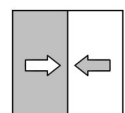




Operating manual

DE23

Differential pressure transmitter



Masthead

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Subject to technical amendments.



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1 Safety guidelines

1.1 General



WARNING

This operating manual contains instructions fundamental to the installation, operation and maintenance of the device that must be observed unconditionally. It must be read by the assembler, operator and the specialized personnel in charge of the instrument before it is installed and put into operation.

This operating manual is an integral part of the product and therefore needs to be kept close to the instrument in a place that is accessible at all times to the responsible personnel.

The following sections, in particular instructions about the assembly, commissioning and maintenance, contain important information, non-observance of which could pose a threat to humans, animals, the environment and property.

The instrument described in these operating instructions is designed and manufactured in line with the state of the art and good engineering practice.

1.2 Personnel Qualification

The instrument may only be installed and commissioned by specialized personnel familiar with the installation, commissioning and operation of this product.

Specialized personnel are persons who can assess the work they have been assigned and recognize potential dangers by virtue of their specialized training, their skills and experience and their knowledge of the pertinent standards.

1.3 Risks due to Non-Observance of Safety Instructions

Non-observance of these safety instructions, the intended use of the device or the limit values given in the technical specifications can be hazardous or cause harm to persons, the environment or the plant itself.

The supplier of the equipment will not be liable for damage claims if this should happen.

1.4 Safety Instructions for the Operating Company and the Operator

The safety instructions governing correct operation of the instrument must be observed. The operating company must make them available to the installation, maintenance, inspection and operating personnel.

Dangers arising from electrical components, energy discharged by the medium, escaping medium and incorrect installation of the device must be eliminated. See the information in the applicable national and international regulations.

Please observe the information about certification and approvals in the Technical Data section.

1.5 Unauthorised Modification

Modifications of or other technical alterations to the instrument by the customer are not permitted. This also applies to replacement parts. Only the manufacturer is authorised to make any modifications or changes.

1.6 Inadmissible Modes of Operation

The operational safety of this instrument can only be guaranteed if it is used as intended. The instrument model must be suitable for the medium used in the system. The limit values given in the technical data may not be exceeded.

The manufacturer is not liable for damage resulting from improper or incorrect use.

1.7 Safe working practices for maintenance and installation work

The safety instructions given in this operating manual, any nationally applicable regulations on accident prevention and any of the operating company's internal work, operating and safety guidelines must be observed.

The operating company is responsible for ensuring that all required maintenance, inspection and installation work is carried out by qualified specialized personnel.

1.8 Pictogram explanation



DANGER

Type and source of danger

This indicates a **direct** dangerous situation that could lead to death or **serious injury** (highest danger level).

- a) Avoid danger by observing the valid safety regulations.



WARNING

Type and source of danger

This indicates a **potentially** dangerous situation that could lead to death or **serious injury** (medium danger level).

- a) Avoid danger by observing the valid safety regulations.



CAUTION

Type and source of danger

This indicates a **potentially** dangerous situation that could lead to slight or serious injury, damage or **environmental pollution** (low danger level).

- a) Avoid danger by observing the valid safety regulations.



NOTICE

Note / advice

This indicates useful information of advice for efficient and smooth operation.

2 Product and functional description

2.1 Delivery scope

- Differential pressure transmitter DE23 ## # # # # R00M #
- Operating Instructions

2.2 Intended use

The DE23 is a differential pressure transmitter for measuring very small over-pressure, under-pressure and differential pressure in neutral, non-corrosive gaseous media.

2.3 Equipment versions

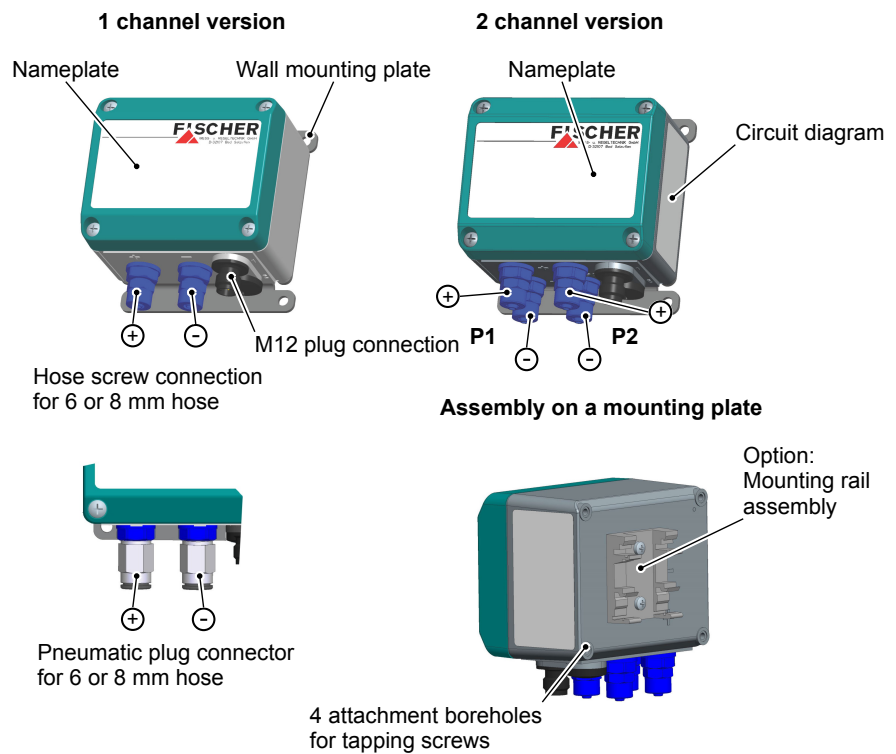


Fig. 1: Equipment versions

Nameplate

The presented type plates serve to show an example of the information shown. The data shown is purely fictive, but does correspond to the actual conditions. For more information, please see the order code at the end of these instructions.

1 channel version

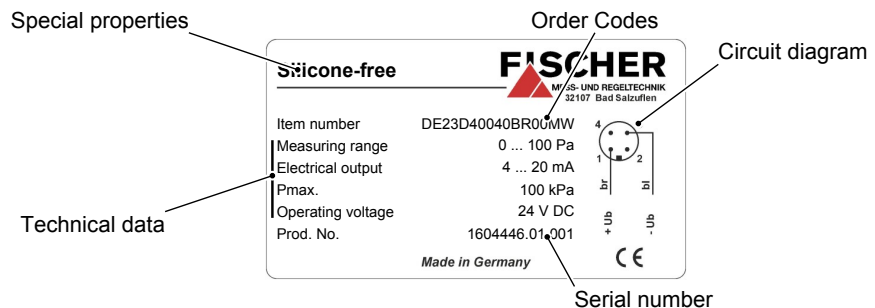


Fig. 2: Nameplate 2-wire

2 channel version

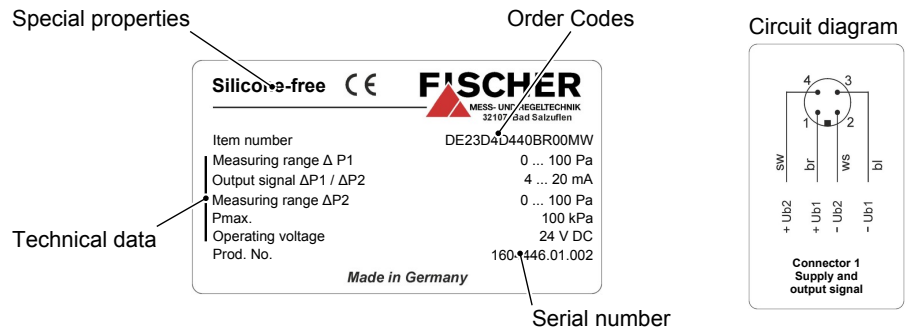


Fig. 3: Nameplate 2-wire

2.4 Function diagram

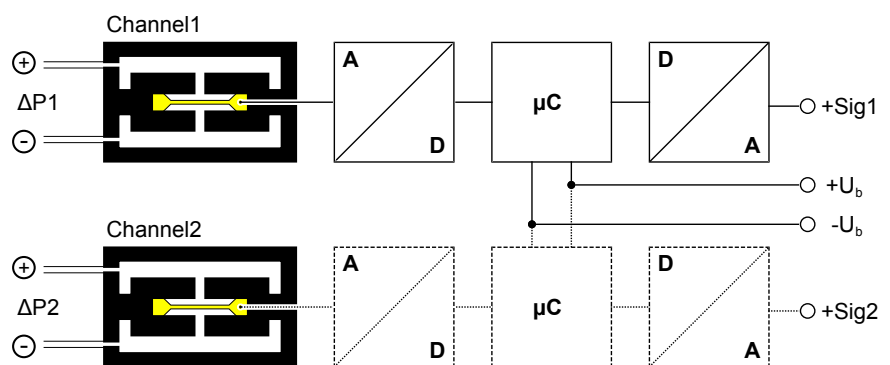


Fig. 4: Function diagram 3-wire (voltage output)

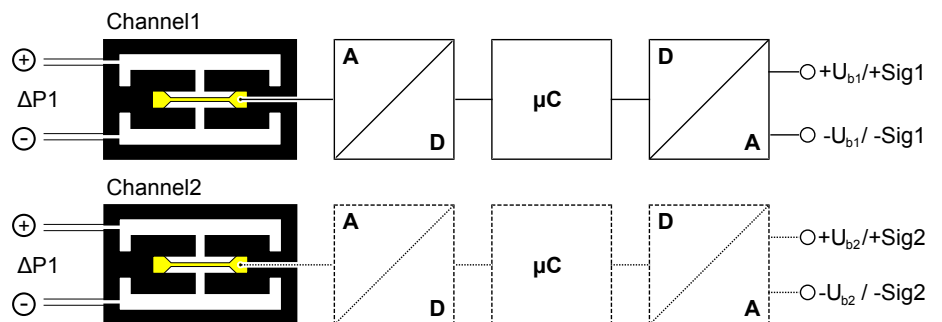


Fig. 5: Function diagram 2-wire (current output)

2.5 Design and mode of operation

The basis of this transmitter is a sensor element with a produced differential condenser made with silicon-glass technology.

The active pressure generates changes in capacity that is evaluated by the device's electronics and transformed into an analogue signal 4 ... 20 mA or 0 ... 10 V.

The measuring channel are identical in the 2-channel models.

3 Assembly and Starting Operation

3.1 Generalities

The device is designed for installation onto flat assembly plates. For screw connection to the assembly plate, the device features four assembly bores on its back, which can be used for \varnothing 3.5 mm tapping screws.

Optionally, the device can be supplied with a wall mounting plate or an adapter element for assembly with a mounting rail.

Ex-works, the device is set for vertical installation. Any installation position is possible.

3.2 Process connection

- By authorized and qualified specialized personnel only.
- The pipes need to be depressurized when the instrument is being connected.
- Appropriate steps must be taken to protect the device from pressure surges.
- Check that the device is suitable for the medium being measured.
- Maximum pressures must be observed (cf. Tech. data)



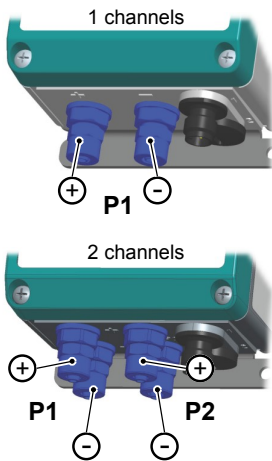
⚠ CAUTION

Do not blow into the pressure connections.

This may damage the sensor.

The pressure lines must be kept as short as possible and installed without any tight bends to avoid delays.

The process connections are marked with (+) and (-) symbols on the device. The pressure lines must be mounted according to these symbols.



1. Differential pressure measurement

- ⊕ Higher pressure
- ⊖ lower pressure

2. Pressure measurement

- ⊕ Pressure
- ⊖ open

3. Under-pressure measurement

- ⊕ open
- ⊖ Under-pressure

3.3 Electrical connections

- By authorized and qualified specialized personnel only.
- When connecting the unit, the national and international electro-technical regulations must be observed.
- Disconnect the system from the mains, before electrically connecting the device.
- Install the consumer-adapted fuses.
- Do not connect the connector if strained.

3.3.1 2-wire connection (4 ... 20 mA)

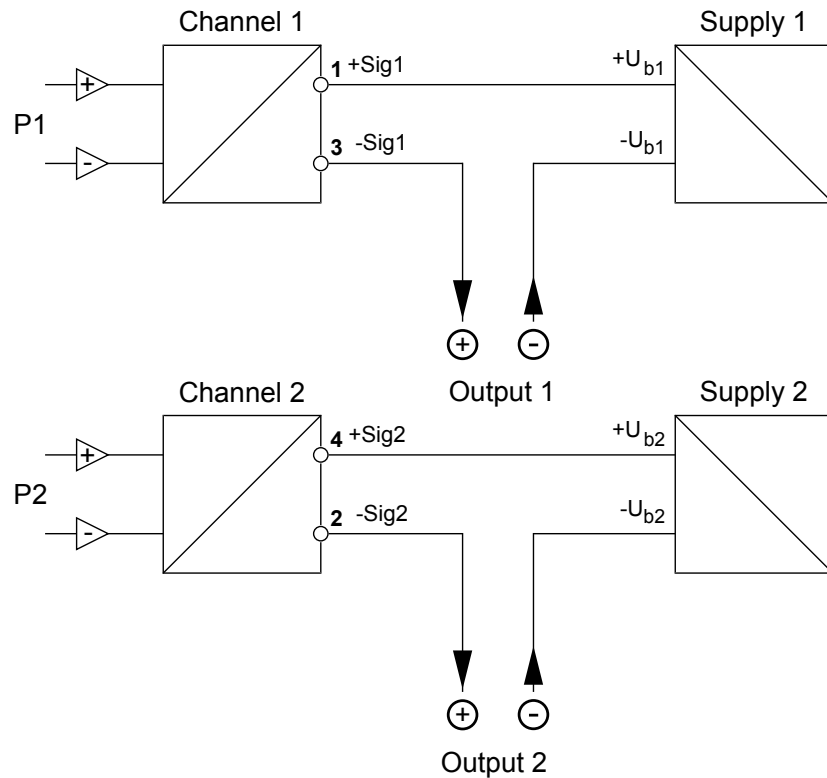


Fig. 6: Electrical connections

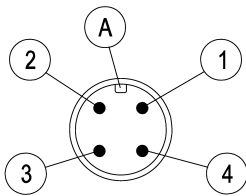


Fig. 7: M12 connector 4-pin

1 channel version

Pin	Description				Cable colour
1	Supply/output	(+)	+U _b	+Sig	brown
2					white
3	Supply/output	(-)	-U _b	-Sig	blue
4					black
A	Coding				

2 channel version

Pin	Description				Cable colour
1	Supply 1 / output 1	(+)	+U _{b1}	+Sig1	brown
2	Supply 2 / output 2	(-)	-U _{b2}	-Sig2	white
3	Supply 1 / output 1	(-)	-U _{b1}	-Sig1	blue
4	Supply 2 / output 2	(+)	+U _{b2}	+Sig2	black
A	Coding				

3.3.2 3-wire connection (0 ... 10 V)

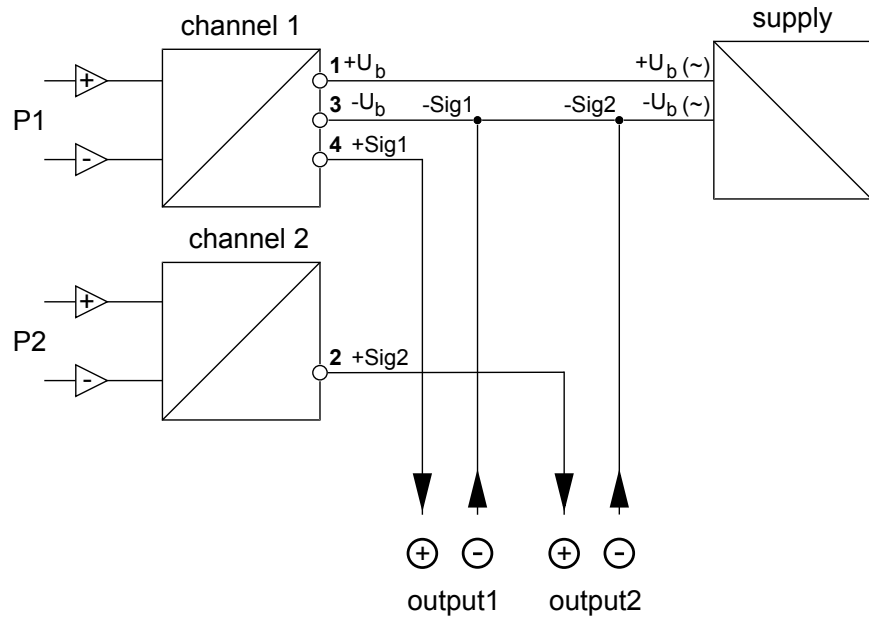


Fig. 8: Electrical connections

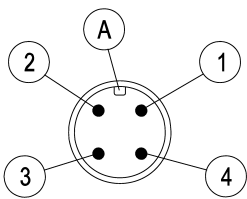


Fig. 9: M12 connector 4pol

1 channel version

Pin	Description		Cable colour
1	Supply	(+)(~) +Ub	brown
2			white
3	Supply	(-)(~) -Ub -Sig	blue
4	Output	(+) +Sig	black
A	Coding		

2 channel version

Pin	Description		Cable colour
1	Supply	(+)(~) +Ub	brown
2	Output 2	(+) +Sig2	white
3	Supply	(-)(~) -Ub -Sig1 / -Sig2	blue
4	Output 1	(+) +Sig1	black
A	Coding		

3.4 Commissioning

A prerequisite for commissioning is correct installation of all electrical supply lines and the pressure lines. All connections are arranged so that there are no mechanical forces acting on the device.



⚠ CAUTION

Leak test

The pressure lines need to be checked for leaks before commissioning.

The device switches into normal mode as soon as the device is connected to a power supply.

4 Maintenance

4.1 Maintenance

The instrument is maintenance-free. We recommend the following regular inspection to guarantee reliable operation and a long service life:

- Check the function in combination with downstream components.
- Check the leak-tightness of the pressure connection lines.
- Check the electrical connections.

The exact test cycles need to be adapted to the operating and environmental conditions. In combination with other devices, the operating instructions for the other devices also need to be observed.

4.2 Transport

The measuring device must be protected against impacts. It should be transported in the original packaging or a suitable transport container.

4.3 Service

All defective or faulty devices should be sent directly to our repair department. Please coordinate all shipments with our sales department.



WARNING

Process media residues

Process media residues in and on dismantled devices can be a hazard to people, animals and the environment. Take adequate preventive measures. If required, the devices must be cleaned thoroughly.

Return the device in the original packaging or a suitable transport container.

4.4 Accessories

- M12 Connection lines of different lengths (see order code [▶ 16])
- Wall mounting set

4.5 Disposal



WARNING

Incorrect disposal may pose a risk to the environment.

Please help to protect the environment by always disposing of the work pieces and packaging materials in compliance with the valid national waste and recycling guidelines or reuse them.

5 Technical Data

5.1 Generalities

Reference conditions (acc. to IEC 61298-1)		
Temperature	+15 ... +25 °C	
Relative humidity	45 ... 75 %	
Air pressure	86 ... 106 kPa	860 ... 1060 mbar
Installation position	User-defined	

All information in the technical data refer to one measuring value channel. The technical data for the second measuring value channel is identical and is therefore not listed.

5.2 Input variables

Measured variable

Differential pressure, positive and negative over-pressure

Measuring ranges

Relative pressure	+/- measuring ranges	asymmetric
0 ... 25 Pa	± 25.0 Pa	-20 ... +80 Pa
0 ... 50 Pa	± 50.0 Pa	
0 ... 100 Pa	± 100.0 Pa	
0 ... 250 Pa	± 250.0 Pa	
0 ... 500 Pa		
0 ... 1000 Pa		

For all measuring ranges:

Max. system pressure	stat. pressure	1 bar
Bursting pressure on one side		1,7 bar

5.3 Output sizes

	Current output	Voltage output
Output signal	4 ... 20 mA	0 ... 10 V
Apparent ohmic resistance	$R_L \leq (U_b - 12 \text{ V}) / 0.02 \text{ A}$	
Characteristic curve	linear	linear
Connection type	2-Wire	3-Wire

5.4 Measurement accuracy

Characteristic curve deviation ¹⁾	1 % FS ²⁾
Reproducibility	0.1 % FS
TK zero-point and range ³⁾	0.6 % FS / 10 K
Long-term stability	≤ 0.5 % FS / year
Response time (10 ... 90 %)	250 ms

¹⁾ Non-linearity and hysteresis at 25 °C

²⁾ FS: Full Scale (measuring range span)

³⁾ Compensation range 4 ... 50 °C

5.5 Auxiliary energy

	2-wire (4 ... 20 mA)	3-wire (0 ... 10 V)	
Rated Voltage	24 V DC	24 V AC	24 V DC
Adm. operating voltage	19 ... 36 V	19,2 ... 28,8 V	14 ... 36 V
Power consumption (per chanel)	Max. 20 mA	Max. 6 mA	

5.6 Application conditions

Increase ambient temperature	-10 ... +60 °C
Media temperature	-10 ... +60 °C
Storage temperature	-20 ... +70 °C
Enclosure protection class	IP65 as per EN 60529
EMC	EN 61326-1:2013 EN 61326-2-3:2013
RoHS	EN 50581:2012

5.7 Construction design

5.7.1 Process connection

All device models are available with the following process connections:

Hose screw connection (aluminium anodised)	for 6/4 mm hose
	for 8/6 mm hose
Pneumatic plug connector	for 6/4 mm hose
	for 8/6 mm hose

5.7.2 Electrical connection

M12 round plug connector, 4-pin, male, A-coding

5.7.3 Materials

Housing	Polyamide PA 6.6
Has contact to the medium	Silicon, PVC, aluminium, brass

5.7.4 Assembly

Attachment boreholes on the rear side for attachment to mounting plates.

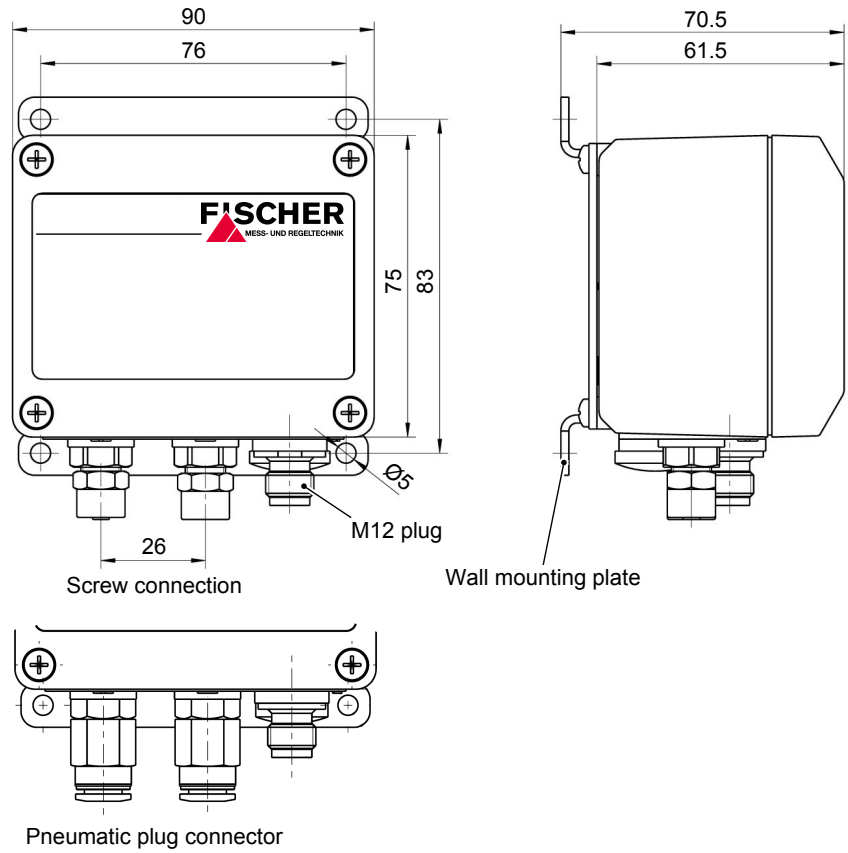
Assembly of the mounting rails using an adapter element.

Wall mounting using wall mounting plate

5.7.5 Dimensional drawings

All dimensions in mm unless otherwise stated

Wall-mounting



Attachment boreholes on rear side

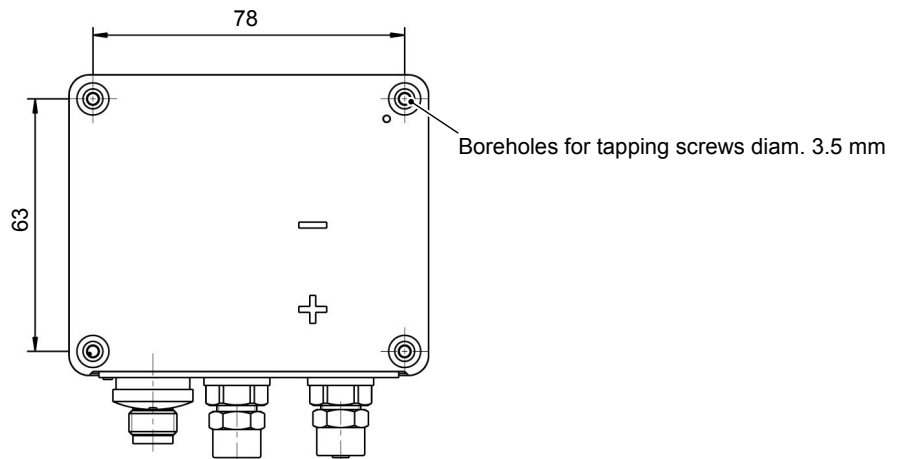


Fig. 10: Dimension drawing

Assembly of the mounting rails

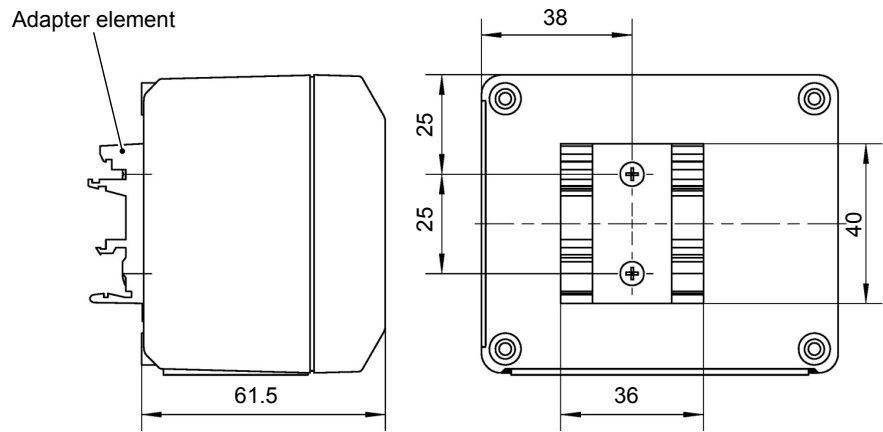


Fig. 11: Assembly of the mounting rails

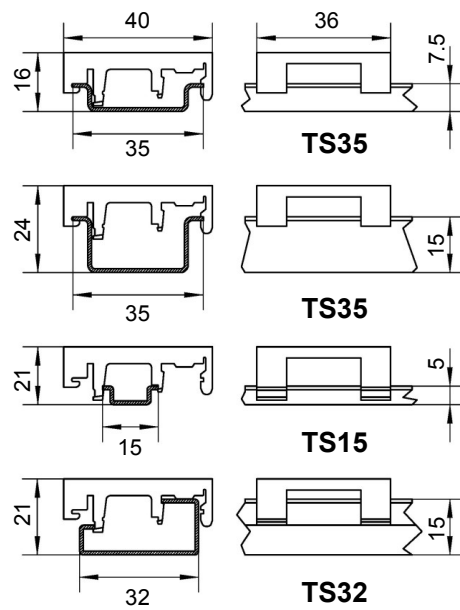
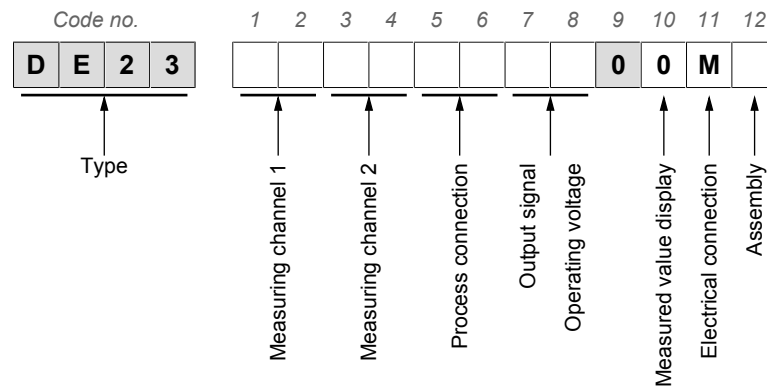


Fig. 12: Mounting rails options

6 Order Codes



Measuring range channel 1:

[1,2]	(Code no.)
D1	0 ... 25 Pa
J6	0 ... 50 Pa
D4	0 ... 100 Pa
D6	0 ... 250 Pa
J7	0 ... 500 Pa
D9	0 ... 1000 Pa
L5	± 25.0 Pa
L2	± 50.0 Pa
L0	-20 ... +80 Pa
L7	± 100.0 Pa
L6	± 250.0 Pa (only versions 4...20 mA, 2-wire)

Measuring range channel 2:

[3,4]	(Code no.)
00	without
D1	0 ... 25 Pa
J6	0 ... 50 Pa
D4	0 ... 100 Pa
D6	0 ... 250 Pa
J7	0 ... 500 Pa
D9	0 ... 1000 Pa
L5	± 25.0 Pa
L2	± 50.0 Pa
L0	-20 ... +80 Pa
L7	± 100.0 Pa
L6	± 250.0 Pa (only versions 4...20 mA, 2-wire)

Process connection:

[5,6] (Code no.)	
40	Aluminium hose screw connection anodised for 6/4 mm hose
41	Aluminium hose screw connection anodised for 8/6 mm hose
P6	Pneumatic plug connector for 6/4 mm hose
P8	Pneumatic plug connector for 8/6 mm hose

Output signal/Operating voltage:

[7,8]	Output signal	Operating voltage
BR	4 ... 20 mA 2-wire connection	24 V DC
CL	0 ... 10 V 3-wire connection	24 V AC/DC

Measured value display:

[10] (Code no.)	
0	none

Electrical connection:

[11] (Code no.)	
M	M12 plug connection

Assembly options:

[12] (Code no.)	
0	Attachment boreholes on rear side (standard)
S	Assembly on mounting rails
W	Wall-mounting

6.1 Accessories

Order no.	Planned measures	No. of Poles	Length
06401993	Connection cable with M12 connector	4-pin	2 m
06401994	Connection cable with M12 connector	4-pin	5 m
04005144	Wall mounting set		

7 Annex



EU Declaration of Conformity

(Translation)

For the product described as follows

Product designation **Differential Pressure Transmitter**

Type designation **DE23**

it is hereby declared that it corresponds with the basic requirements specified in the following designated directives:

2014/30/EU *EMC Directive*
2011/65/EU *RoHS Directive*

The products were tested in compliance with the following standards.

Electromagnetic compatibility (EMC)
EN 61326-1:2013 *Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements*
EN 61326-2-3:2013 *Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-3: Particular requirements - Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning*

RoHS
EN 50581:2012 *Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances*

Also they were subjected to the conformity assessment procedure „**Internal production control**“.

The object of the declaration described above is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Sole responsibility for the issue of this declaration of conformity in relation to fulfilment of the fundamental requirements and the production of the technical documents is with the manufacturer.

Manufacturer **FISCHER Mess- und Regeltechnik GmbH**
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Documentation representative Mr. Stefan Richter
Dipl. Ing.
General Manager R & D

The devices bear the following marking: **CE**

Bad Salzufflen,
2016-07-27

S. Richter
General Manager R & D



Seite 1 von 1

Fig. 13: CE_DE_DE23

