developing solutions

FISCHER
MESS- UND REGELTECHNIK

Datasheet

DE45

Digital differential pressure switch / transmitter
with colour-change LCD

09005351 • DB_EN_DE45_LCD • Rev. ST4-I • 07/22

1 Product and functional description

1.1 Intended use

The DE45 is a multi-functional switching unit with an optional transmitter output. It is suitable for measuring overpressure, underpressure and differential pressure in gaseous media. The device is to be exclusively used for the applications agreed between the manufacturer and user.

Typical applications

- Monitoring of roll filters, extraction systems etc.
- Draft measurement in chimneys
- Flow and control pressure measurements
- Surface coating systems

Important features

- Robust, resistant to overpressure and maintenance-free
- Optional signal output with possibility of characteristic curve spread and reversal with any offset
- Characteristic curve implementation via table with max. 30 measuring points
- 4...6-digit LCD, full graphic, colour backlighting

1.2 Part designations

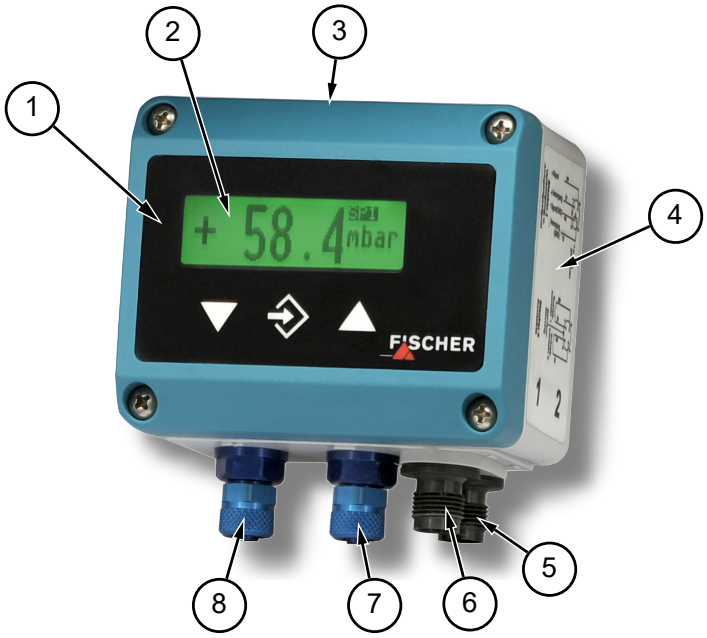


Fig. 1: Part designations

1	Membrane keyboard	5	M12 connector 2 (4-pin, male)
2	LC display	6	M12 connector 1 (5-pin, male)
3	Casing lid	7	Process connection (-)
4	Lower part of casing	8	Process connection (+)

1.3 Function diagram

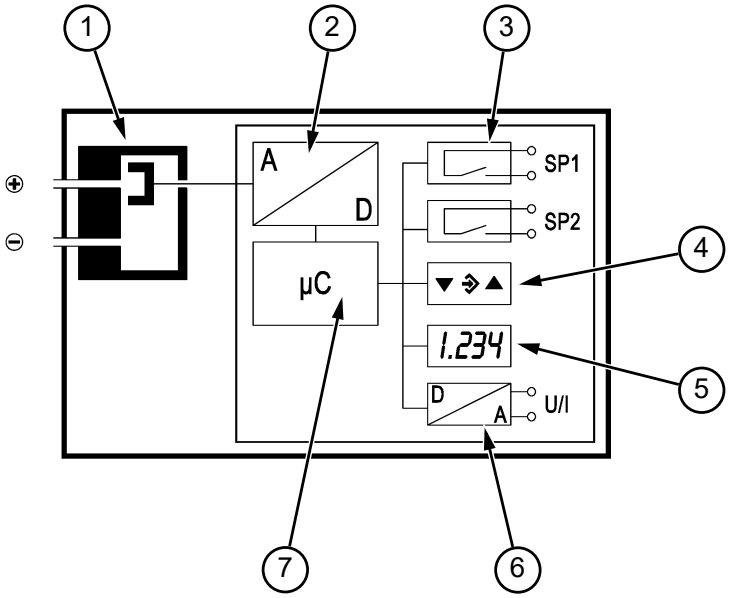


Fig. 2: Function diagram DE45_LCD

1	Sensor element	5	LC display
2	Signal processing	6	Analogue output
3	Switching outputs	7	Microcontroller
4	Membrane keyboard		

1.4 Design and mode of operation

The device is based on a piezo-resistive sensor element that is suitable for measuring overpressure, underpressure and differential pressure. The pressures to be compared directly act on a silicon diaphragm equipped with piezo-resistive resistors.

When the pressure is equal, the measuring diaphragm is in its idle state. In the event of differential pressure, the diaphragm is moved toward the lower pressure which changes the resistance of the attached resistors. This change is evaluated by the device's electronics and transformed into the display, switch contacts or an optional output signal.

The optional output signal can be dampened, spread, inverted and transformed via a table function even if it is non-linear.

2 Technical data

Please also observe the order code here.

2.1 Input variables

Measuring variable: Differential pressure for gas-like media

Measuring Range			Stat. operating pressure max.	Bursting pressure
mbar	Pa	kPa	mbar	mbar
0…4	0…400	0…0.4	50	150
0…6	0…600	0…0.6	50	150
0…10	0…1000	0…1.0	100	300
0…16	0…1600	0…1.6	100	300
0…25	---	0…2.5	250	750
0…40	---	0…4.0	250	750
0…60	---	0…6.0	500	750
0…100	---	0…10.0	500	750
0…160	---	0…16.0	1500	3000
0…250	---	0…25.0	1500	3000
±2.5	±250	±0.25	50	150
±4	±400	±0.4	50	150
±6	±600	±0.6	50	150
±10	±1000	±1.0	100	300
±16	±1600	±1.6	100	300
±25	---	±2.5	250	750
±40	---	±4.0	250	750
±60	---	±6.0	500	750
±100	---	±10.0	500	750

2.2 Output parameters

Analogue output:

Output	Signal range	Load
0…20 mA	0,0…21,0 mA	$U_b \leq 26$ V : $R_L \leq (U_b - 4\ V)\ /0{,}02$ A
4…20 mA	0,0…21,0 mA	$U_b > 26$ V : $R_L \leq 1100\ \Omega$
0…10 V	0,0…11,0 V	$R_L \geq 2\ k\Omega$

Switching outputs:

2 potential-free relay contacts
2 potential-free semiconductor switches (MOSFET)

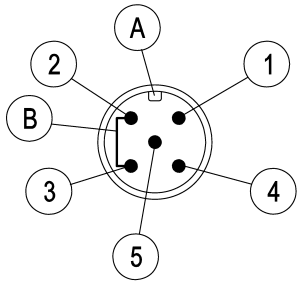
	Relay	MOSFET
Progr. switching function	Open contact (NO) Break contact (NC)	One-pin activator (NO) One-pin deactivator (NC)
Max. switching voltage	32 V AC/DC	3…32 V AC/DC
Max. switching current	2 A	0.25 A
max. switching output	64 W / 64 VA	8 W / 8 VA $R_{ON} \leq 4\ \Omega$

2.3 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

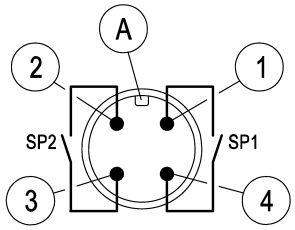
Electrical connection

2 x round plug connector M12



A Coding
B Bridge

1 Power supply (+Ub)
2 Output (- Sig)
3 Power supply (-Ub)
4 Output (+ Sig)
5 not connected



A Coding

1 Switch output 1
2 Switch output 2
3 Switch output 2
4 Switch output 1

Fig. 3: Electrical connection DE45_LCD

2.4 Measuring accuracy

Characteristic curve deviation: (Non-linearity and hysteresis)

Maximum: 1.0 % FS
Typical: 0.5 % FS

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)

Measurement range	TK zero-point [% FS/10K]		TK span [% FS/10K]	
mbar	typ.	max.	typ.	max.
0…4	0.2	1.0	0.3	1.0
0…6	0.2	1.0	0.3	1.0
0…10	0.2	0.4	0.3	0.3
0…16	0.2	0.4	0.3	0.3
0…25	0.2	0.4	0.3	0.3
0…40	0.2	0.4	0.3	0.3
0…60	0.2	0.4	0.3	0.3
0…100	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	0.2	1.0	0.3	1.0
±4	0.2	0.5	0.3	0.5

Measurement range	TK zero-point [% FS/10K]		TK span [% FS/10K]	
mbar	typ.	max.	typ.	max.
±6	0.2	0.4	0.3	0.3
±10	0.2	0.4	0.3	0.3
±16	0.2	0.4	0.3	0.3
±25	0.2	0.4	0.3	0.3
±40	0.2	0.4	0.3	0.3
±60	0.2	0.4	0.3	0.3
±100	0.2	0.4	0.3	0.3

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

2.5 Application conditions

Ambient temperature	-10 … +70 °C
Media temperature	-10 … +70 °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 IEC 63000:2018

2.6 Construction design

Process connection

2x aluminium hose screw connection for 6/4 mm or 8/6 mm hose.
2x pneumatic plug connector for 6/4 mm or 8/6 mm hose.

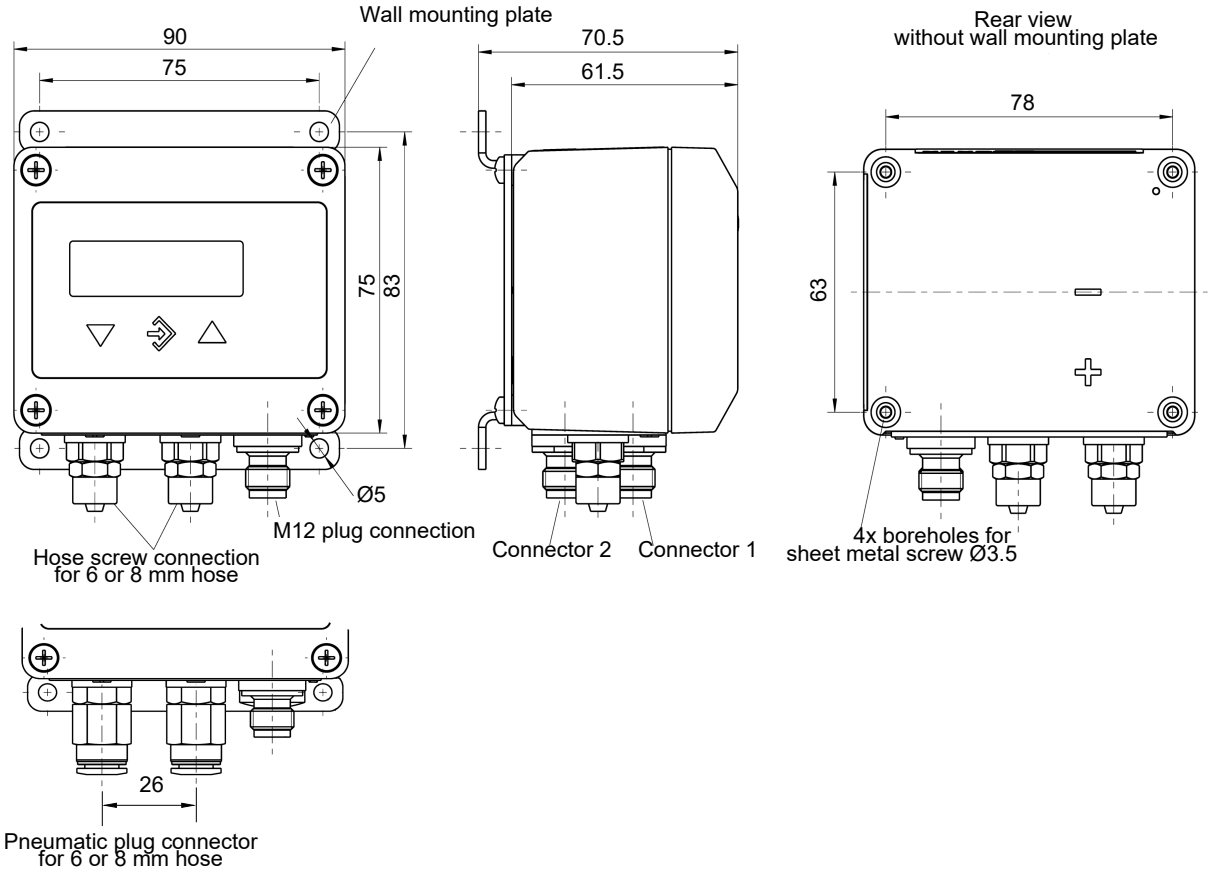
Materials

Housing	Polyamide (PA) 6.6
Media-contacting material	Silicon, PVC, aluminium, brass

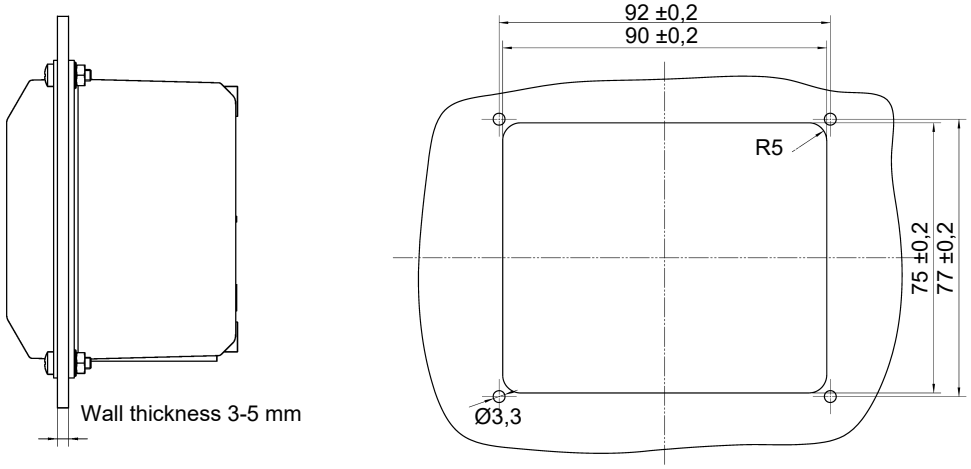
Assembly

Attachment boreholes on the rear for attaching the mounting plates.
Wall mourning using the wall mounting plate.
Panel installation using the panel installation set.
Assembly of the mounting rails using an adapter.

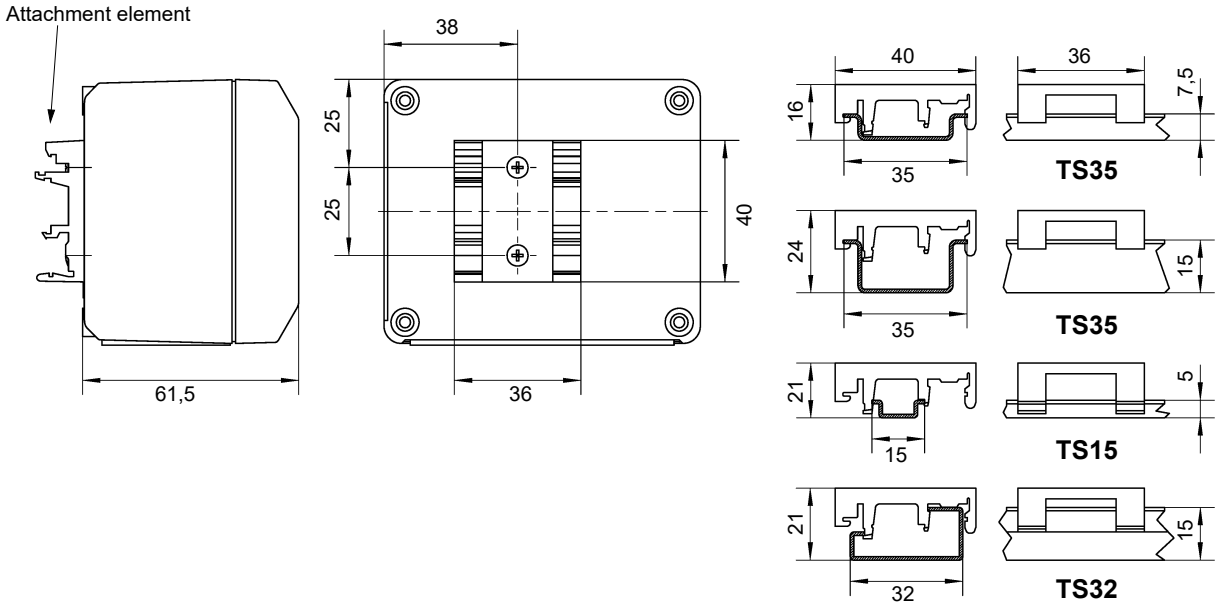
Wall mounting



Installation of front panel



Assembly of the mounting rails



2.7 Display and operating interface

Display

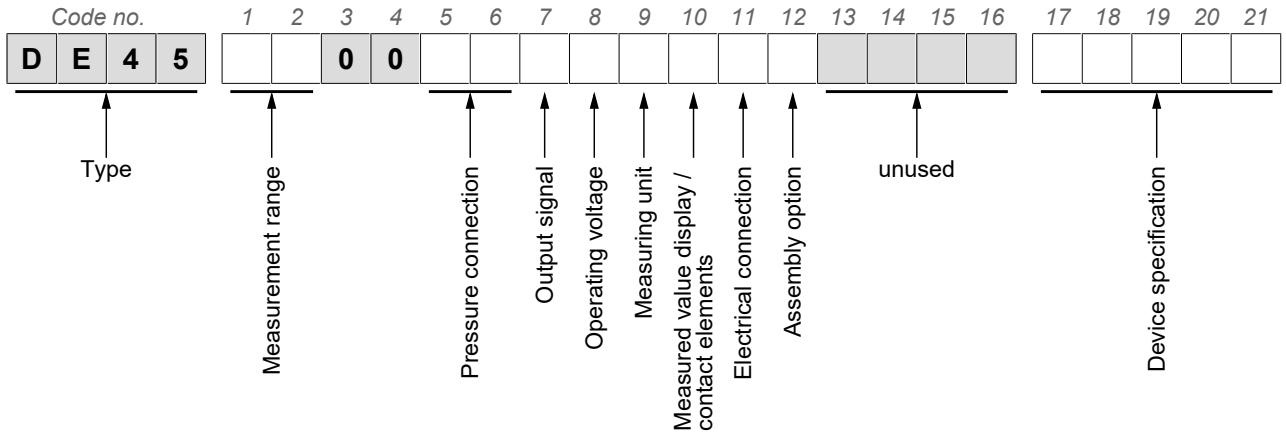
4...6-digit LCD, full graphic, colour backlighting

Programming

Damping	0.0 … 100.0 s (jump response time 10 / 90 %)
Switch output	Switch-off point, switch-on point, response time (0...1800s), function (NC / NO contact)
Measuring range unit	mbar / Pa / "free unit", starting value, end value and decimal point for "free unit"
Output signal	User-definable within the basic measuring range (1)
Zero-point stabilising	0…⅓ of the basic measuring range (2)
Zero point correction	±⅓ of the basic measuring range (3)
Implementation of characteristic curve	linear, square rooted, table with 3...30 support points
Password	001 ... 999 (000 = no password protection)

(1) Max. effective spread 4:1
(2) measured values around zero are set to zero.
(3) To compensate different installation positions.

3 Order Codes



[1.2]	Measuring range
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
J7	0 … 500 Pa
D8	0 … 600 Pa
D9	0 … 1000 Pa
E1	0 … 1600 Pa
L6	-250 … +250 Pa

[1.2]	Measuring range
N1	0 … 1 kPa
N2	0 … 1.6 kPa
N3	0 … 2.5 kPa
N4	0 … 4 kPa
N5	0 … 6 kPa
E5	0 … 10 kPa
L8	-1 … +1 kPa
L9	-1.6 … +1.6 kPa
M6	-2.5 … +2.5 kPa
M7	-4 … +4 kPa
M8	-6 … +6 kPa

[5.6]	Pressure connection
40	Aluminium screw connection for 6 / 4 mm hose
41	Aluminium screw connection for 8 / 6 mm hose
P6	Pneumatic plug connector for 6/4 mm hose
P8	Pneumatic plug connector for 8/6 mm hose

[7]	Output signal
0	without output signal
A	0... 20 mA (3-wire)
P	4... 20 mA (3-wire)
C	0 … 10 V (3-wire)

[8]	Operating voltage
K	24 V AC/DC

[9]	Measuring unit
W	Selectable pressure units

[10]	Measured value display / contact elements
C	4-digit colour change LCD / 2 relay contacts
D	4-digit colour change LCD / 2 semiconductor switches

[11]	Electrical connection
M	M12 plug connector (plastic)

[12]	Assembly option
0	Standard (attachment boreholes on rear side)
S	Mounting rail installation
T	Panel mounting set
W	Wall mounting

3.1 Device specification

Device specification on request.

3.2 Accessories

Order no.	Designation	No. of Poles	Length
06401993	Connection cable for switch outputs with M12 connector	4-pin	2 m
06401994	Connection cable for switch outputs with M12 connector	4-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
EU03.F300	Transmitter PC Interface incl. PC software		

3.3 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.

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