

Process pressure measurement

Process pressure

VEGABAR 42



Product Information

VEGA

Contents

| | | |
|----------|---|-----------|
| 1 | Description of the measuring principle | 3 |
| 2 | Type overview | 4 |
| 3 | Mounting information | 5 |
| 4 | Electrical connection | |
| 4.1 | General requirements | 6 |
| 4.2 | Voltage supply | 6 |
| 4.3 | Connection cable | 6 |
| 4.4 | Cable screening and grounding | 6 |
| 4.5 | Wiring plans | 6 |
| 5 | Adjustment | |
| 5.1 | Overview | 7 |
| 5.2 | Adjustment with the integrated insert | 7 |
| 5.3 | Adjustment with PACTware™ | 7 |
| 6 | Technical data | 8 |
| 7 | Dimensions | 10 |
| 8 | Product code | 11 |

Take note of safety instructions for Ex applications



With Ex applications, please note the Ex-specific safety information on our homepage www.vega.com/services/downloads and in the documentation that comes with every instrument. In hazardous areas you should take note of the appropriate regulations, conformity and type approval certificates of the sensors and power supply units. The sensors must only be operated on intrinsically safe circuits. The permissible electrical values are stated in the certificate.

1 Description of the measuring principle

Measuring principle

The sensor element of VEGABAR 42 is the dry ceramic-capacitive CERTEC[®] measuring cell. Base element and diaphragm consist of high purity sapphire-ceramic[®].

The process pressure causes via the diaphragm a change in an elec. parameter of the measuring cell. This change is converted into an appropriate output signal.

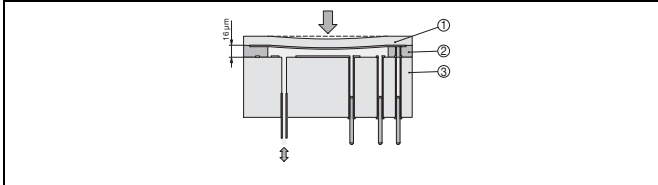


Fig. 1: Configuration of the CERTEC[®] measuring cell in VEGABAR 42

- 1 Diaphragm
- 2 Soldered glass bond
- 3 Base element

The advantages of the CERTEC[®] measuring cell are:

- Very high overload resistance
- No hysteresis
- Excellent long-term stability
- Completely front flush installation
- Good corrosion resistance
- Very high abrasion resistance

Wide application range

(Abbildung Messprinzip Radar)

VEGABAR 42 pressure transmitters are designed for process pressure measurement of gases, vapours and liquids.

VEGABAR 42 is suitable for applications with average requirements and 4 ... 20 mA/HART signal output. The sensor offers zero/span adjustment, housing with terminal connection, optional display and adjustment option via PACTware[™] and PC.

2 Type overview

VEGABAR 42



| | |
|-------------------------------|---|
| Measuring cell: | CERTEC® |
| Diaphragm: | Ceramic |
| Products: | Gases, vapours and liquids |
| Process fitting: | G½ A or M20x1.5 acc. to EN 837, G½ A inner G¼ A, ½ NPT inner ¼ NPT |
| Material: | 316Ti |
| Measuring range: | -1 ... 0.6 bar up to 0 ... 60 bar (-14.5 ... 8.7 psi up to 0 ... 870 psi) |
| Process temperature: | -40 ... +100 °C (-40 ... +212 °F) |
| Deviation in characteristics: | <0.2 % |
| Signal output: | 4 ... 20 mA/HART |
| Connection: | Housing with terminal |
| Adjustment/Indication: | zero-span/yes |

3 Mounting information

Installation position

VEGABAR functions in any installation position. Depending on the measuring system, the installation position can influence the measurement. This can be compensated by a position correction.

The instruments with manometer connection acc. to EN 837 are mounted acc. to the directives for manometers (DIN EN 839-2).



Information:

We recommend using lock fittings, measuring instrument holders and siphons from the line of VEGA accessories.

4 Electrical connection

4.1 General requirements

The supply voltage range can differ depending on the instrument version. The exact range is stated in the "Technical data".

Take note of country-specific installation standards (e.g. the VDE regulations in Germany) as well as prevailing safety regulations and accident prevention rules.



In hazardous areas you should take note of the appropriate regulations, conformity and type approval certificates of the sensors and power supply units.

4.2 Voltage supply

Power supply and current signal are carried over the same two-wire connection cable. The requirements on the power supply are stated in the Technical data of this Product Information manual.

The VEGA power supply units VEGATRENN 149AEx, VEGAS-TAB 690, VEGADIS 371 as well as the VEGAMET signal conditioning instruments are suitable for power supply. When one of these instruments is used, a reliable separation of the supply circuit from the mains circuits acc. to DIN VDE 0106 part 101 and the protection class is ensured.

4.3 Connection cable

General

The sensors are connected with standard two-wire cable without screen. An outer cable diameter of 5 ... 9 mm ensures the seal effect of the cable entry.

If electromagnetic interference is expected, screened cable should be used for the signal lines.

Ex applications



In Ex applications, the corresponding installation regulations must be noted for the connection cable.

4.4 Cable screening and grounding

The cable screen must be connected on both ends to ground potential.

If potential equalisation currents are expected, the connection on the evaluation side must be provided via a ceramic capacitor (e.g. 1 nF, 1500 V).

4.5 Wiring plans

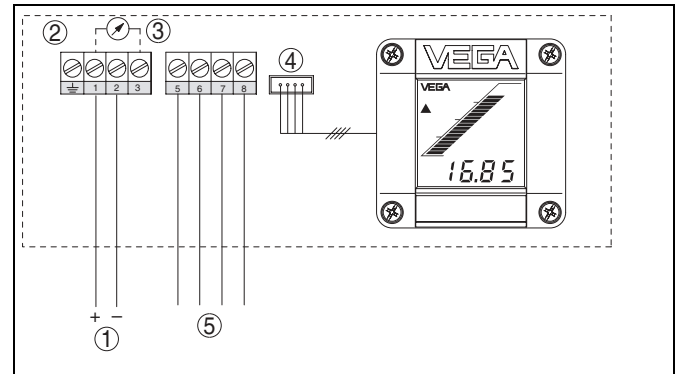


Fig. 2: Wiring plan VEGABAR

- 1 To power supply or processing system
- 2 Ground connection¹⁾
- 3 Current meter for local control
- 4 Plug connection to the housing cover with display
- 5 To VEGADIS 10

¹⁾ Connect screened cable, here. Connect ground terminal outside on the housing as prescribed. The two terminals are galvanically connected.

5 Adjustment

5.1 Overview

4 ... 20 mA/HART

VEGABAR 42 - 4 ... 20 mA/HART can be adjusted with the following adjustment media:

- Integrated adjustment insert
- Adjustment software acc. to FDT/DTM standard, e.g. PACTware™ and PC
- a HART handheld

4 ... 20 mA

VEGABAR 42 - 4 ... 20 mA can be adjusted with the following adjustment media:

- Integrated adjustment insert.

5.2 Adjustment with the integrated insert

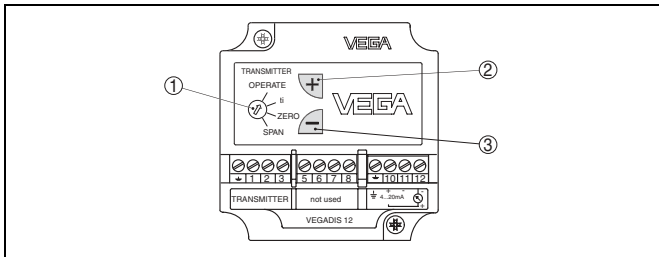


Fig. 3: Adjustment elements with VEGABAR 42

- 1 Rotary switch: choose the requested function
- 2 [+] key change value
- 3 [-] key change value

5.3 Adjustment with PACTware™

PACTware™/DTM

VEGABAR 42 - 4 ... 20 mA/HART is adjusted via the signal cable by means of PACTware™.

An instrument driver for the respective VEGABAR is necessary for the adjustment with PACTware™.

All currently available VEGA DTMs are provided in a DTM Collection with the current PACTware™ version on CD. They are available from the responsible VEGA agency for a token fee. The basic version of this DTM Collection incl. PACTware™ is available as a free-of-charge download from the Internet.

To use the entire range of functions of the DTM incl. project documentation, a DTM licence is required for the particular instrument family, e.g. VEGABAR. This licence can be bought from the responsible VEGA agency.

Connecting the PC to the signal cable

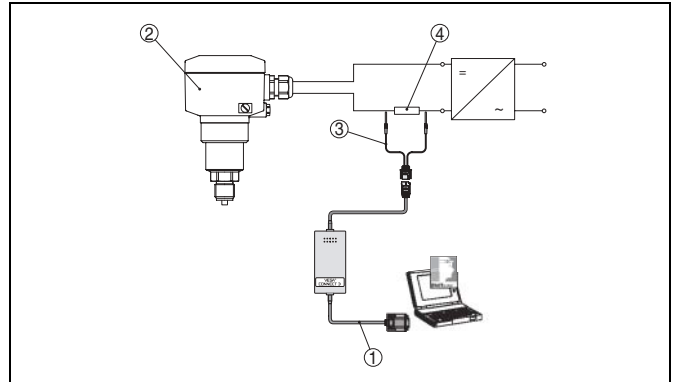


Fig. 4: Connecting the PC to the signal cable

- 1 RS232 connection
- 2 VEGABAR
- 3 HART adapter cable for VEGACONNECT 3
- 4 HART resistance 250 Ohm

To adjust with PACTware™, a VEGACONNECT 3 with I²C adapter cable (art. no. 2.27323) as well as a power supply unit and a HART resistor with approx. 250 Ohm is required in addition to the PC and the suitable VEGA DTM.



Note:

With power supply units with integrated HART resistance (internal resistance approx. 250 Ohm), an additional external resistance is not necessary (e.g. VEGA-TRENN 149A, VEGADIS 371, VEGAMET 381/624/625, VEGASCAN 693). In such cases, VEGACONNECT can be connected parallel to the 4 ... 20 mA cable.

6 Technical data

General data

| | |
|---|--|
| Materials, wetted parts | |
| – Process fitting | 316Ti |
| – Diaphragm | sapphire-ceramic® (99.9 % oxide ceramic Al ₂ O ₃) |
| – Process seal | Viton, Kalrez 6375, EPDM |
| Materials, non-wetted parts | |
| – Housing | plastic PBT (Polyester) |
| – Inspection window, display in housing cover | Lexan |
| – Ground terminal | 316Ti |
| Weight | approx. 0.8 kg (1.8 lbs) |

Output variable

| | |
|--------------------|---|
| Output signal | 4 ... 20 mA/HART |
| Resolution | 1.6 µA |
| Fault signal | Current output 22 mA or 3.6 mA (adjustable via PACTware™) |
| Current limitation | 22 mA |
| Load | see voltage diagram |
| – Integration time | 0 ... 10 s, adjustable via adjustment insert, 0 ... 999 s, adjustable via PACTware™ |

Input variable

| | |
|------------------|------------------|
| Parameter | Process pressure |
| Measuring ranges | see product code |

Reference conditions and influencing variables (similar to DIN EN 60770-1)

| | |
|---|--|
| Reference conditions acc. to DIN EN 61298-1 | |
| – Temperature | +18 ... +30 °C (+64 ... +86 °F) |
| – Relative humidity | 45 ... 75 % |
| – Atmospheric pressure | 860 ... 1060 mbar/86 ... 106 kPa (12.5 ... 15.4 psi) |
| Determination of characteristics | limit point adjustment acc. to DIN 16086 |
| Characteristics | Linear |
| Calibration position | upright, diaphragm points downward |
| Influence of the installation position | depending on the isolating diaphragm version |

Deviation in characteristics²⁾

| | |
|------------------------------|---------|
| Deviation in characteristics | |
| – Turn down 1:1 | <0.2 % |
| – Turn down 1:5 | <0.25 % |
| – Turn down 1:10 | <0.3 % |

Influence of the ambient temperature

| | |
|--|--------------|
| Average temperature coefficient of the zero signal ³⁾⁴⁾ | <0.15 %/10 K |
|--|--------------|

Long-term stability

| | |
|--|----------------|
| Long-term drift of the zero signal ⁵⁾⁶⁾ | <0.1 %/2 years |
|--|----------------|

Ambient conditions

| | |
|--|----------------------------------|
| Ambient, storage and transport temperature | |
| – without indicating module | -40 ... +85 °C (-40 ... +185 °F) |
| – with indicating module | -40 ... +70 °C (-40 ... +158 °F) |

²⁾ Relating to the nominal range, incl. hysteresis and repeatability, determined acc. to the limit point method.

³⁾ 0 ... +80 °C (+32 ... +176 °F), reference temperature +20 °C (+68 °F).

⁴⁾ Acc. to IEC 60770-1, relating to the nominal measuring range.

⁵⁾ Similar to DIN 16086, DINV 19259-1 and IEC 60770-1.

⁶⁾ Acc. to IEC 60770-1, relating to the nominal measuring range.

Process conditions

| | |
|--|---|
| Product temperature with measuring cell seal | |
| – Viton | -20 ... +100 °C (-40 ... +212 °F) |
| – Kalrez 6375 | -10 ... +100 °C (+14 ... +212 °F) |
| – EPDM | -40 ... +100 °C (-40 ... +212 °F) |
| Vibration resistance | mechanical vibrations with 4 g and 5 ... 100 Hz ⁷⁾ |

Electromechanical data

| | |
|-------------|--|
| Cable gland | 1x M20x1.5 (cable- 5 ... 9 mm), 1x blind stopper M20x1.5 |
| Terminals | for wire cross-sections up to 2.5 mm ² |

Voltage supply

| | |
|-----------------------------|----------------|
| Supply voltage | 12 ... 36 V DC |
| Permissible residual ripple | $U_{ss} < 1$ V |
| Load | see diagram |

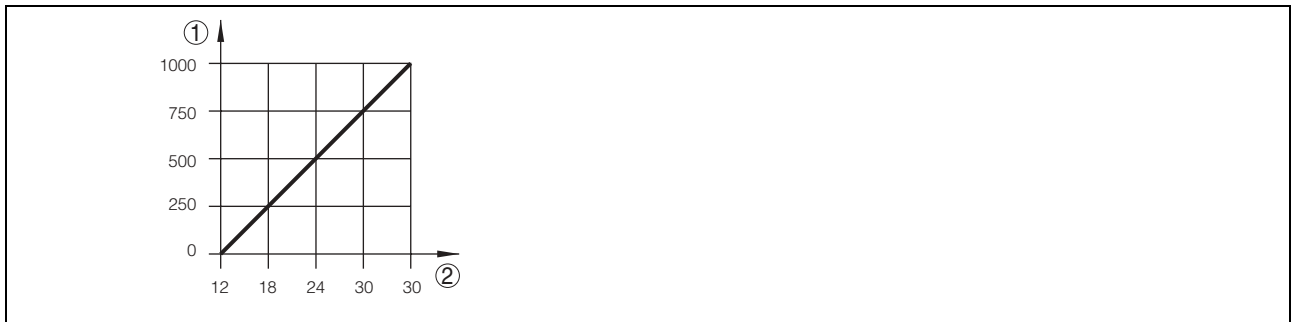


Fig. 5: Voltage diagram

- 1 Load R_{Ltotal} in Ohm
- 2 Voltage of the external energy U_E in Volt

Electrical protective measures

| | |
|----------------------|-------|
| Protection | IP 65 |
| Protection class | III |
| Overvoltage category | III |

Approvals⁸⁾⁹⁾

| | |
|----------------|--------------------------------|
| ATEX | ATEX II 1/2G, 2G EEx ia IIC T6 |
| Ship approvals | GL, LRS, ABS, CCS, RINA |
| Others | WHG |

CE conformity

| | |
|------------------|--------------------------|
| EMC (89/336/EWG) | |
| – Emission | EN 61326: 1997 (class B) |
| – Susceptibility | EN 61326: 1997/A1: 1998 |
| LVD (73/23/EWG) | EN 61010-1: 2001 |

Environmental instructions

| | |
|---|------------------------------------|
| VEGA environment management system ¹⁰⁾ | certified acc. to DIN EN ISO 14001 |
|---|------------------------------------|

⁷⁾ Tested acc. to the regulations of German Lloyd, GL directive 2
⁸⁾ Deviating data in Ex applications: see separate safety instructions.
⁹⁾ You can find detailed information under www.vega.com.
¹⁰⁾ You can find detailed information under www.vega.com.

7 Dimensions

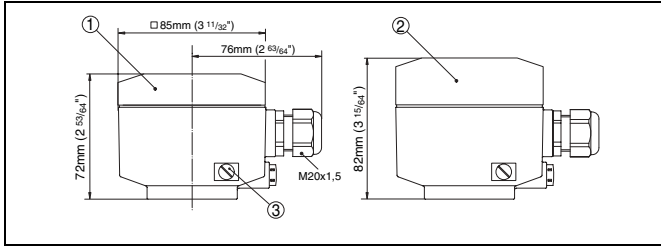


Fig. 6: Plastic housing

- 1 without indicating module
- 2 with indicating module
- 3 Ground connection

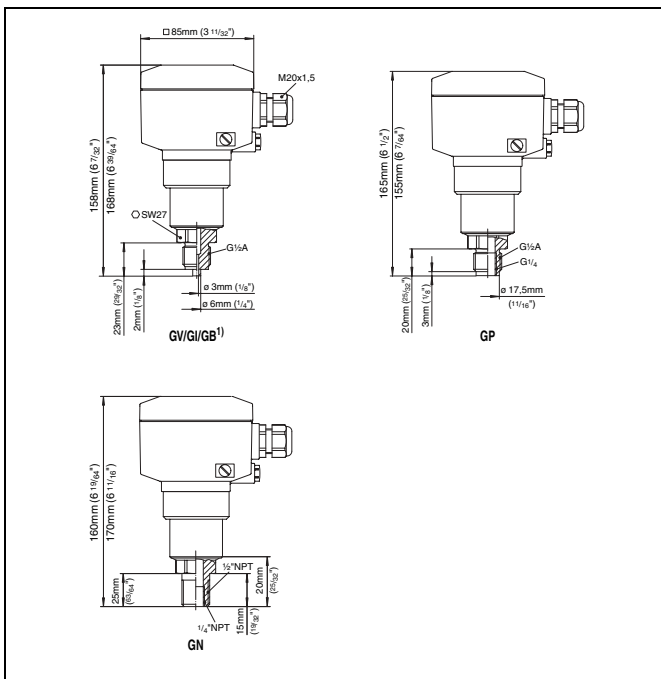


Fig. 7: VEGABAR 42

- 1 with GB: M20x1.5 instead of G1/2 A

8 Product code

VEGABAR 42

| | |
|---|--------------------------|
| Approval | |
| XX without | |
| XM Ship approval | |
| CX ATEX II 1G, 1/2G, 2G EEx ia IIC T6 | |
| CA ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + WHG | |
| CM ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + Ship approval | |
| Process connection / Material | |
| GV G $\frac{1}{2}$ A, manometer connection EN837 PN160 / 316L | |
| GP G $\frac{1}{2}$ A inner G $\frac{1}{4}$ A PN160 / 316L | |
| GN $\frac{1}{2}$ NPT inner $\frac{1}{4}$ NPT PN160 / 316L | |
| Seal measuring cell | |
| 1 Viton | |
| 2 Kalrez 6375 | |
| 3 EPDM | |
| Pressure / Measuring range | |
| A rel. / 0...0.1bar (0...10kPa) | |
| B rel. / 0...0.2bar (0...20kPa) | |
| C rel. / 0...0.4bar (0...40kPa) | |
| D rel. / 0...1.0bar (0...100kPa) | |
| E rel. / 0...2.5bar (0...250kPa) | |
| F rel. / 0...5.0bar (0...500kPa) | |
| G rel. / 0...10.0bar (0...1000kPa) | |
| H rel. / 0...25.0bar (0...2500kPa) | |
| U rel. / 0...60.0bar (0...6000kPa) | |
| K rel. / -0.05...0.05bar (-5...5kPa) | |
| L rel. / -0.1...0.1bar (-10...10kPa) | |
| M rel. / -0.2...0.2bar (-20...20kPa) | |
| O rel. / -0.5...0.5bar (-50...50kPa) | |
| P rel. / -1...0.0bar (-100...0kPa) | |
| Q rel. / -1...1.5bar (-100...150kPa) | |
| R rel. / -1...5.0bar (-100...500kPa) | |
| S rel. / -1...10.0bar (-100...1000kPa) | |
| T rel. / -1...25.0bar (-100...2500kPa) | |
| W rel. / -1...60.0bar (-100...6000kPa) | |
| 1 abs. / 0...1.0bar (0...100kPa) | |
| 2 abs. / 0...2.5bar (0...250kPa) | |
| 3 abs. / 0...5.0bar (0...500kPa) | |
| 4 abs. / 0...10.0bar (0...1000kPa) | |
| 5 abs. / 0...25.0bar (0...2500kPa) | |
| Electronic version | |
| Z 4...20mA | |
| H 4...20mA/HART® | |
| Indication | |
| X without | |
| A mounted | |
| BR42. | <input type="checkbox"/> |
| | <input type="checkbox"/> |
| | <input type="checkbox"/> |
| | <input type="checkbox"/> |
| | <input type="checkbox"/> |
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VEGA

VEGA Grieshaber KG
Am Hohenstein 113
77761 Schiltach
Germany
Phone +49 7836 50-0
Fax +49 7836 50-201
E-Mail: info@de.vega.com
www.vega.com



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