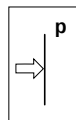
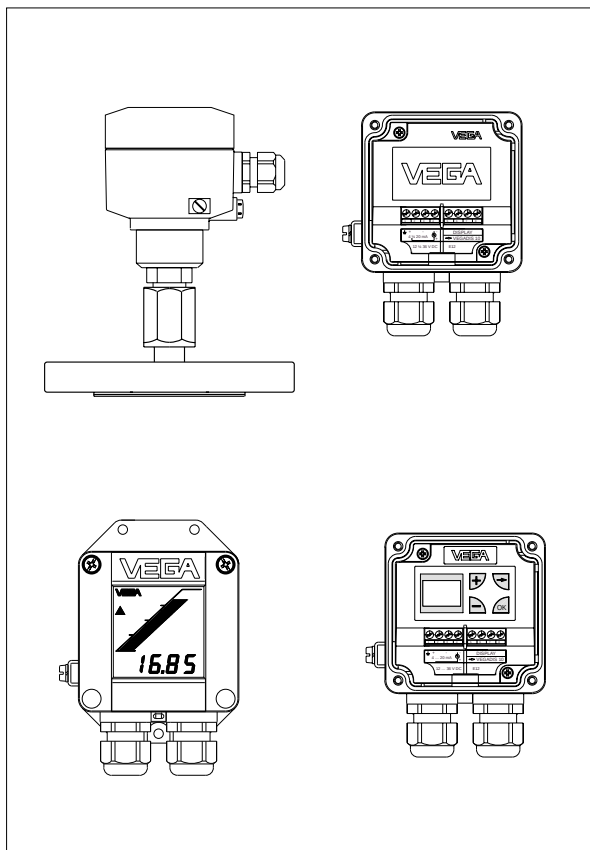


# Operating Instructions

## VEGABAR 21



**Safety information**

The described module must only be installed and operated as described in these operating instructions. Please note that other action can cause damage for which VEGA does not take responsibility.

**Note Ex-area**

Please note the approval documents attached (yellow binder), and especially the included safety data sheet.

## Contents

|                                                            |           |
|------------------------------------------------------------|-----------|
| Safety information .....                                   | 2         |
| Note Ex-area .....                                         | 2         |
| <b>1 Product description</b>                               |           |
| 1.1 Function and configuration .....                       | 4         |
| 1.2 Self-monitoring .....                                  | 4         |
| 1.3 Technical data .....                                   | 5         |
| 1.4 Approvals and certificates .....                       | 10        |
| 1.5 Dimensions .....                                       | 10        |
| <b>2 Mounting .....</b>                                    | <b>13</b> |
| <b>3 Electrical connection</b>                             |           |
| 3.1 Connection information .....                           | 13        |
| 3.2 Connection plan .....                                  | 14        |
| 3.3 Connection examples .....                              | 15        |
| <b>4 Set-up</b>                                            |           |
| 4.1 Adjustment of the basic functions .....                | 16        |
| 4.2 Menu-guided adjustment with additional functions ..... | 17        |
| 4.5 Indicating module .....                                | 22        |
| <b>5 Diagnosis</b>                                         |           |
| 5.1 Maintenance .....                                      | 23        |
| 5.2 Failure removal .....                                  | 23        |
| <b>6 Instrument modification</b>                           |           |
| 6.1 Interchanging adjustment modules .....                 | 25        |
| <b>7 Measurement with isolating systems .....</b>          | <b>26</b> |

## 1 Product description

### 1.1 Function and configuration

VEGABAR 21 is an efficient pressure transmitter with isolating system for process pressure measurement and hydrostatic level measurement. The hydrostatic pressure of the medium acts on the separating diaphragm of the isolating system and is transferred via the isolating liquid to a ceramic-capacitive measuring cell CERTEC®. The pressure on this measuring cell effects a capacitance change within the measuring cell. This capacitance change is detected by an ASIC (Application specific integrated circuit) and converted by an integral oscillator with microcomputer into a pressure proportional signal. The exact, digital processing of measured data with highest resolution ensures perfect technical data.

Isolating systems are used to protect the measuring cell against aggressive products and high temperatures. Due to the suitable selection of isolating liquid and diaphragm material, systems with a temperature resistance up to 400°C are possible.

The oscillator is powered by a separate VEGA-signal conditioning instrument, a stabilised power supply unit or a DCS (active input). After the adjustment, a standardised current signal 4 ... 20 mA is available which can be displayed (e.g. in DCS-systems) or further processed.

Two versions are available for adjustment:

- adjustment module directly on VEGABAR
- adjustment module in external housing (VEGADIS 10)

### 1.2 Self-monitoring

Important electronics components are checked on their function and internal parameters such as sensor value, temperature and operating voltage are monitored to increase the reliability.

VEGABAR 21 with ceramic CERTEC®-measuring cell offers the advantage of a continuous self-monitoring. Measuring and reference capacitance of the measuring cell are in a defined relation over the complete measuring range. Each deviation from these data is a reliable indicator for a malfunction of the measuring cell.

If during these routines failures or malfunctions are detected, a fault signal is triggered via the 4 ... 20 mA-output (current jump to 3,6 mA or 22 mA).

## 1.3 Technical data

### Mechanical data

#### Materials, wetted parts

|                    |                                                                                        |
|--------------------|----------------------------------------------------------------------------------------|
| Process connection | stainless steel 1.4571                                                                 |
| Diaphragm          | stainless steel 1.4571, Hastelloy C276 or B2, Monel 400, Tantalum, PTFE-foil on 1.4571 |
| Extension          | stainless steel 1.4571                                                                 |

#### Materials, non-wetted parts

|                                 |                                         |
|---------------------------------|-----------------------------------------|
| Housing                         | high resistance plastic PBT (Polyester) |
| Earth terminal                  | stainless steel 1.4305                  |
| Window of the indicating module | Lexan                                   |

#### Weight

|         |                                                             |
|---------|-------------------------------------------------------------|
| VEGABAR | approx. 0,8 ... 8 kg<br>(dependent on the isolating system) |
|---------|-------------------------------------------------------------|

#### Adjustment and indicating elements

|                                                 |                                                     |
|-------------------------------------------------|-----------------------------------------------------|
| Adjustment of the basic functions               | 2 keys, 1 rotating switch                           |
| Menu-guided adjustment with additional function |                                                     |
| - adjustment elements                           | 4 keys                                              |
| - indicating elements                           | DOT-Matrix display, 3 lines with 7 figures each     |
| Indicating module                               | LC-display with                                     |
|                                                 | - bargraph (20 segments)                            |
|                                                 | - digital value (4-digit)                           |
|                                                 | - tendency indicators for raising or falling values |

### Electrical data

#### Connection

|                 |                                                               |
|-----------------|---------------------------------------------------------------|
| Cable entry     | M20 x 1,5 (for cable-ø 5 ... 9 mm)                            |
| Screw terminals | for cross-section area of conductor up to 2,5 mm <sup>2</sup> |

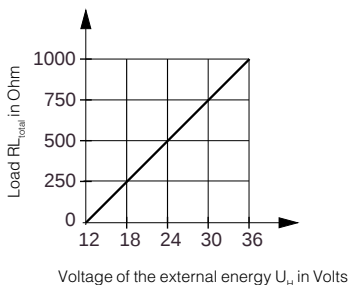
#### Protective measures

|                          |       |
|--------------------------|-------|
| Protection <sup>1)</sup> | IP 65 |
| Protection class         | III   |
| Overvoltage category     | III   |

<sup>1)</sup> For maintaining the housing protection, the use of the suitable seal for the cable in the Pg is necessary. If the used seal does not fit with the cable, it should be replaced by a suitable one.

## Supply and signal circuit

|                             |                                                       |
|-----------------------------|-------------------------------------------------------|
| Supply voltage              | 12 ... 36 V DC                                        |
| Permissible residual ripple | $U_{ss} \leq 1 \text{ V}$                             |
| Output signal               |                                                       |
| - range                     | 3,8 ... 20,5 mA                                       |
| - resolution                | 6 $\mu\text{A}$                                       |
| Current limitation          | 22 mA                                                 |
| Fault signal                | 22 mA (3,6 mA)                                        |
| Integration time            | 0 ... 10 s adjustable                                 |
| Average delay time          | 70 ms                                                 |
| Connection line             | 2-wire                                                |
| Max. permissible load       | dependent on the supply voltage<br>(see load diagram) |



## Indicating and adjustment circuit

|                   |                                         |
|-------------------|-----------------------------------------|
| For connection to | VEGADIS 10 and/or the indicating module |
| Data transmission | digitally                               |
| Connection line   | 4-wire                                  |
| Max. line length  | 25 m                                    |

## Adjustment ranges

|                        |                                             |
|------------------------|---------------------------------------------|
| Zero                   | -20 % ... +95 % adjustable of nominal range |
| Span                   | 3,3 % ... 120 % adjustable of nominal range |
| Recommended turn down: |                                             |
| - accuracy class 0,25  | up to 1 : 5                                 |
| - accuracy class 0,1   | up to 1 : 10                                |

**Measuring ranges**

| Nominal measuring range            | Gauge pressure resistance <sup>1)</sup> | Low pressure resistance |
|------------------------------------|-----------------------------------------|-------------------------|
| Relative pressure<br>0 ... 0,4 bar | 20 bar                                  | -0,4 bar                |
| 0 ... 1,0 bar                      | 25 bar                                  | -1,0 bar                |
| 0 ... 2,5 bar                      | 35 bar                                  | -1,0 bar                |
| 0 ... 5,0 bar                      | 45 bar                                  | -1,0 bar                |
| 0 ... 10,0 bar                     | 60 bar                                  | -1,0 bar                |
| 0 ... 20,0 bar                     | 90 bar                                  | -1,0 bar                |
| 0 ... 40,0 bar                     | 140 bar                                 | -1,0 bar                |
| 0 ... 60,0 bar                     | 200 bar                                 | -1,0 bar                |
| -0,05 ... 0,05 bar                 | 10 bar                                  | -0,1 bar                |
| -0,1 ... +0,1 bar                  | 15 bar                                  | -0,2 bar                |
| -0,2 ... +0,2 bar                  | 20 bar                                  | -0,4 bar                |
| -0,5 ... +0,5 bar                  | 25 bar                                  | -1,0 bar                |
| -1,0 ... +0,0 bar                  | 25 bar                                  | -1,0 bar                |
| -1,0 ... +1,5 bar                  | 35 bar                                  | -1,0 bar                |
| -1,0 ... +4,0 bar                  | 45 bar                                  | -1,0 bar                |
| -1,0 ... +10,0 bar                 | 60 bar                                  | -1,0 bar                |
| -1,0 ... +20,0 bar                 | 90 bar                                  | -1,0 bar                |
| -1,0 ... +40,0 bar                 | 140 bar                                 | -1,0 bar                |
| -1,0 ... +60,0 bar                 | 200 bar                                 | -1,0 bar                |
| Absolute pressure                  |                                         |                         |
| 0 ... 1,0 bar                      | 25 bar                                  |                         |
| 0 ... 2,5 bar                      | 35 bar                                  |                         |
| 0 ... 5,0 bar                      | 45 bar                                  |                         |
| 0 ... 10,0 bar                     | 60 bar                                  |                         |
| 0 ... 20,0 bar                     | 90 bar                                  |                         |
| 0 ... 40,0 bar                     | 140 bar                                 |                         |
| 0 ... 60,0 bar                     | 200 bar                                 |                         |

<sup>1)</sup> Note the nominal pressure of the process connection!

## Accuracy (similar to DIN 16 086, DIN V 19 259 - 1 and IEC 770)

### Influence of the ambient temperature

Average temperature coefficient  
of the zero signal <sup>1) 2)</sup>

- accuracy class 0,25 < 0,15 %/10 K
- accuracy class 0,1 < 0,05 %/10 K

### Long-term stability

Long-term drift of the zero signal <sup>1) 3)</sup> < 0,1 % (meas. cell, without considering the isolating system)

### Deviation

Reference conditions (acc. to IEC 770)

- temperature 15°C ... 35°C
- rel. humidity 45 % ... 75 %
- air pressure 860 mbar ... 1060 mbar
- Determination of characteristics limit point adjustment acc. to DIN 16 086
- Characteristics linear
- Deviation in characteristics <sup>1)</sup>
- accuracy class 0,25 < 0,25 %
- accuracy class 0,1 < 0,1 %
- Hysteresis <sup>1)</sup> < 0,02 %
- Repeatability <sup>1)</sup> < 0,02 %

### Other actuating variables

- Calibration position standing, diaphragm points downwards
- Vibration resistance mechanical vibrations with 4 g and 5 ... 100 Hz, tested acc. to the regulations of German Lloyd GL-characteristics 2

## Operating conditions

### Ambient conditions

- Ambient temperature -40°C ... +85°C
- indication module -20°C ... +70°C
- Storage and transport temperature -40°C ... +85°C
- Medium temperature -40°C ... +100°C
- Medium temperature, abhängig von Temperature
- Druckmittlerflüssigkeit  $p_{abs} > 1 \text{ bar}$  /  $p_{abs}^{4)} < 1 \text{ bar}$
- silicone oil -40°C ... +130°C / -40°C ... +130°C
- silicone oil and cooling element -40°C ... +200°C / -40°C ... +130°C
- silicone oil and capillaries 1 m -40°C ... +200°C / -40°C ... +130°C
- vegetable oil -10°C ... +130°C / -10°C ... +130°C
- vegetable oil and cooling element -10°C ... +250°C / -10°C ... +130°C
- high temperature oil a. cooling element -10°C ... +400°C / -10°C ... +200°C
- high temperature oil and capillaries 1 m -10°C ... +400°C / -10°C ... +200°C

<sup>1)</sup> Relating to the nominal range.

<sup>2)</sup> In the compensated temperature range of 0°C ... +80°C, reference temperature 20°C. Without isolating diaphragm, capillaries, cooling element (see influence of the ambient temperature).

<sup>3)</sup> Acc. to IEC 770, item 6.1.2 relating to the nominal range.

<sup>4)</sup> At  $p_{abs} < 1 \text{ bar}$  (vacuum range) the isolating liquid boils already at low temperatures.

**Zusätzlicher Temperatureinfluß durch Druckmittler**

| Process connection                                                              | Temperature coefficient<br>[mbar/10 K] |
|---------------------------------------------------------------------------------|----------------------------------------|
| FA Flange DN 25 PN 40 acc. to DIN 2501,<br>seal surface acc. to DIN 2526 Form D | 1,8                                    |
| FB Flange DN 40 PN 40 acc. to DIN 2501,<br>seal surface acc. to DIN 2526 Form D | 1,0                                    |
| FC Flange DN 50 PN 40 acc. to DIN 2501,<br>seal surface acc. to DIN 2526 Form D | 2,0                                    |
| FE Flange DN 50 PN 40 with ext. 100 mm                                          | 1,9                                    |
| FG Flange DN 50 PN 40 with ext. 200 mm                                          | 2,1                                    |
| FH Flange DN 80 PN 40 acc. to DIN 2501,<br>seal surface acc. to DIN 2526 Form D | 0,4                                    |
| FK Flange DN 80 PN 40 with ext. 100 mm                                          | 0,5                                    |
| FN Flange DN 1" 300 lbs acc. to ANSI B 16.5,<br>seal surface RF                 | 1,8                                    |
| FO Flange DN 2" 600 lbs acc. to ANSI B 16.5,<br>seal surface RF                 | 2,0                                    |

- by cooling elements,  
dependent on diaphragm-ø                      0,1 ... 1,5 mbar/10 K
- by 1 m capillary line  
dependent on diaphragm-ø                      0,1 ... 15 mbar/10 K

## 1.4 Approvals and certificates

### Approvals

Ex Zone 2  
 StEx Zone 10  
 Ship approval  
 CENELEC EEx ia IIC  
 ATEX II 1G EEx ia IIC and WHG  
 ATEX II 1G EEx ia IIC and ship approval

If for certain applications the use of approved instruments is required, the appropriate legal documents (test reports, test certificates and conformity certificates) have to be noted. These are supplied with the appropriate instrument.

### CE-conformity

VEGABAR 21 corresponds to the requirements of EMC (89/336/EWG) and NSR (73/23/EWG). The conformity has been judged acc. to the following standards:

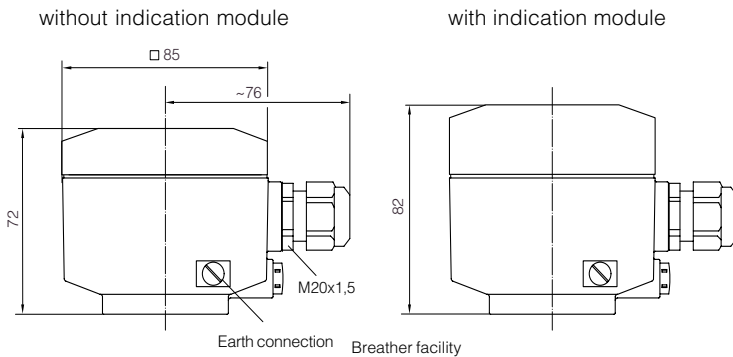
|     |                |                     |
|-----|----------------|---------------------|
| EMC | Emission       | EN 50 081 - 1: 1992 |
|     | Susceptibility | EN 50 082 - 2: 1995 |
| NSR |                | EN 61 010 - 1: 1993 |

### NAMUR-regulations

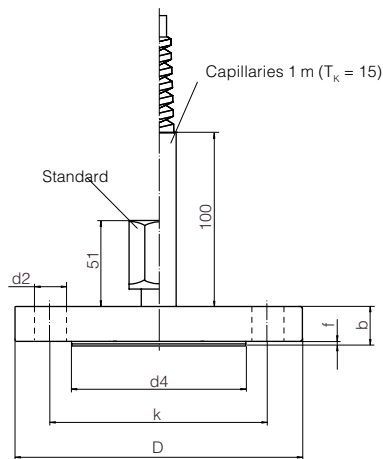
The NAMUR-regulations NE 21, May 1993 are met.

## 1.5 Dimensions

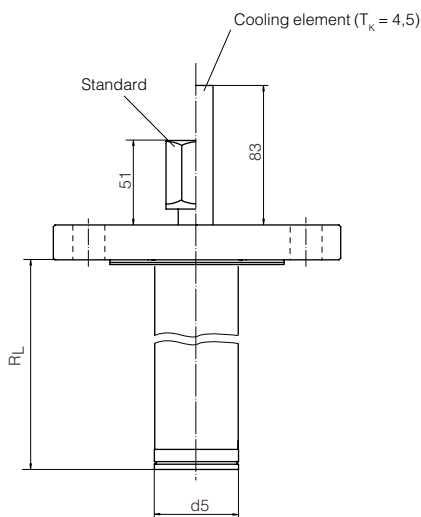
### Housings



## Process connections



**FA, FB, FC  
FH  
FN, FO**



**FE, FG, FK**

- D = outer flange diameter  
 b = flange thickness  
 k = diameter of hole circle  
 d<sub>2</sub> = diameter of holes  
 d<sub>4</sub> = seal ledge diameter  
 d<sub>5</sub> = extension diameter  
 f = seal ledge strength  
 R<sub>L</sub> = extension length  
 d<sub>M</sub> = diaphragm diameter

**Flange connection acc. to DIN 2501, seal ledge acc. to DIN 2526 form D**

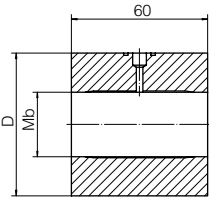
| Order code | Flange Size   | D   | b  | Holes k | No. | d <sub>2</sub> | Seal ledge d <sub>4</sub> | f | Extension R <sub>L</sub> | d <sub>5</sub> | d <sub>M</sub> |
|------------|---------------|-----|----|---------|-----|----------------|---------------------------|---|--------------------------|----------------|----------------|
| FA         | DN 25 / PN 40 | 115 | 22 | 85      | 4   | 14             | 68                        | 2 | —                        | —              | —              |
| FB         | DN 40 / PN 40 | 150 | 18 | 110     | 4   | 18             | 88                        | 3 | —                        | —              | —              |
| FC         | DN 50 / PN 40 | 165 | 20 | 125     | 4   | 18             | 102                       | 3 | —                        | —              | —              |
| FE         | —             | —   | —  | —       | —   | —              | —                         | — | 100                      | 48,3           | 47             |
| FG         | —             | —   | —  | —       | —   | —              | —                         | — | 200                      | 48,3           | 47             |
| FH         | DN 80 / PN 40 | 200 | 24 | 160     | 8   | 18             | 138                       | 3 | —                        | —              | —              |
| FK         | —             | —   | —  | —       | —   | —              | —                         | — | 100                      | 76             | 72             |

**Flange connection acc. to ANSI B 16.5, seal ledge RF**

|    |                 |     |    |     |   |    |    |     |  |  |  |
|----|-----------------|-----|----|-----|---|----|----|-----|--|--|--|
| FN | DN 1" / 300 lbs | 125 | 22 | 89  | 4 | 20 | 51 | 2   |  |  |  |
| FO | DN 2" / 600 lbs | 165 | 32 | 127 | 8 | 20 | 92 | 6,4 |  |  |  |

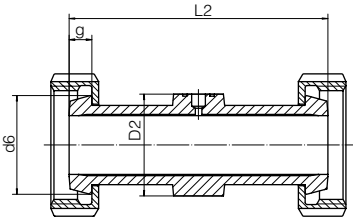
Tube isolating diaphragms for mounting  
between flanges with connection acc. to  
DIN 2501

| Order<br>code | DN | PN        | D  | Mb   |
|---------------|----|-----------|----|------|
| RC            | 50 | 6 ... 400 | 95 | 54,5 |



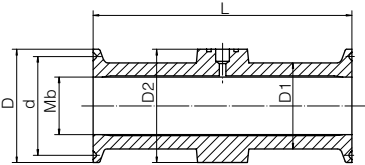
Tube isolating diaphragms with connection acc.  
to DIN 11 851

| Order<br>code | DN | PN | G1       | L2  | D2 | d6   | g  | m  |
|---------------|----|----|----------|-----|----|------|----|----|
| RF            | 50 | 25 | Rd78x1/6 | 156 | 70 | 68,5 | 11 | 18 |



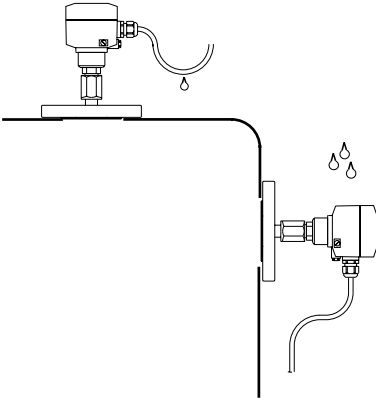
Tube isolating diaphragms with Clamp-  
connection

| Order<br>code | DN | PN | L   | D  | d    | D1 | D2 | Mb |
|---------------|----|----|-----|----|------|----|----|----|
| RH            | 2" | 40 | 156 | 64 | 56,3 | 56 | 75 | 48 |



## 2 Mounting

VEGABAR can be mounted in any position. The cable entries have to point downwards to avoid humidity ingress. For this purpose the housing can be rotated by 330° against the mounting part.



For mounting, a seal must be used corresponding to the connection. This seal is either supplied with VEGABAR or must be provided by the customer.

### Compensation of the atmospheric pressure

The atmospheric pressure of instruments used for overpressure measurements is compensated via a breather facility integrated in the housing.

## 3 Electrical connection

### 3.1 Connection information

The electronics in VEGABAR 21 requires a power supply of 12 ... 36 V DC. It is provided in two-wire technology, i.e. supply voltage and current signal are led to the terminals via the same two-wire connection cable.

This external energy is provided via a separate power supply unit:

- power supply unit, e.g. VEGASTAB 690
- processing unit with integral DC-current source (e.g. active DCS-input)
- VEGAMET or VEGADIS 371

Observe that the external energy source is reliably separated from the mains circuits acc. to DIN VDE 0106, part 101. The above mentioned VEGA-instruments meet this requirement and protection class III is therefore ensured.

The external energy source must supply a terminal voltage of at least 12 V to the transmitter. The actual terminal voltage on the transmitter depends on the following factors:

- output voltage of the external energy source under nominal load.
- Electrical resistors of the connected instruments in the circuit (see connected instruments, load resistor).

Note the following instructions for electrical connection:

- The connection must be made acc. to the specific installation standards (e.g. in Germany according to the VDE-regulations).
- The terminal voltage must not exceed 36 V to avoid damage of the electronics.
- The electrical connection is provided with a reverse polarity protection.
- The wiring between VEGABAR and power supply can be made with standard two-wire cable.

- If strong electromagnetic interferences have to be expected, screened cable is recommended. The screening should be earthed at one side of the sensor.
- If overvoltages are expected, we recommend the installation of VEGA-overvoltage arresters.
- In the PG a seal must be used which fits to the cable.

## 3.2 Connection plan

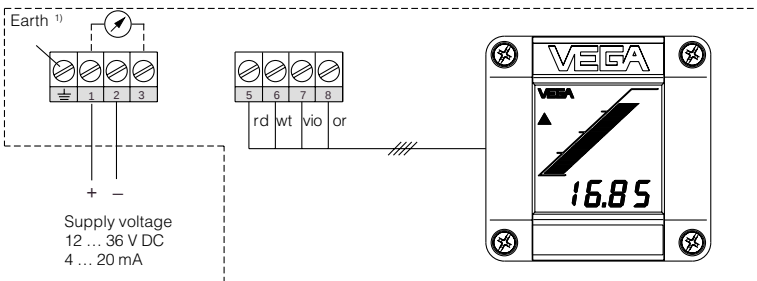
### Note:

A current meter for local control of the output current can be connected to terminals 1 and 3. This measurement can be made during operation without interrupting the supply line.

## VEGABAR

### VEGABAR (with or without indication)

Current meter for local control



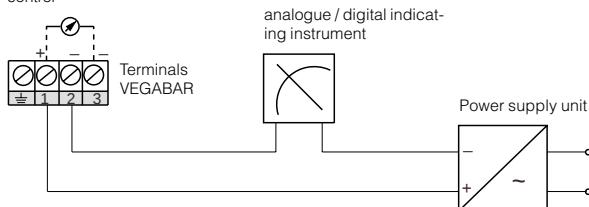
<sup>1)</sup> If screened cable is used, the screen must be connected in the terminal box on one side to earth and the earth terminal must be earthed outside on the housing according to the prescription. Both terminals are connected in the housing.

### 3.3 Connection examples

#### Supply via power supply unit

The processing is made by an indicating instrument.

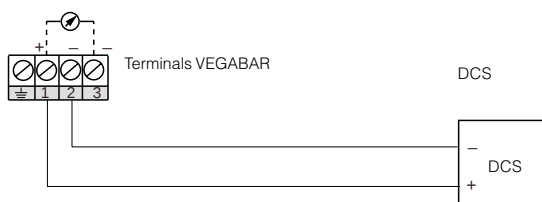
Current meter for local control



#### Supply via a DCS with active input circuit

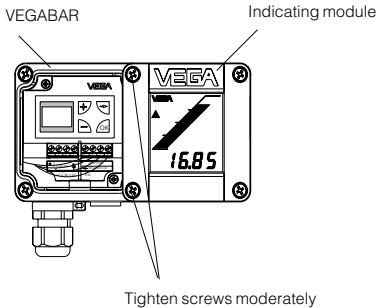
The processing is made via a DCS with active input circuit.

Current meter for local control



## 4 Set-up

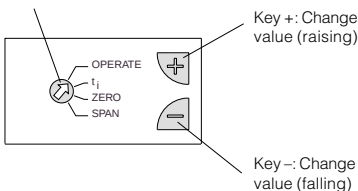
The electrical connection as well as the set-up can be facilitated by mounting the cover or indicating module short-term laterally or displaced to the bottom on VEGABAR.



### 4.1 Adjustment of the basic functions

#### Adjustment elements

Rotating switch: Choose the requested function



#### Adjustment system

- Select the requested function with the rotating switch.
- Change the value with keys "+" and "-".
- Reset rotating switch to OPERATE, the adjusted values are transferred to the EEPROM-memory. They remain there even in case of voltage loss.

### Adjustment

For adjustment of zero and span, a current meter must be connected to terminals 1 and 3. The measured value is identical with the output current.

#### 1 Adjustment of zero

(e.g. process pressure zero or empty vessel)

- Set rotating switch to zero
- By pushing the "+" and "-" keys simultaneously, the current jumps directly to 4 mA or adjusting by pushing the "+" and "-" keys a current of 4 mA

Adjustment range of zero:

-20 % ... +95 % of the nominal measuring range

#### 2 Adjustment of span

(e.g. process pressure or vessel level maximum)

- Set rotating switch to span
- By pushing the "+" and "-" keys simultaneously, the current jumps directly to 20 mA or adjusting by pushing the "+" and "-" keys a current of 20 mA

Adjustment range of span:

3,3 % ... 120 % of the nominal measuring range

#### Note:

- A modification of zero does not influence the span.
- It is also possible to adjust currents for part fillings or part pressures, e.g. 8 mA for 25 % and 16 mA for 75 %. VEGABAR calculates automatically the current values for 0 % or 100 % (only possible with  $\geq 3,3$  %).

## Integration time

An integration time  $t_i$  of 0 ... 10 s can be adjusted for damping of pressure shocks.

### Procedure

- Set rotating switch to  $t_i$
- By pushing the “-“-key 10-times, ensure first of all that the integration time is set to 0 s
- For every 1 s requested integration time, push the “+“-key once

The integration time is the time required by the current output signal to reach 90 % of the actual level after a step change of the process pressure.

## 4.2 Menu-guided adjustment with additional functions

The adjustment with the multiple function module is menu orientated and is made via the four keys in conjunction with the clear text indication. The jump from the measured value indication to the main menu is made with the “OK“-key. Use the “→“-key to change from one menu point to the other within the menu.

### Branching

A branching is indicated with the symbol ▼ and enables a jump to the below menu with the “OK“-key. In this menu you can find parameters which are linked (possibly in other submenus).

Parameters have no ▲ or ▼ symbol. The value of the parameters can be modified with the “+“ and “-“-keys or chosen from the list. When these buttons are pushed once, the value flashes first. When pushing again, the value is modified. The modified value can be saved with the “OK“-key. Push the “→“-key to interrupt the input (without storing the modification).

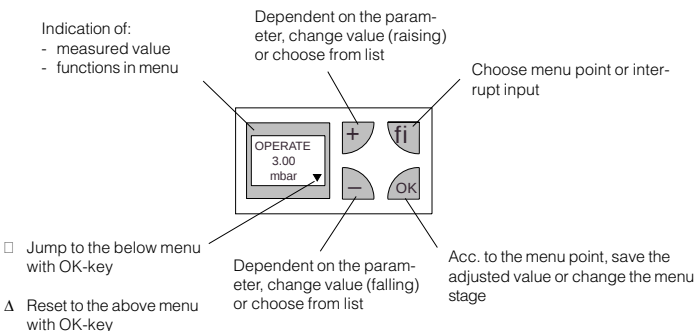
Certain parameters can only be indicated and their values cannot be modified.

### Reset

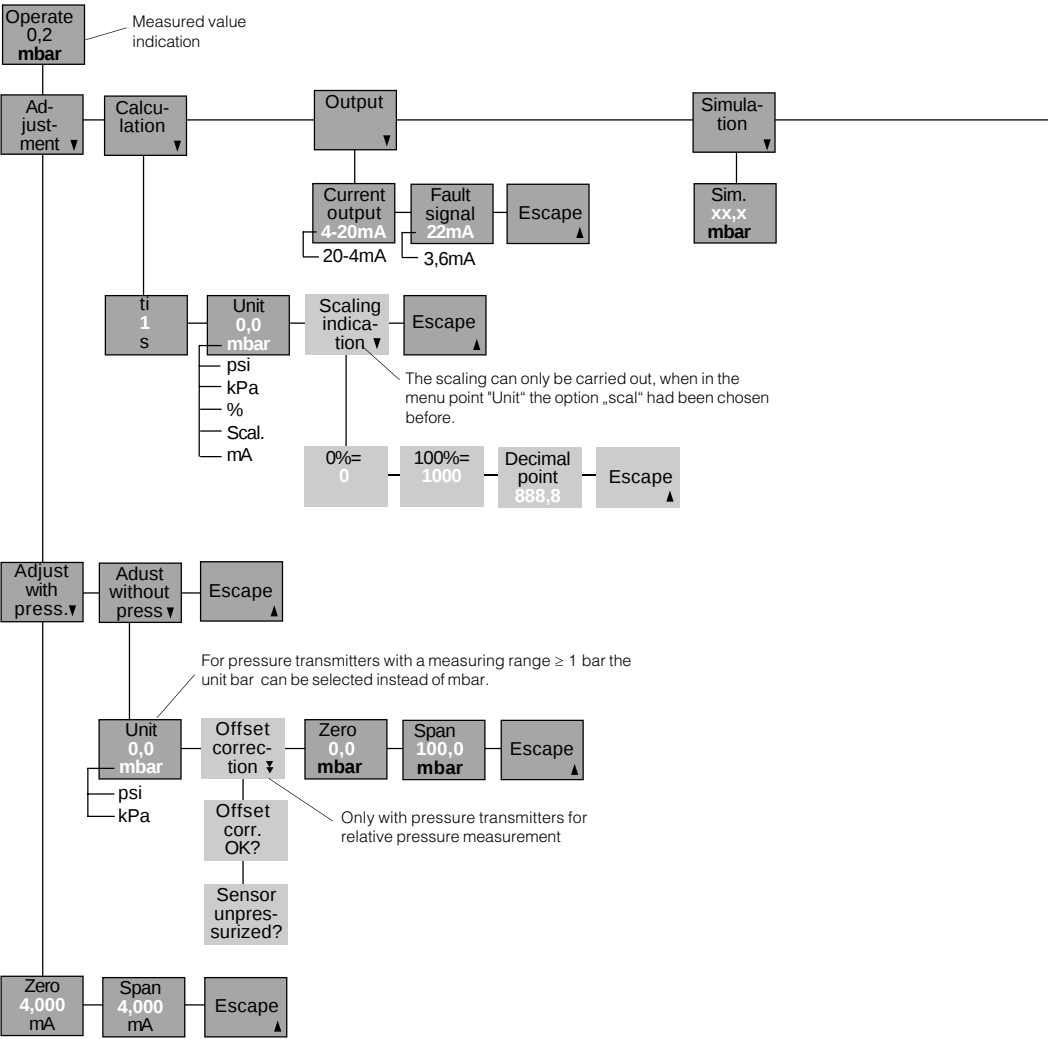
A reset is marked with the symbol ▲ and enables with the “OK“-key a jump to the above menu.

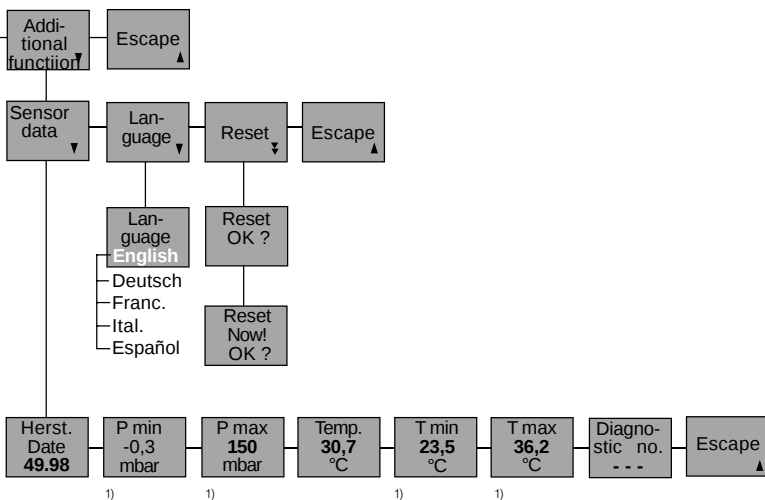
Automatic reset to measured value indication is triggered 60 minutes after having pushed a key for the last time.

## Adjustment elements



Menu plan

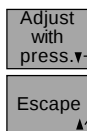




- <sup>1)</sup> By pushing the "+" and "-" keys simultaneously, the min. and max. values can be reset to the actual value.



Use the arrow key, to move in the menu plan to the right.

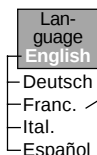


In menu points with these symbols you can move with the "OK"-key to the bottom or top.



In white letters you see the parameters which can be modified with the "+" or "-" key and saved with the "OK"-key.

The sensor and measured value information which cannot be modified in these positions are in italic print.



List  
These options can be chosen with the "+" or "-" key and saved with the "OK"-key.

## Adjustment by considering the actual pressure (life-adjustment)

The life-adjustment comprises two steps:

- 1 Adjustment of zero
- 2 Adjustment of span

The appropriate output current is displayed via the DOT-matrix.

### 1 Adjustment of zero

(e.g. process pressure zero or vessel empty)

**Zero 4,000 mA** Set with the "+" or "-" -key the current value to 4,000 mA. Then push the "OK"-key.

### 2 Adjustment of span

(e.g. process pressure or vessel level max.)

**Span 20,000 mA** Set with the "+" or "-" -key the current value to 20,000 mA. Then push the "OK"-key.

### Note:

- A modification of zero does not influence the adjusted span.
- For standard adjustment of zero/span "+" and "-" are pushed simultaneously. The value jumps directly to 4 mA/20 mA.
- In case of a high turn down generally the "+" and "-" -key should be pushed simultaneously due to the resolution.
- When pushing the "+" or "-" -keys individually, the output current remains at the last value, only after storing with the "OK"-key it takes the adjusted value.
- It is also possible to adjust currents for part fillings or part pressures, e.g. 8 mA for 25 % and 16 mA for 75 %. Then VEGABAR calculates automatically the current values for 0 % or 100 % (only possible with >3,3 %).

## Adjustment without considering the actual pressure (dry adjustment)

The adjustment without pressure comprises four steps:

- 1 Enquiry of the unit in which the adjustment should be carried out
- 2 Offset correction
- 3 Adjustment of zero
- 4 Adjustment of span

The offset correction (only with overpressure) defines the reference basis for the measurement. It can be carried out:

- before or after the adjustment of zero and span
- before or after installation of VEGABAR.

VEGABAR must be unpressurised when the offset correction is carried out!

The adjustment without pressure can be carried out assembled or unassembled (e.g. workroom). An actually available pressure has no meaning for the adjustment.

### 1 Enquiry of the unit

**Adjust without press.** Choose with the "+" or "-" -key the unit. Save the selected unit with the "OK"-key.

**Unit 0,0 mbar**

psi

kPa

### 2 Adjustment of zero

**Zero 0,0 mbar** Adjust zero with the "+" or "-" -key and save with the "OK"-key.

### 4 Adjustment of span

**Span 100,0 mbar** Adjust span with the "+" or "-" -key and save with the "OK"-key.

**Note:**

- A modification of zero does not influence the adjusted span.
- By pushing the "+" and "-" keys the output current remains on the last value, after saving with the "OK"-key, the output current takes the adjusted value.

**Processing****Adjustment of the integration time**

**ti**  
1  
s

For damping of pressure shocks an integration time  $t_i$  of 0 s ... 10 s can be adjusted with the "+" or "-" key. With the "OK"-key the adjusted value can be saved.

**Selection of the unit**

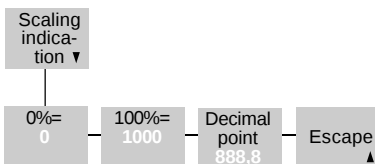
**Unit**  
0,0  
mbar

psi  
kPa  
%  
scal.  
mA

In the measured value indication the actually measured pressure is displayed on the DOT-matrix. The appropriate unit can be chosen out of a list with the "+" or "-" key and the "OK"-key. When choosing the unit "Scal." the following menu points are available.

**Scaling**

In operating condition the actually measured pressure is displayed on the indicating module as 4-digit digital value.



The bar graph relates to the adjusted measuring range and change proportionally to the current output. Digital values < -10 % or > 110 % are displayed as flashing figure.

By scaling user specific figures as 4-digit digital values are coordinated on the indicating module to the values 4 mA or 20 mA of the current output.

**Outputs****Current output/Selection of the characteristics**

The current output provides the actually measured pressure as analogue current signal 4 ... 20 mA relating to the adjustment.

**Current output**  
4-20mA  
20-4mA

The characteristics can also be inverted, i.e. adjusted to 20 ... 4 mA with the "+" or "-" key and the "OK"-key.

**Fault signal**

If during the continuous self-monitoring failures, damages or interferences in the measuring cell or the electronics are detected, the fault signal is triggered via the current output.

**Fault signal**  
22mA  
3,6mA

With the "+" or "-" key and the "OK"-key you choose if the failure current should be 22 mA or 3,6 mA.

**Simulation**

**Simulation**  
▼

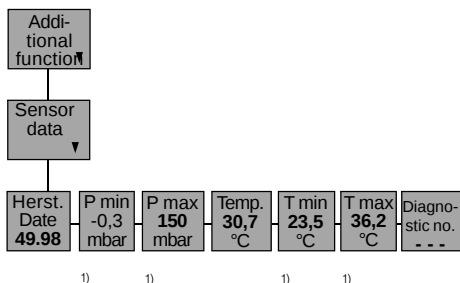
**Sim.**  
xx,x  
mbar

To check the outputs of VEGABAR and connected components, you can adjust with the "+" or "-" key an individual pressure or %-value. The adjusted value flashes with activated simulation. With the "OK"-key the simulation can be finished.

## Additional functions

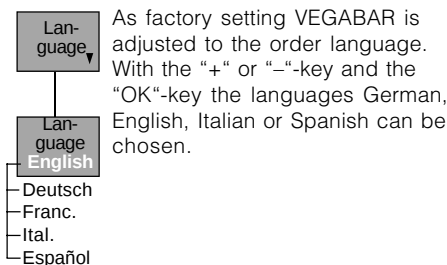
Important sensor data can be indicated via DOT-matrix for information and diagnosis purposes:

- manufacturing date
- pointer function ( $p_{\min}$ )
- pointer function ( $p_{\max}$ )
- actual temperature value (Temp)
- pointer function ( $T_{\min}$ )
- pointer function ( $T_{\max}$ )
- diagnosis number



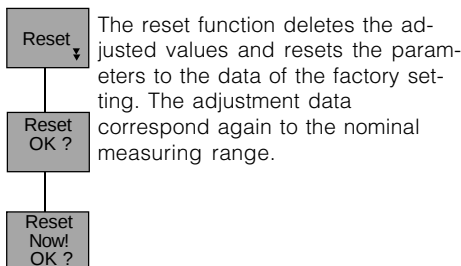
1) The min. and max.-values can be set to the actual value by pushing the "+" and "-" keys simultaneously.

## Language



As factory setting VEGABAR is adjusted to the order language. With the "+" or "-" key and the "OK"-key the languages German, English, Italian or Spanish can be chosen.

## Reset



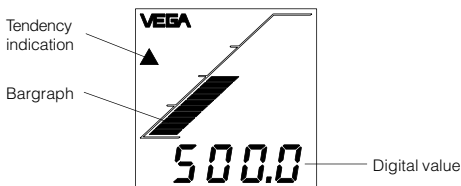
The reset function deletes the adjusted values and resets the parameters to the data of the factory setting. The adjustment data correspond again to the nominal measuring range.

## 4.5 Indicating module

Digital value

- 4 digits and decimal point
- with single range and basic function module fixed indication range in bar
- the multiple function module can be individually scaled.

The connection is made acc. to the scheme in section "Electrical connection".



## 5 Diagnosis

### 5.1 Maintenance

VEGABAR process pressure transmitters are maintenance free.

### 5.2 Failure removal

#### Fault signals

With selftest and continuous self-monitoring VEGABAR offers high reliability. If however interferences occur, the diagnosis of VEGABAR distinguishes between atypical process conditions and faults in the VEGABAR.

#### Atypical process conditions

Exceeding or decreasing of the measuring range limits (fault signal extinguishes when the value is again in the measuring range).

#### Failure in VEGABAR

Failure in the electronics, interferences or damages in the measuring cell.

The below table assists in the processing of fault signals.

| Reason                                               | Fault signal via         |                                                                        | Current output                         |
|------------------------------------------------------|--------------------------|------------------------------------------------------------------------|----------------------------------------|
|                                                      | DOT-matrix               | Bargraph<br>Digital indication                                         |                                        |
| Clear decreasing or exceeding of the measuring range | "OPERATE<br>????<br>bar" | Bargraph 0 % or 100 %<br>Digital value flashes                         | Current value<br>3,6 mA<br>or<br>22 mA |
| Overload range of the measuring cell                 |                          | Bargraph 0 % or 100 %, digital value: four flashing segments "- - - -" |                                        |
| Failure in VEGABAR                                   |                          | all segments flash                                                     |                                        |

On instruments with menu-guided adjustment with additional functions, possible reasons are displayed in the menu point "Diagnosis no." in case of failure.

| Diagnosis no. | Meaning                                                              |
|---------------|----------------------------------------------------------------------|
| 1             | No frequency from C/f-converter                                      |
| 2             | Frequency signal of the capacitor outside the limit values           |
| 3             | Frequency signal of the reference capacitor outside the limit values |
| 4             | Frequency signal temperature outside the limit values                |
| 7             | Communication to EEPROM interfered                                   |
| 9             | Error in CRC-check sum EEPROM                                        |

#### Fault finding

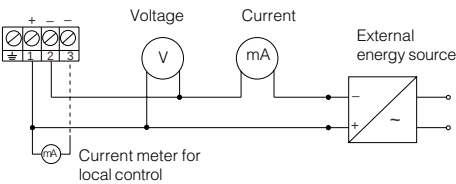
If the indicated value does not correspond to the level in the vessel or to the process pressure, the following measures have to be carried out:

- check the pressure compensation (only with overpressure measuring ranges)
- check the electrical connection.

#### Checking pressure compensation

Open the housing of VEGABAR. The measured value should not change. However if the indicated value changes, compensation of the atmospheric pressure is not ensured and the measured value will be affected. Check the breather facility on the VEGABAR-housing.

Checking the electrical components



Voltage

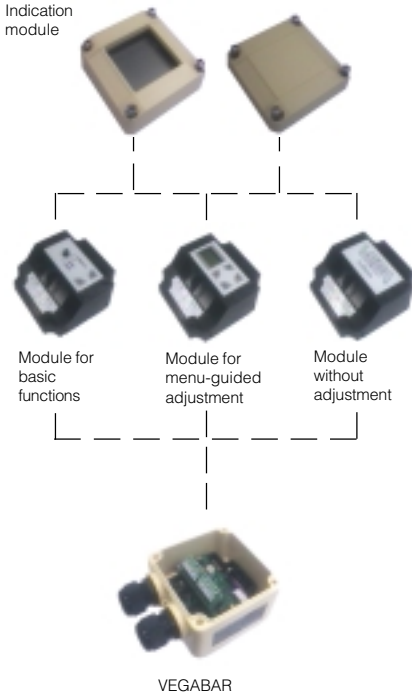
- the terminal voltage on VEGABAR must be at least 12 V DC

Current

| Current value   | Condition                                                                      |
|-----------------|--------------------------------------------------------------------------------|
| 3,8 ... 20,5 mA | standard range for output current                                              |
| 0 mA            | signal line open circuit                                                       |
| 3,6 mA          | oscillator or pressure sensor element defect                                   |
| 22 mA           | short-circuit in the signal line, oscillator or pressure sensor element defect |

## 6 Instrument modification

### 6.1 Interchanging adjustment modules



The modular construction of VEGABAR enables to retrofit, interchange or remove adjustment modules and the indicating module. A retrofitting can be e.g. necessary when a VEGABAR with factory setting should be adapted to modified measurement conditions. Already saved data (e.g. adjustment values) are not saved in the adjustment module but in an EEPROM of the oscillator and a new adjustment is therefore not necessary.

The connection of the modules is made:

- on the adjustment module via a 4-pole plug connection
- on the indicating module via screw terminals.

### Exchange of the adjustment module

#### Removal of the adjustment module

- 1 Separate VEGABAR from the power supply
- 2 Loosen the screws on the cover of VEGABAR or VEGADIS 10
- 3 Loosen connection line from the terminals
- 4 Loosen screws of the adjustment cover
- 5 Remove adjustment cover and plug connection

#### Insertion of an adjustment module

- 6 Plug the connection of the new adjustment cover to the plug-in socket of the oscillator
- 7 Fasten new adjustment cover
- 8 Fasten connection lines to terminals
- 9 Close cover of VEGABAR or VEGADIS 10
- 10 Connect VEGABAR to power supply

### Retrofitting of an indicating module

- 1 Separate VEGABAR from power supply
- 2 Loosen screws on cover of VEGABAR or VEGADIS 10
- 3 Remove cover
- 4 Connect indicating module via the four lines to the screw terminals (note "3.2 Connection plan")

#### Note:

Step 4 is facilitated when the indicating module is temporarily (carefully) mounted with two screws.

- 5 Place indicating module in the correct position on VEGABAR or VEGADIS 10
- 6 Tighten screws of the cover
- 7 Connect VEGABAR to power supply

## 7 Measurement with isolating systems

### Application limits

Isolating systems extend the temperature and product application range of pressure transmitters considerably. Therefore check in addition that the complete measurement loop suits the temperature. If due to the temperature conditions, a high ambient temperature can be caused on the instrument, the use of a cooling element or a capillary will be necessary.

The max. permissible gauge pressure on the separating diaphragm should not exceed a value of -500 mbar. Should higher low pressure values be expected, please contact us respectively.

### Error treatment

The influence of an isolating system is directly determined by the temperature of the isolating liquid in front of the measuring cell. The temperature coefficient  $T_k$  (see „1.5 Technical data“) is valid for silicone oil. It reduces with water-glycerine to 50 % of the values.

The total temperature error results in the sum of  $T_{k_{\text{Pressure transmitter}}}$  and  $T_{k_{\text{Isolating diaphragm}}}$ :

$$T_{k_{\text{tot}}} = T_{k_{\text{Isolating diaphragm}}} + T_{k_{\text{Pressure transmitter}}}$$

Example:

You use an isolating system with a  $T_k$  of 2,7 mbar/10 K (acc. to „1.5 Technical data“).

Your pressure transmitter has a measuring range of 0 ... 1 bar and a  $T_k$  of 0,05 %/10 K (acc. to technical data). This corresponds to a  $T_k$  of 0,5 mbar/10 K.

$$\begin{aligned} T_{k_{\text{total}}} &= \\ &= 2,7 \text{ mbar/10 K} + 0,5 \text{ mbar/10 K} \\ &= 3,2 \text{ mbar/10 K} \end{aligned}$$

We recommend the use of a process pressure transmitter with the max. available accuracy level to keep the total error within the limits.





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Technical data subject to alteration.