FISCHER MESS- UND REGELTECHNIK

Data Sheet and Operating Manual

DE45 | **Digital differential pressure switch / transmitter**

DE45##00###K0#M#R####

Gas explosion protection zone 2

Table of Content

1 Safety guidelines
2 Intended use
3 Description of the product and functional description
4 Installation and assembly
5 Commissioning
6 Maintenance
7 Transport
8 Service
9 Accessories
10 Disposal
11 Technical data
12 Dimensional drawings
13 Order Codes
14 Manufacturer's Declarations and Certificates

CE Ex II 3G
Ex nA IIC T4
-10°C ≤ T_{amb} ≤ 60°C

1 Safety guidelines

1.1 General Information

This operating manual contains instructions fundamental to the installation, operation and maintenance of the instrument that must be observed unconditionally. It must be read by the assembler, operator and the specialized personnel in charge of the device before it is installed and put into operation.

This operating manual is part of the product and therefore must be kept close to the device in a place that is easily accessible for the responsible personnel.

The following sections, in particular the instructions about assembly, commissioning and maintenance, contain important safety information, non-observance of which could lead to risks to people, animals, the environment and objects.

1.2 Personnel Qualification

The instrument may only be installed and commissioned by specialized personnel familiar with the installation, commissioning and operation of this product.

Specialized personnel are persons who can assess the work they have been assigned and recognize potential dangers by virtue of their specialized training, their skills and experience and their knowledge of the pertinent standards.

For explosion-proof models the specialized personnel must have received special training or instruction or be authorized to work with explosion-proof instruments in explosion hazard areas.

1.3 Risks due to Non-Observance of Safety Instructions

Non-observance of these safety instructions, the intended use of the device or the limit values given in the technical specifications can be hazardous or cause harm to persons, the environment or the plant itself.

Claims for damages from the manufacturer are excluded in this case.

1.4 Safety Instructions for the Operating Company and the Operator

The safety instructions on correct operation of the device shall be observed. The operating company must make them available to the installation, maintenance, inspection and operating personnel.

Dangers arising from electrical components, energy discharged by the medium, escaping medium and incorrect installation of the instrument must be eliminated. For more information, please refer to the applicable national and international regulations.

In Germany these are the DIN EN, UVV and, in industry-specific cases, the DVGW-, Ex-, GL-, etc., the VDE guidelines and the regulations of the local power utility companies.

The instrument must be decommissioned and secured against inadvertent re-operation if a situation arises in which it must be assumed that safe operation is no longer possible. Reasons for this assumption could be:

- evident damage to the instrument,
- failure of the electrical circuits,
- long storage in temperatures over 70°C,
- considerable strain due to transport.
- Repairs may be carried out by the manufacturer only.

A professional single conformity inspection as per DIN EN 61010, section 1, must be carried out before the device can be re-commissioned. This inspection must be performed at the manufacturer's location. Correct transport and storage of the device is assumed.

The following sections, in particular the instructions about assembly, commissioning and maintenance, contain important safety information, non-observance of which could lead to risks to people, animals, the environment and objects.

1.5 Unauthorised Modification

Modifications of or other technical alterations to the instrument by the customer are not permitted. This also applies to replacement parts. Any modifications / alterations required shall be carried out by Fischer Mess- und Regeltechnik GmbH only.

1.6 Inadmissible Modes of Operation

The operational safety of this device can only be guaranteed if it is used as intended. The device model must be suitable for the medium used in the system. The limit values given in the technical data may not be exceeded.

1.7 Safe working practices for maintenance and installation work

The safety instructions given in this operating manual, any nationally applicable regulations on accident prevention and any of the operating company's internal work, operating and safety guidelines must be observed.

The operating company is responsible for ensuring that all required maintenance, inspection and installation work is carried out by qualified specialized personnel.

1.8 Explanation of the symbols

WARNING!
… indicates a potentially dangerous situation, non-observance of which could endanger persons, animals, the environment or objects.

INFORMATION!
… highlights important information for efficient and fault-free operation.

TIP!
… highlights recommendations that may be useful but which are not necessarily required in specific situations.

2 Intended use

Display and switching device for differential pressure of gaseous media. The instrument is to be exclusively used for the applications agreed between the manufacturer and user.

Explosion hazard area classification

The differential pressure switch / transmitter DE45 is suitable for use in explosive areas "zone 2" as an electrical device".

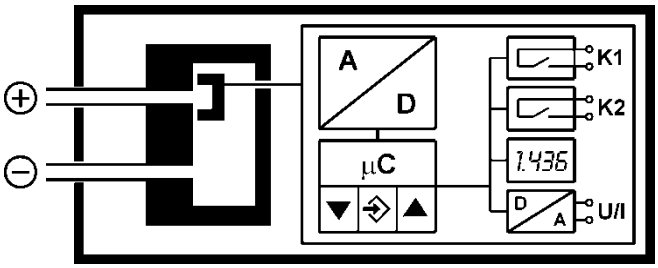
Designation as per guideline 94/9/EC

CE ⟨Ex⟩ II 3G Ex nA IIC T4

$-10°C \leq T_{amb} \leq 60°C$

3 Description of the product and functional description

3.1 Function diagram



3.2 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. In case of equal pressure, the measuring diaphragm is in its idle state. In case of pressure difference, the force acting on the measuring membrane causes it to be moved towards the side of the lower pressure. This movement of the diaphragm induces a change of resistance, which is evaluated by the device's electronics and transformed into signals on the display, switch contacts and an output signal.

4 Installation and assembly

The unit is designed for mounting on flat assembly plates. For screw connection to the assembly plate, the device features four assembly bores on its back, which can be used for ∅3.5 mm tapping screws.

Optionally, the device can be delivered with a wall-mounting plate (see 13, order code).

At the factory, the device is calibrated for vertical installation, but the installation position is arbitrary. For installation positions deviating from the vertical, the zero-point signal can be corrected by the integrated zero-point adjuster (see 5.3.2).

The enclosure protection type IP 65 is only guaranteed, if a suitable power supply cable is used (see accessories).

4.1 Process connection

- By authorized and qualified specialized personnel only.
- The pipes need to be depressurized when the instrument is being connected.
- Appropriate steps must be taken to protect the device from pressure surges.
- Check the suitability of the device for the media to be measured.
- Check that the pressure connections do not leak before commissioning.
- Maximum pressures shall be observed.

⚠ Do not blow into the pressure connections!

The pressure connections are marked with (+) and (-) symbols on the device. For differential pressure measurements, the higher pressure is connected to the (+) side and the lower pressure to the (-) side of the device.

The pressure measuring lines must be installed on a gradient so that no air pockets e.g. for liquid measurements, water pockets or for gas measurements can be created. If the required incline is not reached, water and/or air filters need to be installed at suitable points.

The pressure sensing lines need to be kept as short as possible and installed without sharp bends to avoid interfering delay times.

If the pressure sensing lines are already pressurised at the time of commissioning, zero-point control and adjustment cannot be performed. In such cases, the device should be only connected to the mains without the pressure sensing lines.

4.2 Electronic connection

- By authorized and qualified specialized personnel only.
- The electrical connection of the device shall be performed according to relevant VDE and local electricity board regulations.
- Disconnect the system from the mains before connecting the device.

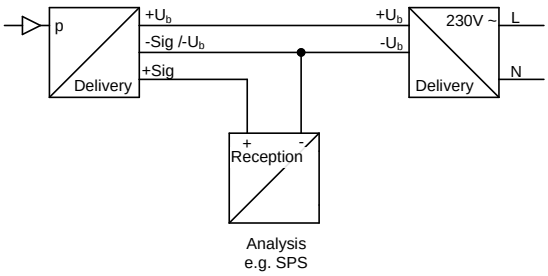
Refer to the technical data for the recommended power supply.

⚠ To guarantee safe operation of the device, the supply circuit must satisfy the requirements for zone 2, category 3, and the local applicable regulations and guidelines for the installation and operation of electrical systems in explosion hazard areas (e.g. EN 60079-14).

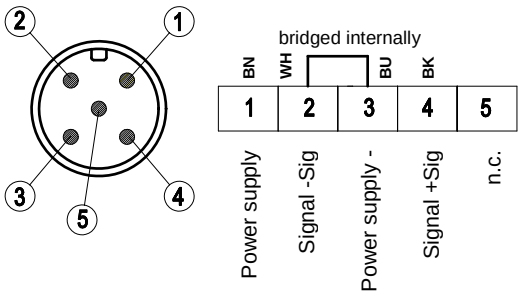
⚠ The supply voltage (24 V DC/AC) may not exceed 32V DC/AC. The supply circuit must be protected by a 200mAT fuse.

⚠ The device may be configured with the EU03.F300 configuring adaptor outside of the explosion hazard areas only (i.e. not in zone 2).

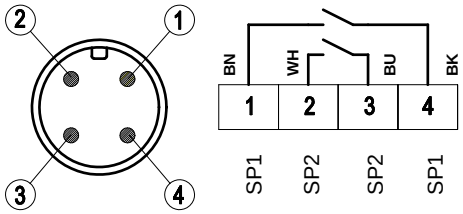
3 conductor circuit



Connector 1: Power supply and output signal



Connector 2: Switching outputs



The nominal supply voltage and the permissible range can be found in the technical data.

The admissible load / resistance for the signal output is stated in the technical data.

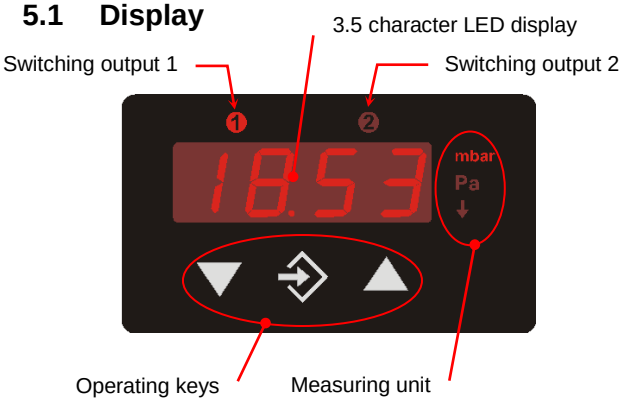
The connection "Signal ground"(-Sig) is connected internally to the supply ground. It only serves as the ground connection for the output signal. This means that the output signal is free of interference levels on the power supply lines.

5 Commissioning

All electrical supply, operating and measuring lines, and the pressure connections must have been correctly installed before commissioning. All supply lines are arranged so that there are no mechanical forces acting on the device.

Check that the pressure connections do not leak before commissioning.

5.1 Display



- The 3.5 digit LCD display represents the current differential pressure in normal mode.
- The selected measuring unit is illuminated on the right of the display.

The units shown in the picture may vary from the actual model.

- Two light diodes ① and ② above the display indicate the status of the switching outputs. As soon as the switch is closed, the respective LED shines.

5.2 Operating keys

The operating keys have the following function:

▼	Page down menu Reduce value
⇨	Enter key
▲	Page up menu Increase value

5.3 Configuration

For commissioning there is a multitude of setting options for optimum adaptation of the device to the measuring point and task at hand. This section covers these options step by step.

Depending on the device model [1] some menu items may not be available. For example, all characteristic curve functions are faded out in the menu if the device does not have a signal output.

Tipp

It is possible to completely configure the device using a PC adapter at the PC. Here all parameters are directly visible and accessible. Also, the entire configuration can be loaded, saved and documented as a printout. For more information about this program, please refer to the program documentation (cf. Accessories).

[1] with regard to the transmitter signal, voltage output, current output, etc.

5.3.1 General points

Connect the device to the power supply and ensure that it is not under any pressure (if necessary, disconnect any pressure lines).

Proceed as follows to set a parameter:

- Press the enter key ⏎ to switch to the menu. *ESC* will appear on the display.
- Use the arrow keys ▼ ▲ to select a parameter from the list.
- Press the enter key ⏎ to call up the parameter.
- Use the arrow keys ▼ ▲ to set the required value.
- Press the enter key ⏎ to save the value.

After setting all parameters, leave the menu as follows:[2]

- Use the arrow keys ▼ ▲ to set the *ESC* parameter. You will find these at the start and also at the end of the list of parameters.
- Press the enter key ⏎ to leave to the menu.

5.3.2 Selecting the pressure unit

First select the pressure measuring unit. The unit that is currently valid is illuminated to the right of the number displays. Press the middle key ⏎ to make the setting and then search for the parameter *Ein* using the right-hand key ▲. Press ⏎ again an then change the displayed value using ▲ or ▼.

1 = top
2 = middle
3 = bottom

Once the value has been selected, save it with ⏎ and *Ein* will appear again in the display.

Then leave the setting mode. Press ▼ until *ESC* and the ⏎ appear. The current measured pressure is shown again. The correct pressure unit is now illuminated to the right of this.

The display can only show up to ±1999. Therefore in some cases it may not be possible to select all stated pressure units.

5.3.3 Zero point control and adjustment

Ensure that the device is not under any pressure (if necessary, disconnect any pressure lines).

If the device does precisely indicate zero at this point of time, parameter *oFI* enables you to adjust the measuring value exactly to zero. To do so, you have to set the measuring value indicated below *oFI* to zero.

After zero-point adjustment, the pressure sensing lines can be reconnected.

5.3.4 Damping and zero-point stabilising

If there are unsteady pressure readings at this point of time or during operation, you can use parameters *dAn* and *nP* to stabilise the reading (and the output signal).

The parameter *dAn* functions like a capillary throttle. However, it only acts on the display, output signal and switch points (if these exist) but not on the measuring cell itself. With this parameter, the response time can be set to pressure jumps. The value range comprises 0.0 s to 100.0 s.

But with maximum attenuation, it will take more than 2 minutes for the reading to also reach zero after a pressure jump from nominal pressure (100 %) to zero!

In many cases, unsteady readings are not a problem during normal operating mode, but this is not true for the idle state, i.e. if zero (differential) pressure is expected.

In such situations, parameter *nP* can be applied. Its value defines a measuring value range around zero. Within this range, the measuring value is set to zero.

Example:
A value of 0.08 mbar [3] is entered for *nP*. In this case all pressures within the range of -0.08 mbar to +0.08 mbar are set to zero. The reading will only not indicate zero anymore if the pressure exceeds these limits. However the pressure value and display do not correspond to one hundred percent. The measuring pressure and reading match again when the double value, in this case 0.16 mbar, is reached again.

5.3.5 Setting the output signal

The transmitter output signal primarily depends on the sensed pressure. However, you have the option of adjusting the output signal to a large extent to suit your requirements.

However the basic measuring range (indicated on the type label) and the type of output signal (voltage / current) are not variable.

Parameters *nA* (start of measuring range) and *nE* (end of measuring range) define the two pressures between which the output signal can generally change. Both values are adjustable across the entire basic measuring range. The set values always

[2] All set parameter values are only valid once you leave the menu via the *ESc* parameter.

[3] 0.08 mbar ≙ 8 Pa

refer to pressure (in the relevant measuring unit) and are converted when the measuring unit is changed.

The assigned signal values for *nA* and *nE* are invariable (type label, e.g. 0…10 V or 4…20 mA).

If *nA* is smaller than *nE* this is referred ´to a rising characteristic curve. The output signal grows as the pressure increases.

If *nE* is smaller than *nA*, this is a decreasing characteristic curve and the output signal decreases with the falling pressure.

The difference between values *nA* and *nE* must at least be 25 % of the basic measuring range. The software does not allow any larger spreads. If the range information is stated wrongly, you cannot leave the menu.

Example:
The following must apply for a basic measuring range of 400 Pa: *nA* – *nE* ≥ 100 Pa.

5.3.6 Output signal limits (Namur)

Regardless of the pressure, the three parameters *oGl*, *oG2* and *oEr* define the limit values for output currents or voltages that may not be undercut or exceeded.

These limit values have priority over the range defined by the *nA* and *nE*. They primarily serve to prevent error messages in downstream systems caused by a brief overstepping of measuring ranges.

The parameter *oGl* defines the limit value for the minimum output signal. The output signal may not undercut this value. Usually, this parameter is only recommended for devices with an output signal of 4…20 mA because in these devices, a value below 3.8 mA is often assessed as an error signal.

The parameter *oG2* defines the limit value for the maximum output signal. The output signal may not exceed this value. This parameter can be used for all outputs (voltage and current) to limit the maximum value of e.g. 10.2 V.

The parameter *oEr* defines the value for the error signal. The value defined via the *oEr* is issued as an output signal, if the device detects an internal error and can no longer work correctly. However, the device is not able to recognise all possible errors and defects.

If you set *oGl* = *oG2* = 0, the output signal will no longer be checked for limits.

Tipp

If you set *oGl* to the maximum value (11 V or 21 mA), you can use *oG2* to adjust the output signal independent of the pressure from zero to the maximum value. You do not need to leave the menu item, the output is directly changed. You operate the device then as a transducer and can simply check the further signal processing.

5.3.7 Characteristic curve function *F*

In some applications, measuring pressure is an indirect unit for the actual measuring variable. Flow measurements via a panel or determining the filling level by means of hydrostatic pressure measurements are two typical examples of this. In these cases, you might want to change the output signal of the transmitter to a non-linear characteristic curve so that the following analysis receives a signal that is linear-proportional to the actual measuring variable (e.g. volume in m³ or volume flow cm³/s etc.)

The parameter *F* allows you to select between the following variants:

F	
0	linear characteristic curve (standard)
1	square rooted characteristic curve
2	flat cylindrical tank
3...30	Support point table with 3 to 30 pairs of values

Whenever you change the value from *F*, the program creates a new table. All previous values in the table are rejected and replaced with new linear entries.

The tables of type *F* = 0 to *F* = 2 are not visible. Internal values are used here to calculate the table. These values are invariable.

For *F* = 3...30 you can only influence the 1..28 intermediate values (cf. 5.3.8) You only have access to the start and end values via the *nA* and *nE* parameters.

When the parameters *nA* and *nE* are changed the table is deleted and *F* = 0 is set.

At the start of the measuring range (*nA*) 0% of the output signal (e.g. 0 mA) is issued.

At the end of the measuring range (*nE*) 100% of the output signal (e.g. 20 mA) is issued.

5.3.8 Menu jump *Lin*

If the value of *F* is greater than or equal to 3, there is a submenu *Lin*. here you can access all table values apart from the table start (*nA*) and end (*nE*).

This submenu has its own entry and exit point that is shown with *End*. The table is only saved if you return to the main menu at this point, i.e. if you change to the parameter *Lin* again via the key ⏎.

If the table is not structured correctly, an error message *Err* will appear here and you cannot quit the submenu.

The table comprises 3…30 pairs of values. In the case of a device with a power output, the first pair of values is {I01|P01} [4]. The first value I01 defines the output signal. The second value P01 determines the pressure at which the output signal is issued.

Followed by the pairs of values {i02|P02} ... {i30|P30}.

Entering or changing values in the table via the membrane keypad is tiresome and prone to errors. This is only intended as an emergency solution in case access to the PC adapter is not possible.

The table is correct if the following applies for all signal values: The value is larger than the previous value. Either larger (rising characteristic curve) or smaller (falling characteristic curve) apply to the pressure values accordingly. No transition from rising to falling characteristic curves or vice versa is allowed.

5.3.9 Switch points

The two switch outputs ① ② are configured by four parameters respectively.

The function of the switching output ① is determined by the parameters r1A, r1E, r1d and r1F.

The function of the switching output ① is determined by the parameters r2A, r2E, r2d and r2F.

r1A defines the switch-off point; r1E defines the switch-on point from of switch output 1. The values are set in the valid measuring unit (shown on the right).

Together, the two parameters r1A and r1E determine the switch function of switch output 1:

If r1A is smaller than r1E, the output switches on, if the measured value exceeds r1E. It is only switched off again if the measured value r1A is undercut (hysteresis function).

If r1A = r1E, the output switches on if the measured value exceeds r1E and off if the measured value undercuts r1A.

If r1A is larger than r1E, the output switches on, if r1E < Measured value < r1A applies (window function).

Both parameters can be set independently over the entire range.

If the measuring unit is switched over, the switching points are converted accordingly. Rounding errors may cause deviations in the last position.

r1d allows the reaction of the switch output 1 to be delayed by between 0.0 and 100.0 s. This value applies equally for switching on and off.

r1F reverse the function of the switch output. If the value = 1, the switch output works as an NO contact, if the value = 2, the switch out works as a NC contact.

5.3.10 Password

The last menu item -P- is used to enter a password. A value between 001 and 999 can be selected for the password. The value 000 cancels the password function.

If a password has been issued, the text PAS appears after ESC and ◆, and you need to enter the correct value using ◆ and ▲,▼. You will only arrive at all other menu items after doing this. In the event of an error, the display will jump back to the start of the menu ESC.

If the password is forgotten, it can only be reset by the manufacturer or overwritten via the PC adapter.

5.3.11 Display options

The parameter d0 enables the reading to settle if the measuring value fluctuates heavily. This filter function is similar to the dAM function, but only impacts on the reading not on the output signal.

At d0 = -1 only the switchpoint LEDs are controlled. At d0 = -2 these are switched off.

5.3.12 Reset to default

The function rES allows all settings to be reset to the default settings. The default values can only be defined via a PC interface.

5.3.13 Free unit

If the device is designed for a "free" third unit (membrane symbol: 🡻), the display can be scaled infinitely using the parameters nAF, nEF and dPF.

The measuring range defined by the parameters nA and nE is converted to nAF and nEF. This also takes into account the table function (F). The value of dPF determines the position of a decimal point.

[4] At a voltage output {u01|P01} ... {u30|P30}.

5.4 Parameter overview

After switching on the device, it will briefly indicate the software version number and then enters the normal operating mode. By using the middle ◈ key on the membrane keypad you can access the parameter menu. The reading now shows the text *ESC*. By using the right ▲ key, you can choose the parameters from the following list one by one:

Note:
Depending on the device model, individual parameters may not be available if the device does not have this feature.

PAS **Enter password**
(only appears if the password is active), value range 000...999
000 = deactivated

dAN **Attenuation**
(Jump response time T90),
value range 0.0..100.0s

dO **Display attenuation**
Value range -2...0...100.
-2 = Display off, LED Switch point off
-1 = Display off, LED Switch point on
0 = Display on, LED Switch point on
1...100 Display attenuation

r1A **Switch-off point**
From switching output ①

r1E **Switch-on point**
From switching output ①

r1d **Switching delay**
from switch output • ①
Value range 0.0 to 100.0s. This value applies equally for switching on and off.

r1F **Switching function**
From switching output ①
Values range 1,2
1 = Switching output as NO contact,
2 = Switching output as NC contact

r2A **Switch-off point**
From switching output ②

r2E **Switch-on point**
From switching output ②

r2d **Switching delay**
from switching output ②
Value range 0.0 to 100.0s. This value applies equally for switching on and off.

r2F **Switching function**
From switching output ②
Values range 1,2
1 = Switching output as NO contact,
2 = Switching output as NC contact

on **Measuring range unit**
Value range 1,2,3
The selection is illuminated on the right of the reading. Not all basic measuring ranges allow free switchover. The respective unit size can only be selected if the basic measuring range of the device can be shown sensibly.

nA **Start of measuring range**
The measuring value is set in that the output signal is minimal.
(e.g.: 0V, 0mA or 4mA).

nE **End of measuring range**
The measuring value is set in that the output signal is maximum.
(e.g.: 10V, or 20mA).

nP **Zero-point stabilising**
Value range 0 to ⅓ of the basic measuring range. The value acts symmetrically around real zero.

dPF **Free unit**
Decimal point position

nAF **Free unit**
Start of measuring range (display)

nEF **Free unit**
End of measuring range (display)

oFI **Offset correction measuring input 1**
Value range -⅓ FS...0... +⅓ FS

F **Characteristic curve function**
Value range 0...30
0 = linear,
1 = square rooted,
2 = flat cylindrical tank
3..30 = Table

Lin **Menu jump**
Submenu table processing
If F < 3 this menu item is faded out.

oG1 **Limit value**
Minimum output signal

oG2 **Limit value**
Maximum output signal

oEr **Error signal**
(Output signal in error case)

rES **Reset**
all parameters to standard values (specification of the standard values per PC)

-P- **Password setting**

Value range 000 to 999
Value 000 does not hold password protection.

6 Maintenance

The device is maintenance-free.

We recommend regular inspections to guarantee reliable operation and a long life cycle, such as:

- Checking the reading.
- Checking the switching function in combination with downstream components.
- Checking the leak-tightness of the pressure connection lines.
- Checking the electrical connection (cable clamp connections).

The exact test cycles shall be adapted to the operating and ambient conditions. The operating manuals of any other connected device components shall also be observed.

7 Transport

The device must not be exposed to mechanical shocks. It shall be transported only in packaging specifically intended for transport.

8 Service

All damaged or faulty devices shall be directly sent to our repair department. Please coordinate the return of any device with our sales department.

Process media residues in and on dismantled instruments can be a hazard to people, animals and the environment. Take adequate preventive measures. If required the devices shall be thoroughly cleaned.

9 Accessories

- Set of cables with M12 connectors (please enquire)
- PC adapter with type EU03.F300 software

10 Disposal

For the sake of the environment ....

Please help to protect our environment and dispose of or recycle used devices as required by the applicable regulations.

11 Technical data

			+ ranges (0 …)										+/- ranges								
Measuring ranges		mbar	4	6	10	16	25	40	60	100	160	250	2.5	4	6	10	16	25	40	60	100
		Pa	400	600	1000	1600							250	400	600	100	1600				
		kPa	0.4	0.6	1.0	1.6	2.5	4.0	6.0	10.0	16.0	25.0	0.25	0.4	0.6	1.0	1.6	2.5	4.0	6.0	10.0
Static operating pressure	max.	mbar	50		100		250		500		1500		50			100		250		500	
Bursting pressure		mbar	150		300		750		1500		3000		150			300		750		1500	
Characteristic curve deviation °)	max.	%FS	1.0										1.0								
	typ.	%FS	0.5										0.5								
Tk span°°)	max.	%FS/10K	1.0		0.3						0.4		1.0	0.5		0.3					
	typ.	%FS/10K	0.3										0.3								
Tk zeropoint °°)	max.	%FS/10K	1.0		0.4								1.0	0.5		0.4					
	typ.	%FS/10K	0.2										0.2								

°: Characteristic curve deviation (non-linearity and hysteresis) at 25°C, basic measuring range (linear characteristic curve, not spread)
°°: :with reference to the basic measuring range (not spread); compensation range 0..60°C.

General points

Admissible ambient temperature: -10°C ≤ Tamb ≤ 60°C
Admissible media temperature: -10 ... 60°C
Admissible storage temperature: -20 ... 70°C
Enclosure protection class: IP 65 acc. to DIN EN 60529

Electrical data

Nominal voltage: 24V AC/DC
Admissible operating voltage Ub: 12 ... 32V AC/DC
A CE-compliant power supply unit with a 200 mAT fuse only may be used as a power supply.
Electrical connection type: Three-wire
Output signal: 0 ... 20mA, 4 ... 20mA AC/DC | 0 ... 10V DC
Admissible apparent ohmic resistance: $R_L \leq (U_b - 4\ V) / 0{,}02A$ (for $U_b \leq 26V$) | $R_L \geq 2\ K\Omega$ (for $U_b \geq 15V$),
$R_L \leq 1100\ \Omega$ (for $U_b > 26V$) | $R_L \geq 10\ K\Omega$ (for $U_b = 12 \ldots 15V$)
Power consumption: approx. 2 W / VA
Display: 3.5 character LED

Switch contacts

2 potential-free semiconductor switches (MOSFET., 1-pin, NO/NC programmable)
U_{max}: 3…32 V DC/AC
I_{max}: 0,25 A
R_{ON}: ≤ 4 Ω
P_{max}: 8 W / VA

Connections

Process connection: Hose screw connections made of Al, 6/4 mm or 8/6 mm
electr. connection: 2 x round plug connector M12
Connector 1 for supply and analogue output signal (5-pole, male)
Connector 2 for switch contacts (4-pole, male)

Materials

Casing: Polyamide PA 6.6
Media-contacting material: Silicon, PVC, aluminium, brass

Assembly

Bore-holes on the reverse side for attachment of the assembly panels
Panel mounting set
Wall mounting by means of assembly plate

Markings: **CE Ex II 3G Ex nA IIC T4**

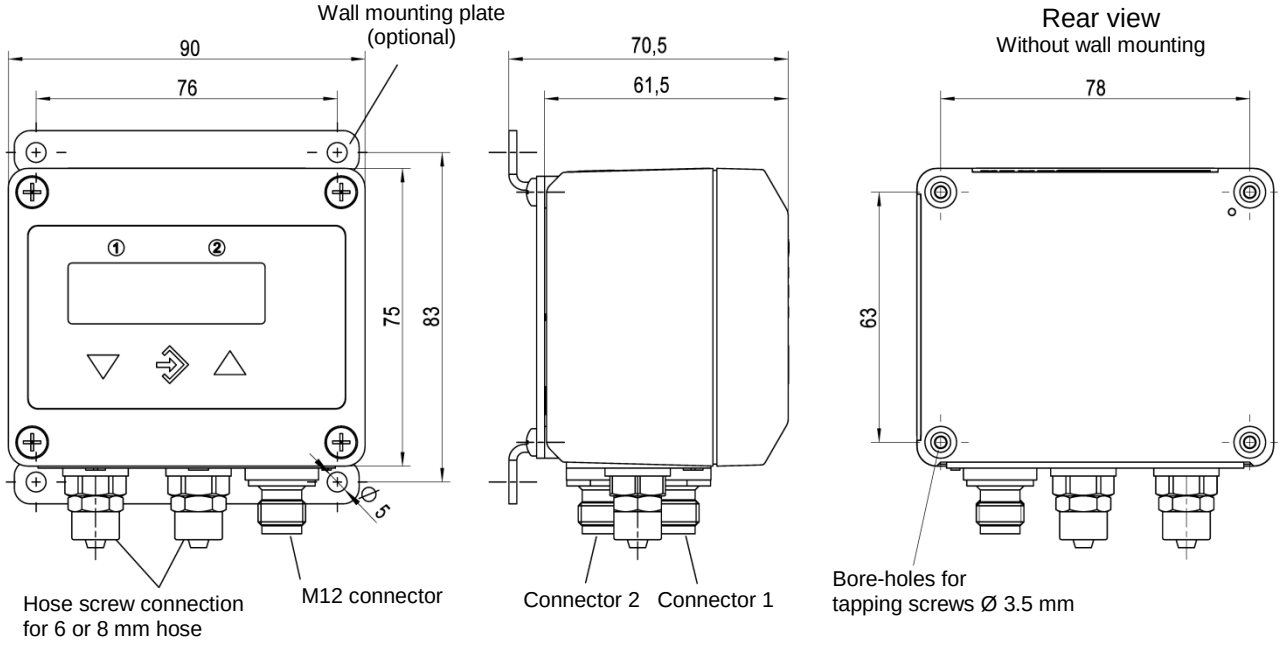
11.1 Programming

Programming is carried out via the membrane keypad and menu navigation; can be locked with a password

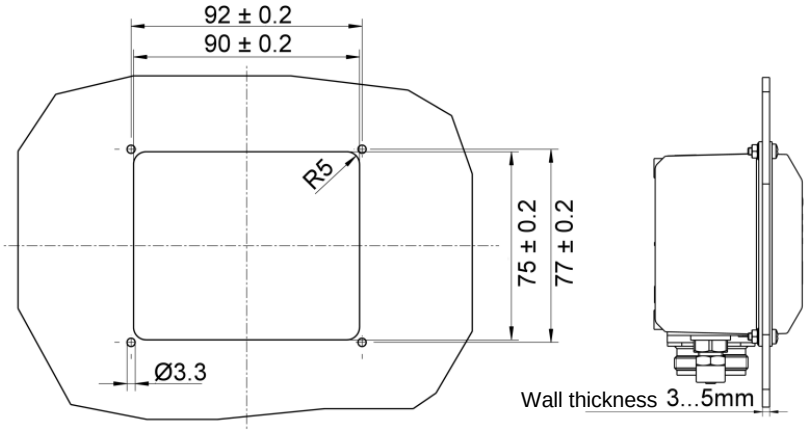
	Settings
Attenuation	0.0 ... 100,0 s (jump response time 10 / 90 %) for signal output; separately also for display
Switching output 1 / 2	Switch-off point, switch-on point, response time (0...100s), function (NC / NO contact)
Measuring range unit	mbar / Pa / "fee unit", starting value, end value and decimal point for "free unit"
Zero-point stabilising	0 ... 1/3 of the basic measuring range (1)
Output signal	User-definable within the basic measuring range (2)
Zero point correction	± 1/3 of the basic measuring range (3)
Implementation of characteristic curve	linear, square rooted, flat cyl. tank, table with 3...30 support points
Password	001 ... 999 (000 = no password protection)

Comments:
(1): Measuring values (around zero) are set to zero (e.g. to supress seepage)
(2): Maximum effective spread 4:1. Only the output signal is influenced. This in turn enables a decreasing characteristic curve, if the start of the measuring range > end of the measuring range.
(3): Zero point correction for compensation of various installation positions.

12 Dimensional drawings (all dimensions in mm unless otherwise specified)



Panel mounting



13 Order Codes

Digital differential pressure switch / transmitter, with 3 ½-digit LED display

Type DE45 | | | 0 | 0 | | | | K | | 6 | M | | R#### |

Measuring ranges

0	… 4	mbar	>	5	2
0	… 6	mbar	>	5	3
0	… 10	mbar	>	5	4
0	… 16	mbar	>	5	5
0	… 25	mbar	>	5	6
0	… 40	mbar	>	5	7
0	… 60	mbar	>	5	8
0	… 100	mbar	>	5	9
0	… 160	mbar	>	6	0
0	… 250	mbar	>	8	2
-2.5	… +2.5	mbar	>	A	6
-4	… +4	mbar	>	A	7
-6	… +6	mbar	>	A	8
-10	… +10	mbar	>	A	9
-16	… +16	mbar	>	B	1
-25	… +25	mbar	>	B	2
-40	… +40	mbar	>	C	5
-60	… +60	mbar	>	B	3
-100	… +100	mbar	>	B	4
0	… 400	Pa	>	D	7
0	… 500	Pa	>	J	7
0	… 600	Pa	>	D	8
0	… 1000	Pa	>	D	9
0	… 1600	Pa	>	E	1
-250	… +250	Pa	>	L	6
0	… 1	kPa	>	N	1
0	… 1,6	kPa	>	N	2
0	… 2,5	kPa	>	N	3
0	… 4	kPa	>	N	4
0	… 6	kPa	>	N	5
0	… 10	kPa	>	E	5
0	… 16	kPa	>	E	6
0	… 25	kPa	>	E	7
-1	… +1	kPa	>	L	8
-1,6	… +1,6	kPa	>	L	9
-2,5	… +2,5	kPa	>	M	6
-4	… +4	kPa	>	M	7
-6	… +6	kPa	>	M	8

Pressure connection

Aluminium screw connection for 6 / 4 mm hose	**4 0**
Aluminium screw connection for 8 / 6 mm hose	**4 1**

Electrical output signal

without analogue electrical 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**

Operating voltage

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

Measuring unit

Standard pressure units	>	**0**

Measured value display / contact elements

3 1/2-digit-LED – 2 semiconductor switches	>	**6**

Electrical connection

M12 plug connection	>	**M**

Assembly option

Standard (attachment boreholes on rear side)	>	**0**
Panel mounting set	>	**T**
Wall mounting	>	**W**

Customer-specific no.

Markings for use in zone 2 - risk by gases: CE Ex II 3G Ex nA IIC T4	>	**R####**

13.1 Accessories

Order Code	Designation	No. of Poles	Usage	Length
06401993	Connection cable with M12 connector	4-pole	for switching outputs	2 m
06401994	Connection cable with M12 connector	4-pole	for switching outputs	5 m
06401995	Connection cable with M12 connector	5-pole	for supply / signal	2 m
06401996	Connection cable with M12 connector	5-pole	for supply / signal	5 m
EU03.F300	Adapter for parameterization via PC software			