

DE45 || Digital Differential Pressure Switch / Transmitter

The DE45 is a multi-function pressure instrument that combines a digital read-out, dual limit detection relays, and optional transmitter output.

It can measure positive gauge, negative gauge, or differential pressure.

It is ideally suited for applications such as:

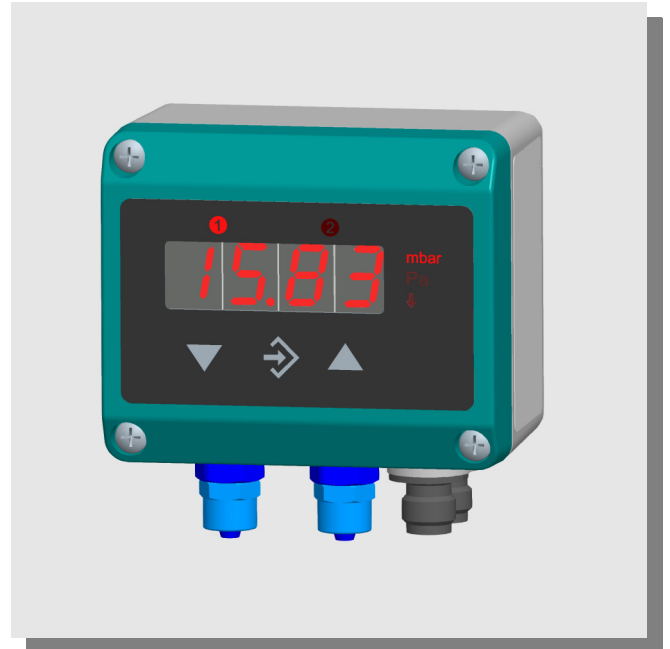
- Ventilation and air handling systems
- Climate control systems
- Environmental systems

Principles of Operation

The instrument is based on a piezo-resistive sensor element and can measure positive gauge, negative gauge (vacuum) or differential pressure. The pressure is measured directly by a piezo-resistive resistance bridge that is formed on the surface of an integral silicon diaphragm in each sensor.

Change of pressure results in change of resistance that is converted to a varying voltage and then digitized. The instrument's internal microcontroller transfers the measured value on the LED display, controls the two limit detection relays / switches, and transmits the measured value through an analog conversion stage as a voltage or current signal output.

An optional output signal can be slew rate limited, spreaded, inverted, and transformed nonlinearly by means of a table function.



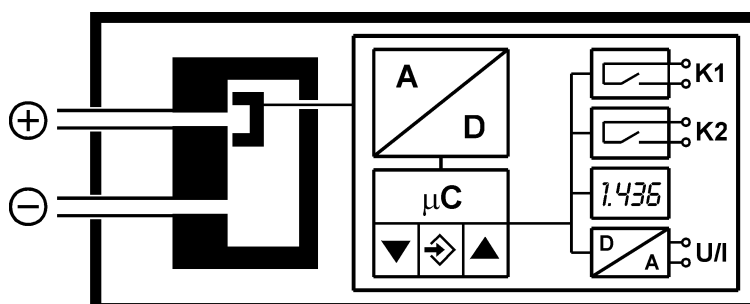
Features

- Robust design, over-pressure safe
- Maintenance-free
- Selectable pressure units
- Signal output with possibility of spreading and inverting characteristic curve with any offset (optional)
- Characteristic conversion of output via 3...30 entries table
- Complete set-up of all parameters and print out by using optional PC-programming interface EU03

Applications

- Monitoring of roll-band filters, vacuum systems, etc.
- Chimney draught measurement
- Flow and control-pressure measurement
- Surface coating systems

Schematic Diagram



Specifications

General

Measuring range	mbar	0-4	0-6	0-10	0-16	0-25	0-40	0-60	0-100	0-160	0-250	±2,5	±4	±6	±10	±16	±25	±40	±60
	Pa	0-400	0-600	0-1000	0-1600							±250	±400	±600	±1000	±1600			
	kPa	0-0.4	0-0.6	0-1.0	0-1.6	0-2.5	0-4.0	0-6.0	0-10.0	0-16.0	0-25.0	±0.25	±0.4	±0.6	±1.0	±1.6	±2.5	±4.0	±6.0
max. static operating pressure	mbar	50		100		250		500		1500		50		100		250		500	
Max. safe pressure	mbar	150		300		750		1500		3000		150		300		750		1500	
Straight line deviation (max.)°	%FS	1.0																	
Straight line deviation (typ.)°	%FS	0.5																	
TC span (max.)°	%FS 10K	1.0		0.3					0.4	1.0	0.5	0.3							
TC span (typ.)°	%FS 10K	0.3																	
TC offset (max.)°	%FS 10K	1.0		0.4					1.0	0.5	0.4								
TC offset (typ.)°	%FS 10K	0.2																	

° Straight line deviation = nonlinearity + hysteresis; at 25 °C; pressure within specified range (characteristic linear, not spreaded)

°° Pressure within specified range (characteristic linear, not spreaded); compensated temperature range 0 to 60 °C

Operating temp. (ambient)	-10 ... 70°C
Operating temp. (media)	-10 ... 70°C
Storage temperature	-20 ... 70°C
Protection class (housing)	IP 65 per DIN EN 60529

Electrical

Nominal supply voltage	24 V DC / AC
Operating supply voltage	12 ... 32 V DC / AC
Output signal	0 ... 20 mA, 4 ... 20 mA, or 0 ... 10 V DC (3-wire)
Output signal load	for current output $R_L \leq (U_B - 4 \text{ V}) / 0.02 \text{ A}$ ($U_B \leq 26\text{V}$), else $R_L \leq 1100 \Omega$ for voltage output $R_L \geq 2 \text{ K}\Omega$ ($U_B \geq 15 \text{ V}$), $R_L \geq 10 \text{ K}\Omega$ ($U_B = 12 \dots 15\text{V}$)
Power consumption	Approx. 2 W / VA
Switching contacts	2 sets of programmable voltage free relay contacts: N/O or N/C $U_{\text{max}} = 32 \text{ V DC/AC}$, $I_{\text{max}} = 2 \text{ A}$, $P_{\text{max}} = 64 \text{ W/VA}$ Optional, instead of relay outputs: 2 programmable voltage free MOSFET switch outputs, NO/NC $U = 3 \dots 32 \text{ V DC/AC}$, $I_{\text{max}} = 0.25 \text{ A}$, $P_{\text{max}} = 8 \text{ W/VA}$, $R_{\text{ON}} \leq 4 \Omega$

Display 3½ digit LED

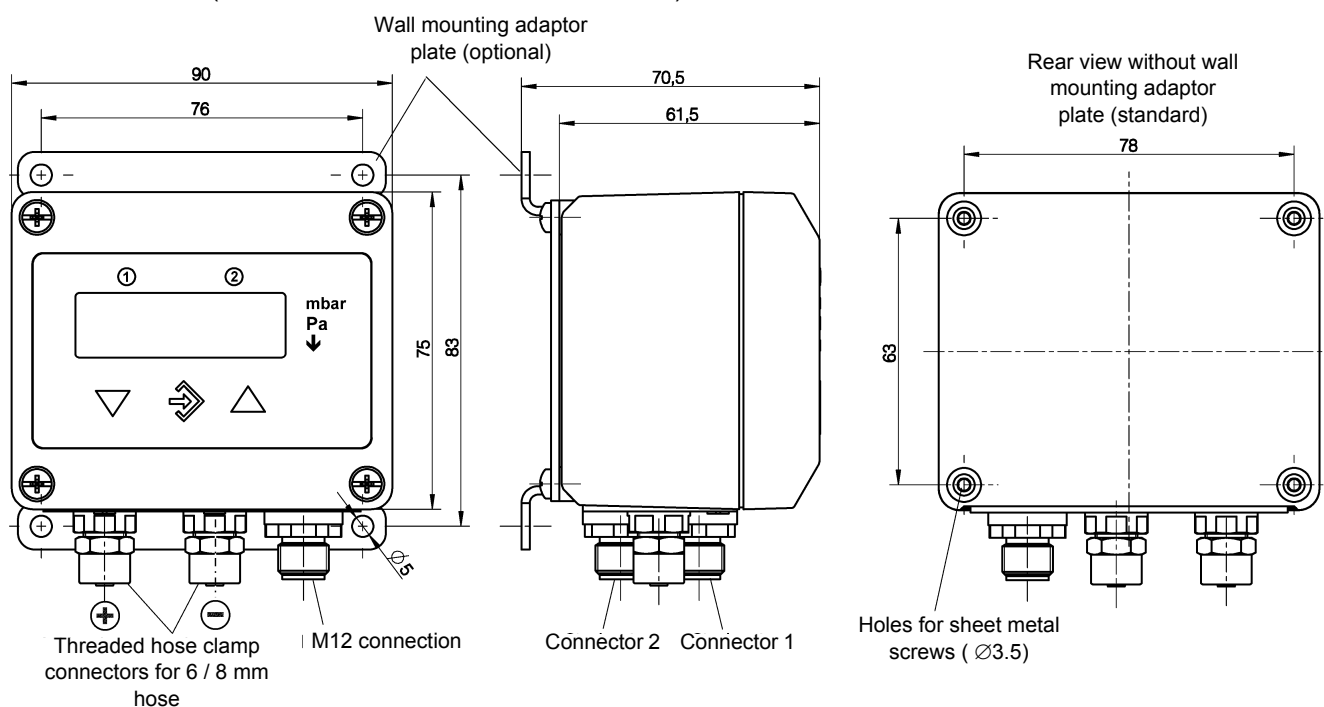
Connections

Electrical connections	Two round-shell multi-pin connector sockets (M12, male) Connector 1: 5-pin: power input and analog signal output Connector 2: 4-pin: relay contacts / solid-state switch outputs
Pressure connections	Threaded hose clamp connectors (aluminum) for 8/6 or 6/4 mm hose

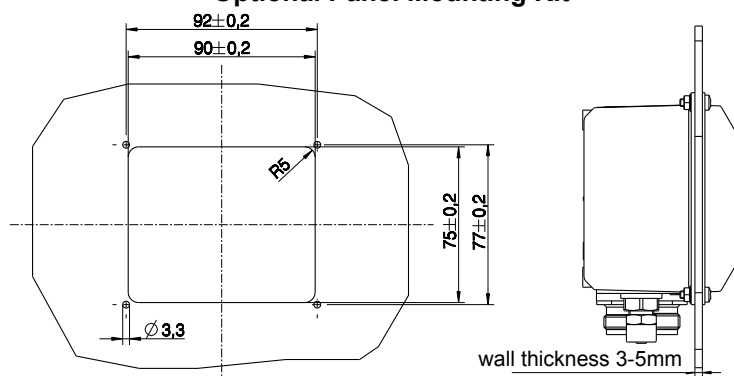
Materials, Mounting

Materials, housing	Polyamide PA 6,6
Materials, media contact	Silicon, PVC, aluminum, brass
Mounting	Rear mounting holes for panel mounting Optional panel mounting kit Wall mountable using adaptor plate If the instrument is intended for outdoor application, we highly recommend using an adequate protective housing (or at least a big enough shelter) as protection against UV-radiation on the membrane keyboard and against exposure of the instrument to rain or snow.

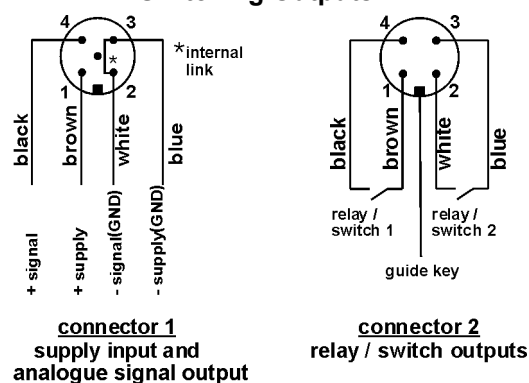
Dimensions (all units in mm unless stated otherwise)



Optional Panel Mounting Kit



Electrical Connections, Switching Outputs



Programming

Via membrane key-switches or by using PC-programming interface (accessory), programming mode can be password protected.

	Settings:
Input filtering	0.0 ... 100.0 secs (10 / 90% step response time) for signal output, display separated
Relay / switch 1 / 2	activation point, de-activation point, response time delay (0.0 ... 100.0 secs), logic (N/O or N/C)
Measurement unit selection	mbar / Pa / „free unit“ start value, end value and decimal place for „free unit“
Zero suppression	0 ... 100 counts (1)
Output signal start / end value	can be set at any point of measuring range (2)
Zero pressure calibration	± 100 counts (3)
Output characteristic	linear, square rooted, horizontal cylindr. tank, table (3...30 entries)
Password range	001 ... 999 (000 = password protection disabled)

- (1) Measured value deviations up to 100 counts, symmetric about zero, are set to zero. Used for zero drift suppression.
 (2) Maximum effective turn-down ratio = 4:1. Only the output signal is affected.
 Transfer function is inverted if start value > end value.
 (3) Zero calibration setting may change with mounting orientation.

Ordering Code

Digital Differential Pressure Switch / Transmitter

DE45

		0	0			K	0		M	
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Measuring Range	Max. Static Operating Pressure	↑	↑	↑	↑	↑
0 4 mbar	50 mbar	5	2			
0 6 mbar	50 mbar	5	3			
0 . . . 10 mbar	100 mbar	5	4			
0 . . . 16 mbar	100 mbar	5	5			
0 . . . 25 mbar	250 mbar	5	6			
0 . . . 40 mbar	250 mbar	5	7			
0 . . . 60 mbar	500 mbar	5	8			
0 . . 100 mbar	500 mbar	5	9			
0 . . 160 mbar	1500 mbar	6	0			
0 . . 250 mbar	1500 mbar	8	2			
- 2.5 . . 2.5 mbar	50 mbar	A	6			
- 4 4 mbar	50 mbar	A	7			
- 6 6 mbar	100 mbar	A	8			
- 10 . . . 10 mbar	100 mbar	A	9			
- 16 . . . 16 mbar	250 mbar	B	1			
- 25 . . . 25 mbar	250 mbar	B	2			
- 40 . . . 40 mbar	500 mbar	C	5			
- 60 . . . 60 mbar	500 mbar	B	3			
Pressure Connections						
Threaded hose clamp connectors for 6 / 4 mm hose		4	0			
Threaded hose clamp connectors for 8 / 6 mm hose		4	1			
Signal Output						
No signal output				0		
Current output: 0 - 20 mA linear, 3-wire				A		
Voltage output: 0 - 10 V DC linear, 3-wire				C		
Current output: 4 - 20 mA linear, 3-wire				P		
Supply Voltage						
24 V DC/AC nominal (12-32 V DC/AC operating)				K		
Display and Limit Switching Outputs						
3½ digit LED display; 2 sets of voltage free relay contacts					3	
3½ digit LED display; 2 solid-state switch outputs					6	
Electrical Connections						
M12 round-shell multi-pin connectors						M
Mounting						
Rear fastening holes (standard)						0
Panel mounting kit						T
Wall mounting						W

Accessories

Ordering Code	Designation	Pins	Application	Length
06401993	cable with M12 connector	4-pin	for relay / switch	2 m
06401994	cable with M12 connector	4-pin	for relay / switch	5 m
06401995	cable with M12 connector	5-pin	for supply / signal	2 m
06401996	cable with M12 connector	5-pin	for supply / signal	5 m
04005144	wall mounting adapter set			
EU03F300	PC-programming interface with SW			