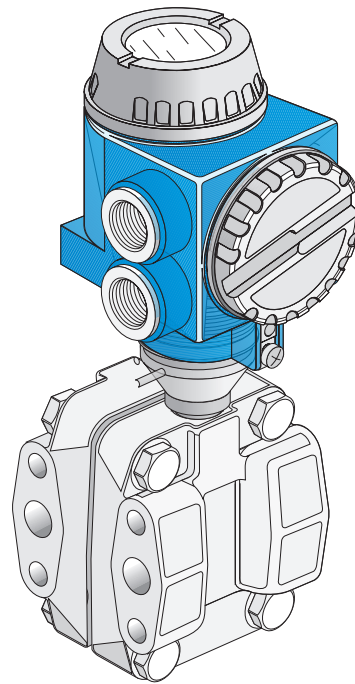
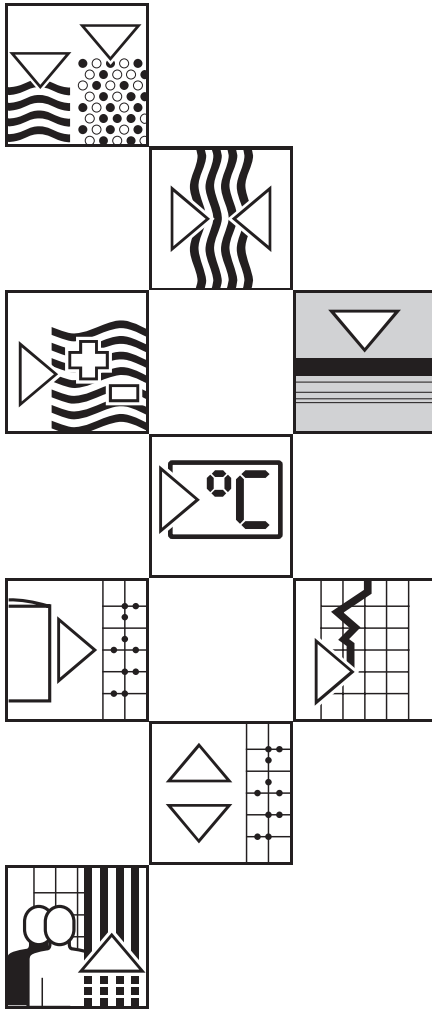
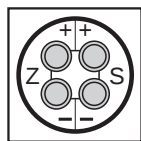


deltabar S PROFIBUS-PA Differential Pressure Measurement

Operating Instructions



Short Operating Instructions

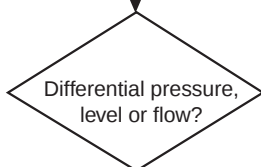
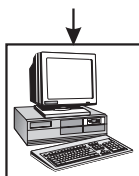


Commissioning on-site

- Differential pressure
 - Level
 - Flow
- Chapters 4.1 and 5

Remote operation via Commuwin II

Chapters 4.2, 6, 7 and 8

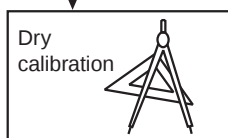
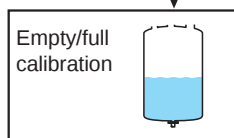


Differential pressure Chapter 6

- Calibration
- Damping
- Locking/unlocking the operation
- Measuring point information

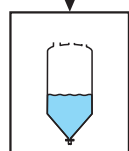
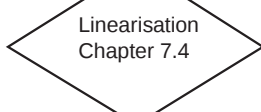
Level Chapter 7

- Calibration
- Density correction



Flow Chapter 8

- Calibration
- Creep flow suppression
- Damping
- Locking/unlocking the operation
- Measuring point information



- Damping
- Locking/unlocking the operation
- Measuring point information

Table of Contents

Software History	4	8	Flow Measurement	61
Notes on Safety	5		8.1 Calibration via Commuwin II	61
1 Introduction	7		8.2 Damping	66
1.1 Measuring system	9		8.3 Locking/Unlocking the operation	66
2 Installation	10		8.4 Totalizer	67
2.1 Measuring system for differential pressure measurement	10		8.5 Measuring point information	71
2.2 Measuring system for flow measurement	11	9	Diagnosis and Warnings	72
2.3 Measuring system for level measurement	12		9.1 Diagnosis of errors and warnings	72
2.4 Mounting	14		9.2 Simulation	75
2.5 Electrical connection	16		9.3 Reset	75
3 PROFIBUS-PA Interface	18		9.4 Editing limits	77
3.1 Synopsis	18	10	Maintenance and Repair	80
3.2 Setting the device address	19		10.1 Repair	80
3.3 Device database and type files	20		10.2 Mounting the display	81
3.4 Cyclic data exchange	21		10.3 Exchanging the sensor module and electronics	82
3.5 Acyclic data exchange	24		10.4 Exchanging the transmitter	83
3.6 Data formats	29		10.5 Sensor calibration	84
3.7 Configuration of profile parameters	30		10.6 Replacement parts	85
4 Operation	32	11	Technical Data	86
4.1 On-site operation	32	12	Operating Matrix	90
4.2 Operation with Commuwin II	33		12.1 Matrix Commuwin II	90
5 Commissioning the Measuring Point	34		12.2 Matrix Analog Input Block (AI Transmitter)	91
5.1 Function of manifolds	34		12.3 Description of parameters	92
5.2 Differential pressure measurement	35		Index	98
5.3 Level measurement	37			
5.4 Flow measurement with differential pressure	41			
6 Differential Pressure Measurement	44			
6.1 Calibration via Commuwin II	44			
6.2 Damping	49			
6.3 Locking/Unlocking the operation	49			
6.4 Measuring point information	50			
7 Level Measurement	51			
7.1 Calibration via Commuwin II	51			
7.2 Calibration with reference pressure	54			
7.3 Dry calibration	55			
7.4 Linearisation	56			
7.5 Damping	59			
7.6 Locking/Unlocking the operation	59			
7.7 Measuring point information	60			

Software History

Software	Changes	Significance
1.0	Original Software DPV1 (profile 2.0)	
1.1	– OUT Status codes changed – Slot/Index table changed	
2.0	PROFIBUS-PA version 3.0 (profile 3.0)	PROFIBUS-PA parameter, new matrix fields for Commuwin II V6H0 Ident. number V6H1 Set unit to bus V6H2 Out Value (Analog Input Block) V6H3 Out Status (Analog Input Block) V6H4 Select 2nd cyclic value V6H5 Select V0H0 (Display value) V6H6 Out Value from PLC V6H7 Profile version Two further values can be read cyclically. Data can be sent cyclically to the device. V9H5 Zero correction V9H6 Zero correction value (Display)
2.1	– Corrections in communication stack – Ccorrection of parameter attributes	
2.2	– Corrections in communication stack – Ccorrection of one parameter attribute	



Note!

Note!

Second generation Deltabar S PROFIBUS-PA devices with 3.0 profiles are cyclical downwards compatible with the first generation Deltabar S PROFIBUS-PA devices with 2.0 profiles, i.e. first generation devices can be replaced with second generation devices.

However, to use the additional functions of second generation devices with 3.0 profiles, such as cyclical reading of two additional values, the PLC must be configured with the GSD (EH3x1504.gsd or EH3_1504.gsd).

If the additional functions of the 3.0 profile are not required, the PLC configuration with the first generation GSD (EH__1504.gsd) can be kept.

Notes on Safety

The Deltabar S is a differential pressure transmitter for measuring differential pressure, flow and level.

The Deltabar S has been designed to operate safely in accordance with current technical, safety and EU standards. If installed incorrectly or used for applications for which it is not intended, however, it is possible that application-related dangers may arise, e.g. product overflow due to incorrect installation or calibration. For this reason, the instrument must be installed, connected, operated and maintained according to the instructions in this manual: personnel must be authorised and suitably qualified. The manual must have been read and understood, and the instructions followed. Modifications and repairs to the device are permissible only when they are expressly approved in the manual.

Please pay particular attention to the technical data on the nameplate.

If the device is to be installed in an explosion hazardous area, then the specifications in the certificate as well as all national and local regulations must be observed. The instrument can be delivered with the certificates listed in the table below. The certificate can be identified from the first letter of the order code stamped on the nameplate.

- Ensure that all personnel are suitably qualified.
- Observe the specifications in the certificate as well as national and local regulations.
- Take special care with regard to the grounding of the bus cable screening, see e.g. IEC 60079-14.

Approved usage

Mounting, commissioning, operation

Explosion hazardous areas



Code	Certificate	Explosion protection
A, F, K, S, 3, 5	Standard	none
B, N	ATEX	ATEX II 3 G EEx nA II T6
C, I, L, 6	PTB	ATEX II 1/2 G EEx ia IIC T4/T6
D	PTB	PMD 235: ATEX II 1/2 G EEx ia IIC T4/T6, Zone 0
T	PTB	ATEX II 2 G EEx d IIC T4/T6
W	FM	IS Class I, II, III, Div. 1, Groups A...G
2	CSA	IS Class I, II, III, Div. 1, Groups A...G

Certificates for applications in explosion hazardous areas

Safety Conventions and Symbols

In order to highlight safety-relevant or alternative operating procedures in the manual, the following conventions have been used, each indicated by a corresponding icon in the margin.

Safety conventions

Symbol	Meaning
 Note!	Note! A note highlights actions or procedures which, if not performed correctly, may indirectly affect operation or may lead to an instrument response which is not planned.
 Caution!	Caution! Caution highlights actions or procedures which, if not performed correctly, may lead to personal injury or incorrect functioning of the instrument.
 Warning!	Warning! A warning highlights actions or procedures which, if not performed correctly, will lead to personal injury, a safety hazard or destruction of the instrument.

Explosion protection

	Device certified for use in explosion hazardous area If the device has this symbol embossed on its name plate it can be installed in an explosion hazardous area.
	Explosion hazardous area Symbol used in drawings to indicate explosion hazardous areas. – Devices located in and wiring entering areas with the designation "explosion hazardous areas" must conform with the stated type of protection.
	Safe area (non-explosion hazardous area) Symbol used in drawings to indicate, if necessary, non-explosion hazardous areas. – Devices located in safe areas still require a certificate if their outputs run into explosion hazardous areas.

Electrical symbols

	Direct voltage A terminal to which or from which a direct current or voltage may be applied or supplied.
	Alternating voltage A terminal to which or from which an alternating (sine-wave) current or voltage may be applied or supplied.
	Grounded terminal A grounded terminal, which as far as the operator is concerned, is already grounded by means of an earth grounding system.
	Protective grounding (earth) terminal A terminal which must be connected to earth ground prior to making any other connection to the equipment.
	Equipotential connection (earth bonding) A connection made to the plant grounding system which may be of type e.g. neutral star or equipotential line according to national or company practice.

1 Introduction

The Deltabar S family of devices is used for the measurement of differential pressure, level and flow in gases, vapours and liquids. They are used in all sectors of industry. You can operate the additional flow and level measurement functions using Commuwin II.

Application

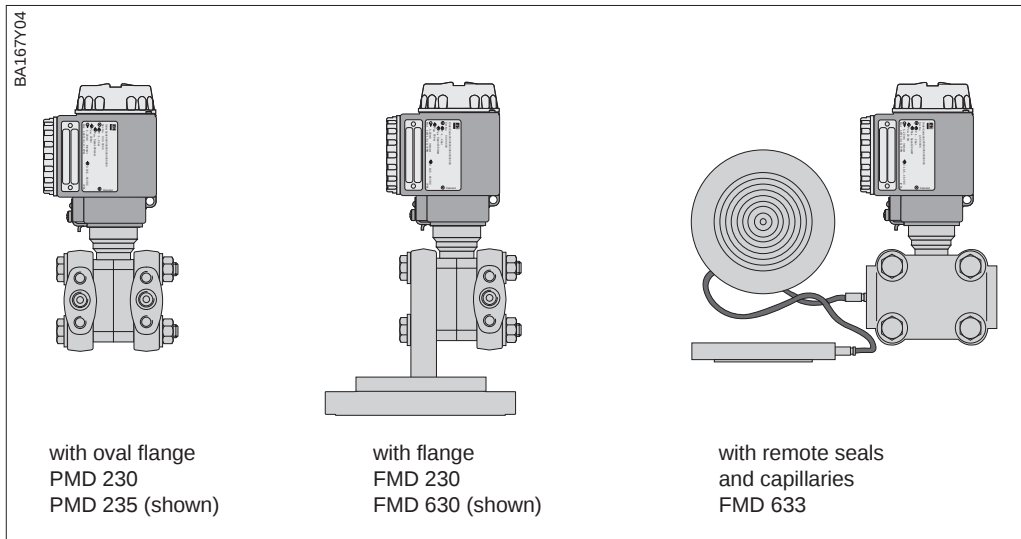


Figure 1.1
Deltabar S versions

Metal sensor

The system pressure deflects the separating diaphragm and a fill fluid transmits the pressure to a resistance bridge. The pressure dependent change in bridge output voltage is measured and processed further.

Operating principle

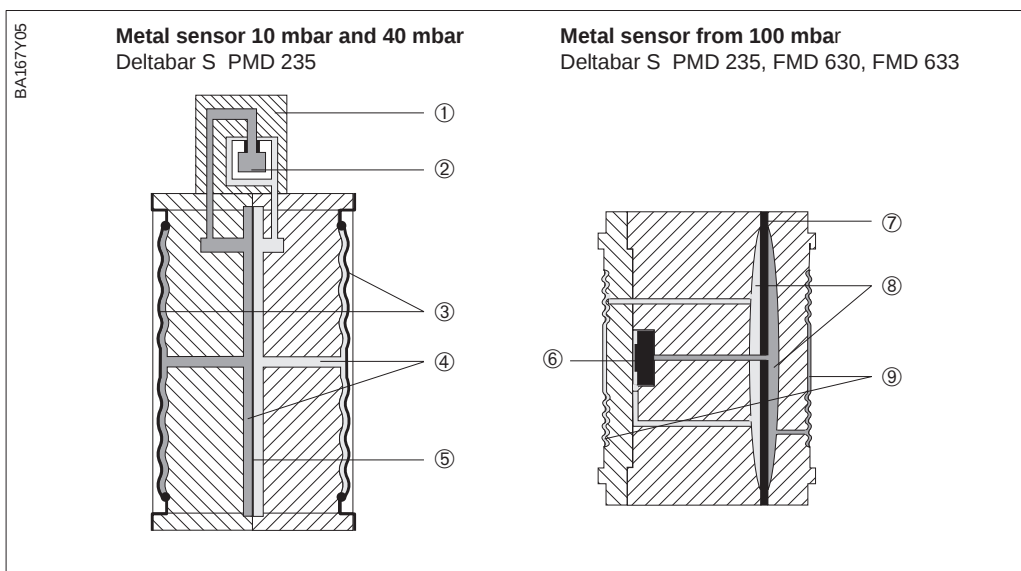


Figure 1.2

Metal sensor 10 mbar, 40 mbar

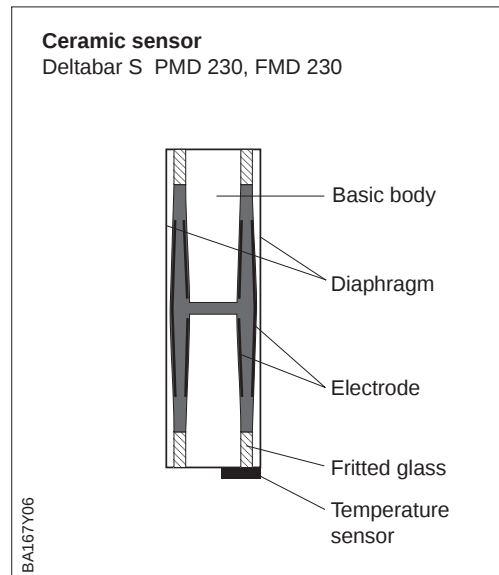
- ① Measuring element
- ② Silicon membran
- ③ Separating diaphragm and membran bed
- ④ Filling fluid
- ⑤ Integrated overload protection

Metal sensor from 100 mbar

- ⑥ Measuring element
- ⑦ Overload diaphragm
- ⑧ Filling fluid
- ⑨ Separating diaphragm and membran bed

Ceramic sensor

The system pressure acts directly on the robust ceramic diaphragm of the pressure sensor and deflects it by maximum 0.025 mm. A change in capacitance proportional to the pressure acting is measured by electrodes on the ceramic substrate and diaphragm. The measuring range is determined by the thickness of the ceramic diaphragm.



1.1 Measuring system

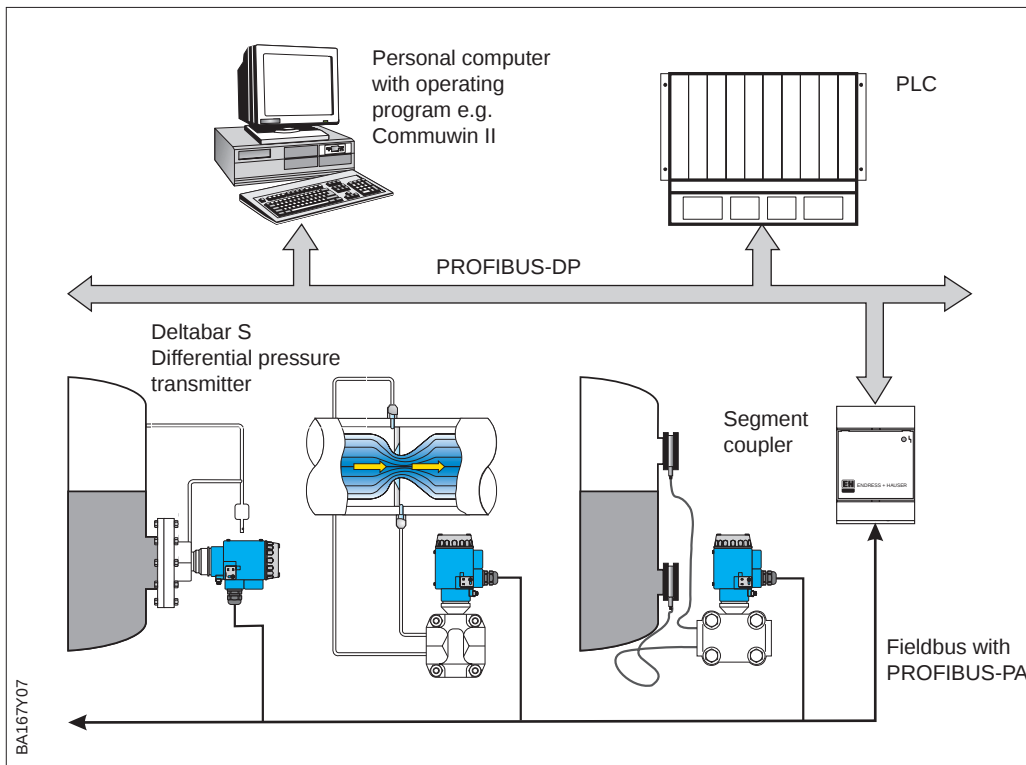


Figure 1.3
Measuring system Deltabar S
with PROFIBUS-PA protocol

In the simplest case, the measuring point comprises:

- Deltabar S with PROFIBUS-PA protocol
- PLC or personal computer with an operating program e.g. Commuwin II
- Segment coupler
- PROFIBUS-PA terminating resistor

Measuring point

The maximum number of transmitter on one bus segment is determined by their consumption, the power of the bus coupler and the required bus length, see Operating Instructions BA 198F/00/en. Normally however:

Number of transmitters

- max. 10 Deltabar S for hazardous area applications
- max. 32 Deltabar S for non-hazardous area applications

can be operated on one bus segment. Deltabar S consumes max. 11 mA per device.

For further information, see Operating Instructions BA 198F "PROFIBUS-DP/-PA: Guidelines for planning and commissioning", the PNO Guidelines or under the Internet address <http://www.PROFIBUS.com> and for operation in hazardous ia areas: EN 50020 (FISCO model).

The sensor overload limits are to be found in Chapter 11 "Technical Data".

Sensor overload limits

2 Installation

This Chapter describes:

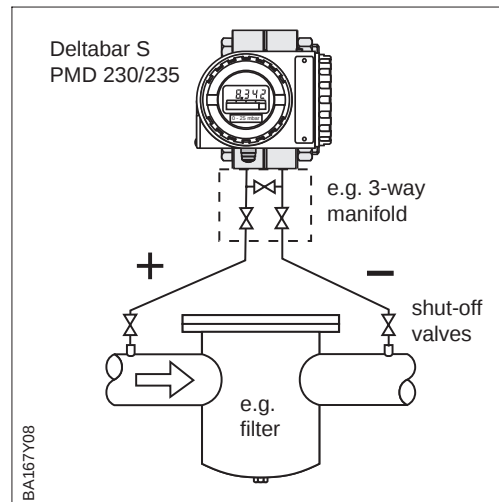
- the measuring set-up of the Deltabar S for the most common installations
- and the electrical connection.

2.1 Measuring system for differential pressure measurement

Note!

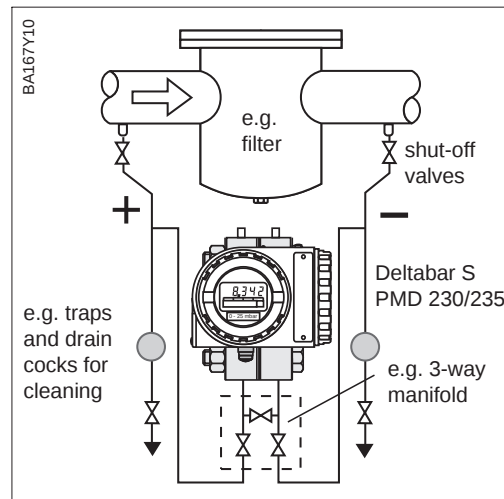
- General recommendations for laying pressure piping may be taken from DIN 19210 "Methods for measurement of fluid flow; differential pressure piping for flow measurement devices" or the appropriate national or international standards.
- Check that pressure piping installed outdoors is adequately insulated and/or heated.

Gases and vapours



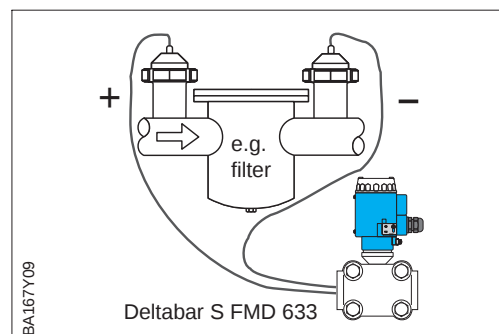
- Mount the Deltabar S above the tapping point, so that condensation can run back into the process piping.
- Use a three-way manifold for simple mounting without interruption of the process.
- Install the pressure piping with a continuous fall of at least 10%.

Liquids



- Mount the Deltabar S below the tapping point, so that the pressure piping is always filled with liquid and gas bubbles can back into the process pipe.
- Use a three-way manifold for simple mounting without interruption of the process.
- Traps prevent the build up of dirt in the pressure piping.
- Install the pressure piping with a continuous fall of at least 10%.

Gases, vapours and liquids with diaphragm seals and capillaries



- FMD 633: Mount the remote seals on flanges above the process pipe.
- For vacuum: Mount the transmitter below the tapping point.
- There should be no temperature difference between the capillaries.
- Always use two identical diaphragm seals (e.g. diameter, material etc.) for the plus and minus sides.

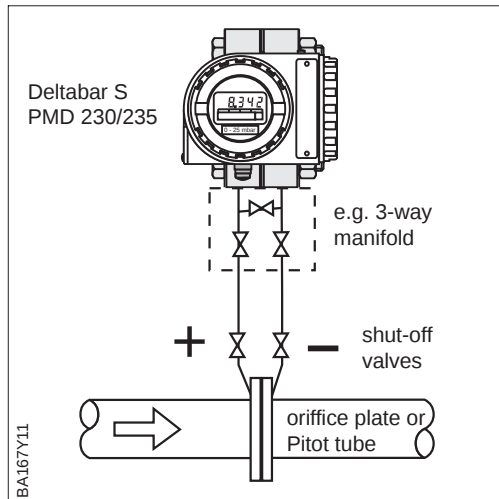
2.2 Measuring system for flow measurement

Note!

General recommendations for laying pressure piping may be taken from DIN 19210 "Methods for measurement of fluid flow; differential pressure piping for flow measurement devices" or the appropriate national or international standards.



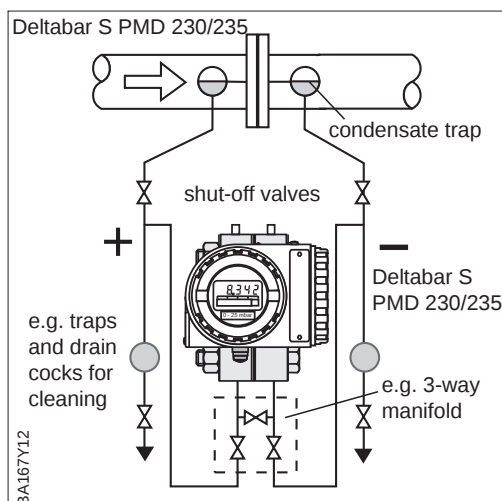
Note!



Measurement with orifice plate or Pitot tube

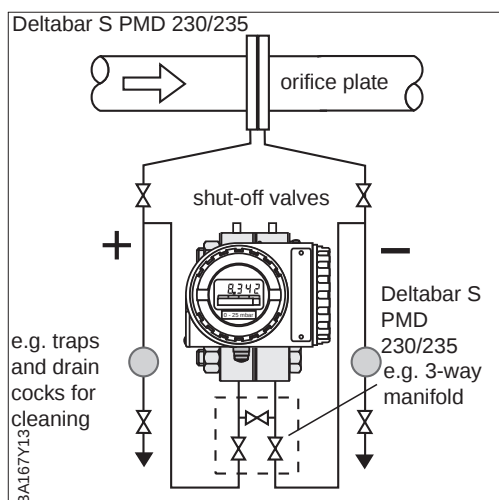
Gases

- Mount the Deltabar S above the tapping point, so that condensation can run back into the process piping.
- Use a three-way manifold for simple mounting without interruption of the process.
- Install the pressure piping with a continuous fall of at least 10%.



- Mount the Deltabar S below the tapping point.
- Mount condensate traps at the same level as the tapping points.
- Before commissioning, fill the pressure piping to the level of the condensate trap.
- Use a three-way manifold for simple mounting without interruption of the process.
- Install the pressure piping with a continuous fall of at least 10%.

Vapours



- Mount the Deltabar S below the tapping point, so that the pressure piping is always filled with liquid and gas bubbles can back into the process pipe.
- Use a three-way manifold for simple mounting without interruption of the process.
- Traps prevent the build up of dirt in the pressure piping.
- Install the pressure piping with a continuous fall of at least 10%.

Liquids

2.3 Measuring system for level measurement

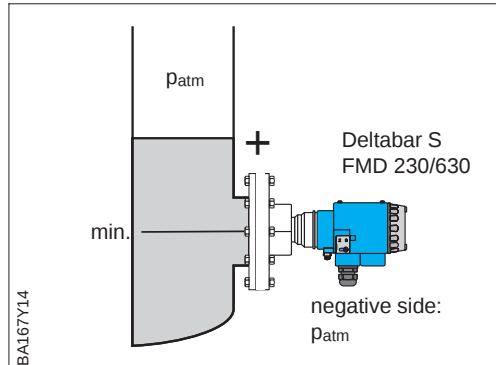


Note!

Note!

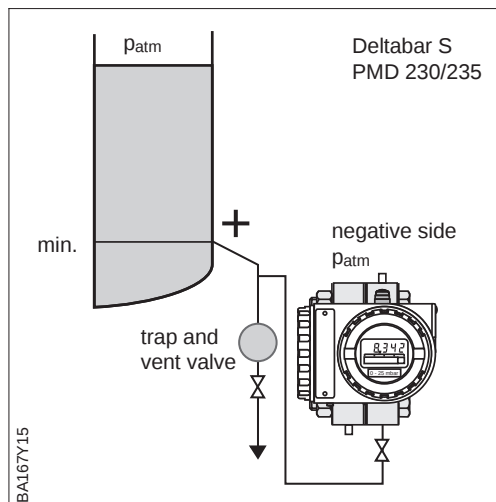
General recommendations for laying pressure piping may be taken from DIN 19210 "Methods for measurement of fluid flow; differential pressure piping for flow measurement devices" or the appropriate national or international standards.

Open tank



FMD 230, FMD 630

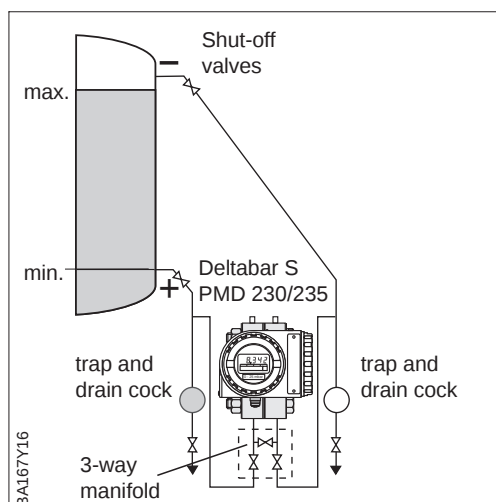
- Mount the Deltabar S direct on the tank.
- The negative side is open to atmosphere pressure.



PMD 230, PMD 235

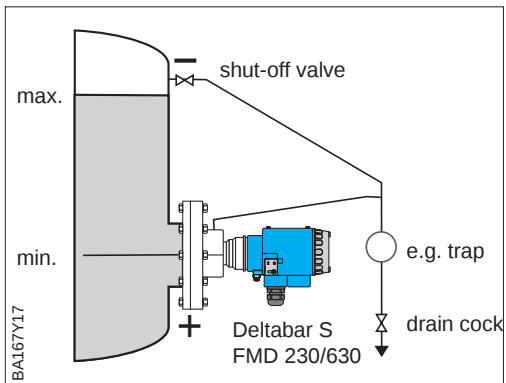
- Mount the Deltabar S below the lower tapping, so that the pressure piping is always filled with liquid.
- The negative side is open to atmosphere pressure.
- A trap prevents the build up of dirt in the pressure piping.
- Install the pressure piping with a continuous fall of at least 10%.

Closed tank

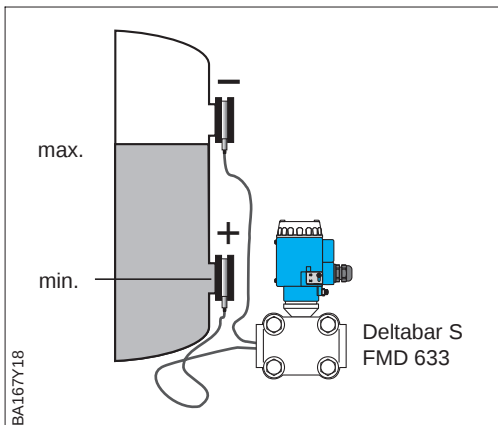


PMD 230, PMD 235

- Mount the Deltabar S below the lower tapping so that the pressure piping is always filled with liquid.
- The negative side must be above the maximum level to be measured.
- Traps prevent the build up of dirt in the pressure piping.
- Use a three-way manifold for simple mounting without interrupting the process.
- Install the pressure piping with a continuous fall of at least 10%.

*FMD 230, FMD 630***Closed tank**

- Mount the Deltabar S direct on the tank.
- The negative side is open to atmosphere pressure.
- A trap prevents the build up of dirt in the pressure piping.
- Install the pressure piping with a continuous fall of at least 10%.

*FMD 633*

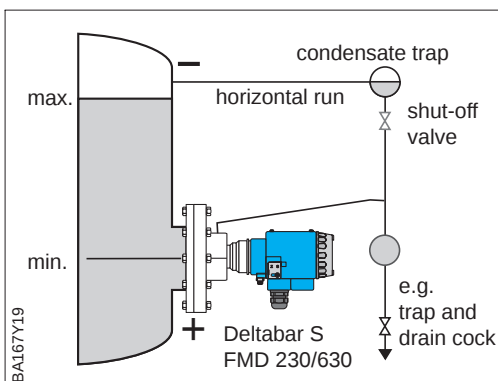
- Mount the Deltabar S below the tapping point.
- Mount the remote seals with capillaries onto the tank.
- Always use two identical diaphragm seals (e.g. diameter, material etc.) for the plus and minus sides.

Note!

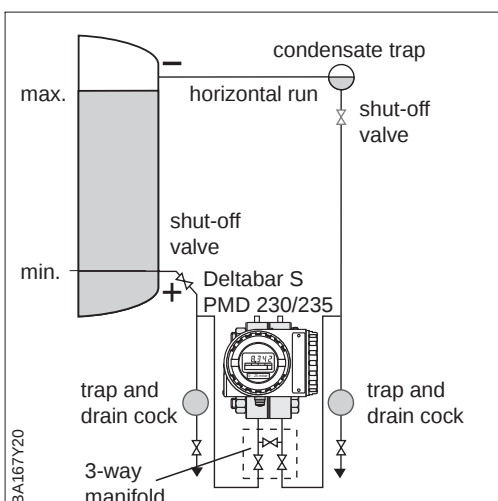
Level measurement can only be carried out between the upper edge of the lower remote seal and the lower edge of the upper remote seal.



Note!

*FMD 230, FMD 630***Closed tank with steaming liquids**

- Mount the Deltabar S direct on the tank.
- The tapping for the negative side must be above the maximum level to be measured.
- A condensate trap ensures constant pressure on the negative side.
- Install the pressure piping with a continuous fall of at least 10%.

*PMD 230, PMD 235*

- Mount the Deltabar S below the lower tapping, so that the pressure piping is always filled with liquid.
- The tapping for the negative side must be above the maximum level to be measured. The condensate trap ensures a constant pressure.
- Traps prevent the build up of dirt in the pressure piping.
- Use a three-way manifold for simple mounting without interruption of the process.
- Install the pressure piping with a continuous fall of at least 10%.

2.4 Mounting

Diaphragm seal

- Do not clean or touch the diaphragm seal with pointed or hard objects.
- Remove the protective cap just before installation.

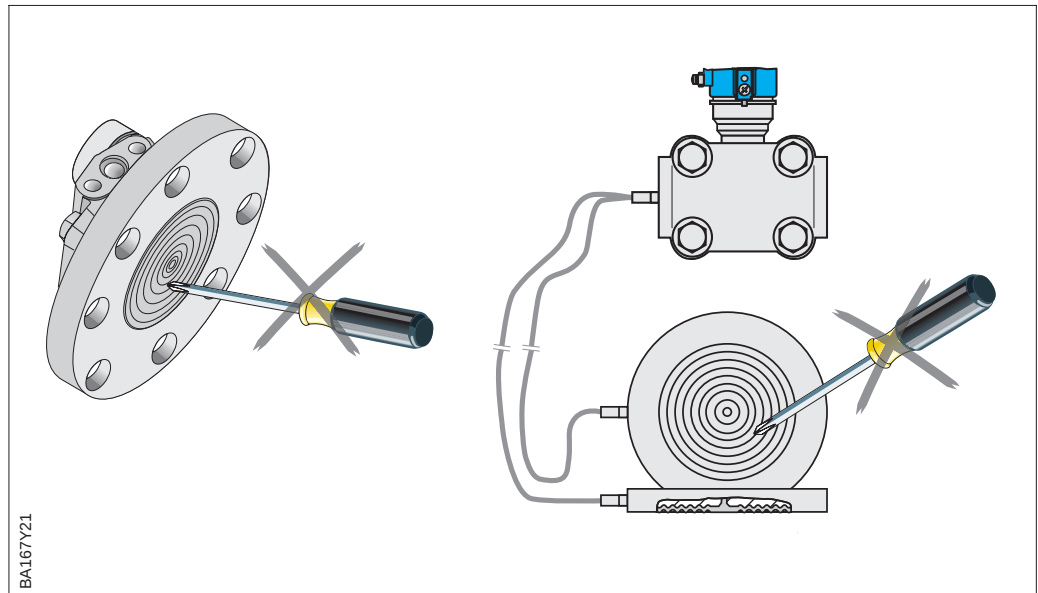


Figure 2.1
Handle diaphragm seals with care!

Seal for flange mounting

The recommended seal depends on the flange: DIN 2690 or ANSI B 16.5.

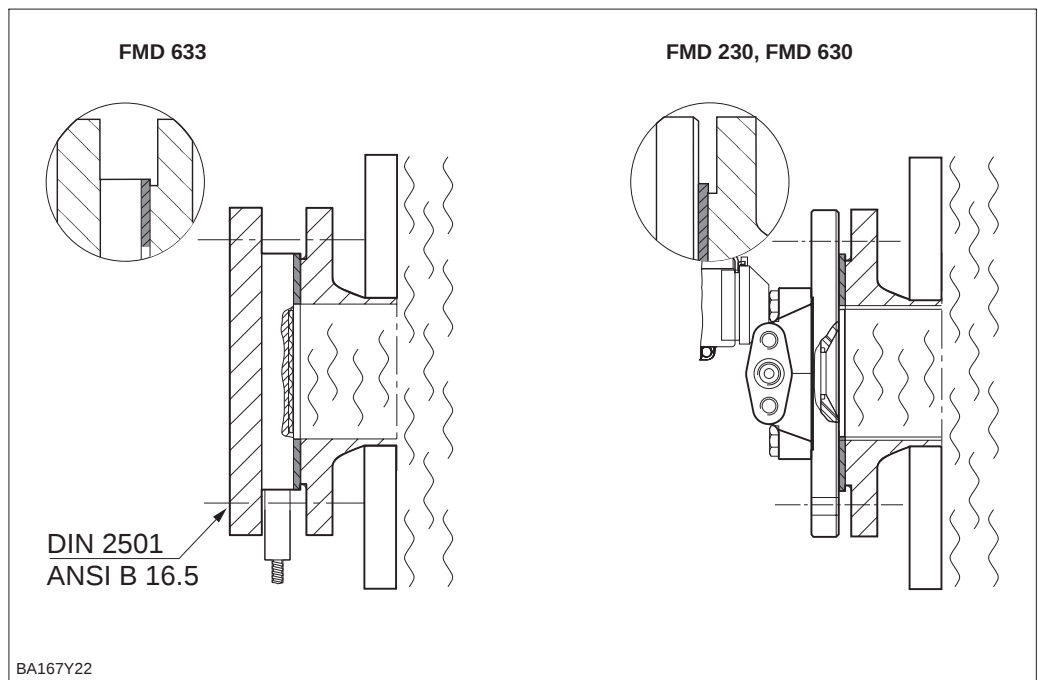


Figure 2.2
Mounting of the version with flange or diaphragm seal
left:
FMD 633 with cell diaphragm seal and capillary lines
right:
FMD 230/FMD 630 with flange connection

If transmitters with remote seals are mounted on vertical pipes, sufficient tension relief must be provided otherwise the capillaries may kink.

Wall and pipe mounting

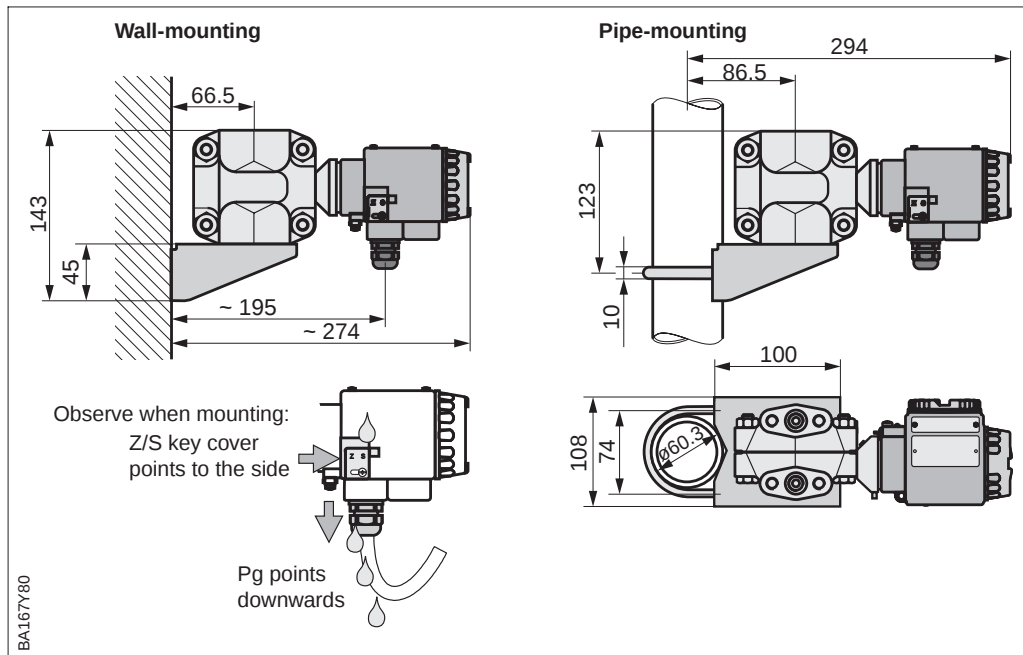


Figure 2.3
Wall- and pipe-mounting



Caution!

Caution!
Mount the housing such that:

- The cable gland always points downwards so that condensatiuon on the connection cable runs off and not into the housing.
- The Z/S key cover points the side so that it's protected from water.

After the Deltabar S has been mounted, the housing can be aligned such that:

- the terminal compartment is easily accessible,
- the display can be easily read,
- the cable gland and the cover of the Z/S keys are protected from water.

Align housing

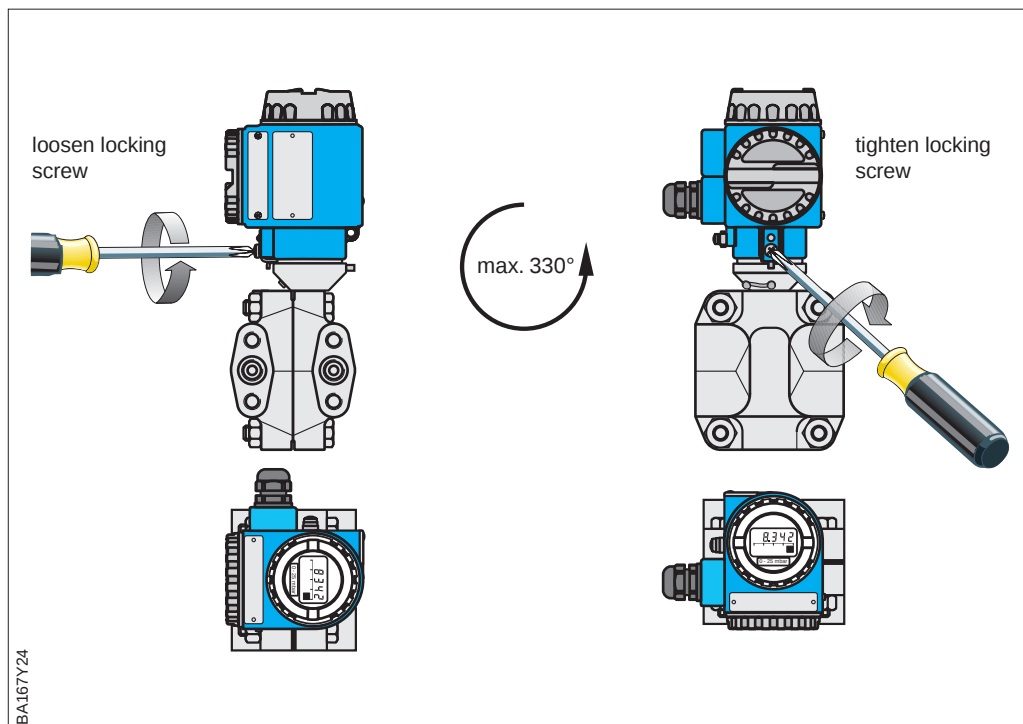


Figure 2.4
Align housing

以上内容仅为本文档的试下载部分，为可阅读页数的一半内容。如要下载或阅读全文，请访问：<https://d.book118.com/367163130051006116>