



Ex II 3D Ex tc IIIB T125 °C Dc

Ex II 3G Ex nA IIC T4 Gc



RoHS III  
COMPLIANT

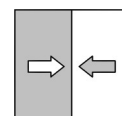


## Datasheet

### DE44 ... R/S

Digital 2-channel differential pressure switch/transmitter  
with colour-change LCD

Model with 2 switch points for explosive areas  
Dust explosion protection zone 22, dry dusts  
Gas explosion protection zone 2, gases and vapors



# 1 Product and functional description

## 1.1 Performance characteristics

### Typical applications

- Air-conditioning technology
- Ventilation technology
- Environmental technology
- Monitoring of automatic roll filters, extraction systems etc.
- Tensile measurements on chimneys
- Flow and control pressure measurements
- Surface technology

### Important features

- Long-term stable measurement of low pressure
- Robust, resistant to overpressure and maintenance-free
- two independent differential pressure sensors
- Two analogue outputs Sig1 and Sig2 with the option of spreading and reversing the characteristic line with any offset
- Square root extraction or characteristic line implementation via a table with max. 30 measuring points for both analogue outputs Sig1 and Sig2
- 4...6-digit LCD, full graphic, colour backlighting
- Switchable pressure units
- Menu-guided operation

### a) Model with 2 switch points

- Two switch points SP1 and SP2 with semiconductor switches

### b) Model with 4 switch points

- Four switch points SP1 ... SP4 with semiconductor switches

## 1.2 Use as intended

The DE44 is a multi-functional switching unit with an optional transmitter output. It is suitable for measuring overpressure, under-pressure and differential pressure in gaseous media.


The unit is suitable as an electrical device for operation in potentially explosive areas.

### 1.2.1 Explosion hazard area classification

#### Dust explosion protection

Devices with the order code **DE44 ## ## ## # KW # L # S#####** are suitable as 'Electrical equipment for use in areas with combustible dust', Zone 22 - dry dusts.

Designation as per Directive 2014/34/EU:

 II 3D Ex tc IIIB T125 °C Dc

$-10\text{ °C} \leq T_{\text{amb}} \leq 60\text{ °C}$



**⚠ WARNING**

**Static electricity**

The case must be equipped with an earth connection on the side to reduce the surface resistance.

**Gas explosion protection**

Devices with the order code **DE46 DE44 ## ## ## # KW # M # R####** are suitable as 'Electrical equipment for use in potentially explosive areas, Zone 2 - Gases and vapours.

Identification acc. to Directive 2014/34/EU:

Ⓔ II 3G Ex nA IIC T4 Gc

-10 °C ≤ T<sub>amb</sub> ≤ 60 °C

**1.3 Part designations**

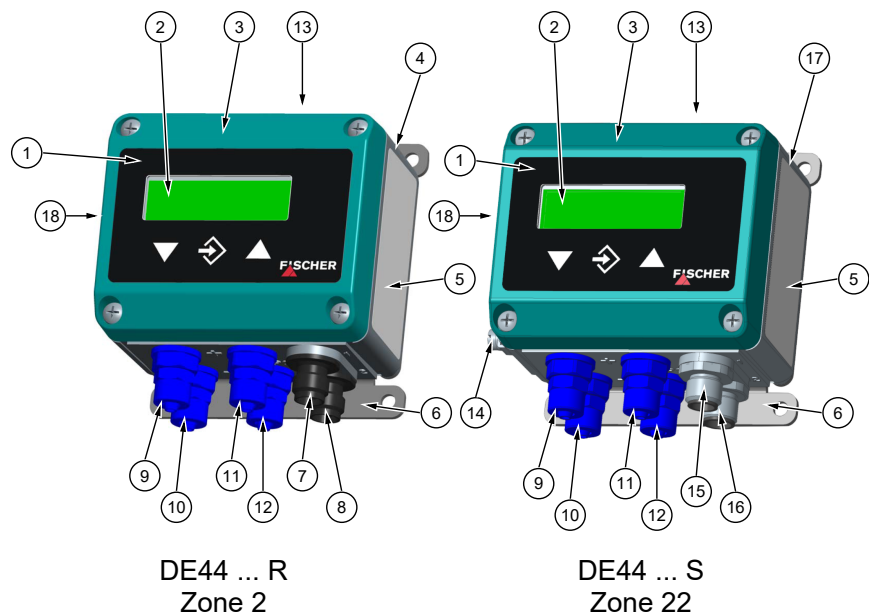


Fig. 1: DE44\_LCD\_Overview

1	Foil keypad	2	LC display
3	Casing lid	4	Lower part of casing
5	Circuit diagram	6	Wall bracket
7	M12 plug 1 (plastic)	8	M12 plug 2 (plastic)
9	Process connection P1 (+)	10	Process connection P1 (-)
11	Process connection P2 (+)	12	Process connection P2 (-)
13	Type plate	14	Ground connection
15	M12 plug 1 (MS nickel-plated)	16	M12 plug 2 (MS nickel-plated)
17	Lower part of casing (metal)	18	ATEX code

## 1.4 Function diagram with 2 switching outputs

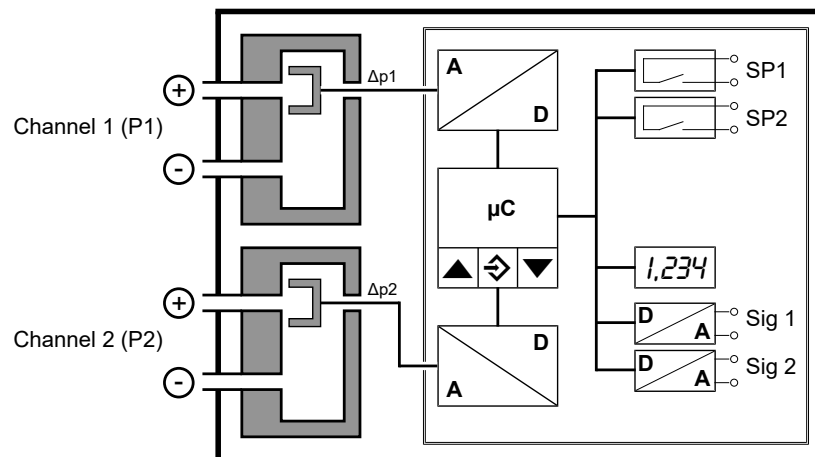


Fig. 2: Function diagram with 2 switching outputs

## 1.5 Function diagram with 4 switching outputs

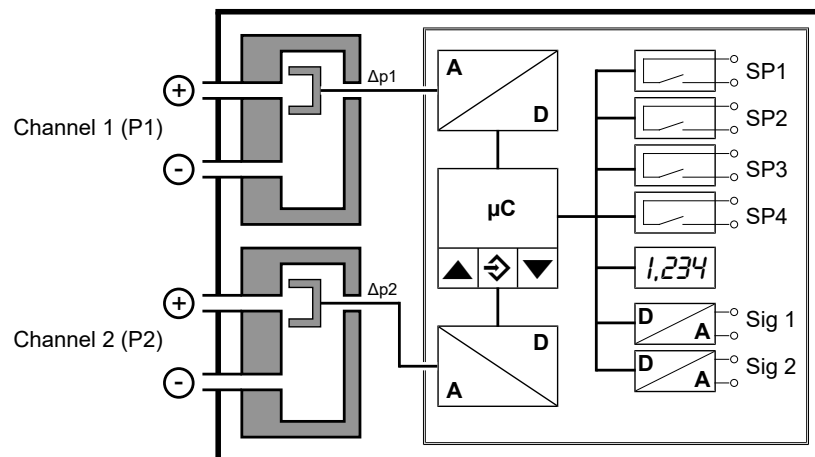


Fig. 3: Function diagram with 4 switching outputs

## 1.6 Design and mode of operation

This switch unit is based on two piezo-resistor sensor elements that are suitable for measuring over-pressure, under-pressure and differential pressure. The pressure that is to be measured acts upon a silicone membrane that is equipped with a resistor bridge.

This pressure-related movement of the diaphragm induces a change of resistance, which is evaluated by the device's electronics and transformed into signals for the display and two or four switch contacts. There are also (optional) two transmitter outputs available. The outputs are permanently assigned to the input channels.

- Channel 1 (P1) → Output 1 (Sig 1)
- Channel 2 (P2) → Output 2 (Sig 2)

An output signal between the uniform signals 0 ... 20 mA, 4 ... 20 mA and 0 ... 10 V can be selected. Both outputs can be dampened, spread and inverted. Both outputs can also be square-rooted and transformed via a table function even if it is non-linear.

In the case of flow measurements, larger values with 5 or 6 digits can be shown (see also Parameter decimal place measuring range).

**a) Model with 2 switching outputs**

The switching outputs can be assigned to the input channels by means of configuration:

- Channel 1 (P1) → SP1, SP2
- Channel 1 (P1) → SP1  
Channel 2 (P2) → SP2
- Channel 2 (P2) → SP1, SP2

**b) Model with 4 switching outputs**

The switching outputs are permanently assigned to the input channels as follows:

- Channel 1 (P1) → SP1, SP2
- Channel 2 (P2) → SP3, SP4

## 2 Technical data

### 2.1 General

Please also observe the order code here.

### 2.2 Input variables

#### Measuring variable

2 x differential pressure for gas-like media

#### Measuring range

Measuring range			Stat. operating pressure max.	Bursting pressure
mbar	Pa	kPa	mbar	mbar
0...4	0...400	---	50	150
0...6	0...600	---	50	150
0...10	0...1000	0...1	100	300
0...16	0...1600	0...1.6	100	300
0...25	---	0...2.5	250	750
0...40	---	0...4	250	750
0...60	---	0...6	500	1500
0...100	---	0...10	500	1500
0...160	---	---	1500	3000
0...250	---	---	1500	3000
±2.5	±250	---	50	150
±4	±400	---	50	150
±6	±600	---	50	150
±10	±1000	±1	100	300
±16	±1600	±1.6	100	300
±25	---	±2.5	250	750
±40	---	±4	250	750
±60	---	±6	500	1500
±100	---	---	500	1500

Table 1: Measuring ranges

You can select a unit other than the unit of the basic measuring range with the parameter **Unit** (measuring menu level). The conversion is automatic. All measuring ranges listed in the table are listed in the order code and can be ordered.

## 2.3 Output parameters

### Output signal

There are two output signals available that are permanently assigned to the respective input channels. The type of output signal (0/4...20 mA, 0...10V) must be stated on the order and cannot be changed. Signal range and load are identical for both outputs.

Output 1 (P1)	Output 2 (P2)	Signal range	Apparent ohmic resistance
0...20 mA	0...20 mA	0.0...21.0 mA	$U_b \leq 26 \text{ V} : R_L \leq (U_b - 4 \text{ V})/0.02 \text{ A}$ $U_b > 26 \text{ V} : R_L \leq 1100 \Omega$
4...20 mA,	4...20 mA,		
0...10 V	0...10 V	0.0...11.0 V	$R_L \geq 2 \text{ k}\Omega$

Table 2: Signal range and load

### Switching outputs

#### a) Model with 2 switching outputs

2 potential-free relay contacts

2 potential-free semiconductor switches (MOSFET)

	Relay	MOSFET
Progr. switching function	Open contact (NO) Break contact (NC)	One-pin activator (NO) One-pin deactivator (NC)
allowed Switching voltage	32 V AC/DC	12...32 V AC/DC
Max. switching current	2A	0.25A
Max. switching output	64 W / 64 VA	8 W / 8 VA $R_{ON} \leq 4 \Omega$

Table 3: Two switching outputs

#### b) Model with 4 switching outputs

4 potential-free semiconductor switches (MOSFET)

	MOSFET
Progr. switching function	One-pin activator (NO) One-pin deactivator (NC)
Allowed switching voltage	12...32 V AC/DC
Max. switching current	0.25A
Max. switching output	8 W / 8 VA $R_{ON} \leq 4 \Omega$

Table 4: Four switching outputs

## 2.4 Measuring accuracy

### Characteristic curve deviation

(Non-linearity and hysteresis)

Maximum: 1.0 % FS

Typical: 0.5 % FS

Table 5: Characteristic curve deviation

The information refers to a linear, non-spread characteristic curve at 25 °C and applies to all measuring ranges. FS (Full Scale) refers to the basic measuring range.

### Temperature coefficient (TK)

Measuring range			TK zero-point [% FS/10K]		TK span [% FS/10K]	
mbar	Pa	kPa	typ.	max.	typ.	max.
0...4	0...400	---	0.2	1.0	0.3	1.0
0...6	0...600	---	0.2	1.0	0.3	1.0
0...10	0...1000	0...1	0.2	0.4	0.3	0.3
0...16	0...1600	0...1.6	0.2	0.4	0.3	0.3
0...25	---	0...2.5	0.2	0.4	0.3	0.3
0...40	---	0...4	0.2	0.4	0.3	0.3
0...60	---	0...6	0.2	0.4	0.3	0.3
0...100	---	0...10	0.2	0.4	0.3	0.3
0...160	---	---	0.2	0.4	0.3	0.3
0...250	---	---	0.2	0.4	0.3	0.3
±2.5	±250	---	0.2	1.0	0.3	1.0
±4	±400	---	0.2	0.5	0.3	0.5
±6	±600	---	0.2	0.4	0.3	0.3
±10	±1000	±1	0.2	0.4	0.3	0.3
±16	±1600	±1.6	0.2	0.4	0.3	0.3
±25	---	±2.5	0.2	0.4	0.3	0.3
±40	---	±4	0.2	0.4	0.3	0.3
±60	---	±6	0.2	0.4	0.3	0.3
±100	---	---	0.2	0.4	0.3	0.3

Table 6: Temperature coefficient

With reference to the basic measuring range (FS), Compensation range 0..60°C.

## 2.5 Auxiliary energy

Rated Voltage	24 V AC/DC
Admissible operating voltage	$U_b = 12...32$ V AC/DC
Power consumption	Typ. 2 W / Max. 3 W

Table 7: Auxiliary energy



### **WARNING**

#### Supply circuit

A CE-conform mains adapter with a slow 200 mA fuse only may be used in the power supply circuit.



**Connector 1**

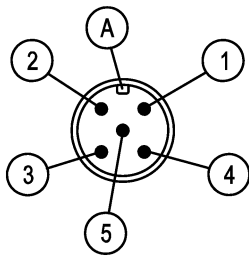


Fig. 4: M12 plug 5-pin

**Connector 2**

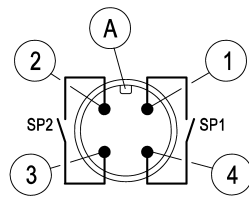


Fig. 5: M12 plug 4-pin

**Connector 2**

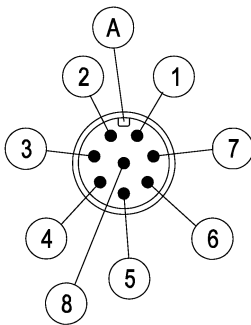


Fig. 6: M12 plug 8-pin

**Ambient conditions**

**Electrical connection**

Pin	Signal name		Cable colour
1	Supply	+U <sub>b</sub>	brown
2	Output 2	+Sig2	white
3	Supply	-U <sub>b</sub>	blue
4	Output 1	+Sig1	Black
5	unused		green/yellow
A	Coding A		

Table 8: Supply and output signal

**a) Model with 2 switching outputs**

Pin	Signal name		Cable colour
1	Switching output 1	SP1	brown
2	Switching output 2	SP2	white
3	Switching output 2	SP2	blue
4	Switching output 1	SP1	Black
A	Coding A		

Table 9: Two switching outputs

**b) Model with 4 switching outputs**

Pin	Signal name		Cable colour
1	Switching output 1	SP1	white
2	Switching output 1	SP1	brown
3	Switching output 2	SP2	green
4	Switching output 2	SP2	yellow
5	Switching output 3	SP3	grey
6	Switching output 3	SP3	pink
7	Switching output 4	SP4	blue
8	Switching output 4	SP4	red
A	Coding A		

Table 10: Four switching outputs

**2.6 Application conditions**

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	
ATEX	EN 60079-0:2012+A11:2013	
	EN 60079-31:2014	Dust
	EN 60079-15:2010	Gases and vapours

## 2.7 Construction design

### Process connection

4 x aluminium hose screw connection for 6/4 or 8/6 mm hose  
4 x pneumatic plug connector for 6/4 or 8/6 mm hose

### Materials

Housing Polyamide (PA) 6.6  
Media-contacting Silicon, Viton, brass nickel plate, aluminium material

### Assembly

Attachment boreholes on the rear side for attachment to mounting plates.  
Wall mounting using wall mounting plate  
Panel mounting set for installing the panel  
Assembly of the mounting rails using an adapter  
*Table 11: Important design features*

### Dimensional drawings

All dimensions in mm unless otherwise stated

#### 2.7.1 Process and electric connections

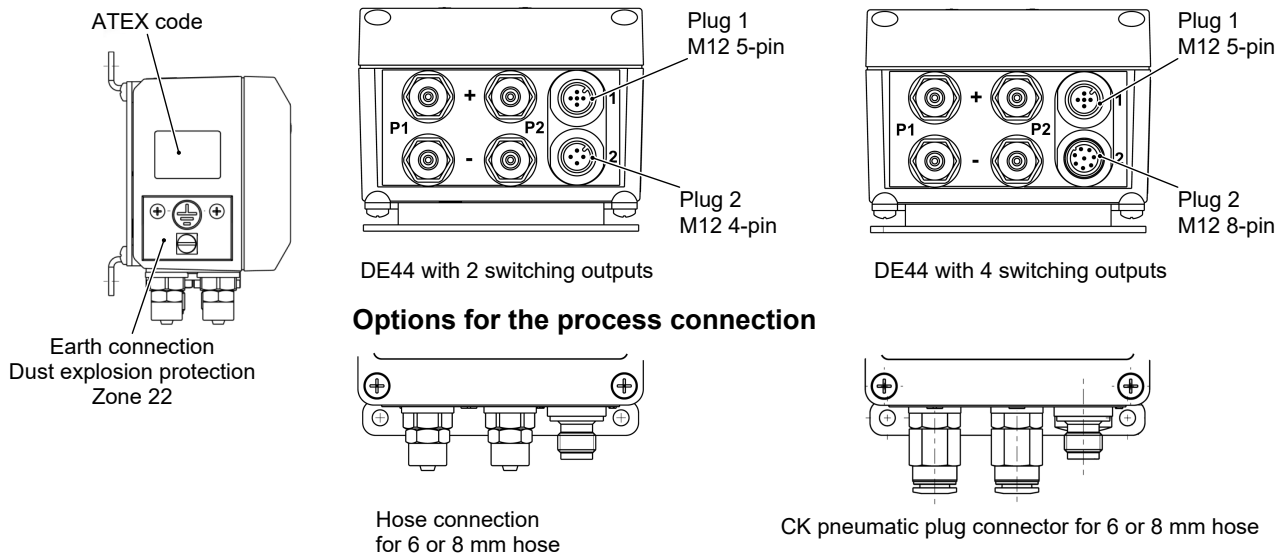


Fig. 7: Ports

### 2.7.2 Wall mounting

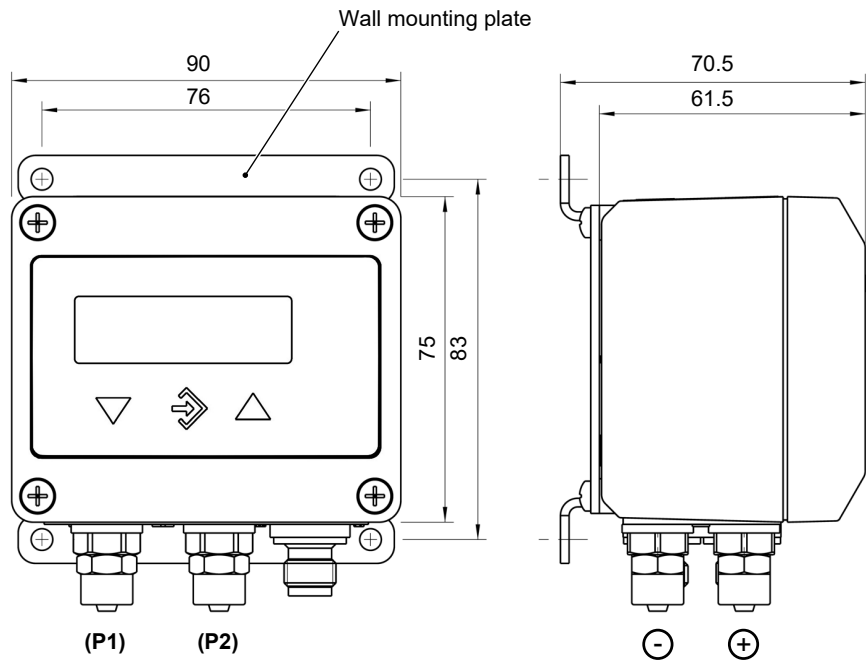


Fig. 8: Wall mounting dimension diagram

### 2.7.3 Assembly on an assembly plate

The standard model is not supplied with a wall mounting plate. It is attached to flat mounting plates using attachment boreholes on the rear side.

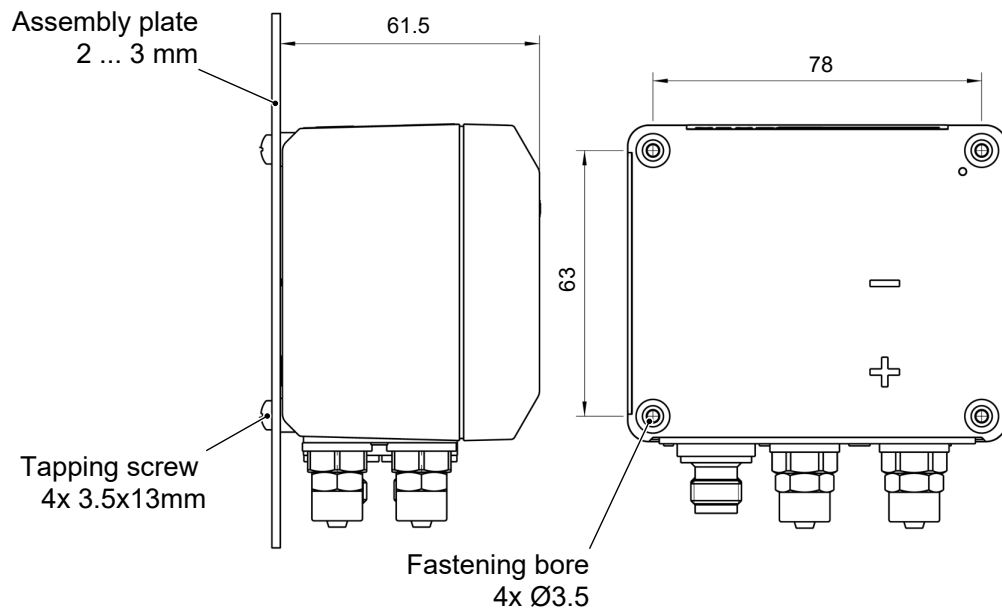


Fig. 9: Assembly on an assembly plate dimension diagram

### 2.7.4 Installation of front panel

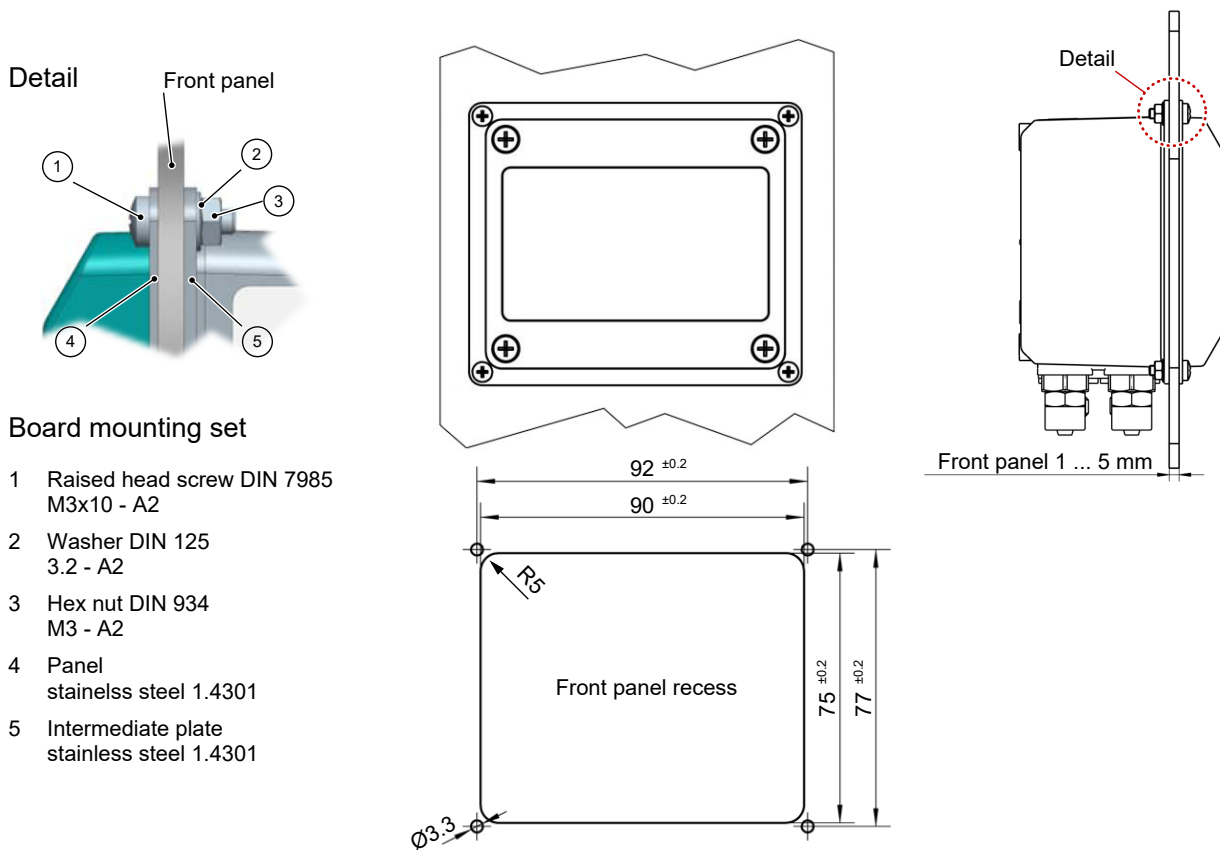
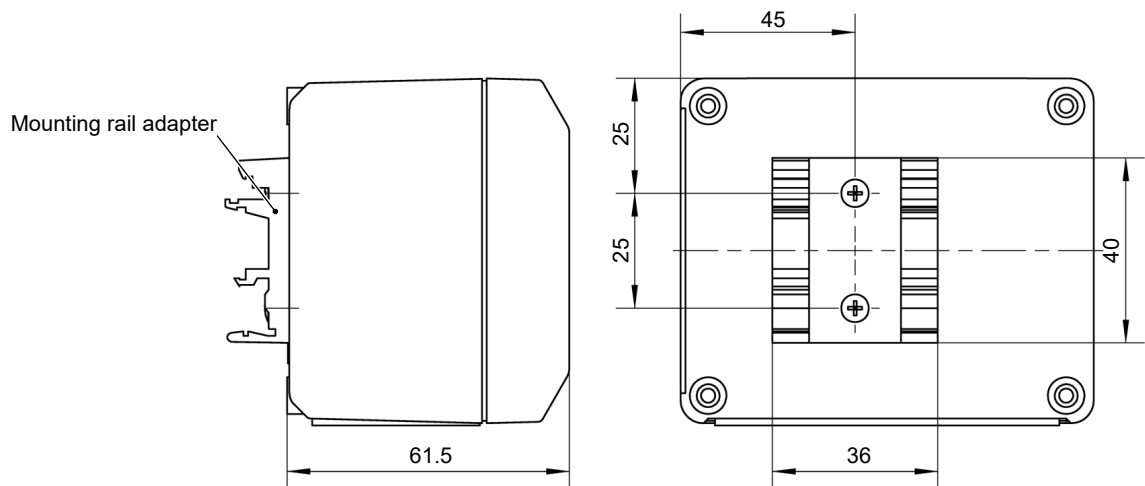


Fig. 10: Front panel dimensional diagram

### 2.7.5 Assembly of the mounting rails



The device can be mounted to the following mounting rails using the mounting rail adapter:

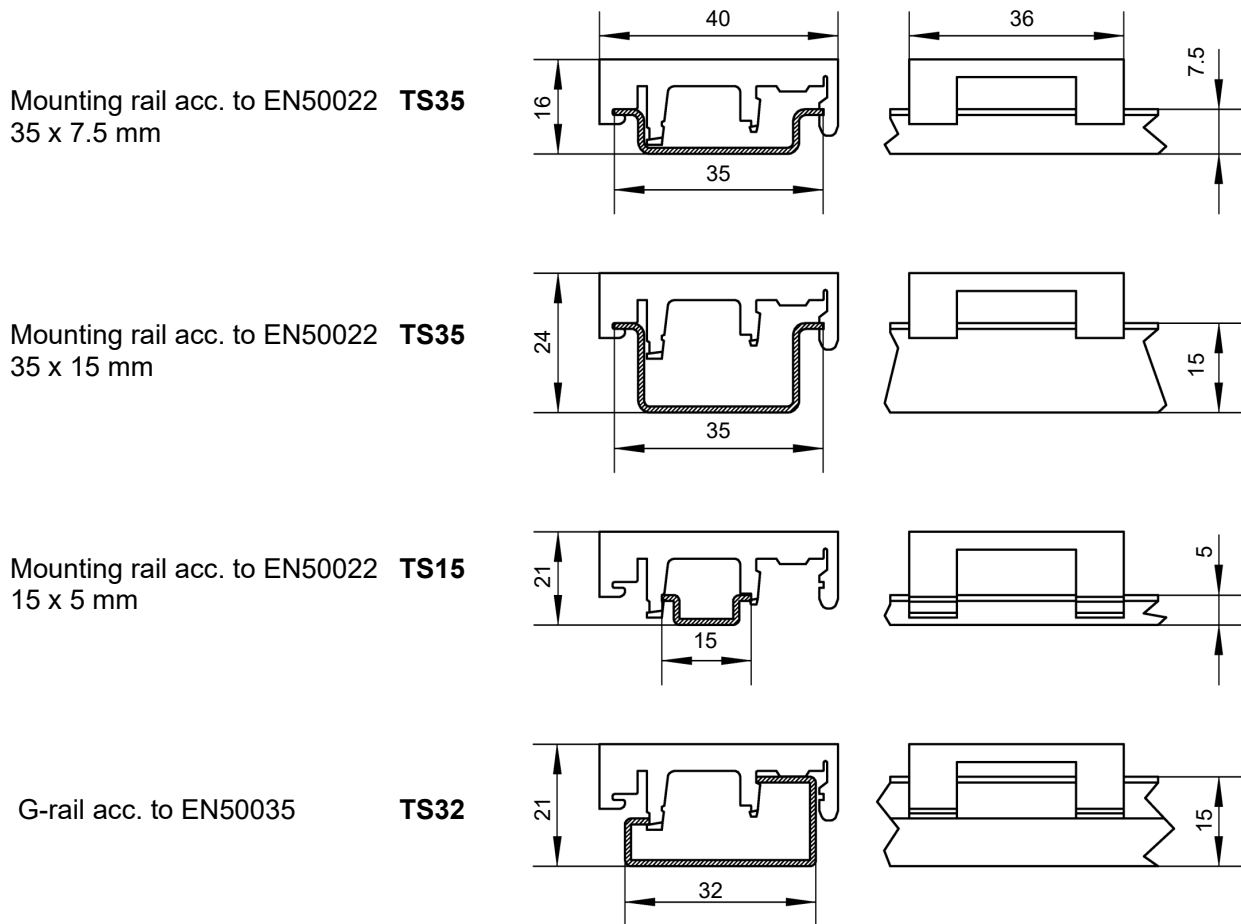


Fig. 11: Mounting rail dimensional diagram

## 2.8 Display and operating interface

### Advertisement

4...6-digit LCD, full graphic, colour backlighting

### Programming

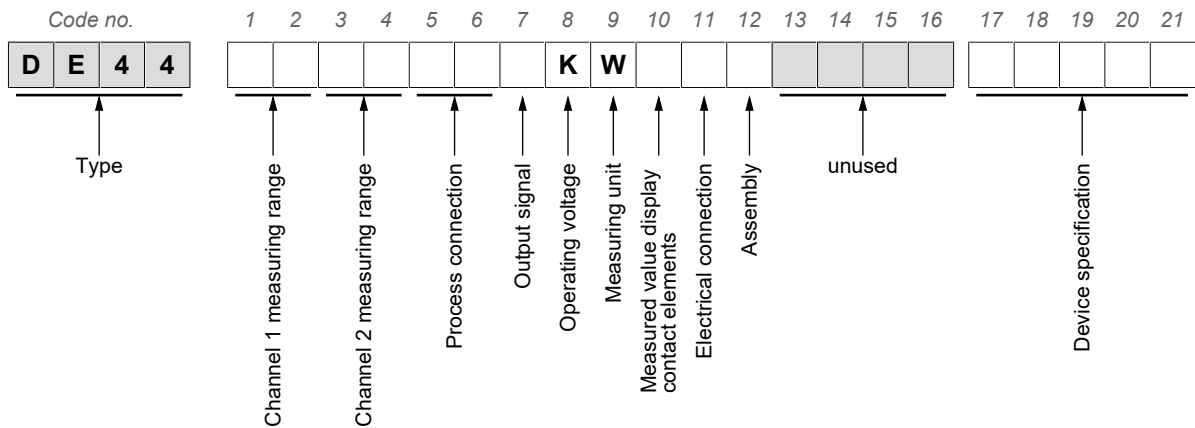
Attenuation	0.0...100.0s (jump response 10/90%)
Display assignment	P1 and P2 are shown at the same time
Switching output channel 1 and channel 2	Switch-off point, switch-on point, delay (0...1800s), function (NC / NO contact) <ul style="list-style-type: none"> <li>• 2 switching outputs: assignment to the relay</li> <li>• 4 switching outputs: fixed assignment</li> </ul>
Offset correction	$\pm 1/3$ of the basic measuring range <sup>(1)</sup>
Zero-point window	Measured values around zero are set to zero within settable limits
Output signal	User-definable within the basic measuring range <sup>(2)</sup>
Characteristic curve P1	linear, square rooted, table with 3...30 support points
Characteristic curve P2	linear, square rooted, table with 3...30 support points
Password	001 ... 999 (000 = no password protection)

Table 12: Important features of the user interface

(1) To compensate different installation positions.

(2) Max. effective spread 4:1

### 3 Order Codes



**Measuring range:**

**Channel 1**

[1.2]	(Code no.)
52	0 ... 4 mbar
53	0 ... 6 mbar
54	0 ... 10 mbar
55	0 ... 16 mbar
56	0 ... 25 mbar
57	0 ... 40 mbar
58	0 ... 60 mbar
59	0 ... 100 mbar
60	0 ... 160 mbar
82	0 ... 250 mbar
A6	-2.5 ... +2.5 mbar
A7	-4 ... +4 mbar
A8	-6 ... +6 mbar
A9	-10 ... +10 mbar
B1	-16 ... +16 mbar
B2	-25 ... +25 mbar
C5	-40 ... +40 mbar
B3	-60 ... +60 mbar
B4	-100 ... +100 mbar
D7	0 ... 400 Pa
D8	0 ... 600 Pa
D9	0 ... 1000 Pa
E1	0 ... 1600 Pa
L6	-250 ... +250 Pa
N1	0 ... 1 kPa
N2	0 ... 1.6 kPa
N3	0 ... 2.5 kPa
N4	0 ... 4 kPa

<b>[1.2] (Code no.)</b>	
<b>N5</b>	0 ... 6 kPa
<b>E5</b>	0 ... 10 kPa
<b>L8</b>	-1 ... +1 kPa
<b>L9</b>	-1.6 ... +1.6 kPa
<b>M6</b>	-2.5 ... +2.5 kPa
<b>M7</b>	-4 ... +4 kPa
<b>M8</b>	-6 ... +6 kPa



## Channel 2

<b>[3.4] (Code no.)</b>	
<b>52</b>	0 ... 4 mbar
<b>53</b>	0 ... 6 mbar
<b>54</b>	0 ... 10 mbar
<b>55</b>	0 ... 16 mbar
<b>56</b>	0 ... 25 mbar
<b>57</b>	0 ... 40 mbar
<b>58</b>	0 ... 60 mbar
<b>59</b>	0 ... 100 mbar
<b>60</b>	0 ... 160 mbar
<b>82</b>	0 ... 250 mbar
<b>A6</b>	-2.5 ... +2.5 mbar
<b>A7</b>	-4 ... +4 mbar
<b>A8</b>	-6 ... +6 mbar
<b>A9</b>	-10 ... +10 mbar
<b>B1</b>	-16 ... +16 mbar
<b>B2</b>	-25 ... +25 mbar
<b>C5</b>	-40 ... +40 mbar
<b>B3</b>	-60 ... +60 mbar
<b>B4</b>	-100 ... +100 mbar
<b>D7</b>	0 ... 400 Pa
<b>D8</b>	0 ... 600 Pa
<b>D9</b>	0 ... 1000 Pa
<b>E1</b>	0 ... 1600 Pa
<b>L6</b>	-250 ... +250 Pa
<b>N1</b>	0 ... 1 kPa
<b>N2</b>	0 ... 1.6 kPa
<b>N3</b>	0 ... 2.5 kPa
<b>N4</b>	0 ... 4 kPa
<b>N5</b>	0 ... 6 kPa
<b>E5</b>	0 ... 10 kPa

	<b>[3.4] (Code no.)</b>
	<b>L8</b> -1 ... +1 kPa
	<b>L9</b> -1.6 ... +1.6 kPa
	<b>M6</b> -2.5 ... +2.5 kPa
	<b>M7</b> -4 ... +4 kPa
	<b>M8</b> -6 ... +6 kPa
	<b>[5.6] (Code no.)</b>
<b>Pressure connection:</b>	<b>40</b> Aluminium screw connection for 6 / 4 mm hose
	<b>41</b> Aluminium screw connection for 8 / 6 mm hose
	<b>P6</b> Pneumatic plug connector for 6/4 mm hose
	<b>P8</b> Pneumatic plug connector for 8/6 mm hose
	<b>[7] (Code no.)</b>
<b>Output signal:</b>	<b>0</b> without output signal
	<b>4</b> 0 ... 20 mA (3-wire) channel 1+2
	<b>6</b> 4 ... 20 mA (3-wire) channel 1+2
	<b>5</b> 0 ... 10 V (3-wire) channel 1+2
	<b>[8] (Code no.)</b>
<b>Operating voltage</b>	<b>K</b> 24 V AC/DC
	<b>[9] (Code no.)</b>
<b>Measuring unit:</b>	<b>W</b> Selectable pressure units
	<b>[10] (Code no.)</b>
<b>Measured value display / contact elements:</b>	<b>D</b> 4-digit colour change LCD / 2 semiconductor switches
	<b>G</b> 4-digit colour change LCD / 4 semiconductor switches
	<b>[11] (Code no.)</b>
<b>Electrical connection</b>	<b>M</b> M12 plug connector, plastic (for ATEX devices Zone 2)
	<b>L</b> M12 connector socket, MS nickel-plated (for ATEX devices Zone 22)
	<b>[12] (Code no.)</b>
<b>Assembly option:</b>	<b>0</b> Standard (attachment boreholes on rear side)
	<b>S</b> Assembly of the mounting rails
	<b>T</b> Panel mounting set
	<b>W</b> Wall mounting



## Device specification

[17]	(Code no.)
<b>R</b>	Use in Zone 2 - Risk from gases and vapours  II 3G Ex nA IIC T4 Gc
<b>S</b>	Use in Zone 22 - Risk from dust  II 3D Ex tc IIIB T125°C Dc $-10\text{ °C} \leq T_{\text{amb}} \leq 60\text{ °C}$

The codes with the numbers [18] to [22] specify the device as requested by the customer and agreed with our sales department.

### 3.1 Accessories

Order no.	Planned measures	No. of Poles	Length
06401993	Connection cable for switching outputs with M12 connector	4-pin	2 m
06401994	Connection cable for switching outputs with M12 connector	4-pin	5m
09011146	Connection cable for switching outputs with M12 connector	8-pin	5m
06401995	Connection cable for supply/signal with M12 connector	5-pin	2 m
06401996	Connection cable for supply/signal with M12 connector	5-pin	5 m
EU03F300	Transmitter PC Interface incl. PC software Casing: 107x54x30 mm		
EU050000	Transmitter PC Interface incl. PC software	without battery	
EU050001	Casing: 195x101x44 mm	With battery	
A data sheet about the EU03 ad EU 05 models is available on our website <a href="http://www.fischermess-technik.de">www.fischermess-technik.de</a> or on request.			

### 3.2 Information about the document

This document contains all technical data about the device. Great care was taken when compiling the texts and illustrations. nevertheless, errors cannot be ruled out.

Subject to technical amendments.

## Notes

**Notes**



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