

## DE39 Digital Differential Pressure Transmitter - GL structural tested with pressure sensors

Differential pressure instrument for liquid and gaseous media.

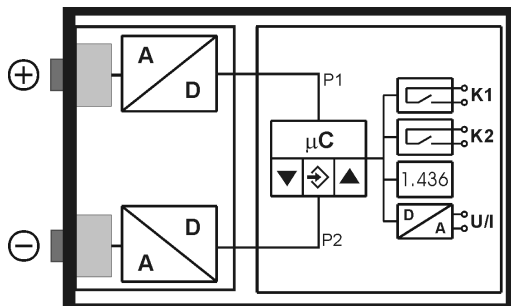
### Construction and Operation

The instrument is based on an electronic module which interprets the analogue signals from the integrated pressure sensors. These signals may be displayed separately. It is the electronic module's main task to compute the pressure difference, which can be displayed and processed. The interpretation allows to set two independent switching points and provides an electrical output signal proportional to the differential pressure.

The integrated pressure transmitters are based on a ceramic measuring system. The digitized signals are processed to the electronic module.

The pressure ratings of the pressure sensors and the measuring range of the instrument are factory calibrated and marked accordingly on the product identification label.

### Functional Scheme



### Features

- Large bright LED display
- Selectable pressure units
- 2 independent limits with a choice of logic modes
- Digitally programmable zero adjustment and filtering
- Optional analogue signal output, with user-programmable scaling, linearization, inversion, and offset adjustment.
- User-defined signal conversion look-up table (up to 30 points)
- Fully programmable from a PC, using the optional Model EU03 PC Adaptor
- Separate display of each pressure possible

### Approval (Option)

- Type test according to the German Lloyd directives, test mark (BL), No. 59 364 - 08 HH (see Ordering Code)

### Typical Applications

- Differential pressure measurement of highly contaminated media
- Filter condition monitoring
- Hydrostatic level measurement
- Simplified pump control
- Monitoring of pumps and compressors



## Specifications


### General

Measuring range	bar	6.0	10.0	16.0	25.0	40.0
Nominal pressure of pressure sensor (static operating pressures)	bar	6	10	16	25	40
Straight line deviation (max.)°	%FS	2.5				
Straight line deviation (typ.)°	%FS	<1.0				
TC span (max.)°°	%FS 10K	<0.3				
TC span (typ.)°°	%FS 10K	<0.1				
TC offset (max.)°°	%FS 10K	<0.4				
TC offset (typ.)°°	%FS 10K	<0.15				

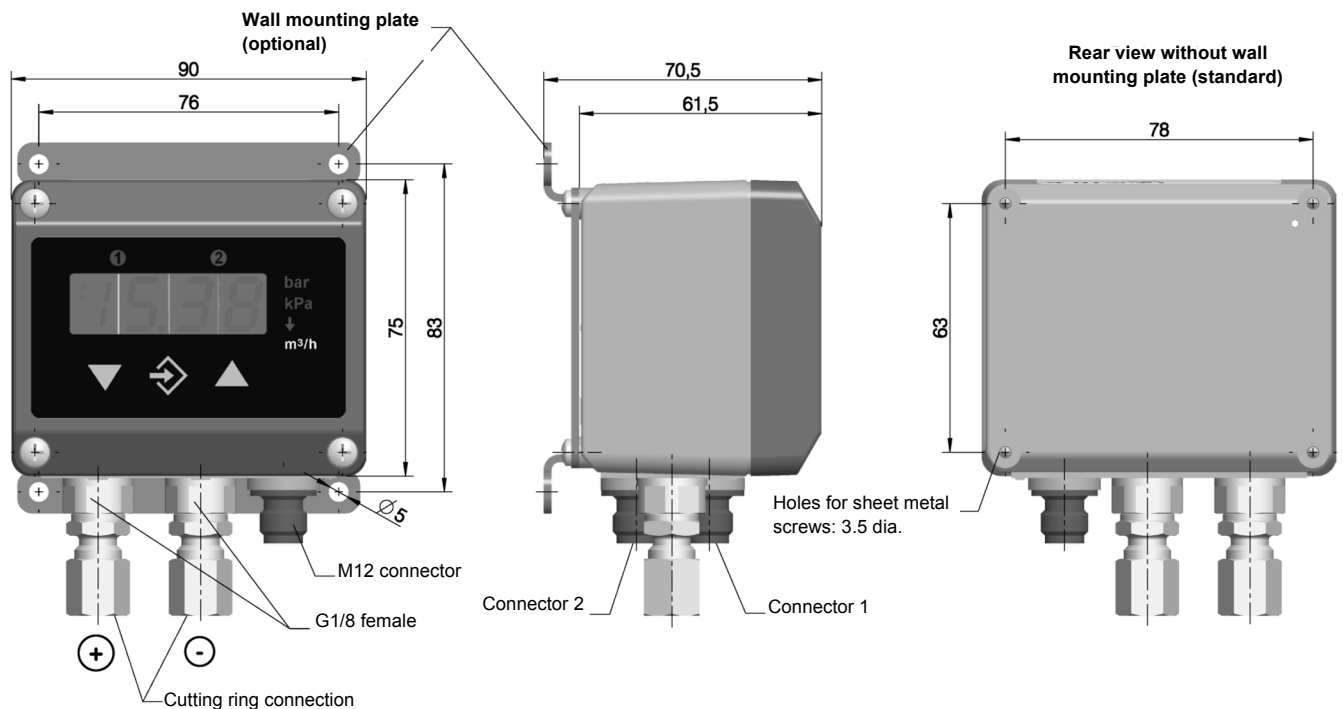
The effective measuring range is the result of the measuring range and the adjusted spreading (max. 10:1). Using a 6 bar instrument for instance, the smallest possible measuring range is 0...0,6 bar.

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

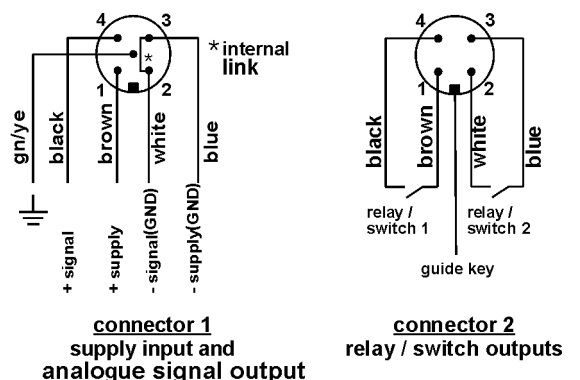
°°: Pressure within specified range (characteristic linear, not spreaded)

Operating temp. (ambient)	-10 ... 70°C
Operating temp. (media)	-10 ... 80°C
Storage temperature	-20 ... 70°C
Protection class (housing)	IP 65 per DIN EN 60529
<b>Electrical</b>	
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 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
<b>Connections</b>	
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	G 1/8 female threads with optional cutting ring fittings for 6 or 8 mm tube
<b>Materials, mounting</b>	
Materials, housing	Polyamide PA6,6 (GL-variant: Lexan Resin 640A)
Materials, media contact	Stainless steel 1.4305, VITON®, ceramics (Al <sub>2</sub> O <sub>3</sub> , 96%)
<b>Approval</b>	<b>Type test according to the German Lloyd directives, test mark </b> <b>Certificate No. 59 364 - 08 HH, (see Ordering Code)</b>
Mounting	Mounting holes at rear for panel mounting 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)



## Electrical Connection / Switching Function



## Programming

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

	Settings
Offset	Cancellation of input pressure difference
Displayed pressure	P1, P2, ΔP (3)
Input filtering	0.0...100.0s (10/90% step response time) for signal output, display separated
Relay / switch 1/2	Activation point, de-activation point, response time delay (0...100 s), logic (N/O or N/C)
Measurement unit selection	bar, kPa, „free unit“ start value, end value and decimal place for „free unit“
Output signal start/end value	can be set at any point measuring range (2)
Zero suppression	0...100 counts (1)
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 = 10:1. Only the output signal is affected. Transfer function is inverted if start value > end value.
- (3) Display of P1 or P2 is for inspecting purpose only. All settings refer to ΔP.

## Ordering Code

### Digital Differential Pressure Transmitter with pressure sensors

DE39 

		W				K	0		M	
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#### Range

0 ... 6 bar	> 0 6
0 ... 10 bar	> 0 7
0 ... 16 bar	> 0 8
0 ... 25 bar	> 0 9
0 ... 40 bar	> 1 0

#### Measuring System

Chrome-nickel-steel 1.4305 ..... > W

#### Approval Options

Standard model ..... > 0  
GL type approved model ..... > Z

#### Pressure Connection

Female thread G 1/8 ..... > 0 0  
Cutting ring connection of 1.4571 for 6 mm tube ..... > 2 4  
Cutting ring connection of 1.4571 for 8 mm tube ..... > 2 5  
Cutting ring connection of brass for 6 mm tube ..... > 2 8  
Cutting ring connection of brass for 8 mm tube ..... > 2 9

#### Electrical Signal Output

Without output signal ..... > 0  
0 - 20 mA 3-wire (STANDARD) ..... > A  
0 - 10 V DC 3-wire (STANDARD) ..... > C  
4 - 20 mA 3-wire (STANDARD) ..... > P

#### Power Supply

24 V DC/AC (12-32 V DC/AC) ..... > K

#### Display / Switching Function

3 1/2 digit LED display; 2 sets of voltage free relay contacts ..... > 3  
3 1/2 digit LED display; 2 solid-state switch outputs ..... > 6

#### Electrical Connection

M12 plug connection ..... > M

#### Mounting

Standard (rear mounting 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			
EU03F300	PC-programming interface with SW			