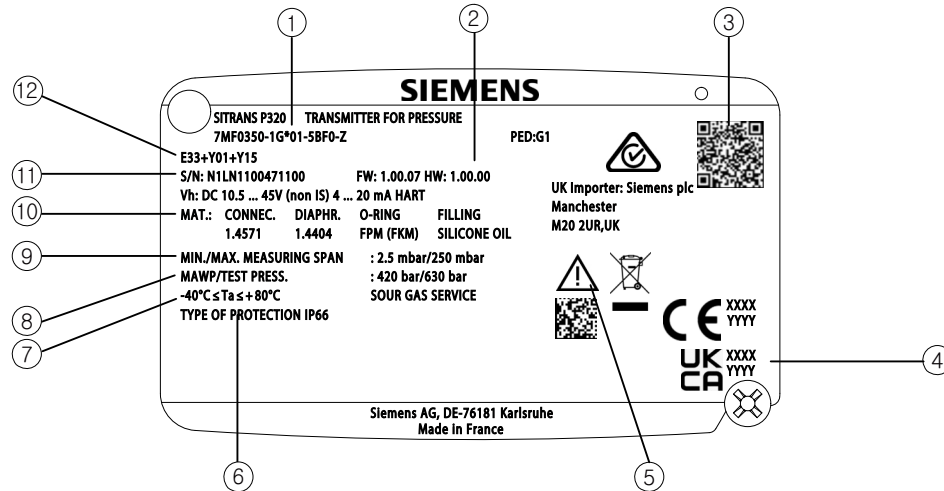
Edition	Comments	Device revision	Compatible version of device integration package	
03/2024	Manual revised	HART 7	SIMATIC PDM V9.0 or higher	EDD: 1.02.00 or higher
11/2023	New device features	FW: 1.02.00 or higher HW: 1.00.00 or higher	AMS Device Manager V13 or higher	
			DTM Pactware V4.2 or higher	
			AMS Trex Device Communicator	
		PROFIBUS PA FW: 1.00.06 or higher HW: 1.00.00 or higher	SIMATIC PDM V9.0 or higher DTM Pactware V4.2 or higher	EDD: 1.00.00 or higher
		FOUNDATION Fieldbus FW: 1.00.08 or higher HW: 1.00.01 or higher	SIMATIC PDM V9.1 or higher DTM Pactware V4.3 or higher AMS Trex Device Communicator	EDD: 1.00.00 or higher
09/2021	New type of communication	HART 7 FW: 1.01.00 or higher HW: 1.00.00 or higher	SIMATIC PDM V9.0 or higher	EDD: 1.00.00 or higher
			AMS Device Manager V13 or higher	
			DTM Pactware V4.2 or higher	
			FC475 V3.9 or higher	
		PROFIBUS PA FW: 1.00.05 or higher HW: 1.00.00 or higher	SIMATIC PDM V9.0 or higher DTM Pactware V4.2 or higher	EDD: 1.00.00 or higher
		FOUNDATION Fieldbus FW: 1.00.08 or higher HW: 1.00.00 or higher	SIMATIC PDM V9.1 or higher DTM Pactware V4.3 or higher AMS Trex Device Communicator	EDD: 1.00.00 or higher
01/2021	Manual revised	HART 7 FW: 1.01.00 or higher HW: 1.00.00 or higher	SIMATIC PDM V9.0 or higher	EDD: 1.01.00 or higher
			AMS Device Manager V13 or higher	
			DTM Pactware V4.2 or higher	
			FC475 V3.9 or higher	
		PROFIBUS PA FW: 1.00.05 or higher HW: 1.00.00 or higher	SIMATIC PDM V9.0 or higher DTM Pactware V4.2 or higher	EDD: 1.00.00 or higher
09/2018	Manual revised	HART 7	SIMATIC PDM V9.0 or higher	EDD: 1.00.00 or higher
06/2018	First edition	FW: 1.00.08 or higher HW: 1.00.00 or higher	AMS Device Manager V13 or higher	
			DTM Pactware V4.1 SP4 or higher	
			FC475 V3.9 or higher	

2.6 Nameplate layout

Nameplate with general information

The nameplate with the article number and other important information, such as design details and technical data, is located on the cover over the buttons.

Example



- | | |
|--|---|
| ① Article number (MLFB number) | ⑦ Permitted ambient temperature for the hazardous area of the corresponding temperature class |
| ② Firmware and hardware identity | ⑧ Maximum permissible operating pressure / maximum permissible test pressure |
| ③ QR code to the mobile website with device-specific information | ⑨ Minimum/maximum measuring span |
| ④ Conformity with country-specific directives | ⑩ Material: Connection, diaphragm, O-ring, oil |
| ⑤ Note operating instructions, certificates and approvals | ⑪ Serial number |
| ⑥ Protection class | ⑫ Order supplement (order code) |

Nameplate with approval information

The nameplate with approval information is located on the front of the enclosure.

Examples

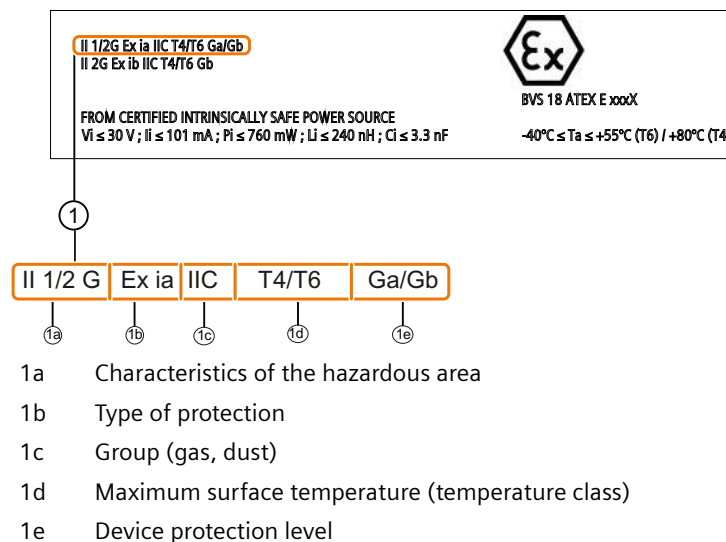


Figure 2-1 Example ATEX

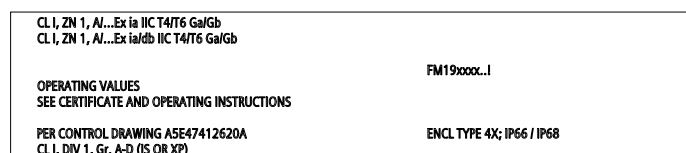
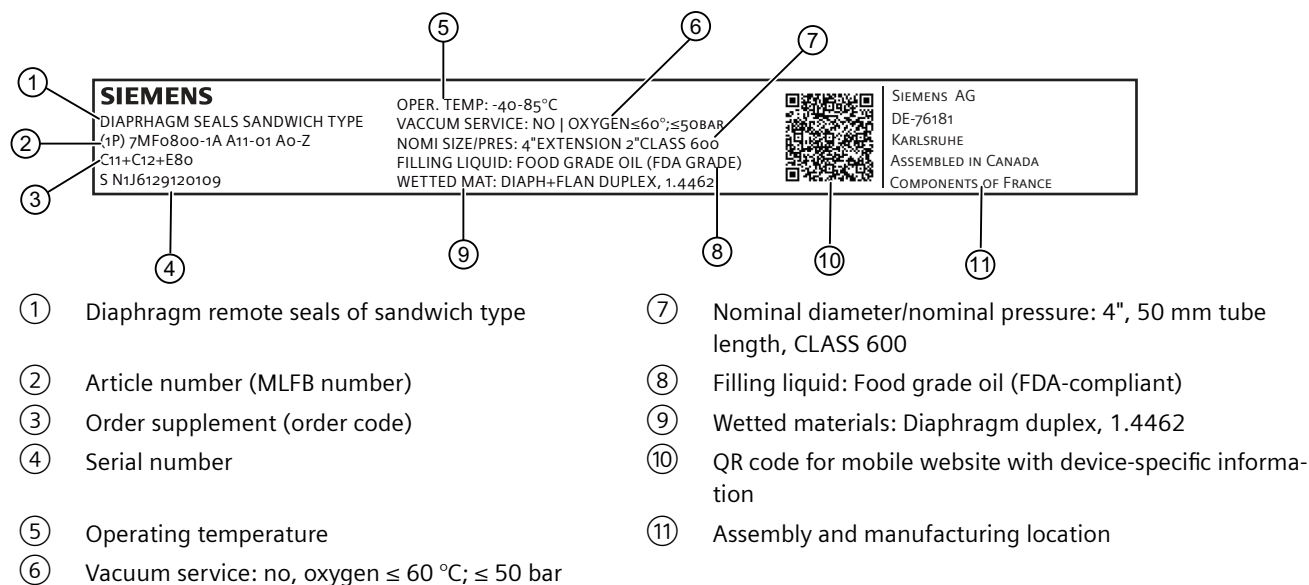


Figure 2-2 Example FM

Nameplate with information on the remote seals

The nameplate with information on the remote seals is located on the back of the enclosure.

Example



2.7 Checking the consignment

1. Check the packaging and the delivered items for visible damages.
2. Report any claims for damages immediately to the shipping company.
3. Retain damaged parts for clarification.
4. Check the scope of delivery by comparing your order to the shipping documents for correctness and completeness.

**WARNING****Using a damaged or incomplete device**

Risk of explosion in hazardous areas.

- Do not use damaged or incomplete devices.

2.8 Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial cybersecurity concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial cybersecurity measures that may be implemented, please visit
<https://www.siemens.com/cybersecurity-industry>.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Cybersecurity RSS Feed under
<https://new.siemens.com/cert>.

Download any type of software files (available updates such as EDD) only from secure sources (e.g. SIOS Portal or SIEMENS page of product family).

2.9 Transportation and storage

To guarantee sufficient protection during transport and storage, observe the following:

- Keep the original packaging for subsequent transportation.
- Devices/replacement parts should be returned in their original packaging.
- If the original packaging is no longer available, ensure that all shipments are properly packaged to provide sufficient protection during transport. Siemens cannot assume liability for any costs associated with transportation damages.

NOTICE
Insufficient protection during storage
The packaging only provides limited protection against moisture and infiltration.
• Provide additional packaging as necessary.

Special conditions for storage and transportation of the device are listed in Technical specifications (Page 63).

2.10 Notes on warranty

The contents of this manual shall not become part of or modify any prior or existing agreement, commitment or legal relationship. The sales contract contains all obligations on the part of Siemens as well as the complete and solely applicable warranty conditions. Any statements regarding device versions described in the manual do not create new warranties or modify the existing warranty.

The content reflects the technical status at the time of publishing. Siemens reserves the right to make technical changes in the course of further development.

Safety notes

3.1 Precondition for use

This device left the factory in good working condition. In order to maintain this status and to ensure safe operation of the device, observe these instructions and all the specifications relevant to safety.

Observe the information and symbols on the device. Do not remove any information or symbols from the device. Always keep the information and symbols in a completely legible state.

3.1.1 Warning symbols on the device

Symbol	Explanation
	Consult operating instructions

3.1.2 Laws and directives

Observe the safety rules, provisions and laws applicable in your country during connection, assembly and operation. These include, for example:

- National Electrical Code (NEC - NFPA 70) (USA)
- Canadian Electrical Code (CEC Part I) (Canada)

Further provisions for hazardous area applications are for example:

- IEC 60079-14 (international)
- EN 60079-14 (EU and UK)

3.1.3 Conformity with European directives

The CE mark on the device is a sign of conformity with the following European directives:

Electromagnetic compatibility EMC 2014/30/EU	Directive of the European Parliament and of the Council on the harmonization of the laws of the Member States relating to electromagnetic compatibility
Atmosphère explosible ATEX 2014/34/EU	Directive of the European Parliament and the Council on the harmonization of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres

3.1 Precondition for use

Pressure Equipment Directive PED 2014/68/EU Directive of the European Parliament and of the Council on the harmonization of the laws of the Member States relating to the making available on the market of pressure equipment

RoHS Directive (Restriction substances) 2011/65/EU Directive of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment

The directives applied can be found in the EU declaration of conformity for the associated device.

3.1.4 Conformity with UK regulations

Electromagnetic Compatibility SI 2016/1091 Electromagnetic Compatibility Regulations 2016

Explosive Atmospheres SI 2016/1107 Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016

Pressure Equipment SI 2016/1105 Pressure Equipment (Safety) Regulations 2016

Directive on the Restriction of the Use of Certain Hazardous Substances SI 2012/3032 The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

The applicable regulations can be found in the UKCA Declaration of Conformity of the specific device.

3.1.5 Classification according to the pressure equipment directive

- For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)
- Only for devices with MAWP 420 bar (6092 psi):
For gases of Fluid Group 1 and liquids of Fluid Group 1; fulfills the basic safety requirements as per article 3, Para 1 (appendix 1); classified as category III, module H conformity evaluation by TÜV Nord
- The intended use according to DGRL must be ensured.



WARNING

Improper device modifications

Risk to personnel, system, and environment can result from modifications to the device, particularly in hazardous areas.

- Only carry out modifications that are described in the instructions for the device. Failure to observe this requirement cancels the manufacturer's warranty and the product approvals. Do not operate the device after unauthorized modifications.

3.2 Requirements for special applications

Due to the large number of possible applications, each detail of the described device versions for each possible scenario during commissioning, operation, maintenance or operation in systems cannot be considered in the instructions. If you need additional information not covered by these instructions, contact your local Siemens office or company representative.

Note

Operation under special ambient conditions

We highly recommend that you contact your Siemens representative or our application department before you operate the device under special ambient conditions as can be encountered in nuclear power plants or when the device is used for research and development purposes.



DANGER

Using equipment with approval-related restrictions

Risk of explosion, damage to property due to operating conditions not in conformity with the approval (e.g. temperature and pressure limits exceeded)

- Take note of the approval restrictions before using the device. You can find the information on this in the current certificates.

See also

Product documentation (Page 91)

3.3 Use in hazardous areas

Qualified personnel for hazardous area applications

Persons who install, connect, commission, operate, and service the device in a hazardous area must have the following specific qualifications:

- They are authorized, trained or instructed in operating and maintaining devices and systems according to the safety regulations for electrical circuits, high pressures, aggressive, and hazardous media.
- They are authorized, trained, or instructed in carrying out work on electrical circuits for hazardous systems.
- They are trained or instructed in maintenance and use of appropriate safety equipment according to the pertinent safety regulations.

**WARNING****Use in hazardous area**

Risk of explosion.

- Only use equipment that is approved for use in the intended hazardous area and labeled accordingly.
- Do not use devices that have been operated outside the conditions specified for hazardous areas. If you have used the device outside the conditions for hazardous areas, make all Ex markings unrecognizable on the nameplate.

See also

Technical specifications (Page 63)

**WARNING****Loss of safety of device with type of protection "Intrinsic safety Ex i"**

If the device or its components have already been operated in non-intrinsically safe circuits or the electrical specifications have not been observed, the safety of the device is no longer ensured for use in hazardous areas. There is a risk of explosion.

- Connect the device with type of protection "Intrinsic safety" solely to an intrinsically safe circuit.
- Observe the specifications for the electrical data on the certificate and/or in Technical specifications (Page 63).

**WARNING****Use of incorrect device parts in potentially explosive environments**

Devices and their associated device parts are either approved for different types of protection or they do not have explosion protection. There is a risk of explosion if device parts (such as covers) are used for devices with explosion protection that are not expressly suited for this type of protection. If you do not adhere to these guidelines, the test certificates and the manufacturer warranty will become null and void.

- Use only device parts that have been approved for the respective type of protection in the potentially explosive environment. Covers that are not suited for the "explosion-proof" type of protection are identified as such by a notice label attached to the inside of the cover with "Not Ex d Not SIL".
- Do not swap device parts unless the manufacturer specifically ensures compatibility of these parts.

**WARNING****Use of the device with intrinsic safety "Ex i" type of protection in a polluted environment.**

If you open the device on the display side, there is a risk of pollution. The safety of the device for use in hazardous areas is therefore no longer guaranteed. There is a danger of explosion.

- Ensure that the environment is clean before rotating or replacing the display.

**WARNING****Incorrect material for the diaphragm in Zone 0**

Risk of explosion in the hazardous area. If operated with intrinsically safe supply devices of category "ib" or devices of the flameproof enclosure version "Ex d" and simultaneous use in Zone 0, pressure transmitter explosion protection depends on the tightness of the diaphragm.

- Ensure that the material used for the diaphragm is suitable for the process medium. Refer to the information in the section "Technical specifications (Page 63)".

**WARNING****Electrostatic charging – all the parts outside the process in contact with the surroundings**

There is a risk of explosion in potentially explosive areas if electrostatic charges develop, for example, when plastic surfaces, capillary coatings or painted surfaces are cleaned with a dry cloth.

- Prevent electrostatic charging in potentially explosive areas.

**WARNING****Brush discharge – all the parts within the process that come in contact with the media**

There is a risk of explosion in potentially explosive areas if electrostatic charges develop, for example, in high charging processes (such as can occur in the pneumatic transportation of powder or in an electrostatic coating process).

- Avoid electrostatic charging in potentially explosive areas.

3.3 Use in hazardous areas

Installing/mounting

4.1 Basic safety instructions



DANGER

Pressure applications

Danger to personnel, system and environment will result from improper disassembly.

- Never attempt to loosen, remove, or disassemble process connection while vessel contents are under pressure.



WARNING

Wetted parts unsuitable for the process media

Risk of injury or damage to device.

Hot, toxic and corrosive media could be released if the wetted parts are unsuitable for the process medium.

- Ensure that the material of the device parts wetted by the process medium is suitable for the medium. Refer to the information in Technical specifications (Page 63).



WARNING

Unsuitable connecting parts

Risk of injury or poisoning.

In case of improper mounting, hot, toxic, and corrosive process media could be released at the connections.

- Ensure that connecting parts (such as flange gaskets and bolts) are suitable for connection and process media.

4.1.1 Electrostatic charging

** WARNING****Electrostatic charging**

Risk of explosion in potentially explosive areas.

The protective films can become electrostatically charged in the explosion-endangered area and cause an explosion.

- Ensure that all protective foils have been removed from the nameplates.

** WARNING****Exceeded maximum permissible operating pressure**

Risk of injury or poisoning.

The maximum permissible operating pressure depends on the device version, pressure limit and temperature rating. The device can be damaged if the operating pressure is exceeded. Hot, toxic and corrosive process media could be released.

Ensure that maximum permissible operating pressure of the device is not exceeded. Refer to the information on the nameplate and/or in Technical specifications (Page 63).

** WARNING****Incorrect material for the diaphragm in Zone 0**

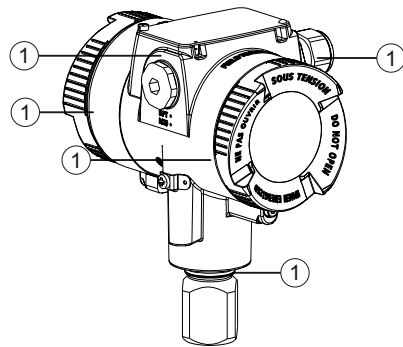
Risk of explosion in the hazardous area. If operated with intrinsically safe supply devices of category "ib" or devices of the flameproof enclosure version "Ex d" and simultaneous use in Zone 0, pressure transmitter explosion protection depends on the tightness of the diaphragm.

- Ensure that the material used for the diaphragm is suitable for the process medium. Refer to the information in the section "Technical specifications (Page 63)".

** WARNING****Loss of safety for devices with "flameproof enclosure" type of protection**

Risk of explosion in hazardous areas. An explosion may be caused by hot gas escaping from the flameproof enclosure if there is too little space between it and fixed parts (e.g. walls, pipes).

- Ensure that there is a minimum clearance of at least 40 mm between the flameproof joints and the fixed parts.



① Flameproof joint

! WARNING

Using safety extra-low voltage for devices of the protection type "db", "ec", "tb" or "tc"

Risk of explosion in hazardous areas.

- Disconnect the non-intrinsically safe circuit safely from ground, e.g. using an SELV circuit.

! WARNING

Vibrations in the plant

Risk of injury or damage to device.

Vibration leads to material fatigue, for example, cracks and weld seams breaks.

Hot, toxic and corrosive process media can emerge.

- Make sure that you have mounted the pressure transmitter (including accessories) protected against vibration.
- When mounting the level transmitter, make sure that the level transmitter is operated vibration-free.

Refer to the information on vibration resistance in the section Technical specifications (Page 63).

! CAUTION

Hot surfaces resulting from hot process media

Risk of burns resulting from surface temperatures above 65 °C (149 °F).

- Take appropriate protective measures, for example contact protection.
- Make sure that protective measures do not cause the maximum permissible ambient temperature to be exceeded. Refer to the information in Technical specifications (Page 63).

 CAUTION

External stresses and loads

Damage to device by severe external stresses and loads (e.g. thermal expansion or pipe tension). Process media can be released.

- Prevent severe external stresses and loads from acting on the device.

Note

Material compatibility

Siemens can provide you with support concerning selection of parts wetted by process media. However, you are responsible for the selection of parts. Siemens accepts no liability for faults or failures resulting from incompatible materials.

4.1.2 Installation location requirements

 WARNING

Insufficient air supply

The device may overheat if there is an insufficient supply of air.

- Install the device so that there is sufficient air supply in the room.
- Observe the maximum permissible ambient temperature. Refer to the information in the section Technical specifications (Page 63).

NOTICE

Aggressive atmospheres

Damage to device through penetration of aggressive vapors.

- Ensure that the device is suitable for the application.

4.1.2.1 Direct sunlight

NOTICE
Direct sunlight Damage to device. The device can overheat or materials become brittle due to UV exposure. • Protect the device from direct sunlight. • Make sure that the maximum permissible ambient temperature is not exceeded. Refer to the information in Technical specifications (Page 63).

4.1.2.2 Devices with marine approval

Note

For vibrations in the direction of the measuring cell diaphragm, the measuring accuracy of the pressure transmitter with flush-mounted diaphragm can deviate no more than 0.2% from the respective specification.

- Install the device so that no or almost no vibrations occur in the direction of the diaphragms.
- To avoid measuring values that fluctuate strongly, use the damping function.

For information on vibration resistance, refer to the marine approval certificate.

4.1.3 Proper mounting

 WARNING
Incorrect mounting at Zone 0 Risk of explosion in hazardous areas. • Ensure sufficient tightness at the process connection. • Observe the standard IEC/EN 60079-14.

NOTICE**Incorrect mounting**

The device can be damaged, destroyed, or its functionality impaired through improper mounting.

- Before installing ensure there is no visible damage to the device.
- Make sure that process connectors are clean, and suitable gaskets and glands are used.
- Mount the device using suitable tools. Refer to the information in Technical specifications (Page 63).

NOTICE**Use of line and cable entries made of plastic in hazardous areas**

Device damage caused by impact at temperatures below -20 °C.

- Make sure that the line and cable entries are protected from impacts.

4.2 Installation (except level)

Before you mount the device

- Compare the operating data with the data on the nameplate of the pressure transmitter.
- Observe the minimum and maximum permissible ambient and medium temperature limits also under the influence of convection and heat radiation.
- Note the effect of the ambient temperature on the measuring accuracy in the section Technical specifications (Page 63).
- For remote seal mounting, observe the notes in the section "Mounting with remote seal" of the operating instructions.

Mounting location

Verify that the mounting location meets the following conditions:

- Accessible
- Close to the measuring point
- Shock-free and vibration-free
- Load-free process connections
- Within the permitted ambient temperature values

Protect the pressure transmitter from:

- Direct heat radiation
- Sudden temperature fluctuations

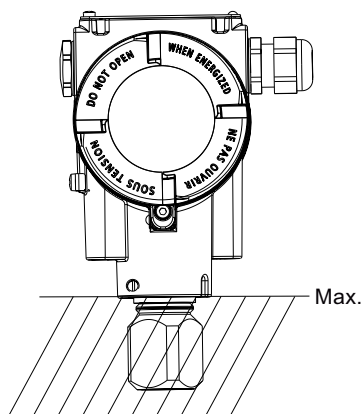
- Heavy contamination
- Mechanical damage
- Direct sunlight

Procedure

1. Select the arrangement of the pressure transmitter depending on the aggregate state of the medium.

Gas	Vapor or liquid
Above the pressure sampling point	Below the pressure sampling point
Lay the pressure line with a constant gradient to the pressure sampling point, so that any condensation produced can drain in the main line and thereby avoid corruption of the measured values.	Lay the pressure line with a constant gradient to the pressure sampling point so that any gas pockets can escape in the main line.

2. Attach the pressure transmitter to the process connection.
Use an appropriate tool (e.g. open-ended wrench with width across flats 36). Otherwise, the measuring cell may be damaged.
3. Turn only on the key area above the process connection.
Caution: If you turn the pressure transmitter on the housing, the measuring cell may be damaged.
4. For insulated systems, ensure that you insulate the device as far as possible to the lower edge of the enclosure.
In this way, you avoid a defect in the device or the loss of explosion protection for Ex devices. You can find the permissible temperature values in the section Technical specifications (Page 63).



5. To guarantee secure and vibration-free installation of the pressure transmitter, fasten it to a mounting bracket (Page 30).

Level

You can find details on how to mount the device with level in the section Installation (level) (Page 31).

4.3 Securing the device with mounting bracket

Here you have the following mounting options with the mounting bracket:

- On a mounting range
- On a vertical or horizontal pipe (Ø 50 to 60 mm), according to the examples 1 and 2

Safety notes

NOTICE

Mounting with differential pressure lines

Differential pressure lines can break if they are not mounted correctly.

- Install the device so that the pressure transmitter and the differential pressure lines are not subject to different vibrations.

NOTICE

Use of mounting bracket in maritime applications

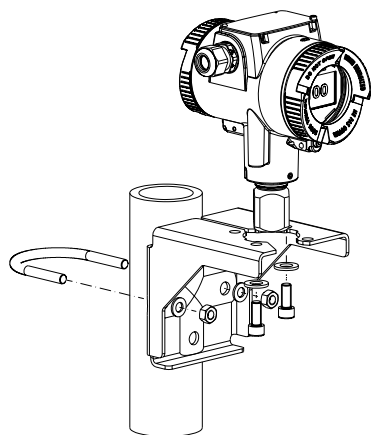
Device damages in case of vibration

- Secure the mounting bracket as shown in the figures.

Note

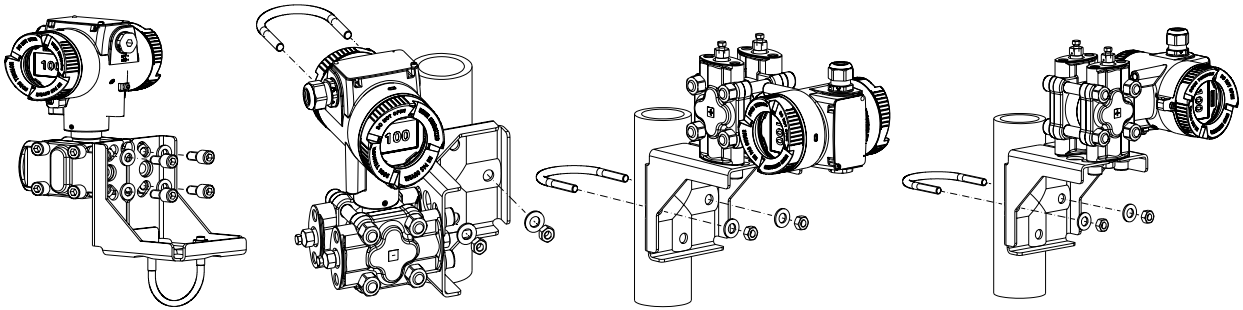
When securing the mounting bracket, observe the torques in the section Torques (Page 82).

Example 1: Pipe mounting of pressure transmitter (gauge pressure series)



Example 2: Pipe mounting of pressure transmitter (differential pressure series)

The following positions are possible:



4.4 Installation (level)

Before you mount the device

- Compare the operating data with the data on the nameplate of the pressure transmitter.
- Observe the minimum and maximum permissible ambient and medium temperature limits also under the influence of convection and heat radiation.
- Note the effect of the ambient temperature on the measuring accuracy in the section Technical specifications (Page 63).
- For remote seal mounting, observe the notes in the section "Mounting with remote seal" of the operating instructions.

Mounting location

Verify that the mounting location meets the following conditions:

- Accessible
- Close to the measuring point
- Shock-free and vibration-free
- Load-free process connections
- Within the permitted ambient temperature values

Protect the pressure transmitter from:

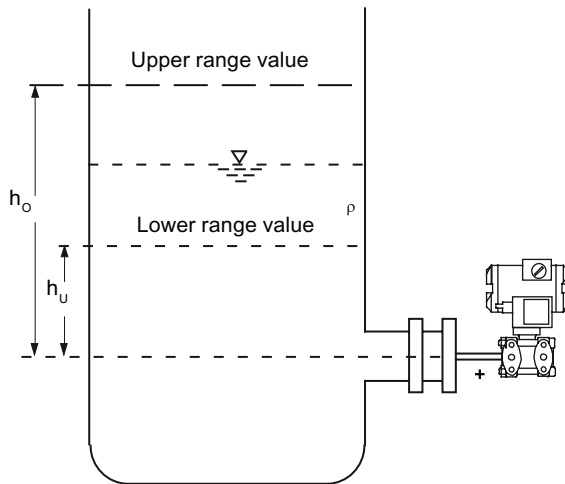
- Direct heat radiation
- Rapid temperature fluctuations
- Heavy contamination
- Mechanical damage
- Direct sunlight

Note

Select the height of the mounting flange such that the pressure transmitter is always mounted below the lowest fill height to be measured.

Procedure

1. Attach the seal to the container's mating flange.
Ensure that the seal is centrally positioned and that it does not restrict the movement of the flange's seal diaphragm in any way. Otherwise, the seal of the process connection is not guaranteed to be tight.
2. Screw on the pressure transmitter's flange.
3. Observe the installation position.

4.4.1 Mounting on the container**Mounting on open container****Formula**

$$p_{MA} = \rho \cdot g \cdot h_U$$

$$p_{ME} = \rho \cdot g \cdot h_O$$

h_U Lower filling level

h_O Upper filling level

ρ Pressure

p_{LRV} Lower range value

p_{URV} Upper range value

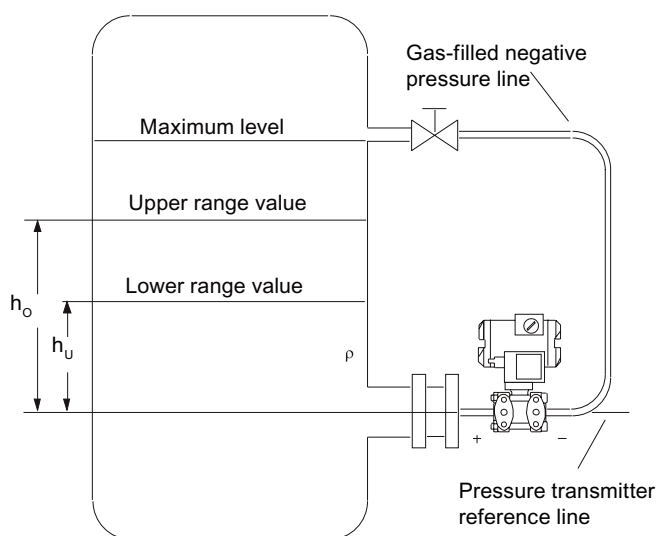
ρ Density of the measured medium in the container

g Acceleration due to gravity

A line is not required when taking measurements in an open container because the low pressure side is connected to the atmosphere.

Ensure that no dirt enters the open connection ports. To this end, use a threaded plug with vent valve 7MF4997-1CP, for example.

Mounting on the closed container (no or little condensate formation)



Formula

$$p_{MA} = \rho \cdot g \cdot h_U$$

$$p_{ME} = \rho \cdot g \cdot h_O$$

h_U Lower filling level

h_O Upper filling level

p Pressure

p_{LRV} Lower range value

p_{URV} Upper range value

ρ Density of the measured medium in the container

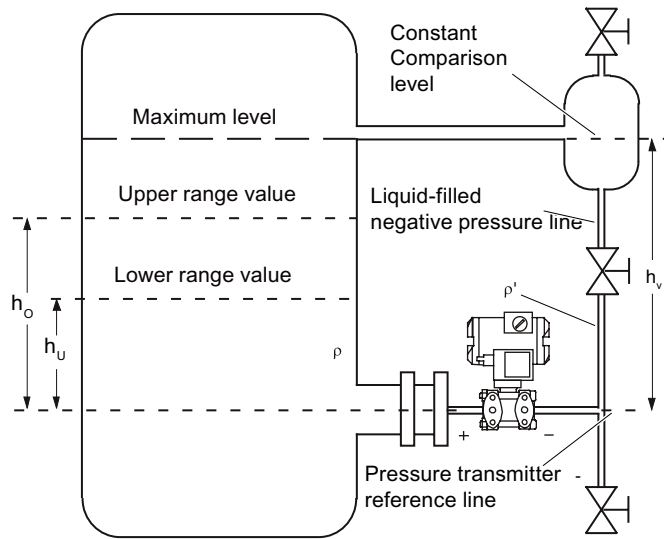
g Acceleration due to gravity

When taking measurements in a closed container without or with little condensate formation, the low pressure line is not filled.

Lay the line in such a way that condensation pockets do not form. If required, you need to install a condensation container below the low pressure line of the pressure transmitter.

The process connection on the low pressure side is a female thread $\frac{1}{4}$ -18 NPT or an oval flange.

Lay the line for the low pressure using a seamless steel tube 12 mm x 1.5 mm.

Mounting on closed container (heavy condensate formation)**Formula**

$$P_{MA} = g \cdot (h_U \cdot \rho - h_V \cdot \rho')$$

$$P_{MA} = g \cdot (h_O \cdot \rho - h_V \cdot \rho')$$

h_U Lower filling level

h_O Upper filling level

h_V Gland distance

p Pressure

p_{LRV} Lower range value

p_{URV} Upper range value

ρ Density of the measured medium in the container

ρ' Density of fluid in the low pressure line corresponds to the prevailing temperature there

g Acceleration due to gravity

When taking measurements in a closed container with strong condensate formation, you must fill the low pressure line (mostly with the condensate of the measured medium) and install a condensate pot.

Lock the device using the 2-way valve manifold 7MF9017-..A.

To compensate the liquid column on the low pressure side, reset the zero point.

4.5 Removing

WARNING

Incorrect disassembly

The following risks may result from incorrect disassembly:

- Injury through electric shock
- Risk through emerging media when connected to the process
- Risk of explosion in hazardous area

In order to disassemble correctly, observe the following:

- Before starting work, make sure that you have switched off all physical variables such as pressure, temperature, electricity etc. or that they have a harmless value.
- If the device contains hazardous media, it must be emptied prior to disassembly. Make sure that no environmentally hazardous media are released.
- Secure the remaining connections so that no damage can result if the process is started unintentionally.

Connecting

5.1 Basic safety instructions



WARNING

Unsuitable cables, cable glands and/or plugs

Risk of explosion in hazardous areas.

- Use only cable glands/plugs that comply with the requirements for the relevant type of protection.
- Tighten the cable glands in accordance with the torques specified in Technical specifications (Page 63).
- Close unused cable inlets for the electrical connections.
- When replacing cable glands, only use cable glands of the same type.
- After installation, check that the cables are seated firmly.



WARNING

Improper power supply

Risk of explosion in hazardous areas as result of incorrect power supply.

- Connect the device in accordance with the specified power supply and signal circuits. The relevant specifications can be found in the certificates, in Technical specifications (Page 63) or on the nameplate.



WARNING

Incorrect conduit system

Risk of explosion in hazardous areas as result of open cable inlet or incorrect conduit system.

- In the case of a conduit system, mount a spark barrier at a defined distance from the device input. Observe national regulations and the requirements stated in the relevant approvals.



WARNING

Unprotected cable ends

Risk of explosion through unprotected cable ends in hazardous areas.

- Protect unused cable ends in accordance with IEC/EN 60079-14.

 WARNING**Lack of equipotential bonding**

Danger of explosion through compensating currents or ignition currents through lack of equipotential bonding.

For devices of intrinsic safety "db", "ec", "tb" or "tc" which are operated in a non-intrinsically safe circuit, observe the following:

- Connect the device to the system via the equipotential bonding terminal.

Note: For devices of the intrinsic safety "ia", "ib" and "ic" type of protection, which are operated in an intrinsically safe circuit, connection to the system via the equipotential bonding terminal is not required.

 WARNING**Improper laying of shielded cables**

Risk of explosion through compensating currents between hazardous area and the non-hazardous area.

- Shielded cables that cross into hazardous areas should be grounded only at one end.
- If grounding is required at both ends, use an equipotential bonding conductor.

 WARNING**Connecting or disconnecting device in energized state**

Risk of explosion in hazardous areas.

- Connect or disconnect devices in hazardous areas only in a de-energized state.
- Install a suitable switch-off device.

Exceptions:

- Devices having the type of protection "Intrinsic safety Ex i" may also be connected in energized state in hazardous areas.

 WARNING**Incorrect selection of type of protection**

Risk of explosion in hazardous areas.

This device is approved for various types of protection.

1. Select an intrinsic safety type of protection "ia", "ib", "ic" or non-intrinsic safety "db", "tb", "tc", "ec".
2. Connect the device according to the selected type of protection.
3. When operating with non-intrinsically safe power supplies, make the intrinsically safe types of protection permanently unrecognizable as in the nameplate example.

II 1/2G Ex ia IIC T4/T6 Ga/Gb II 1/2G Ex ia/db IIC T4/T6 Ga/Gb

Figure 5-1 Nameplate example: Type 7MF0..0-.....-D..-Z + E20

NOTICE**Ambient temperature too high**

Damage to cable sheath.

- At an ambient temperature $\geq 60\text{ °C}$ (140 °F), use heat-resistant cables suitable for an ambient temperature at least 20 °C (36 °F) higher.

NOTICE**Condensation in the device**

Damage to device through formation of condensation if the temperature difference between transportation or storage and the mounting location exceeds 20 °C (36 °F).

- Before taking the device into operation, let the device adapt for several hours in the new environment.

NOTICE**Incorrect measured values with incorrect grounding**

The device must not be grounded using the "+" connection. It may otherwise malfunction and be permanently damaged.

- If necessary, ground the device using the "-" connection.

Note**Electromagnetic compatibility (EMC)**

You can use this device in industrial environments, households and small businesses.

For metal enclosures there is an increased electromagnetic compatibility compared to high-frequency radiation. This protection can be increased by grounding the enclosure.

See also

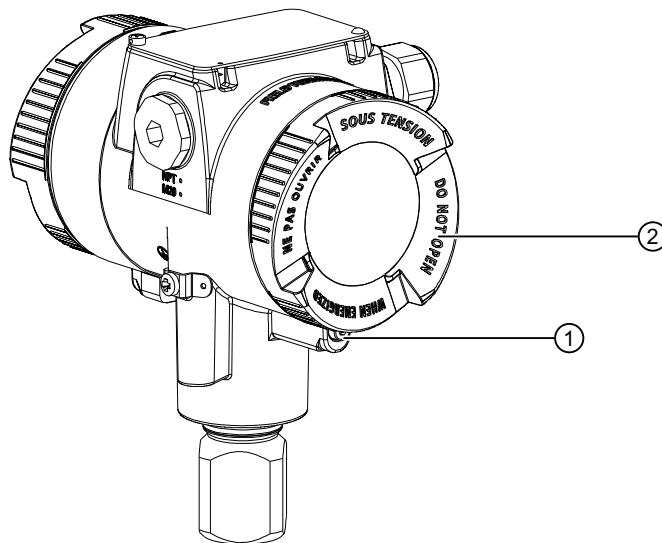
Technical specifications (Page 63)

Note**Improvement of interference immunity**

- Lay signal cables separate from cables with voltages > 60 V.
- Use cables with twisted wires.
- Keep device and cables at a distance from strong electromagnetic fields.
- Take account of the conditions for communication specified in the Technical specifications (Page 63).
- Use shielded cables to guarantee the full specification according to HART/PA/FF/Modbus/EIA-485/Profibus DP.

5.2 Connecting the device

5.2.1 Opening the device



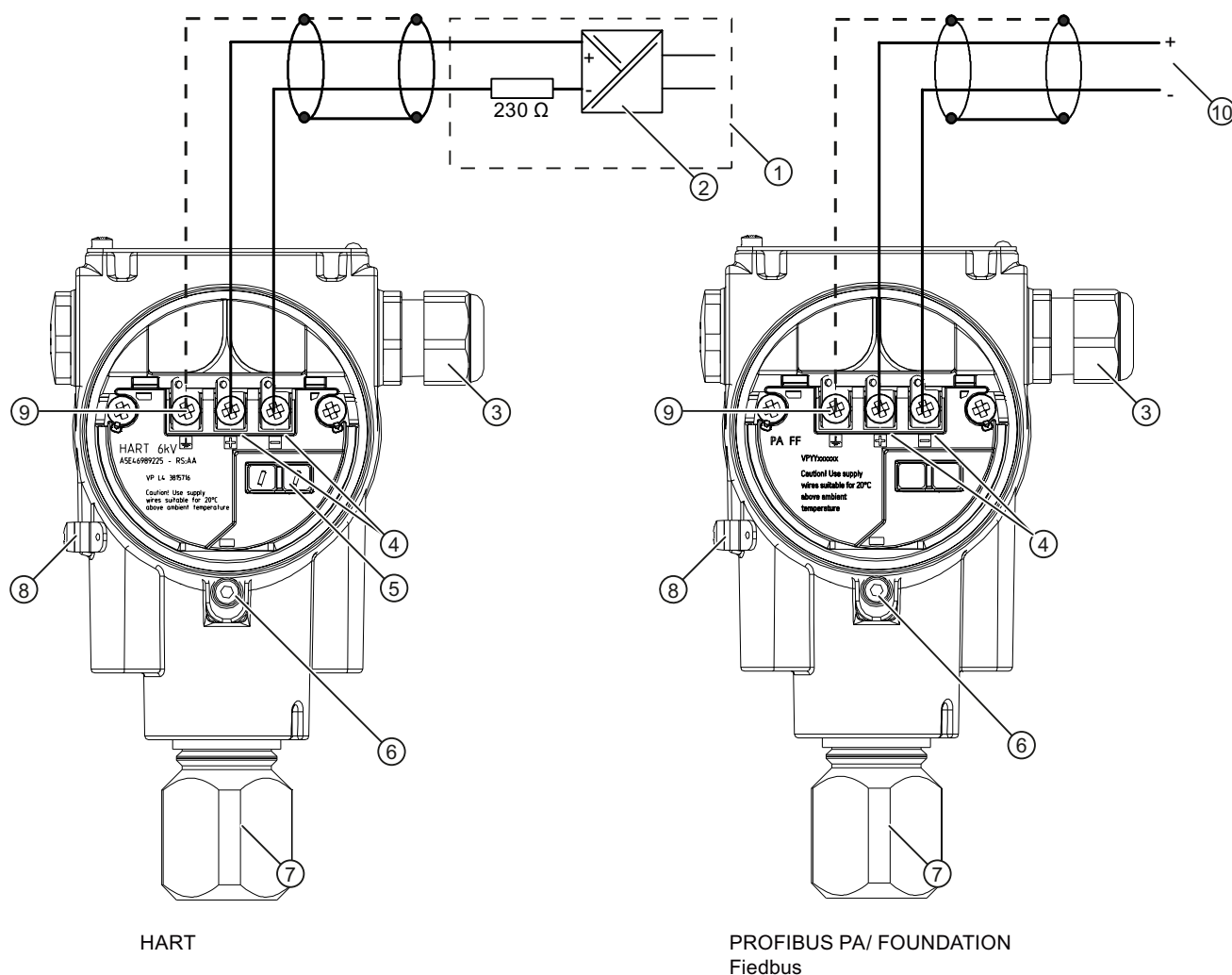
- ① Safety catch (optional)
② Cover of the electrical cable compartment.

Figure 5-2 Rear view of pressure transmitter

1. Use a 3 mm Allen key to loosen the safety catch ①.
2. Unscrew the cover of the electrical cable compartment ②.

5.2.2 Connecting the device

Procedure



- | | |
|--|--|
| ① Isolating power supply with integrated load | ⑥ Safety catch |
| ② Supply voltage | ⑦ Process connection |
| ③ Cable gland | ⑧ Protective conductor connection/
equipotential bonding terminal |
| ④ Connecting terminals | ⑨ Ground terminal |
| ⑤ Test connector for DC measuring device (available
for HART) | ⑩ Fieldbus |

Figure 5-3 Example

5.2 Connecting the device

1. Connect the device to the system via the existing protective conductor connection ⑦ by observing the torques.
 - Use a cable with a diameter of 1 ... 4 mm².
2. Insert the connecting cable through the cable gland ③.
3. Connect the wires to the connection terminals ④ "+", and "-", observing the torques.
 - Use wires with a diameter of 0.5 ... 2.5 mm².
 - If you use stranded wire, you need ferrules.
4. Apply the shield to the screw of the ground terminal ⑨.
The screw of the ground terminal is electrically connected to the external protective conductor connection.

NOTICE**Incorrect measured values with incorrect grounding**

The device must not be grounded using the "+" connection. Otherwise, the device may malfunction and be permanently damaged.

- If necessary, ground the device using the "-" connection.

5. For devices with intrinsically safe protection type, use a supply unit that corresponds to the requirements of the relevant type of protection.

5.2.3 Closing the device

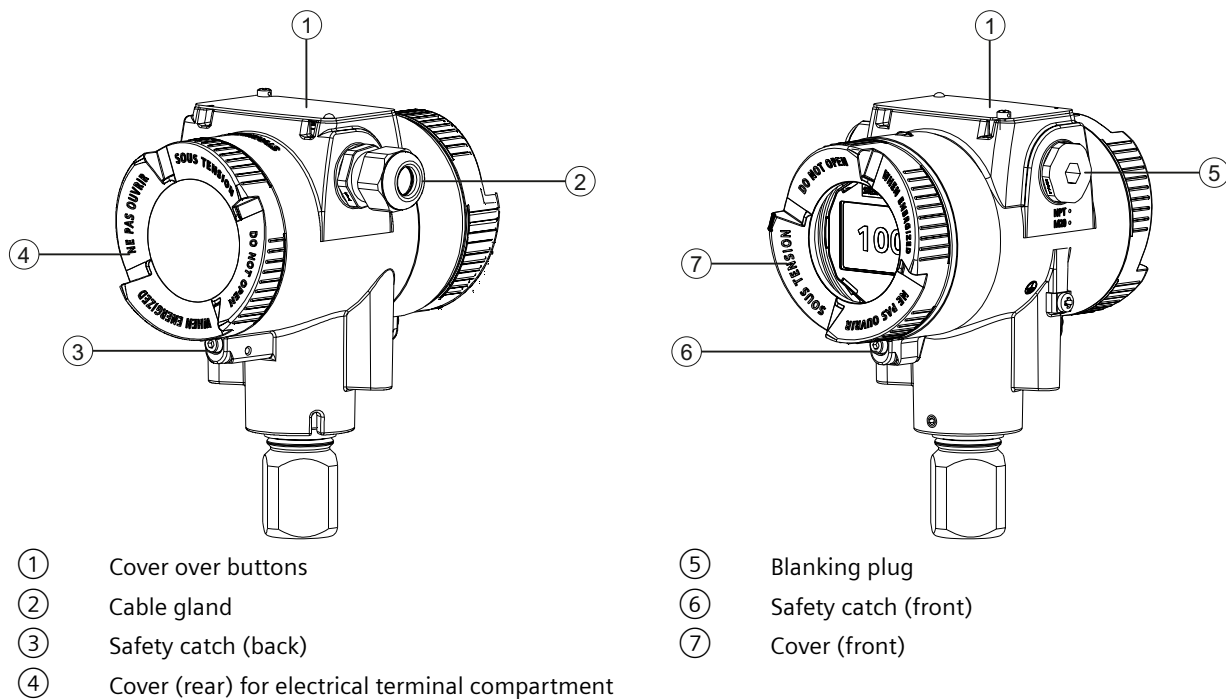


Figure 5-4 View of the pressure transmitter: Left: Back right: Front view

1. Screw on the cover ④ and ⑦ as far as it will go.
Make sure that there is no gap between enclosure and cover.
2. Secure each cover with the cover catch ③ and ⑥ by removing the screw.
For the aluminum enclosure, observe the torque (Page 82).
3. Close the cover over the buttons①.
4. Tighten the screw for the cover over the buttons.

5.3 Switching on the supply voltage

Requirement

- You have connected the device correctly. (Page 41)
- The terminal voltage on the device is correct. (Page 82)

Procedure

Switch on the supply voltage.

- Product name and firmware version appear briefly on the display.
- The measured values are shown on the display.
For a device without a display, you read off the current output as follows:
 - Over the remote control (e.g. SIMATIC PDM).
 - With a DC current measuring device.

Commissioning

6.1 Basic safety instructions

DANGER

Toxic gases and liquids

Danger of poisoning when venting the device: if toxic process media are measured, toxic gases and liquids can be released.

- Before venting ensure that there are no toxic gases or liquids in the device, or take the appropriate safety measures.

WARNING

Improper commissioning in hazardous areas

Device failure or risk of explosion in hazardous areas.

- Do not commission the device until it has been mounted completely and connected in accordance with the information in Technical specifications (Page 63).
- Before commissioning take the effect on other devices in the system into account.

WARNING

Commissioning and operation with error message

If an error message displays, correct operation is no longer guaranteed.

- Check the severity of the error.
- Correct the error.
- If the error still exists:
 - Take the device out of operation.
 - Do not restart the device.

The same risk continues to apply when error messages are switched off or disabled.

WARNING

Loss of explosion protection

Risk of explosion in hazardous areas if the device is open or not properly closed.

- Close the device as described in Technical specifications (Page 63).

**WARNING****Opening device in energized state**

Risk of explosion in hazardous areas

- Only open the device in a de-energized state.
- Check prior to commissioning that the cover, cover locks, and cable inlets are assembled in accordance with the directives.

Exception: Devices having the type of protection "Intrinsic safety Ex i" may also be opened in energized state in hazardous areas.

Note**Hot surfaces**

Hot process medium and high ambient temperatures lead to hot surfaces which can cause burns.

- Take corresponding protective measures, for example wear protective gloves.

**WARNING****Hazardous contact voltage**

Risk of injury through hazardous contact voltage when the device is open or not completely closed.

The degree of protection specified on the nameplate or in Technical specifications (Page 63) is no longer guaranteed if the device is open or not properly closed.

- Make sure that the device is securely closed.

6.2 Commissioning the device

Before you commission the device, observe the following safety notes:

- General safety notes (Page 17)
- Basic safety notes: Installing/mounting (Page 23)
- Basic safety notes: Connecting (Page 37)
- Basic safety notes: Commissioning (Page 45)

Read the entire device manual to achieve the optimum performance of the device.

Procedure

1. Install the device.
Installation (level) (Page 31)
Installation (except level) (Page 28)
2. Connect the device.
Connecting the device (Page 41)
3. Switch on the supply voltage.
Switching on the supply voltage (Page 43)
4. If you want to change the factory settings, configure the device using the local or the remote operation.
 - Read the operating instructions for information on this.
5. Lock the device.
 - Read the operating instructions for information on this.

6.3 Application examples

6.3.1 Gauge pressure, absolute pressure from differential pressure series, and absolute pressure from gauge pressure series

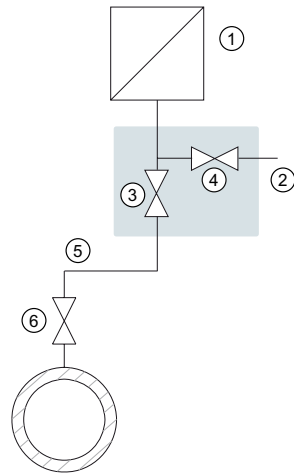
6.3.1.1 Commissioning in gaseous environments

Requirement

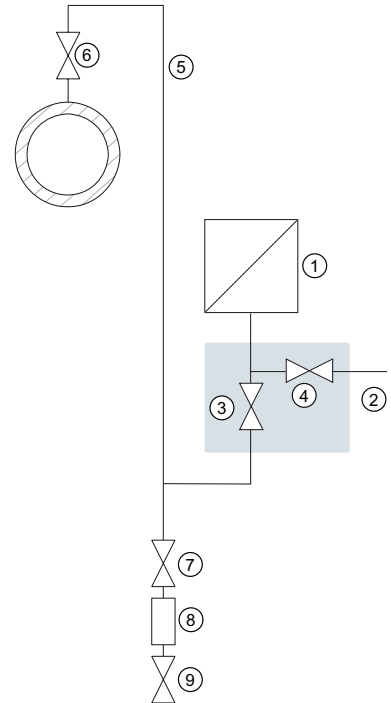
All valves are closed.

Procedure

A



B



A Pressure transmitter above the pressure sampling point

- ① Pressure transmitter
- ② Shut-off valve
- ③ Shut-off valve to process
- ④ Shut-off valve for test connection or for bleed screw
- ⑤ Pressure line

B Pressure transmitter below the pressure sampling point

- ⑥ Shut-off valve
- ⑦ Shut-off valve (optional)
- ⑧ Condensate vessel (optional)
- ⑨ Blowout valve

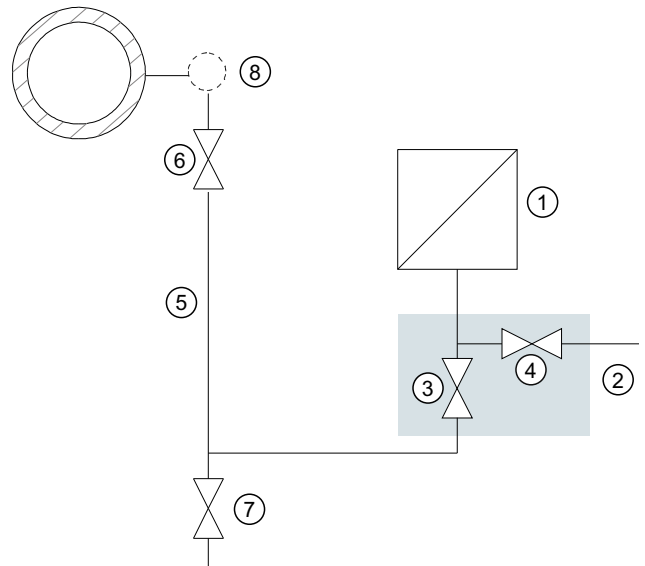
1. Open the shut-off valve for the test connection ④.
2. Via the test connection of the shutoff valve ②, apply the pressure corresponding to the lower range value to the pressure transmitter.
3. Ensure that the lower range value corresponds to the desired value. Otherwise, correct the value.
4. Close the shut-off valve for the test connection ④.
5. Open the shut-off valve ⑥ at the pressure tapping point.
6. Open the shut-off valve for the process ③.

6.3.1.2 Commissioning with steam or liquid

Requirement

All valves are closed.

Procedure



- ① Pressure transmitter
- ② Shut-off valve
- ③ Shut-off valve to process
- ④ Shut-off valve for test connection or for bleed screw
- ⑤ Pressure line
- ⑥ Shut-off valve
- ⑦ Drain valve
- ⑧ Compensation vessel (steam only)

1. Open the shut-off valve for the test connection ④.
2. Via the test connection of the shutoff valve ②, apply the pressure corresponding to the lower range value to the pressure transmitter.
3. Ensure that the lower range value corresponds to the desired value. Otherwise, correct the value.
4. Close the shut-off valve for the test connection ④.
5. Open the shut-off valve ⑥ at the pressure tapping point.
6. Open the shut-off valve for the process ③.

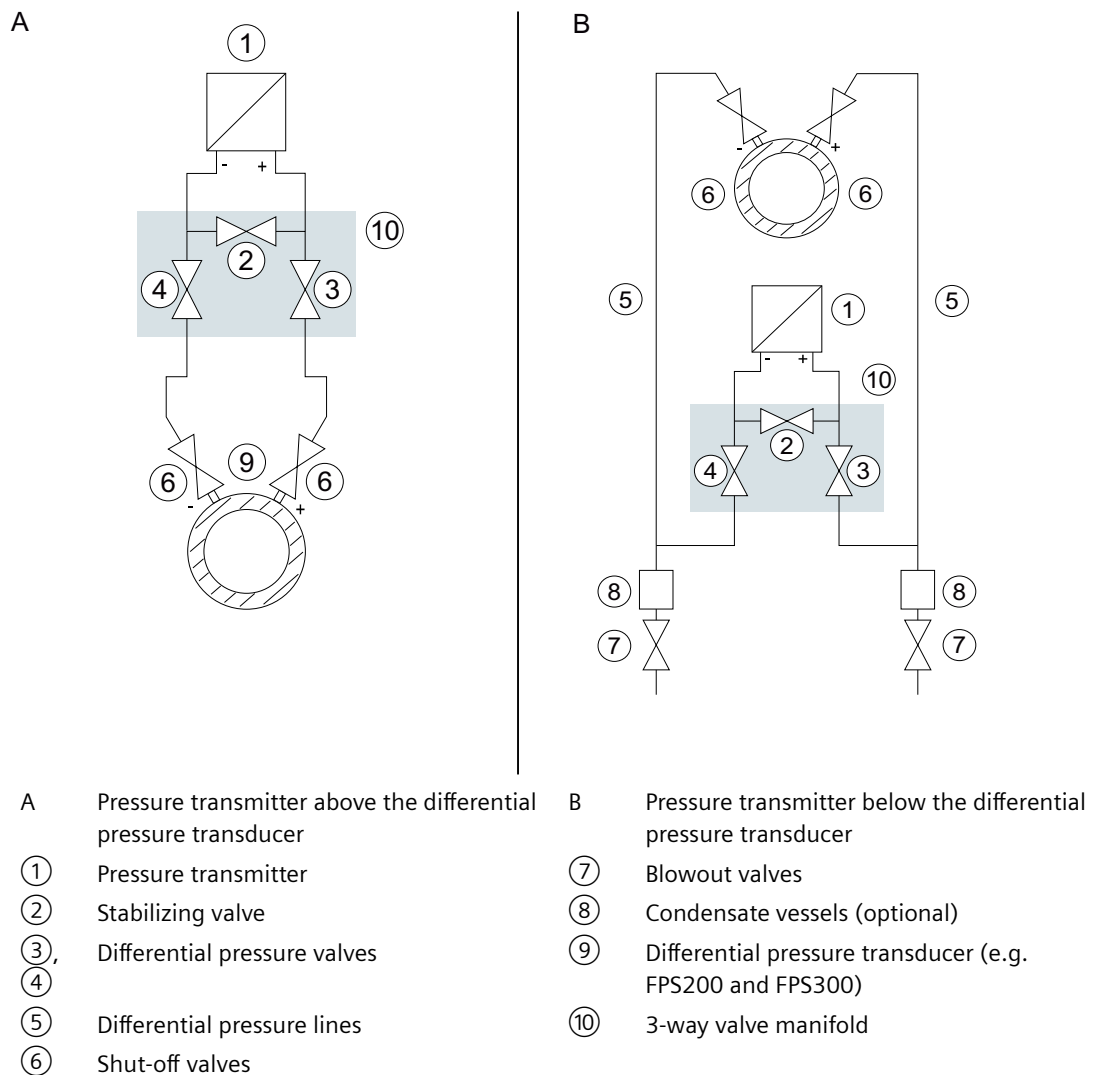
6.3.2 Differential pressure and flow rate

6.3.2.1 Commissioning in gaseous environments

Requirement

All shut-off valves are closed.

Procedure



1. Open both the shut-off valves ⑥ at the pressure tapping point.
2. Open the stabilizing valve ②.
3. Open the differential pressure valve (③ or ④).
4. Check and, if necessary, correct the zero point when the lower range value is 0 bar (4 mA).

5. Close the stabilizing valve ②.
6. Open the other differential pressure valve (③ or ④).

6.3.2.2 Commissioning for liquids

Requirement

All valves are closed.

DANGER

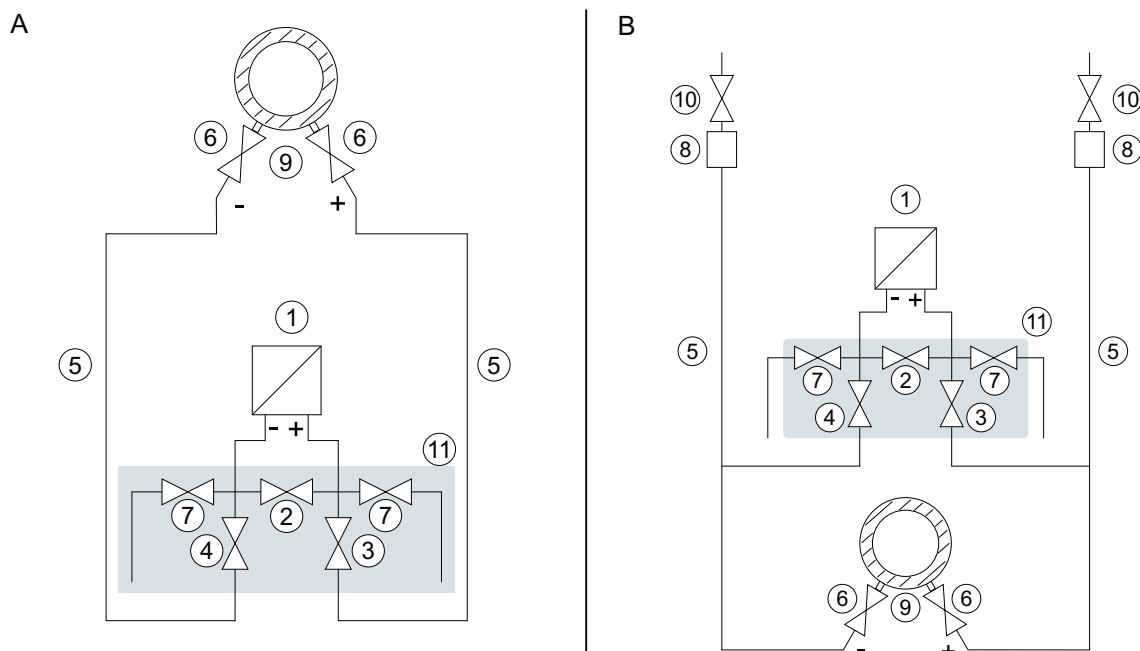
Toxic liquids

Danger of poisoning when the device is vented.

If toxic process media are measured with this device, toxic liquids can escape when the device is vented.

- Before venting, make sure there is no liquid in the device or take the necessary safety precautions.

Procedure



A	Pressure transmitter below the differential pressure transducer	B	Pressure transmitter above the differential pressure transducer
①	Pressure transmitter	⑦	Drain valves
②	Stabilizing valve	⑧	Gas collector vessels (optional)
③, ④	Differential pressure valves	⑨	Differential pressure transducer
⑤	Differential pressure lines	⑩	Vent valves
⑥	Shut-off valves	⑪	5-way valve manifold

1. Open both the shut-off valves ⑥ at the pressure tapping point.
2. Open the stabilizing valve ②.
3. With **pressure transmitters below the differential pressure transducer**, partially open both drain valves ⑦ one after the other until liquid emerges without bubbles.
In the case of a **pressure transmitter above the differential pressure transducer**, partially open both vent valves ⑩ one after the other until liquid emerges without bubbles.
4. Close both drain valves ⑦ or vent valves ⑩.
5. Partially open the differential pressure valve ③ and the vent valve (sealing plug with vent valve) on the positive side of the pressure transmitter until liquid escapes without bubbles.
6. Close the vent valve (sealing plug with vent valve).
7. Partially open the vent valve (sealing plug with vent valve) on the negative side of the pressure transmitter until liquid escapes without bubbles.
8. Close the differential pressure valve ③.

9. Partially open the differential pressure valve ④ until liquid escapes without bubbles.
10. Close the differential pressure valve.
11. Close the vent valve (sealing plug with vent valve) on the negative side of the pressure transmitter.
12. Open the differential pressure valve ③ with half a revolution.
13. For a lower range value of 0 bar, check the zero point (4 mA) and correct the lower range value if it is different.
14. Close the stabilizing valve ②.
15. Open the differential pressure valves (③ and ④) completely.

6.3.2.3 Commissioning with vapor

Requirement

All valves are closed.



WARNING

Hot vapor

Danger of injury or damage to device.

If the shut-off valves ⑥ and the differential pressure valve ③ are both open and the stabilizing valve ② is then opened, the pressure transmitter ① can be damaged by the flow of vapor.

- Follow the specified procedure for commissioning.



WARNING

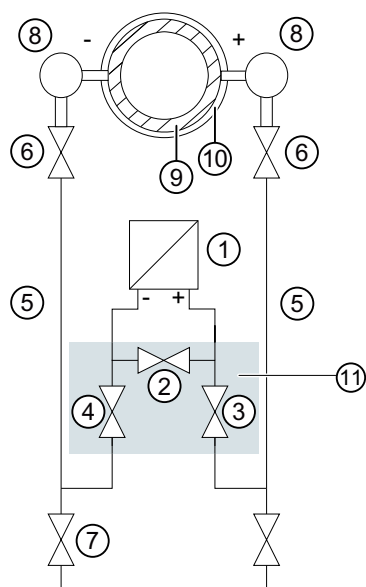
Hot vapor

Danger of injury.

You can briefly open the drain valves ⑦ to clean the line. Hot vapor can escape in the process.

- Only open the drain valves ⑦ briefly, and close them again before vapor escapes.

Procedure



- | | | | |
|----|------------------------------|---|----------------------------------|
| ① | Pressure transmitter | ⑦ | Drain valves |
| ② | Stabilizing valve | ⑧ | Condensate pots |
| ③, | Differential pressure valves | ⑨ | Differential pressure transducer |
| ④ | | | |
| ⑤ | Differential pressure lines | ⑩ | Insulation |
| ⑥ | Shut-off valves | ⑪ | 3-way valve manifold |

1. Open both the shut-off valves ⑥ at the pressure tapping point.
2. Open the stabilizing valve ②.
3. Wait until the steam in the differential pressure lines ⑤ and in the equalizing vessels ⑧ has condensed.
4. Partially open the differential pressure valve ③ and the vent valve (sealing plug with vent valve) on the positive side of the pressure transmitter until condensate escapes without bubbles.
5. Close the vent valve (sealing plug with vent valve).
6. Partially open the vent valve (sealing plug with vent valve) on the negative side of the pressure transmitter until condensate escapes without bubbles.
7. Close the differential pressure valve ③.
8. Partially open the differential pressure valve ④ until condensate escapes without bubbles.
9. Close the vent valve with blanking plug on the negative side ①.
10. Close the differential pressure valve.
11. Open the differential pressure valve ③ by half a revolution.

6.3 Application examples

12. For the lower range value 0 bar, check the zero point (4 mA).
If the differential pressure lines ⑤ have equally high condensate columns with the same temperature, the measurement result is error-free. Otherwise, repeat the zero-point adjustment.
13. Close the stabilizing valve ②.
14. Fully open the differential pressure valves ③ and ④.

Cleaning process cable

1. To clean the line, briefly open the drain valves ⑦.
2. Close the drain valve ⑦ before vapor escapes.

Service and maintenance

7.1 Basic safety instructions

The device is maintenance-free. However, a periodic inspection according to pertinent directives and regulations must be carried out.

An inspection can include:

- Ambient conditions
- Seal integrity of the process connections, cable entries, and cover
- Reliability of power supply, lightning protection, and grounds

WARNING
--

Use of a computer in a hazardous area
--

If the interface to the computer is used in the hazardous area, there is a risk of explosion.

- | |
|---|
| <ul style="list-style-type: none">• Ensure that the atmosphere is explosion-free (hot work permit). |
|---|

CAUTION
--

Releasing button lock

Improper modification of parameters could influence process safety.

- | |
|--|
| <ul style="list-style-type: none">• Make sure that only authorized personnel may cancel the button locking of devices for safety-related applications. |
|--|

NOTICE

Penetration of moisture into the device
--

Damage to device.

- | |
|---|
| <ul style="list-style-type: none">• Make sure when carrying out cleaning and maintenance work that no moisture penetrates the inside of the device. |
|---|

7.2 Cleaning

Cleaning the enclosure

- Clean the outside of the enclosure with the inscriptions and the display window using a cloth moistened with water or a mild detergent.
- Do not use any aggressive cleansing agents or solvents, e.g. acetone. Plastic parts or the painted surface could be damaged. The inscriptions could become unreadable.

NOTICE
Improper cleaning of diaphragm
Damage to device. The diaphragm can be damaged.
• Do not use sharp or hard objects to clean the diaphragm.

7.2.1 Cleaning the device and the remote seal

- Clean the outside of the enclosure parts, the display window and the remote seal using a cloth moistened with water or a mild detergent.
- Do not use any aggressive cleaners or solvents like acetone. Plastic components or the painted surface could get damaged. The inscriptions could become unreadable.

7.2.2 Servicing the remote seal measuring system

The remote seal measuring system usually does not need servicing.

If the mediums are contaminated, viscous or crystallized, it could be necessary to clean the diaphragm from time to time. Use only a suitable solvent to remove the deposits from the diaphragm. Do not use corrosive cleaning agents. Prevent the diaphragm from getting damaged due to sharp-edged tools.

7.3 Maintenance and repair work



WARNING
Impermissible repair of explosion protected devices
Risk of explosion in hazardous areas
• Repair must be carried out by Siemens authorized personnel only.



CAUTION

Hot surfaces

Risk of burns during maintenance work on parts having surface temperatures exceeding 70 °C (158 °F).

- Take corresponding protective measures, for example, by wearing protective gloves.
- After carrying out maintenance, remount touch protection measures.

7.3.1 Defining the maintenance interval



WARNING

No maintenance interval has been defined

Device failure, device damage, and risk of injury.

- Define a maintenance interval for recurring tests depending on the use of the device and your own experience.
- The maintenance interval will vary from site to site depending on corrosion resistance.



WARNING

Maintenance during continued operation in a hazardous area

There is a risk of explosion when carrying out repairs and maintenance on the device in a hazardous area.

- Isolate the device from power.
- or -
- Ensure that the atmosphere is explosion-free (hot work permit).



WARNING

Impermissible accessories and spare parts

Risk of explosion in areas subject to explosion hazard.

- Only use original accessories or original spare parts.
- Observe all relevant installation and safety instructions described in the instructions for the device or enclosed with the accessory or spare part.

 WARNING

Hot, toxic, or corrosive process media

Risk of injury during maintenance work.

When working on the process connection, hot, toxic, or corrosive process media could be released.

- As long as the device is under pressure, do not loosen process connections and do not remove any parts that are pressurized.
- Before opening or removing the device ensure that process media cannot be released.

 WARNING

Improper connection after maintenance

Risk of explosion in areas subject to explosion hazard.

- Connect the device correctly after maintenance.
- Close the device after maintenance work.

Refer to Connecting the device (Page 40).

7.3.2 Checking the seals

Inspect the seals at regular intervals

Note

Incorrect seal changes

Incorrect measured values will be displayed. Changing the seals in a process flange of a differential pressure measuring cell can alter the lower range value.

- Changing seals in devices with differential pressure measuring cells may only be carried out by personnel authorized by Siemens.

Note

Using the wrong seals

Using the wrong seals with flush-mounted process connections can cause measuring errors and/or damage the diaphragm.

- Always use seals which comply with the process connection standards or are recommended by Siemens.

1. Clean the enclosure and seals.
2. Check the enclosure and the seals for cracks and damage.
3. If necessary, lubricate the seals or replace them.

7.4 Return procedure

To return a product to Siemens, see Return to Siemens (www.siemens.com/returns-to-siemens).

Contact your Siemens representative to clarify if a product is repairable, and how to return it. They can also help with quick repair processing, a repair cost estimate, or a repair report/cause of failure report.

NOTICE

Decontamination

The product may have to be decontaminated before it is returned. Your Siemens contact person will let you know for which products this is required.

7.5 Disposal



Devices described in this manual should be recycled. They may not be disposed of in the municipal waste disposal services according to the Directive 2012/19/EC on waste electronic and electrical equipment (WEEE).

Devices can be returned to the supplier within the EC and UK, or to a locally approved disposal service for eco-friendly recycling. Observe the specific regulations valid in your country.

Further information about devices containing batteries can be found at: Information on battery/product return (WEEE) (<https://support.industry.siemens.com/cs/document/109479891/>)

Note

Special disposal required

The device includes components that require special disposal.

- Dispose of the device properly and environmentally through a local waste disposal contractor.

Technical specifications

8.1 Input

8.1.1 Gauge pressure

Gauge pressure input			
Measurand	Gauge pressure		
Measuring span (continuously adjustable) or measuring range, max. operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. test pressure (in accordance with DIN 16086) (for oxygen measurement, max. 100 bar and 60 °C ambient temperature/ process temperature)	Measuring span ¹⁾	Maximum permissible operating pressure MAWP (PS)	Maximum test pressure
	8.3 ... 250 mbar	4 bar	6 bar
	0.83 ... 25 kPa	0.4 MPa	0.6 MPa
	0.12 ... 3.6 psi	58 psi	87 psi
	0.01 ... 1 bar	6 bar	9 bar
	1 ... 100 kPa	0.6 MPa	0.9 MPa
	0.15 ... 14.5 psi	87 psi	130 psi
	0.04 ... 4 bar	20 bar	30 bar
	4 ... 400 kPa	2 MPa	3 MPa
	0.58 ... 58 psi	290 psi	435 psi
	0.16 ... 16 bar	45 bar	70 bar
	0.016 ... 1.6 MPa	4.5 MPa	7 MPa
	2.3 ... 232 psi	652 psi	1015 psi
	0.63 ... 63 bar	80 bar	120 bar
	0.063 ... 6.3 MPa	8 MPa	12 MPa
	9.1 ... 914 psi	1160 psi	1740 psi
	1.6 ... 160 bar	240 bar	360 bar
	0.16 ... 16 MPa	24 MPa	36 MPa
	23 ... 2321 psi	3480 psi	5221 psi
	4 ... 400 bar	400 bar	600 bar
	0.4 ... 40 MPa	40 MPa	60 MPa
	58 ... 5802 psi	5802 psi	8702 psi
	7 ... 700 bar	800 bar	800 bar
	0.7 ... 70 MPa	80 MPa	80 MPa
	102 ... 10153 psi	11603 psi	11603 psi
Gauge pressure measuring limits			
Low measuring limit ²⁾			
Measuring cell with silicone oil filling 30 mbar a/3 kPa a/0.44 psi a			

8.1 Input

Gauge pressure measuring limits	
• Measuring cell with inert oil	30 mbar a/3 kPa a/0.44 psi a
• Measuring cell with FDA-compliant oil	100 mbar a/10 kPa a/1.45 psi a
Upper measuring limit	100% of max. range (for oxygen measurement: max. 100 bar/10 MPa/1450 psi and 60 °C ambient temperature/medium temperature)
Lower range value	Between the measuring limits (continuously adjustable)

¹⁾ For devices with functional safety, the minimum permissible measuring span is limited by the turndown. Therefore, ensure that the configured turndown is no higher than 5:1.

²⁾ For 250 mbar/25 kPa/3.6 psi measuring cells, the low measuring limit is 750 mbar a/75 kPa a/10.8 psi a. The measuring cell is vacuum-tight down to 30 mbar a/3 kPa a/0.44 psi a.

8.1.2 Gauge pressure with front-flush diaphragm

Gauge pressure input with front-flush diaphragm			
Measurand	Gauge pressure		
Measuring span (continuously adjustable) or measuring range, max. operating pressure and max. test pressure	Measuring span ¹⁾	Maximum permissible operating pressure MAWP (PS)	Maximum test pressure
	0.01 ... 1 bar	Refer to the information on the nameplate of the pressure transmitter and the data on the mounting flange ²⁾	
	1 ... 100 kPa		
	0.15 ... 14.5 psi		
	0.04 ... 4 bar		
	4 ... 400 kPa		
	0.58 ... 58 psi		
	0.16 ... 16 bar		
	0.016 ... 1.6 MPa		
	2.3 ... 232 psi		
	0.6 ... 63 bar		
	0.063 ... 6.3 MPa		
	9.1 ... 914 psi		

¹⁾ For devices with functional safety, the minimum permissible measuring span is limited by the turndown. Therefore, ensure that the configured turndown is no higher than 5:1.

²⁾ The MAWP value of the pressure transmitter can be lower than the PN value of the mounting flange and vice versa. To determine the maximum permissible operating pressure and the maximum permissible test pressure, use the lowest value as reference.

Gauge pressure measuring limits with front-flush diaphragm	
Lower measuring limit	
• Measuring cell with silicone oil filling	100 mbar a/10 kPa a/1.45 psi a
• Measuring cell with inert oil	100 mbar a/10 kPa a/1.45 psi a

Gauge pressure measuring limits with front-flush diaphragm

• Measuring cell with FDA-compliant oil	100 mbar a/10 kPa a/1.45 psi a
Upper measuring limit	100% of max. range

8.1.3 Gauge pressure from the differential pressure series**Gauge pressure input from the differential pressure series**

Measurand	Gauge pressure and differential pressure		
Measuring span (continuously adjustable) and maximum operating pressure (according to 2014/68/EU Pressure Equipment Directive)	Measuring span ¹⁾	Maximum permissible operating pressure MAWP (PS)	Max. permissible test pressure
	1 ... 20 mbar	160 bar	240 bar
	0.1 ... 2 kPa	16 MPa	24 MPa
	0.4015 ... 8.031 inH ₂ O	2320 psi	3480 psi
	1 ... 60 mbar	160 bar	240 bar
	0.1 ... 6 kPa	16 MPa	24 MPa
	0.4015 ... 24.09 inH ₂ O	2320 psi	3480 psi
	2.5 ... 250 mbar	160 bar	240 bar
	0.2 ... 25 kPa	16 MPa	24 MPa
	1.004 ... 100.4 inH ₂ O	2320 psi	3480 psi
	6 ... 600 mbar	160 bar	240 bar
	0.6 ... 60 kPa	16 MPa	24 MPa
	2.409 ... 240.9 inH ₂ O	2320 psi	3480 psi
	16 ... 1600 mbar	160 bar	240 bar
	1.6 ... 160 kPa	16 MPa	24 MPa
	6.424 ... 642.4 inH ₂ O	2320 psi	3480 psi
	50 ... 5000 mbar	160 bar	240 bar
	5 ... 500 kPa	16 MPa	24 MPa
	20.08 ... 2008 inH ₂ O	2320 psi	3480 psi
	0.3 ... 30 bar	160 bar	240 bar
	0.03 ... 3 MPa	16 MPa	24 MPa
	4.35 ... 435 psi	2320 psi	3480 psi
	8 ... 160 bar	160 bar	240 bar
	0.8 ... 16 MPa	16 MPa	24 MPa
	116 ... 2320 psi	2320 psi	3480 psi

¹⁾ For devices with functional safety, the minimum permissible measuring span is limited by the turndown. Therefore, ensure that the configured turndown is no higher than 5:1.

Gauge pressure measuring limits from differential pressure series**Lower measuring limit**

• Measuring cell with silicone oil filling	30 mbar a/3 kPa a/0.44 psi a
--	------------------------------

8.1 Input

Gauge pressure measuring limits from differential pressure series	
• Measuring cell with inert oil	30 mbar a/3 kPa a/0.44 psi a
• Measuring cell with FDA-compliant oil	100 mbar a/10 kPa a/1.45 psi a
Upper measuring limit	100% of max. range (for oxygen measurement: max. 100 bar/10 MPa/1450 psi and 60 °C ambient temperature/medium temperature)
Lower range value	Between the measuring limits (continuously adjustable)

8.1.4 Absolute pressure from the gauge pressure series

Absolute pressure input from the gauge pressure series			
Measurand	Absolute pressure		
Measuring span (continuously adjustable) or measuring range, max. operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. test pressure (in accordance with DIN 16086)	Measuring span ¹⁾	Maximum permissible operating pressure MAWP (PS)	Maximum test pressure
	8.3 ... 250 mbar a	4 bar a	6 bar a
	0.83 ... 25 kPa a	0.4 MPa a	0.6 MPa a
	3 ... 100 inH ₂ O a	58 psi a	87 psi a
	43 ... 1300 mbar a	6.6 bar a	10 bar a
	4.3 ... 130 kPa a	0.66 MPa a	1 MPa a
	17 ... 525 inH ₂ O a	95 psi a	145 psi a
	166 ... 5000 mbar a	20 bar a	30 bar a
	16.6 ... 500 kPa a	2 MPa a	3 MPa a
	2.41 ... 72.5 psi a	290 psi a	435 psi a
	1 ... 30 bar a	65 bar a	100 bar a
	0.1 ... 3 MPa a	6.5 MPa a	10 MPa a
	14.5 ... 435 psi a	942 psi a	1450 psi a
	5.3 ... 160 bar a	240 bar a	380 bar a
	0.53 ... 16 MPa a	24 MPa a	38 MPa a
	77 ... 2321 psi a	3480 psi a	5511 psi a
	13.3 ... 400 bar a	400 bar a	600 bar a
	1.3 ... 40 MPa a	40 MPa a	60 MPa a
	192 ... 5801 psi a	5801 psi a	8702 psi a
	23.3 ... 700 bar a	800 bar a	800 bar a
	2.3 ... 70 MPa a	80 MPa a	80 MPa a
	337 ... 10152 psi a	11603 psi a	11603 psi a

¹⁾ For devices with functional safety, the minimum permissible measuring span is limited by the turndown. Therefore, ensure that the configured turndown is no higher than 5:1.

Absolute pressure measuring limits from gauge pressure series	
Lower measuring limit	
• Measuring cell with silicone oil filling	0 mbar a/kPa a/psi a

Absolute pressure measuring limits from gauge pressure series

- Measuring cell with inert oil

For process temperature $-20\text{ °C} < \vartheta \leq 60\text{ °C}$ ($-4\text{ °F} < \vartheta \leq +140\text{ °F}$)	30 mbar a/3 kPa a/0.44 psi a
For process temperature $60\text{ °C} < \vartheta \leq 100\text{ °C}$ (max. 85 °C for measuring cell 30 bar) ($140\text{ °F} < \vartheta \leq 212\text{ °F}$ (max. 185 °F for measuring cell 435 psi))	30 mbar a + 20 mbar a • $(\vartheta - 60\text{ °C})/\text{°C}$ 3 kPa a + 2 kPa a • $(\vartheta - 60\text{ °C})/\text{°C}$ 0.44 psi a + 0.29 psi a • $(\vartheta - 140\text{ °F})/\text{°F}$
Upper measuring limit	100% of max. range (for oxygen measurement: max. 100 bar/10 MPa/1450 psi and 60 °C ambient temperature/medium temperature)
Lower range value	Between the measuring limits (continuously adjustable)

8.1.5 Absolute pressure with front-flush diaphragm**Absolute pressure with front-flush diaphragm**

Measurand	Absolute pressure		
Measuring span (continuously adjustable) or measuring range, max. operating pressure and max. test pressure	Measuring span ¹⁾	Maximum permissible operating pressure MAWP (PS)	Maximum test pressure
	43 ... 1300 mbar a	Refer to the information on the nameplate of the pressure transmitter and the data on the mounting flange ²⁾	
	4.3 ... 130 kPa a		
	17 ... 525 inH ₂ O a		
	166 ... 5000 mbar a		
	16.6 ... 500 kPa a		
	2.41 ... 72.5 psi a		
	1 ... 30 bar a		
	0.1 ... 3 MPa a		
	14.5 ... 435 psi a		
	Depending on the process connection, the measuring span may differ from these values		

¹⁾ For devices with functional safety, the minimum permissible measuring span is limited by the turndown. Therefore, ensure that the configured turndown is no higher than 5:1.

²⁾ The MAWP value of the pressure transmitter can be lower than the PN value of the mounting flange and vice versa. To determine the maximum permissible operating pressure and the maximum permissible test pressure, use the lowest value as reference.

Absolute pressure measuring limits with front-flush diaphragm

Lower measuring limit	
• Measuring cell with silicone oil filling	0 mbar a/kPa a/psi a
Upper measuring limit	100% of max. range
Lower range value	Between the measuring limits (continuously adjustable)

8.1 Input

8.1.6 Absolute pressure from the differential pressure series

Absolute pressure input from the differential pressure series			
Measurand	Absolute pressure		
Measuring span (continuously adjustable) and maximum operating pressure (according to 2014/68/EU Pressure Equipment Directive)	Measuring span ¹⁾	Maximum permissible operating pressure MAWP (PS)	Max. permissible test pressure
	8.3 ... 250 mbar a	160 bar a	240 bar a
	0.83 ... 25 kPa a	16 MPa a	24 MPa a
	3 ... 100 inH ₂ O a	2320 psi a	3480 psi a
	43 ... 1300 mbar a	160 bar a	240 bar a
	4.3 ... 130 kPa a	16 MPa a	24 MPa a
	17 ... 525 inH ₂ O a	2320 psi a	3480 psi a
	166 ... 5000 mbar a	160 bar a	240 bar a
	16.6 ... 500 kPa a	16 MPa a	24 MPa a
	2.41 ... 72.5 psi a	2320 psi a	3480 psi a
	1 ... 30 bar a	160 bar a	240 bar a
	0.1 ... 3 MPa a	16 MPa a	24 MPa a
	14.5 ... 435 psi a	2320 psi a	3480 psi a
	8 ... 160 bar a	160 bar a	160 bar a
	0.8 ... 16 MPa a	16 MPa a	16 MPa a
	116 ... 2320 psi a	2320 psi a	2320 psi a

¹⁾ For devices with functional safety, the minimum permissible measuring span is limited by the turndown. Therefore, ensure that the configured turndown is no higher than 5:1.

Absolute pressure measuring limits from differential pressure series	
Lower measuring limit	
• Measuring cell with silicone oil filling	0 mbar a/kPa a/psi a
• Measuring cell with inert liquid	
For process temperature $-20\text{ °C} < \vartheta \leq 60\text{ °C}$ ($-4\text{ °F} < \vartheta \leq +140\text{ °F}$)	30 mbar a/3 kPa a/0.44 psi a
For process temperature $60\text{ °C} < \vartheta \leq 100\text{ °C}$ (max. 85 °C for measuring cell 30 bar) ($140\text{ °F} < \vartheta \leq 212\text{ °F}$ (max. 185 °F for measuring cell 435 psi))	$30\text{ mbar a} + 20\text{ mbar a} \cdot (\vartheta - 60\text{ °C})/\text{°C}$ $3\text{ kPa a} + 2\text{ kPa a} \cdot (\vartheta - 60\text{ °C})/\text{°C}$ $0.44\text{ psi a} + 0.29\text{ psi a} \cdot (\vartheta - 140\text{ °F})/\text{°F}$
Upper measuring limit	100% of max. range (for oxygen measurement: max. 100 bar/10 MPa/1450 psi and 60 °C ambient temperature/medium temperature)
Lower range value	Between the measuring limits (continuously adjustable)

8.1.7 Differential pressure and flow

Differential pressure and flow rate input, MAWP 160 bar (2320 psi)			
Measurand	Differential pressure and flow		
Measuring span (continuously adjustable) and maximum operating pressure (according to 2014/68/EU Pressure Equipment Directive)	Measuring span ¹⁾	Maximum permissible operating pressure MAWP (PS)	Max. permissible test pressure
	1 ... 20 mbar	160 bar	240 bar
	0.1 ... 2 kPa	16 MPa	24 MPa
	0.4015 ... 8.031 inH ₂ O	2320 psi	3480 psi
	1 ... 60 mbar	160 bar	240 bar
	0.1 ... 6 kPa	16 MPa	24 MPa
	0.4015 ... 24.09 inH ₂ O	2320 psi	3480 psi
	2.5 ... 250 mbar	160 bar	240 bar
	0.2 ... 25 kPa	16 MPa	24 MPa
	1.004 ... 100.4 inH ₂ O	2320 psi	3480 psi
	6 ... 600 mbar	160 bar	240 bar
	0.6 ... 60 kPa	16 MPa	24 MPa
	2.409 ... 240.9 inH ₂ O	2320 psi	3480 psi
	16 ... 1600 mbar	160 bar	240 bar
	1.6 ... 160 kPa	16 MPa	24 MPa
	6.424 ... 642.4 inH ₂ O	2320 psi	3480 psi
	50 ... 5000 mbar	160 bar	240 bar
	5 ... 500 kPa	16 MPa	24 MPa
	20.08 ... 2008 inH ₂ O	2320 psi	3480 psi
	0.3 ... 30 bar	160 bar	240 bar
	0.03 ... 3 MPa	16 MPa	24 MPa
	4.35 ... 435 psi	2320 psi	3480 psi
	8 ... 160 bar	160 bar	240 bar
	0.8 ... 16 MPa	16 MPa	24 MPa
	116 ... 2320 psi	2320 psi	3480 psi

8.1 Input

¹⁾ For devices with functional safety, the minimum permissible measuring span is limited by the turndown. Therefore, ensure that the configured turndown is no higher than 5:1.

Differential pressure and flow rate input, MAWP 420 bar (6092 psi)

Measurand	Differential pressure and flow		
Measuring span (continuously adjustable) or measuring range and maximum operating pressure (according to 2014/68/EU Pressure Equipment Directive)	Measuring span ¹⁾	Maximum operating pressure MAWP (PS)	Max. permissible test pressure
	2.5 ... 250 mbar	420 bar	630 bar
	0.25 ... 25 kPa	42 MPa	63 MPa
	1.004 ... 100.4 inH ₂ O	6091 psi	9137 psi
	6 ... 600 mbar	420 bar	630 bar
	0.6 ... 60 kPa	42 MPa	63 MPa
	2.409 ... 240.9 inH ₂ O	6091 psi	9137 psi
	16 ... 1600 mbar	420 bar	630 bar
	1.6 ... 160 kPa	42 MPa	63 MPa
	6.424 ... 642.4 inH ₂ O	6091 psi	9137 psi
	50 ... 5000 mbar	420 bar	630 bar
	5 ... 500 kPa	42 MPa	63 MPa
	20.08 ... 2008 inH ₂ O	6091 psi	9137 psi
	0.3 ... 30 bar	420 bar	630 bar
	0.03 ... 3 MPa	42 MPa	63 MPa
	4.35 ... 435 psi	6091 psi	9137 psi

¹⁾ For devices with functional safety, the minimum permissible measuring span is limited by the turndown. Therefore, ensure that the configured turndown is no higher than 5:1.

Differential pressure and flow measuring limits

Lower measuring limit

- Measuring cell with silicone oil filling

All measuring cells -100% of maximum measuring range or 30 mbar a /3 kPa a /0.44 psi a

Measuring cell 160 bar/
0.16 MPa/
2320 psi -25% of maximum measuring range or 30 mbar a /3 kPa a /0.44 psi a

- Measuring cell with inert oil

For process temperature -20 °C < ϑ ≤ 60 °C (-4 °F < ϑ ≤ +140 °F) -100% of maximum measuring range or 30 mbar a /3 kPa a /0.44 psi a

For medium temperature 60 °C < ϑ ≤ 100 °C (max. 85 °C for measuring cell 30 bar with MAWP 420 bar) (140 °F < ϑ ≤ 212 °F (max. 185 °F for measuring cell 435 psi)) -100% of maximum measuring range or 30 mbar a /3 kPa a /0.44 psi a
30 mbar a + 20 mbar a • (ϑ - 60 °C)/°C
3 kPa a + 2 kPa a • (ϑ - 60 °C)/°C
0.44 psi a + 0.29 psi a • (ϑ - 140 °F)/°F

- Measuring cell with FDA-compliant oil For process temperature -10 °C < ϑ ≤ 100 °C (-14 °F < ϑ ≤ +212 °F) -100% of maximum measuring range or 100 mbar a /10 kPa a / 14.5 psi a.

Differential pressure and flow measuring limits

Upper measuring limit	100% of max. range (for oxygen measurement: max. 100 bar/10 MPa/1450 psi and 60 °C ambient temperature/medium temperature)
Lower range value	Between the measuring limits (continuously adjustable)

8.1.8 Level

Level input

Measurand	Level	Maximum permissible operating pressure MAWP (PS)	Max. permissible test pressure
Measuring span (continuously adjustable) and maximum operating pressure (according to 2014/68/EU Pressure Equipment Directive)	Measuring span ¹⁾		
	25...60 mbar	See mounting flange	
	2.5...6 kPa		
	10...24.1 in H ₂ O		
	25 ... 250 mbar		
	2.5 ... 25 kPa		
	10 ... 100 inH ₂ O		
	25 ... 600 mbar		
	2.5 ... 60 kPa		
	10 ... 240 inH ₂ O		
	53 ... 1600 mbar		
	5.3 ... 160 kPa		
	21 ... 640 inH ₂ O		
	166 ... 5000 mbar		
	16.6 ... 500 kPa		
	2.41 ... 72.5 psi		
	1...30 bar		
	0.1...3 MPa		
	14.5...435 psi		
	8...160 bar		
	0.8...16MPa		
	116...2320 psi		

¹⁾ For devices with functional safety, the minimum permissible measuring span is limited by the turndown. Therefore, ensure that the configured turndown is no higher than 5:1.

Level measuring limits

Lower measuring limit		
Measuring cell with silicone oil filling	-100% of max. measuring range or 30 mbar a/3 kPa a/0.44 psi a depending on the mounting flange	
Measuring cell with inert oil	-100% of max. measuring range or 30 mbar a/3 kPa a/0.44 psi a depending on the mounting flange	
Measuring cell with FDA-compliant oil	-100% of maximum measuring range or 100 mbar a /10 kPa a /1.45 psi a	

8.2 Operating conditions

Level measuring limits	
Measuring cell with silicone oil filling (160 bar)	-40 bar of max. measuring range or 30 mbar a/3 kPa a/0.44 psi a depending on the mounting flange
Measuring cell with inert oil (160 bar)	-40 bar of max. measuring range or 30 mbar a/3 kPa a/0.44 psi a depending on the mounting flange
Measuring cell with FDA-compliant inert oil (160 bar)	-40 bar of maximum measuring range or 100 mbar a /10 kPa a /1.45 psi a
Upper measuring limit	100% of max. range
Lower range value	Between the measuring limits (continuously adjustable)

8.2 Operating conditions

Operating conditions for gauge pressure and absolute pressure (from the gauge pressure series)		
Ambient conditions		
• Ambient temperature		
	Note: Observe the temperature class in hazardous areas.	
Enclosure	-40 ... +100 °C (-40 ... +212 °F)	
Measuring cell with sili- cone oil filling	-40 ... +85 °C (-40 ... +185 °F)	
Measuring cell with inert oil	-40 ... +85 °C (-40 ... +185 °F)	
Measuring cell with FDA- compliant oil	-10 ...+85 °C (14 ... +185 °F)	
Display	-20 ... +80 °C (-4 ... +185 °F)	
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F) (for FDA-compliant oil: -20 ... + 85 °C (-4 ... +185 °F))	
Climate class in accordance with IEC 60721-3-4	4K26	
Degree of protection accord- ing to IEC/EN 60529/UL50-E	Enclosure with appropriate cable gland	IP66/Type 4X IP68 (2 hours at 1.5 m)
	Enclosure with mounted M12 device plug ¹⁾	IP66/Type 4X
	Enclosure with external overvoltage protection up to 6 kV	IP66/Type 4X
	Enclosure with mounted HAN device plug ¹⁾	IP65
Electromagnetic compatibili- ty		
Interference emission and interference immunity	In accordance with EN 61326 and NAMUR NE 21	
Process medium conditions		
• Process temperature		

Operating conditions for gauge pressure and absolute pressure (from the gauge pressure series)

Cell	Pressure	Temperature range
Measuring cell with sili-cone oil filling		-40 ... +100 °C (-40 ... +212 °F)
Measuring cell with inert oil (gauge pressure)		
	250 mbar	-40 ... +100 °C (-40 ... +212 °F)
	1 bar/100 kPa/14.5 psi	-40 ... +100 °C (-40 ... +212 °F)
	4 bar/400 kPa/58 psi	-40 ... +100 °C (-40 ... +212 °F)
	16 bar/1.6 MPa/232 psi	-40 ... +100 °C (-40 ... +212 °F)
	63 bar/6.3 MPa/914 psi	-40 ... +100 °C (-40 ... +212 °F)
	160 bar/16 MPa/2321 psi	-20 ... +100 °C (-4 ... +212 °F)
	400 bar/40 MPa/5802 psi	-20 ... +100 °C (-4 ... +212 °F)
	700 bar/70 MPa/10152 psi	-20 ... +100 °C (-4 ... +212 °F)
Measuring cell with inert oil (absolute pressure)		-20 ... +100 °C (-4 ... +212 °F)
Measuring cell with FDA-compliant oil		-10 ... +100 °C (14 ... +212 °F)

¹⁾ Only approved for non-Ex devices and devices with intrinsic safety "Ex i" according to ATEX and IECEx.

Operating conditions for gauge pressure and absolute pressure with front-flush diaphragm

Ambient conditions	
Ambient temperature	
Note	Observe the temperature class in hazardous areas.
Enclosure	-40 ... +100 °C (-40 ... +212 °F)
Measuring cell with sili-cone oil filling	-40 ... +85 °C (-40 ... +185 °F)
Measuring cell with inert oil	-40 ... +85 °C (-40 ... +185 °F)
Measuring cell with FDA-compliant oil	-10 ... +85 °C (14 ... 185 °F)
Display	-20 ... +80 °C (-4 ... +176 °F)
Storage temperature	-50 ... +85 °C (-58 ... +185 °F) (for FDA-compliant oil: -20 ... +85 °C (-4 ... +185 °F))
Climate class in accordance with IEC 60721-3-4	4K26

8.2 Operating conditions

Operating conditions for gauge pressure and absolute pressure with front-flush diaphragm

Degree of protection according to IEC/EN 60529/UL50-E	Enclosure with appropriate cable gland	IP66/Type 4X IP68 (2 hours at 1.5 m)
	Enclosure with mounted M12 device plug ¹⁾	IP66/Type 4X
	Enclosure with external overvoltage protection up to 6 kV	IP66/Type 4X
	Enclosure with mounted HAN device plug ¹⁾	IP65

Electromagnetic compatibility

- Interference emission and interference immunity: In accordance with EN 61326 and NAMUR NE 21

Process medium conditions

Process temperature²⁾

- Measuring cell with silicone oil filling: -40 ... +150°C (-40 ... +302 °F)
-40 ... +200°C (-40 ... +392 °F) with cooling extension
- Measuring cell with inert oil: -20 ... +100 °C (-4 ... +212 °F)
- Measuring cell with FDA-compliant oil: -10 ... +150°C (14 ... 302 °F)
-10 ... +200°C (14 ... 392 °F) with cooling extension

¹⁾ Only approved for non-Ex devices and devices with intrinsic safety "Ex i" according to ATEX and IECEx.

²⁾ Observe the temperature limits in the process connection standards (e.g. DIN 32676 and DIN 11851) for the maximum medium temperature for flush-mounted process connections.

Operating conditions for gauge pressure and absolute pressure (from the differential pressure series), differential pressure and flow

Installation conditions

- Measuring cells for differential pressure with MAWP 420 bar: Dynamic stress according to AD 2000-S1 No. 1.4:
 - For MAWP (PS) 420 bar: maximum 1000 load changes
 - At 10% of MAWP (PS): any number of load changes

Ambient conditions

- Ambient temperature

Note: Observe the temperature class in hazardous areas.

Enclosure	-40 ... +100 °C (-40 ... +212 °F)
Measuring cell with silicone oil filling	-40 ... +85 °C (-40 ... +185 °F)
Measuring cell with inert oil	-40 ... +85 °C (-40 ... +185 °F)
Measuring cell with FDA-compliant oil	-10 ... +85 °C (14 ... 185 °F)
Display	-20 ... +80 °C (-4 ... +185 °F)

Operating conditions for gauge pressure and absolute pressure (from the differential pressure series), differential pressure and flow

Storage temperature	-50 ... +85 °C (-58 ... +185 °F) (with FDA-compliant oil: -20 ... + 85 °C (-4 ... +185 °F))	
Climate class in accordance with IEC 60721-3-4	4K26	
Degree of protection according to IEC/EN 60529/UL50-E	Enclosure with appropriate cable gland	IP66/Type 4X IP68 (2 hours at 1.5 m)
	Enclosure with mounted M12 device plug ¹⁾	IP66/Type 4X
	Enclosure with external overvoltage protection up to 6 kV	IP66/Type 4X
	Enclosure with mounted HAN device plug ¹⁾	IP65
Electromagnetic compatibility		
Interference emission and interference immunity	In accordance with EN 61326 and NAMUR NE 21	
Process medium conditions		
Process temperature		
Measuring cell with silicone oil filling	-40 ... +100 °C (-40 ... +212 °F)	
Measuring cell 30 bar (435.11 psi)	-20 ... +100°C (-4 ... +212 °F)	
Measuring cell 160 bar (2320 psi)²⁾	-20 ... +100°C (-4 ... +212 °F)	
Measuring cell with inert oil	-20 ... +100 °C (-4 ... +212 °F)	
Measuring cell with FDA-compliant oil	-10 ... +100°C (14 ...+212°F)	

¹⁾ Only approved for non-Ex devices and devices with intrinsic safety "Ex i" according to ATEX and IECEx.

²⁾ With O-rings made of fluoroelastomer (FKM) or perfluoroelastomer (FFKM or FFPM), the medium temperature limit is -10 ... +100°C (14 ... +212°F)

Operating conditions for level

Installation conditions	
• Installation instruction	Specified by the flange
Ambient conditions	
• Ambient temperature	
Note	Observe the allocation of the max. permissible operating temperature to the max. permissible operating pressure of the relevant flange connection.

8.3 Vibration resistance

Operating conditions for level		
Enclosure	-40 ... +100 °C (-40 ... +212 °F)	
Measuring cell with sili- cone oil filling	-40 ... +85 °C (-40 ... +185 °F)	
Display	-20 ... +80 °C (-4 ... +185 °F)	
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F)	
Climate class in accordance with IEC 60721-3-4	4K26	
Degree of protection accord- ing to IEC/EN 60529/UL50-E	Enclosure with appropriate cable gland	IP66/Type 4X IP68 (2 hours at 1.5 m)
	Enclosure with mounted M12 device plug ¹⁾	IP66/Type 4X
	Enclosure with external overvoltage protection up to 6 kV	IP66/Type 4X
	Enclosure with mounted HAN device plug ¹⁾	IP65
Electromagnetic compatibility		
Interference emission and interference immunity	In accordance with EN 61326 and NA- MUR NE 21	
Process medium conditions		
• Process temperature		
Measuring cell with sili- cone oil filling	• Plus side: See mounting flange • Minus side: -40 ... +100 °C (-40 ... +212 °F)	

¹⁾ Only approved for non-Ex devices and devices with intrinsic safety "Ex i" according to ATEX and IECEx.

8.3 Vibration resistance

General operating conditions	Gauge pressure series ²⁾ Aluminum and stainless steel enclosure	Differential pressure series ¹⁾ Aluminum and stainless steel enclosure
• Note	Make sure that you operate the following device versions free of vibrations: • Fill level transmitter • Flush mounted pressure transmitters • Pressure transmitter with diaphragm seal attachment	
Vibrations (sine)	2 ... 9 Hz at 0.3 mm	
IEC 60068-2-6	9 ... 200 Hz at 5 m/s ² 1 octave/min 5 cycles/axis	

General operating conditions	Gauge pressure series ²⁾ Aluminum and stainless steel enclosure	Differential pressure series ¹⁾ Aluminum and stainless steel enclosure
Continuous shocks (half-sine) IEC 60068-2-27		70 m/s ² 30 ms 6 shocks/axis
Continuous shocks (half-sine) IEC 60068-2-27		250 m/s ² 6 ms 1000 shocks/axis

1) Without mounting bracket

2) With mounting bracket

Operating conditions according to KTA 3503	Gauge pressure series ²⁾ Aluminum and stainless steel enclosure	Differential pressure series ²⁾ Aluminum and stainless steel enclosure
Vibrations (sine) IEC 60068-2-6		9 ... 35 Hz at 10 m/s ² 1 octave/min 1 cycle/axis
Vibrations (sine) IEC 60068-2-6		5 ... 7 Hz at 20 mm 9 ... 100 Hz at 20 m/s ² 10 octave/min 1 cycle/axis
Continuous shocks (half-sine) IEC 60068-2-27		300 m/s ² 11 ms 6 shocks/axis

2) With mounting bracket

Operating conditions according to IEC 61298-3 (2g normal)	Gauge pressure series ²⁾ Aluminum and stainless steel enclosure	Differential pressure series ¹⁾²⁾ Aluminum and stainless steel enclosure
Vibrations (sine) IEC 60068-2-6		10 ... 58 Hz at 0.3 mm 58 ... 1000 Hz at 20 m/s ² 1 octave/min 20 cycles/axis

1) Without mounting bracket

2) With mounting bracket

8.4 Construction

Operating conditions according to IEC 61298-3 (5g enhanced)		Differential pressure series ¹⁾ Aluminum and stainless steel enclosure
Vibrations (sine)		10 ... 58 Hz at 0.7 mm
IEC 60068-2-6		58 ... 1000 Hz at 50 m/s ² 1 octave/min 20 cycles/axis

1) Without mounting bracket

Operating conditions for maritime applications according to IEC 60068-2-6	Gauge pressure series ¹⁾	Differential pressure series ¹⁾
	Aluminum and stainless steel enclosure	Aluminum and stainless steel enclosure
DNV-GL (Det Norske Veritas/Germanischer Lloyd)	2 ... 25 Hz at 3.2 mm	25 ... 100 Hz at 40 m/s ²
Lloyd's Register	0.5 octave/min	1 frequency sweep/axis
Bureau Veritas	Amplification factor (Q) < 2, 30 Hz/90 min	Amplification factor (Q) > 2, resonant frequency/90 min
ABS (American Bureau of Shipping)		
RINA (Registro Italiano Navale)		
CCS (China Classification Society)		

1) Without mounting bracket

8.4 Construction

Construction for gauge pressure and absolute pressure (from the gauge pressure series)	
Weight	Approx. 1.8 kg (3.9 lb) with aluminum enclosure Approx. 3.8 kg (8.3 lb) with stainless steel enclosure
Material	
• Wetted parts materials	
Process connection	Stainless steel, material no. 1.4404/316L or Alloy C22, material no. 2.4602
Oval flange	Stainless steel, mat. no. 1.4404/316L
Seal diaphragm	Stainless steel, material no. 1.4404/316L or Alloy C276, material no. 2.4819
• Non-wetted parts materials	
Electronics housing	- Low-copper die-cast aluminum GD-ALSi 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M - Standard: Powder coating with polyester option: 2 coats: Coat 1: epoxy-based; coat 2: Polyester - Stainless steel nameplate (1.4404/316L)
Mounting bracket	Steel, galvanized, stainless steel 1.4301/304, stainless steel 1.4404/316L

Construction for gauge pressure and absolute pressure (from the gauge pressure series)

Process connection	• Connection pin G¹/₂A in accordance with DIN EN 837-1 • Female thread ¹/₂-14 NPT • Oval flange (MAWP 160 bar abs (2320 psi g) with fastening screw thread: – ⁷/₁₆-20 UNF in accordance with EN 61518 – M10 in accordance with DIN 19213 • Oval flange (MAWP 420 bar abs (MAWP 2320 psi g) with fastening screw thread: – ⁷/₁₆-20 UNF in accordance with EN 61518 – M12 in accordance with DIN 19213 • Male thread M20 x 1.5 and ¹/₂-14 NPT
Electrical connection	Cable inlet using the following screwed joints: • M20 x 1.5 • ¹/₂-14 NPT • Han 7D/Han 8D connector¹⁾ • M12 connector

¹⁾ Han 8D is identical to Han 8U.

Construction for gauge pressure, with flush mounted diaphragm

Weight (pressure transmitter without mounting flange)	Approx. 1.8 kg (3.9 lb) with aluminum enclosure Approx. 3.8 kg (8.3 lb) with stainless steel enclosure								
Material	• Wetted parts materials <table> <tr> <td>Process connection</td><td>Stainless steel, mat. no. 1.4404/316L</td></tr> <tr> <td>Seal diaphragm</td><td>Stainless steel, material no. 1.4404/316L or Alloy C276, material no. 2.4819</td></tr> </table> • Non-wetted parts materials <table> <tr> <td>Electronics housing</td><td> • Low-copper die-cast aluminum GD-AISI 12 or stainless steel precision casting, mat. no. 1.4409/CF-3M • Standard: Powder coating with polyester option D20: 2 coats: Coat 1: epoxy-based; coat 2: Polyester • Stainless steel nameplate (1.4404/316L) </td></tr> <tr> <td>Mounting bracket</td><td>Steel, galvanized, stainless steel 1.4301/304, stainless steel 1.4404/316L</td></tr> </table>	Process connection	Stainless steel, mat. no. 1.4404/316L	Seal diaphragm	Stainless steel, material no. 1.4404/316L or Alloy C276, material no. 2.4819	Electronics housing	• Low-copper die-cast aluminum GD-AISI 12 or stainless steel precision casting, mat. no. 1.4409/CF-3M • Standard: Powder coating with polyester option D20: 2 coats: Coat 1: epoxy-based; coat 2: Polyester • Stainless steel nameplate (1.4404/316L)	Mounting bracket	Steel, galvanized, stainless steel 1.4301/304, stainless steel 1.4404/316L
Process connection	Stainless steel, mat. no. 1.4404/316L								
Seal diaphragm	Stainless steel, material no. 1.4404/316L or Alloy C276, material no. 2.4819								
Electronics housing	• Low-copper die-cast aluminum GD-AISI 12 or stainless steel precision casting, mat. no. 1.4409/CF-3M • Standard: Powder coating with polyester option D20: 2 coats: Coat 1: epoxy-based; coat 2: Polyester • Stainless steel nameplate (1.4404/316L)								
Mounting bracket	Steel, galvanized, stainless steel 1.4301/304, stainless steel 1.4404/316L								
Process connection	• Flanges as per EN and ASME • F&B and Pharma flange • BioConnect/BioControl • PMC style								
Electrical connection	Cable inlet using the following screwed joints: • M20x1.5 • ¹/₂-14 NPTM • Han 7D/Han 8D connector¹⁾ • M12 connector								

¹⁾ Han 8D is identical to Han 8U.

8.4 Construction

Construction for gauge pressure and absolute pressure (from the differential pressure series), differential pressure and flow rate	
Weight	Approx. 3.9 kg (8.5 lb) with aluminum enclosure Approx. 5.9 kg (13 lb) with stainless steel enclosure
Material	
• Wetted parts materials	
Seal diaphragm	Stainless steel, mat. no. 1.4404/316L, Alloy C276, mat. no. 2.4819, Monel 400, mat. no. 2.4360, tantalum or gold
Pressure caps and vents	Stainless steel, mat. no. 1.4408 to MAWP 160 bar, mat. no. 1.4571/316Ti for MAWP 420 bar, Alloy C22, 2.4602 or Monel 400, mat. no. 2.4360
O-ring	FKM (Viton) or optionally: PTFE, FEP, FEPM and NBR
• Non-wetted parts materials	
Electronics housing	- Low-copper die-cast aluminum GD-ALSi 12 or stainless steel precision casting, mat. no. 1.4409/CF-3M - Standard: Powder coating with polyester option D20: 2 coats: Coat 1: epoxy-based; coat 2: Polyester - Stainless steel nameplate (1.4404/316L)
Pressure cap screws	Stainless steel ISO 3506-1 A4-70
Mounting bracket	Steel, galvanized, stainless steel 1.4301/304, stainless steel 1.4404/316L
Process connection	$1/4$ -18 NPT female thread and flange connection with $7/16$ -20 UNF mounting thread in accordance with EN 61518 or M10 mounting thread in accordance with DIN 19213 (M12 for MAWP 420 bar (6092 psi))
Electrical connection	Screw terminals Cable inlet using the following screwed joints: - M20 x 1.5 $1/2$-14 NPT - Han 7D/Han 8D connector¹⁾ - M12 connector

¹⁾ Han 8D is identical to Han 8U.

Construction for level	
Weight	
• In accordance with EN (pressure transmitter with mounting flange, without tube)	Approx. 11 ... 13 kg (24.2 ... 28.7 lb) with aluminum enclosure Approx. 13 ... 15 kg (28.7 ... 33 lb) with stainless steel enclosure
• In accordance with ASME (pressure transmitter with mounting flange, without tube)	Approx. 11 ... 18 kg (24.2 ... 39.7 lb) with aluminum enclosure Approx. 13 ... 20 kg (28.7 ... 44 lb) with stainless steel enclosure
Material	
• Wetted parts materials	
Plus side	

Construction for level	
• Seal diaphragm on the mounting flange	Stainless steel, mat. no. 1.4404/316L, Monel 400, mat. no. 2.4360, Alloy B2, mat. no. 2.4617, Alloy C276, mat. no. 2.4819, Alloy C22, mat. no. 2.4602, tantalum, PTFE
• Sealing surface	Smooth as per EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA for stainless steel 316L, EN 2092-1 form B2 or ASME B16.5 RFSF for the remaining materials
Sealing material in the pressure caps	
• For standard applications	FKM (Viton)
• For underpressure applications on the mounting flange	Copper
Minus side	
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L
• Pressure caps locking screws	Stainless steel, mat. no. 1.4408
• Locking screw	Stainless steel ISO 3506-1 A4-70
• O-ring	FKM (Viton)
• Non-wetted parts materials	
Electronics housing	- Low-copper die-cast aluminum GD-AlSi 12 or stainless steel precision casting, mat. no. 1.4409/CF-3M - Standard: Powder coating with polyester option D20: 2 coats: Coat 1: epoxy-based; coat 2: Polyester - Stainless steel nameplate (1.4404/316L)
Pressure cap screws	Stainless steel ISO 3506-1 A4-70
Measuring cell filling	
• Mounting flange fill fluid	Silicone oil
Process connection	
• Plus side	Flange as per EN and ASME
• Minus side	$1/4$ -18 NPT female thread and flange connection with mounting thread M10 in accordance with DIN 19213 (M12 for MAWP 420 bar (6092 psi)) or $7/16$ -20 UNF in accordance with EN 61518
Electrical connection	
	Screw terminals
	Cable inlet using the following screwed joints:
	- M20 x 1.5 $1/2$-14 NPT - Han 7D/Han 8D connector¹⁾ - M12 connector

¹⁾ Han 8D is identical to Han 8U.

8.5 Torques

Torques	
Connecting terminals	
• Connecting terminals in the connection compartment	1.5 Nm (1.1 ft lb)
• External ground terminal on enclosure	
Cable glands/blanking plugs	
• Screw-in torque for plastic gland in all enclosures	4 Nm (3 ft lb)
• Screw-in torque for metal/stainless steel glands in aluminum/stainless steel enclosure	6 Nm (4.4 ft lb)
• Screw-in torque for NPT adapter made of metal/stainless steel in aluminum/stainless steel enclosure	15 Nm (11.1 ft lb)
• Tightening torque for union nut made of plastic	2.5 Nm (1.8 ft lb)
• Tightening torque for union nut made of metal/stainless steel	4 Nm (3 ft lb)
Screws for mounting bracket (option)	
• Tightening torque for thread M8 or $\frac{5}{16}$ -24 UNF	18 Nm (13.2 ft lb)
• Tightening torque for thread M10 or $\frac{7}{16}$ -20 UNF	36 Nm (26.5 ft lb)
Retaining screws for rotation of the enclosure	
• Tightening torque for aluminum enclosure	3.8 Nm (2.8 ft lb)
• Tightening torque for stainless steel enclosure	3.5 Nm (2.5 ft lb)
Screws for safety catch	
• Tightening torque for aluminum enclosure	0.88 Nm (0.65 ft lb)

8.6 Display, keys and auxiliary power

Display and buttons	
Keys	4 buttons for operation directly on the device
Display	• With or without integrated display (optional) • Cover with glass pane (option)

Auxiliary power U_H		
	HART	PROFIBUS PA/FOUNDATION Fieldbus
Terminal voltage on pressure transmitter	• DC 10.5 V ... 45 V • In the case of intrinsically safe operation 10.5 V ... 30 V DC	-
Auxiliary power	-	Bus-powered
Separate supply voltage	-	-

Auxiliary power U_H		
	HART	PROFIBUS PA/FOUNDATION Fieldbus
Bus voltage		
• Not 	–	9 ... 32 V
• With intrinsically safe operation	–	9 ... 24 V
Current consumption		
• Max. basic current	–	12.5 mA
• Starting current $\leq$ basic current	–	Yes
• Max. current in event of fault	–	15.5 mA
Fault disconnection electronics (FDE) available	–	Yes
Overvoltage protection up to 6 kV (internal)		
Note	Devices with internal overvoltage protection up to 6 kV do not pass the high voltage test with 700 V DC according to IEC 60079-11. For further information, see the associated certificate for explosion protection.	

8.7 Certificates and approvals

8.7.1 ATEX

Explosion protection in accordance with ATEX	HART	PROFIBUS PA/FOUNDATION Fieldbus
Certificates	BVS 18 ATEX E049X 23UKEx xxxx X	
• Intrinsic safety "i"		

8.7 Certificates and approvals

Explosion protection in accordance with ATEX	HART	PROFIBUS PA/FOUNDATION Fieldbus
Designation	II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb II 2G Ex ib IIC T4/T6 Gb	II 1/2G Ex ia IIC T4/T6 Ga/Gb II 2G Ex ib IIC T4/T6 Gb II 3G Ex ic IIC T4/T6 Gc
Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) Temperature class T4 -40 ... +55 °C (-40 ... +158 °F) Temperature class T6	-40 ... +75 °C (-40 ... +167 °F) temperature class T4 -40 ... +50 °C (-40 ... +122 °F) temperature class T6
Permissible temperature of medium	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6	
Connection	To a certified intrinsically safe circuit with the max. values: $U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$ $U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$	FISCO - ia/ib: $U_i = 17.5 \text{ V}$, $I_i = 380 \text{ mA}$, $P_i = 5.32 \text{ W}$ - ic: $U_i = 17.5 \text{ V}$, $I_i = 570 \text{ mA}$ Linear barrier - ia/ib: $U_i = 24 \text{ V}$, $I_i = 174 \text{ mA}$, $P_i = 1.0 \text{ W}$ - ic: $U_i = 32 \text{ V}$, $I_i = 132 \text{ mA}$, $P_i = 1.0 \text{ W}$
Effective inner capacitance	$C_i = 3.29 \text{ nF}$	$C_i = 1.1 \text{ nF}$
Effective inner inductance	$L_i = 0.24 \text{ }\mu\text{H}$	$L_i = 4.8 \text{ }\mu\text{H}$
• Flameproof enclosure encapsulation "d"		
Designation	II 1/2G Ex ia/db IIC T4/T6 Ga/Gb II 2G Ex db ia IIC T4/T6 Gb	
Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6	
Permissible temperature of medium	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6	
Connection	To a circuit with the operating values: $U_H = 10.5 \dots 45 \text{ V DC}$, $4 \dots 20 \text{ mA}$	To a circuit with the operating values: $U_H = 9 \dots 24 \text{ V DC}$
• Dust explosion protection for zones 21, 22		
Designation	II 2D Ex tb IIIC T120 °C Db II 3D Ex tc IIIC T120 °C Dc	
Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)	
Permissible temperature of medium	-40 ... +100 °C (-40 ... +212 °F)	
Max. surface temperature	120°C (248°F)	
Connection	To a circuit with the operating values: $U_H = 10.5 \dots 45 \text{ V DC}$, $4 \dots 20 \text{ mA}$	To a circuit with the operating values: $U_H = 9 \dots 24 \text{ V DC}$
• Dust explosion protection for Zone 20		

Explosion protection in accordance with ATEX		HART	PROFIBUS PA/FOUNDATION Fieldbus
Designation		II 1D Ex ia IIIC T120 °C Da	
Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)	-40 ... +75 °C (-40 ... +167 °F)	
Permissible temperature of medium	-40 ... +100 °C (-40 ... +212 °F)		
Connection	To a certified intrinsically safe circuit with the max. values: $U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$ $U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$	FISCO • ia/ib: $U_i = 17.5 \text{ V}$, $I_i = 380 \text{ mA}$, $P_i = 5.32 \text{ W}$ • ic: $U_i = 17.5 \text{ V}$, $I_i = 570 \text{ mA}$ Linear barrier • ia/ib: $U_i = 24 \text{ V}$, $I_i = 174 \text{ mA}$, $P_i = 1.0 \text{ W}$ • ic: $U_i = 32 \text{ V}$, $I_i = 132 \text{ mA}$, $P_i = 1.0 \text{ W}$	
Effective inner capacitance	$C_i = 3.29 \text{ nF}$	$C_i = 1.1 \text{ nF}$	
Effective inner inductance	$L_i = 0.24 \text{ }\mu\text{H}$	$L_i = 4.8 \text{ }\mu\text{H}$	
• Type of protection for Zone 2			
Designation		II 3G Ex ec IIC T4/T6 Gc	
Permissible ambient temperature "ec"	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +40 °C (-40 ... +104 °F) temperature class T6		
Permissible temperature of medium	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6		
Connection "ec"	To a circuit with the operating values: $U_n = 10.5 \text{ to } 45 \text{ V}$, $4 \text{ ... } 20 \text{ mA}$	To a circuit with the operating values: $U_H = 9 \text{ ... } 24 \text{ V DC}$	

8.7.2 FM/cCSAus

Explosion protection in accordance with FM (USA)	HART	PROFIBUS PA/FOUNDATION Fieldbus
FM19US0155X	The permissible operating values are specified in the certificate (http://www.siemens.com/processinstrumentation/certificates).	

Explosion protection in accordance with FM (USA)	HART	PROFIBUS PA/FOUNDATION Fieldbus
Order variants	Designation	
7MF0...-.....-B..-Z	CL I, DIV 1, Gr. A, B, C, D (IS); T6/T4	CL I, DIV 1, Gr. A, B, C, D (IS); T6/T4 CL I, DIV 2, Gr. A, B, C, D (NI); T6/T4
	CL I, ZN 0, AEx ia IIC T6/T4 Ga	CL I, ZN 0, AEx ia IIC T6/T4 Ga
	CL I, ZN 1, AEx ib IIC T6/T4 Gb	CL I, ZN 1, AEx ib IIC T6/T4 Gb
		CL I, ZN 2, AEx ic IIC T6/T4 Gc
7MF0...-.....-C..-Z		CL I, DIV 1, Gr. A, B, C, D (XP); T6/T4 CL I, ZN 0/1, AEx ia/db IIC T6/T4 Ga/Gb
7MF0...-.....-D..-Z	CL I, DIV 1, Gr. A, B, C, D (IS); T6/T4	CL I, DIV 1, Gr. A, B, C, D (IS); T6/T4 CL I, DIV 2, Gr. A, B, C, D (NI); T6/T4
	CL I, ZN 0, AEx ia IIC T6/T4 Ga	CL I, ZN 0, AEx ia IIC T6/T4 Ga CL I, ZN 2, AEx ic IIC T6/T4 Gc
	CL I, DIV 1, Gr. A, B, C, D (XP); T6/T4	CL I, DIV 1, Gr. A, B, C, D (XP); T6/T4
	CL I, ZN 0/1, AEx ia/db IIC T4/T6 Ga/Gb	CL I, ZN 0/1, AEx ia/db IIC T4/T6 Ga/Gb
7MF0...-.....-L..-Z		CL I, DIV 2, Gr. A, B, C, D (NI) ; T6/T4 CL I, ZN 2, AEx ec IIC T6/T4 Gc CL II, DIV 2, Gr. E, F, G; CL III (NI); T4 ZN 21, AEx tb IIIC T120°C Db ZN 22, AEx tc IIIC T120°C Dc
7MF0...-.....-M..-Z	CL I, DIV 1, Gr. A, B, C, D (IS); T6/T4	CL I, DIV 1, Gr. A, B, C, D (IS); T6/T4
	CL I, DIV 2, Gr. A, B, C, D (NI); T6/T4	CL I, DIV 2, Gr. A, B, C, D (NI); T6/T4
	CL I, ZN 0, AEx ia IIC T6/T4 Ga	CL I, ZN 0, AEx ia IIC T6/T4 Ga CL I, ZN 2, AEx ic IIC T6/T4 Gc
	CL I, ZN 2, AEx ec IIC T6/T4 Gc	CL I, ZN 2, AEx ec IIC T6/T4 Gc
	CL II, DIV 1, Gr. E, F, G; CL III (IS); T6/T4	CL II, DIV 1, Gr. E, F, G; CL III (IS); T6/T4
	ZN 20, AEx ia IIIC T120°C Da	ZN 20, AEx ia IIIC T120°C Da
	CL II, DIV 2, Gr. E, F, G; CL III (NI); T4	CL II, DIV 2, Gr. E, F, G; CL III (NI); T4
	ZN 21, AEx tb IIIC T120°C Db	ZN 21, AEx tb IIIC T120°C Db
7MF0...-.....-S..-Z	CL I, ZN 0/1, AEx ia/db IIC T6/T4 Ga/Gb	CL I, ZN 0/1, AEx ia/db IIC T6/T4 Ga/Gb
	CL I, ZN 0, AEx ia IIC T6/T4 Ga	CL I, ZN 0, AEx ia IIC T6/T4 Ga CL I, ZN 2, AEx ic IIC T6/T4 Gc
	CL I, ZN 2, AEx ec IIC T6/T4 Gc	CL I, ZN 2, AEx ec IIC T6/T4 Gc
	ZN 21, AEx tb IIIC T120°C Db	ZN 21, AEx tb IIIC T120°C Db
7MF0...-.....-T..-Z	CL I, DIV 1, Gr. A, B, C, D (XP); T6/T4	CL I, DIV 1, Gr. A, B, C, D (XP); T6/T4
	CL I, ZN 0/1, AEx ia/db IIC T6/T4 Ga/Gb	CL I, ZN 0/1, AEx ia/db IIC T6/T4 Ga/Gb
	CL I, DIV 1, Gr. A, B, C, D (IS); T6/T4	CL I, DIV 1, Gr. A, B, C, D (IS); T6/T4
	CL I, DIV 2, Gr. A, B, C, D (NI); T6/T4	CL I, DIV 2, Gr. A, B, C, D (NI); T6/T4
	CL I, ZN 0, AEx ia IIC T6/T4 Ga	CL I, ZN 0, AEx ia IIC T6/T4 Ga CL I, ZN 2, AEx ic IIC T6/T4 Gc
	CL I, ZN 2, AEx ec IIC T6/T4 Gc	CL I, ZN 2, AEx ec IIC T6/T4 Gc
	CL II, DIV 2, Gr. E, F, G; CL III (NI); T4	CL II, DIV 2, Gr. E, F, G; CL III (NI); T4

8.7 Certificates and approvals

Explosion protection in accordance with FM (USA)		HART	PROFIBUS PA/FOUNDATION Fieldbus
		ZN 21, AEx tb IIIC T120°C Db	ZN 21, AEx tb IIIC T120°C Db
Special conditions for use			
- For type of protection "db": When used as a partition wall device at areas that require EPL Ga, a power supply is required which is safely isolated from earth. This can be achieved, for example, by use of a SELV power supply unit. - Potential electrostatic charging hazard: Cleaning of enclosure surfaces should be done with damp cloth. - The enclosure shall not be installed in areas with intensive charging processes. - For type of protection "ec": Transient protection shall be provided that is set at a level not exceeding 140 % of the peak rated voltage value at the supply input. - For type of protection "ec", the equipment shall only be used in an area of at least pollution degree 2, as defined in IEC 60664-1. - For type of protection "db", repairs on flame-proof joints can only be done by the original manufacturer. - The variant with overvoltage protection 6kV (order option D70) cannot withstand the dielectric strength test with AC voltage. The dielectric strength test shall be performed with a test voltage of 500 VDC for one minute. - The plug connection type HAN 7D/8U (A32, A33, A36, A37, A41) and type M12 (A62, A63) and type M12 Anheuser Busch plug (L34) may only be operated as part of an intrinsically safe circuit of up to 30 V maximum. Models containing these plugs are only permitted to be used in hazardous Gas environments, not Dust environments.			
Explosion protection in accordance with cCSAus (Canada/USA)			
CSA18CA70163103X		The permissible operating values can be found in the certificate.	
Marking (XP/DIP) or (IS); (NI)	According to CSA Standards	Ex ia/db IIC T4/T6 Ga/Gb Ex ia IIC T4/T6 Ga Ex ia IIIC T120°C Da Ex tb IIIC T120°C Db Ex ec IIC T4/T6 Gc Class I, DIV 1, Gr. A-D (Explosion Proof) Intrinsically Safe (IS) for Class I, DIV 1, Gr. A-D (Intrinsically Safe (IS)) Class II, DIV 2, Gr. E-G; Class III Class I, DIV 2, Gr. A-D (NI)	
	According to US Standards	Class I, Zone 0/1, AEx ia/db IIC T4/T6 Ga/Gb Class I, Zone 0, AEx ia IIC T4/T6 Ga Zone 20, AEx ia IIIC T120°C Da Zone 21, A/Ex tb IIIC T120°C Db Class I, Zone 2, AEx ec IIC T4/T6 Gc Class I, DIV 1 Gr. A-D (Explosion proof (XP)) Class I, DIV 1 Gr. A-D (Intrinsically Safe (IS)) Class II, DIV 2, Gr. E-G; Class III Class I, DIV 2, Gr. A-D (NI)	

8.7.3 Explosion protection for Japan

CSAUK 23JPN108X for Ex db ia IIC T4 Gb

CSAUK 23JPN109X for Ex db ia IIC T6 Gb



Figure 8-1 Example

8.7.4 Further certificates for explosion protection

Further certificates for explosion protection

Explosion protection in accordance with NEPSI (China)
GYJ19.1058X

The permissible operating values and markings can be found in the certificate (<http://www.siemens.com/processinstrumentation/certificates>).

Explosion protection in accordance with INMETRO (Brazil)

BRA-18-GE-0035X

Explosion protection in accordance with EAC (Russia)

TC RU C-DE.AA87.B.01202

Explosion protection in accordance with IECEx

IECEx BVS 18.0038X

Explosion protection in accordance with UKCA
Available soon

Product documentation and support

A.1 Product documentation

Process instrumentation product documentation is available in the following formats:

- Certificates (<http://www.siemens.com/processinstrumentation/certificates>)
- Downloads (firmware, EDDs, software) (<http://www.siemens.com/processinstrumentation/downloads>)
- Catalog and catalog sheets (<http://www.siemens.com/processinstrumentation/catalogs>)
- Manuals (<http://www.siemens.com/processinstrumentation/documentation>)
You have the option to show, open, save, or configure the manual.
 - "Display": Open the manual in HTML5 format
 - "Configure": Register and configure the documentation specific to your plant
 - "Download": Open or save the manual in PDF format
 - "Download as html5, only PC": Open or save the manual in the HTML5 view on your PC

You can also find manuals with the Mobile app at Industry Online Support (<https://support.industry.siemens.com/cs/ww/de/sc/2067>). Download the app to your mobile device and scan the device QR code.

Product documentation by serial number

Using the PIA Life Cycle Portal, you can access the serial number-specific product information including technical specifications, spare parts, calibration data, or factory certificates.

Entering a serial number

1. Open the PIA Life Cycle Portal (<https://www.pia-portal.automation.siemens.com>).
2. Select the desired language.
3. Enter the serial number of your device. The product documentation relevant for your device is displayed and can be downloaded.

To display factory certificates, if available, log in to the PIA Life Cycle Portal using your login or register.

Scanning a QR code

1. Scan the QR code on your device with a mobile device.
2. Click "PIA Portal".

To display factory certificates, if available, log in to the PIA Life Cycle Portal using your login or register.

A.2 Technical support

Technical support

If this documentation does not completely answer your technical questions, you can enter a Support Request (<http://www.siemens.com/automation/support-request>).

For help creating a support request, view this video here.

Additional information on our technical support can be found at Technical Support (<http://www.siemens.com/automation/csi/service>).

Service & support on the Internet

In addition to our technical support, Siemens offers comprehensive online services at service & support (<http://www.siemens.com/automation/serviceandsupport>).

Contact

If you have further questions about the device, contact your local Siemens representative at Personal Contact (<http://www.automation.siemens.com/partner>).

To find the contact for your product, go to "all products and branches" and select "Products & Services > Industrial automation > Process instrumentation".

Contact address for business unit:

Siemens AG
Digital Industries
Process Automation
Östliche Rheinbrückenstr. 50
76187 Karlsruhe, Germany

Sealing plug / thread adapter

B.1 Intended use of accessory part

The sealing plug and the thread adapter (components) are suitable for installation in electrical equipment of flameproof enclosure "Ex db" type of protection of groups IIA, IIB and IIC as well as dust protection by enclosure "Ex tb" type of protection.

B.2 Safety instructions for accessory part

 WARNING Incorrect assembly - The component can be damaged or destroyed or its functionality impaired through incorrect assembly. - Mount the component using a suitable tool. Refer to the information in Chapter "Technical specifications of accessory part (Page 94)", for example, torques for installation. - For "Explosion-proof Ex d" type of protection: To ensure an engagement depth of 8 mm, the enclosure must have a wall thickness of at least 10 mm. Improper modifications Danger to personnel, system and environment can result from modifications and repairs of the component, particularly in hazardous areas. - Any modification which deviates from the delivery state is not permitted. Loss of enclosure type of protection IP protection is not guaranteed without sealant. - Use a suitable thread sealant. - If you are using the component in type of protection dust protection by enclosure "Ex t", use the supplied sealing ring (①, figure in Chapter "Dimension drawings (Page 95)"). Unsuitable fluids in the environment Danger of injury or damage to device. Aggressive media in the environment can damage the sealing ring. Type of protection and device protection may no longer be guaranteed. - Make sure that the sealing material is suitable for the area of use.
--

Note**Loss of type of protection**

Changes in the ambient conditions can loosen the component.

- As part of the recommended maintenance intervals: Check the compression fitting for tight fit and tighten, if necessary.

B.3 IECEx/ATEX

Special conditions for use

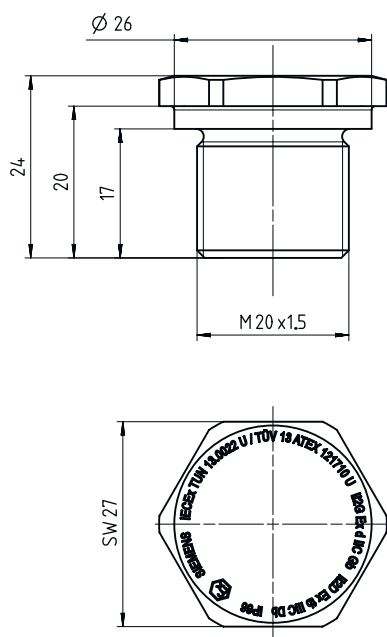
1. The sealing plug and the threaded adapter must be secured against twisting by a suitable twist-proof device.
2. The range of ambient temperature is $-40 \leq T_s \leq +100$ °C.
3. When installed in a non-metallic/non-conductive housing, conformity must be confirmed:
 - Section 7.5 of IEC 60079-0:2017/COR1:2020 for IECEx
 - Section 7.5 of EN IEC 60079-0:2018/AC:2020-02 for ATEX
4. For "Flameproof enclosure Ex d" type of protection: To ensure a screw-in depth of 8 mm, the enclosure must have a wall thickness of at least 10 mm.
5. Use a maximum of one threaded adapter per insertion.
6. A sealing plug must not be used with an adapter.
7. For installation in threaded holes, the sealing surface of the enclosure must be smooth and the threaded hole must be perpendicular to the wall.
8. Protection by enclosure "Ex t": The permissible range of ambient temperature of the AFM 30 seal is -40 °C $\leq T_s \leq +90$ °C.

B.4 Technical specifications of accessory part

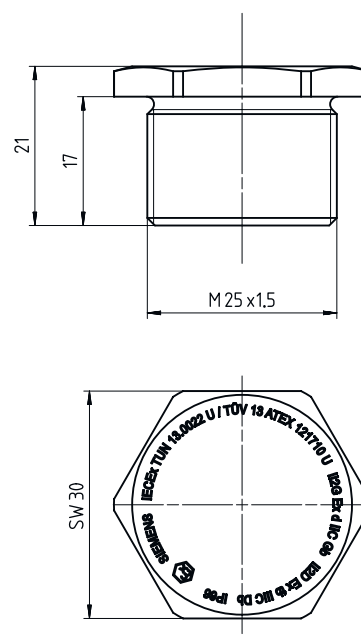
Technical specifications sealing plug and thread adapter	
Sealing plug suitable for types of protection	Explosion-proof enclosure "db" of groups IIA, IIB, IIC Dust protection by enclosure "tb"
Standard compliance	The components meet Directive 2014/34/EU. They meet the requirements of standards IEC/EN 60079-0; IEC/EN 60079-1; IEC/EN 60079-31.
Explosion protection	
• Gas explosion protection	II2G Ex db IIC Gb
• Dust explosion protection	II2D Ex tb IIIC Db
Certificates	IECEx TUN 13.0022 U TÜV 13 ATEX 121710 U
Material for sealing plug / thread adapter	Stainless steel

Technical specifications sealing plug and thread adapter

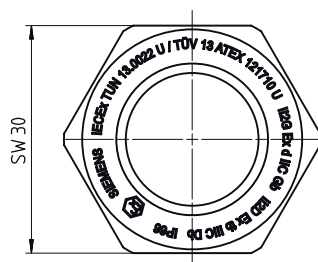
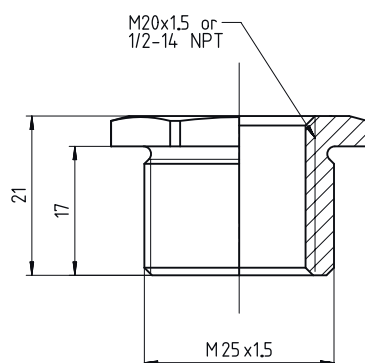
Material for seal	AFM 30
Ambient temperature range	-40 ... +100 °C (-40 ... +212 °F) For dust protection by enclosure "Ex t" type of protection: -40 ... +90 °C (-40 ... +194 °F)
For "Ex d" type of protection: Required wall thickness for tappings	10 mm
Torque	
• For thread size M20 x 1.5	40 Nm
• For thread size M25 x 1.5	55 Nm
• For thread size ½-14 NPT	95 Nm
Width A/F for thread size M20 x 1.5	27
Width A/F for thread size M25 x 1.5	30
Key size for thread size ½-14 NPT	10

B.5 Dimension drawings

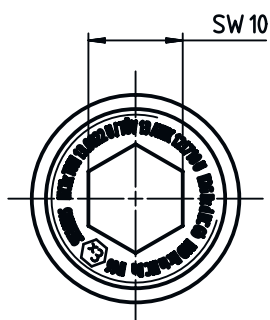
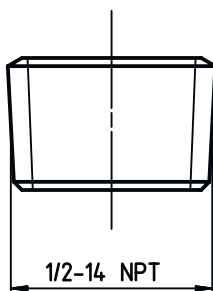
Sealing plug Ex d, M20 x 1.5, dimensions in mm



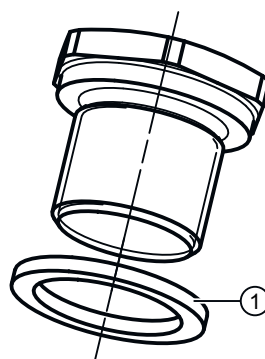
Sealing plug Ex d, M25 x 1.5, dimensions in mm



Thread adapter Ex d, M25 x 1.5 on M20 x 1.5 and
M25 x 1.5 on 1/2-14 NPT, dimensions in mm



Sealing plug Ex d 1/2 -14 NPT



① Sealing ring: Use for dust protection "Ex t" type of protection.

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