

## DE 38 Digital Differential Pressure Transmitter / Switch

The DE 38 is a multi-function field-mounted pressure instrument that combines a digital readout, transmitter, and dual limit detection relays.

It can be used for measurement and control of positive or negative gauge pressure, or differential pressure, flow and level.

It is compatible for use with relatively clean and non-corrosive gases and liquids.

### Principles of Operation

The instrument uses a tough, flexible sensing diaphragm sandwiched between stiffening plates and balanced by springs on either side. The diaphragm is at zero position when the forces exerted by the springs plus the pressures on either side of the diaphragm are equal. When pressure on one side exceeds that on the other side, the diaphragm is deflected towards the lower pressure side, to a new equilibrium position determined by the changed balance of forces. Fastened to the center of the diaphragm is an axial rod, the other end of which forms the moving core of a precision LVDT displacement sensor element.

The linear displacement of the LVDT core is proportional to the pressure difference across the diaphragm. This displacement is converted by the transmitter's electronic module to a standard electrical signal output. An optional output signal can be slew rate limited, spreaded, inverted, and piecewise linear transformed by means of a table.



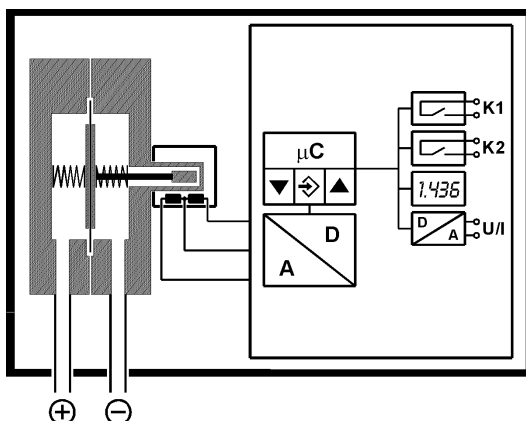
### Features

- Robust design; over-pressure protected
- Wear-free non-contact LVDT sensing element needs no maintenance
- Selectable pressure units
- Piecewise linear output transformation via 3...30 entries table
- Complete set-up of all parameters and print out by using optional PC-programming interface EU03

### Applications

- Monitoring of compressors, filters and vacuum systems
- Measurement of differential pressure between supply and return fuel lines in heating systems

Schematic diagram



## Specifications DE 38

### General

Measuring range	mbar	0-400	0-600	0-1000	0-1600			
max. static operating pressure	bar			0-1.000	0-1.600	0-2.50	0-4.00	0-6.00
straight line error (max.)°	%FS	2.5 %						
Straight line error (typ.)°	%FS	0.8 %						
Tc span (max.)°°	%FS 10K	0.8 %		0.4 %				
Tc span (typ.)°°	%FS 10K	0.2 %						
Tc zero point (max.)°°	%FS 10K	0.8 %		0.5 %				
Tc zero point (typ.)°°	%FS 10K	0.2 %						

°: Straight line error = 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

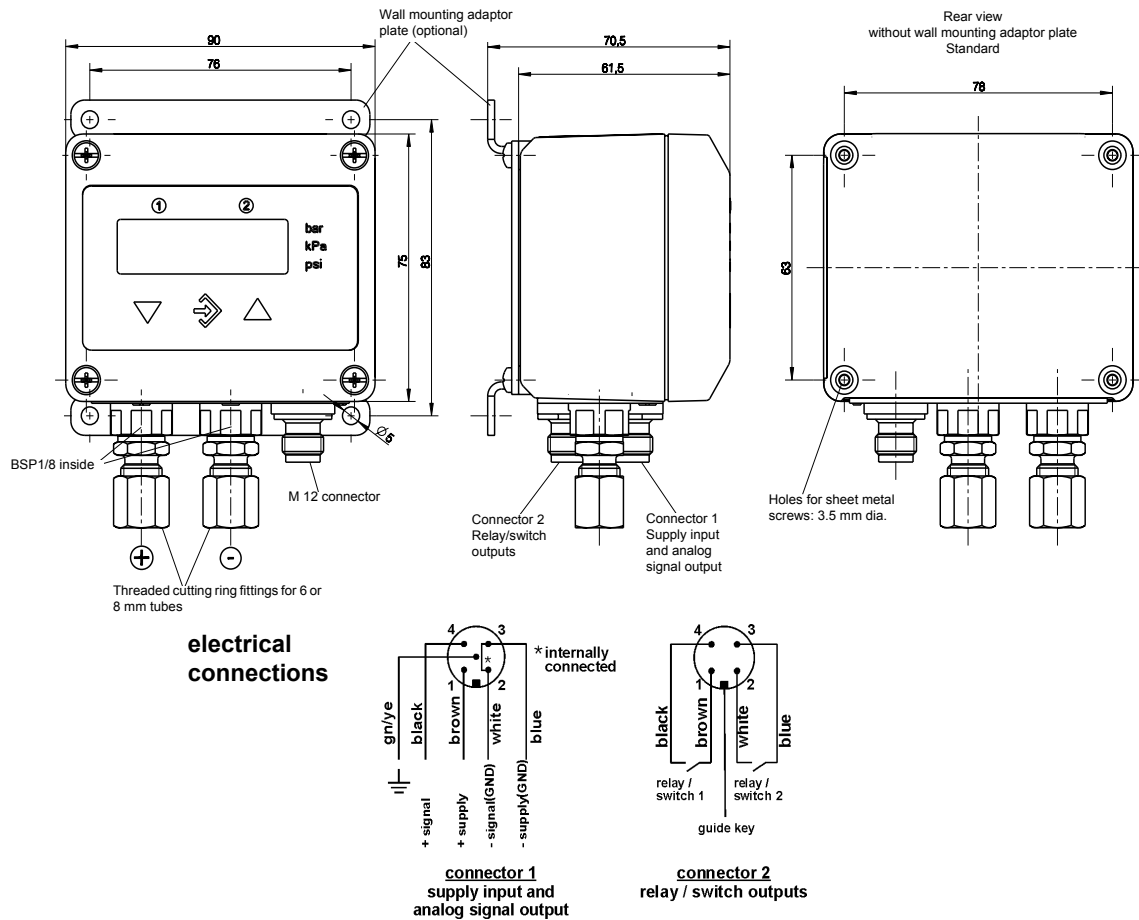
### Electrical

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
Relay contacts	2 sets of voltage free contacts: NO or NC (programmable) $V_{\max} = 32 \text{ V DC / AC}$ ; $I_{\max} = 2 \text{ A}$ ; $P_{\max} = 64 \text{ W / VA}$
Solid-state switch outputs	Optional, instead of relay outputs: 2 voltage free MOSFET switch outputs; NO/NC (programmable), $U = 3 \dots 32 \text{ V DC/AC}$ , $I_{\max} = 0,25 \text{ A}$ , $P_{\max} = 8 \text{ W/VA}$ , $R_{\text{ON}} \leq 4 \Omega$
Display	3½ digit LED

### Connections, materials, mounting

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	BSP 1/8 female threads with optional cutting ring fittings for 6 or 8 mm tube
Materials, housing	Polyamide PAPA
Materials, media contact	Silicon, PVC, aluminum, brass
Mounting	Mounting holes at rear for panel mounting Wall mountable using adaptor plate

## Dimensions DE 38



## Programming

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

<b>Settings:</b>	
Input filtering	0.0 ... 100.0 secs (10 / 90% step response time)
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	bar, kPa, psi
Zero suppression	0 ... 100 counts (1)
Output signal start / end value	can be set at any point from minimum to maximum of measuring range (2)
Zero pressure calibration	±100 counts (3)
Output characteristic	linear, square rooted, horizontal cylindr. tank, table (3...30 entries)
Password range	000 ... 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 DE 38

### Digital Differential Pressure Transmitter / Switch

**DE 38**

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#### Measuring range

0 ... 400 mbar .....	8	3
0 ... 0.6 bar .....	0	1
0 ... 1 bar .....	0	2
0 ... 1.6 bar .....	0	3
0 ... 2.5 bar .....	0	4
0 ... 4 bar .....	0	5
0 ... 6 bar .....	0	6

#### Sensor materials

Pressure chambers, diaphragm, seals: brass / NBR .....	M
Pressure chambers, diaphragm, seals: brass / Viton .....	N

#### Pressure connections

BSP 1/8 female thread .....	0	0
brass cutting ring fitting for 6 mm tube .....	2	8
brass cutting ring fitting for 8 mm tube .....	2	9

#### 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 (12-32 V DC/AC) .....	K
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#### Display and limit switching points

3½ digit LED display; 2 sets of potential-free relay contacts .....	3
3½ digit LED display; 2 solid-state switch outputs .....	6

#### Electrical connections

M12 roundshell multi-pin connectors .....	M
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#### Mounting

Rear fastening holes .....	0
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			
EU03.F300	PC-programming interface with SW			